BURO HAPPOLD

Mayfield Pigeon Triangle

Geoenvironmental Desk Study Report

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Appendix B Topographical and Utility Survey

Appendix C Groundsure Report

Appendix D Preliminary UXO Risk Assessment

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Executive Summary

Background and objectives	This report presents the results of a Ground Engineering Desk Study for Pigeon Triangle, Manchester prepared by Buro Happold on behalf of Mayfield Partnership. The purpose of this desk study is to assess the geoenvironmental, geological, hydrological and hydrogeological conditions present at the Site that may result in potential contamination risks related to the proposed future use.
Proposed development	The proposed development comprises the creation of a public green space. There will be a mix of hard and soft landscaping with soft landscaped areas consisting of tree, shrub and herbaceous planting areas, crevice and cascade gardens and sunken rain gardens/swales. Hard landscape components are envisaged to comprise paving, stepping stones, concrete legato blocks, steel bar edging and log benches.
Site setting	The Site is located in Manchester City Centre to the immediate southeast of Manchester Piccadilly Railway Station, centred on National Grid Reference SJ 84930 97730. The Site covers some 0.064 ha and is currently occupied by a triangular parcel of land comprising: • an unused gravel covered area to the east with concrete legato bricks and wooden planters; • part of an asphalt covered carpark (Travis Street Carpark) to the west; and • Baring Street intersecting the east and west portions in a northwest to southeast direction with footpaths running along each side. The Site is bound to the north by Fairfield Street with Piccadilly Station beyond, to the south by Travis Street, to the east by the convergence of Travis Street onto Fairfield Street and to the west by the rest of Travis Street carpark.
Geology	The anticipated geology comprises Made Ground over Devensian Till over Chester Formation sandstone bedrock. Previous limited ground investigation at the Site identified Made Ground up to 0.8mbgl, but terminated on concrete. Therefore, thickness of Made Ground is not proven. No asbestos or visual/olfactory evidence of gross contamination was recorded at the site. Anthropogenic components of Made Ground comprised ash, hardcore, tarmac, brick and concrete.
Hydrogeology	The superficial Devensian Till is a Secondary Undifferentiated Aquifer and the Chester formation sandstone bedrock is classified as a Principal Aquifer. The Site is not within a Source Protection Zone. Groundwater flow direction is likely to be to the south/southwest towards the River Medlock.
Hydrology	The nearest watercourse is the River Medlock which, at its closest point, is approximately 126m south. There are no surface water abstractions within 2km of the Site.
History	The Site has had minimal development. Historically, it contained a small building, present from 1932 until sometime between 1974 and 1984, labelled from 1948 as the Fairfield Street Garage. The west of the Site has been used as carparking from 1984 until the present day.
Geoenvironmental considerations	A summary of the potentially significant risks (i.e. greater than Low) for the Site in its current condition and proposed future use are: **Moderate/Low risk** to investigation and construction workers, future site users and the underlying Principal Aquifer. These risks could be realised from Made Ground, on-Site historical garage and carparking and adjacent historical timber yard. Potential risks from ground gas (albeit likely low) would primarily relate to Work Exposure Limits during groundworks and maintenance.

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It should be noted that should a different proposed use be planned (e.g. for a building) in future, the ground gas risk assessment should be re-visited to appropriately assess the risk to buildings and future users.

UXO

Based on the risk identified from UXO at the Site, a UXO Threat Mitigation Strategy is required prior to ground investigation and earthworks to manage the potential risks from UXO.

Recommendations

- Undertake a ground investigation to assess geoenvironmental and geotechnical ground conditions.
- Mitigation of risks to be implemented based on the results and assessment of the ground investigation on the suitability of re-use of materials. This may include removal/remediation of site soils (if necessary) as part of enabling works and use of chemically suitable soils in soft landscaped areas with a potential geotextile marker layer.
- Mitigation of potential risks to underground utilities and concrete to be achieved by undertaking appropriate investigation, design and material selection.
- Potential for exposure to hazardous concentrations of ground gas in excavations and confined spaces to be managed as part of good construction practice and health and safety controls.
- Recommendations from the UXO Threat Mitigation Strategy to be implemented prior to ground investigation and earthworks.
- A watching brief to be undertaken during the ground investigation and subsequent groundworks for unexpected contamination.

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1 Introduction

1.1 General

This report presents the results of a Geoenvironmental Desk Study for the Pigeon Triangle site, Manchester, hereby referred to as, 'the Site'. The report has been prepared by Buro Happold on behalf of Mayfield Partnership and the purpose of this study is to establish the environmental, geological, hydrological and hydrogeological conditions present at the Site that may result in potential contamination risks for the proposed future use.

The Site is located in Manchester City Centre to the immediate southeast of Manchester Piccadilly Railway Station, centred on National Grid Reference SJ 84930 97730. The outline of the Site and the current site layout is shown in Figure 1—1.

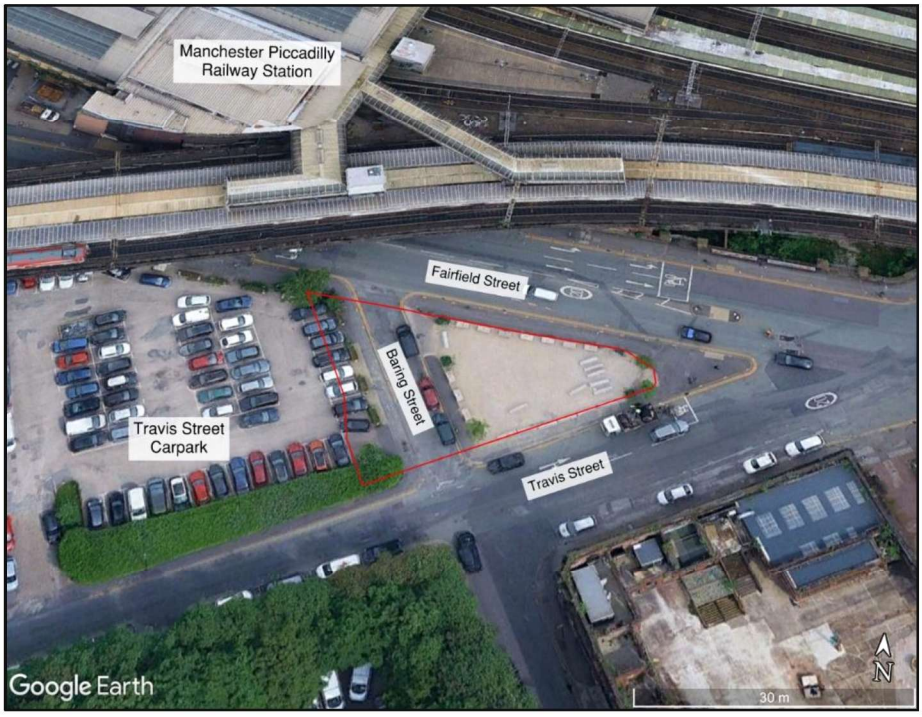


Figure 1—1 Site layout (Google Earth Pro, 2025).

1.2 Study Aims and Objectives

The overall aim of this study was to carry out a geoenvironmental assessment of the Site to inform the Client's understanding of potential ground-related risks associated with the proposed redevelopment.

This report will provide information relevant to redevelopment in accordance with the requirements of the National Planning Policy Framework (NPPF) [1] . The work was carried out in general accordance with the Environment Agency Land Contamination Risk Management (EA LCRM) [2], the relevant British Standard [3] and other current good practice guidance. The particular objectives were:

- Assess the historical and current use of the Site and its surroundings;
- Assess the nature of the ground conditions and the environmental sensitivity of the Site;

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- Assess the potential location, nature and extent of ground and groundwater contamination;
- Assess the potential risks to people and the environment (natural and built) associated with ground contamination (solid, liquid or gas) both in the site's existing condition and for the proposed future use;
- Prepare a report based upon the above suitable to inform the Client about potential risks related to ground conditions and also suitable to support a planning application in accordance with NPPF [1];
- Construct an initial Conceptual Site Model and carry out a preliminary contaminated land risk assessment, in general accordance with the EA LCRM [2];
- Evaluate the potential need for and outline scope of subsequent site investigations and/or remedial action or design.

1.3 Information Sources

The principal sources of information for this desk study report include: historical and current topographic maps, British Geological Survey (BGS) geological maps, previous ground investigation reports (Appendix A), public register information (Appendix C) and information available from the Environment Agency website and other online sources.

This report is therefore based upon information obtained from third party sources. The third party data has been accepted as face value at the time of writing and has not been independently verified. Buro Happold can therefore give no warranty, representation or assurance as to the accuracy or completeness of such information or variations in the data since acquisition.

1.4 Competence

This work reported here was carried out by geoenvironmental scientists from Buro Happold. Buro Happold is a consulting engineering company that manages its work under various Quality Management Systems that are certified to ISO 9001. The work itself was carried out by the staff with relevant qualifications, training and experience. The overall technical responsibility for the work was held by an Associate Director with experience in the assessment of land affected by contamination who is a Chartered Water and Environmental Manager, a registered SiLC (Specialist is Land Contamination) and SQP (Suitably Qualified Person).

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2 Current land use and proposed development

2.1 Site Location

The Site is located in Manchester City Centre to the southeast of Manchester Piccadilly Railway Station, centred on National Grid Reference SJ 84930 97730. The Site covers some 0.064 ha and is currently occupied by a triangular parcel of land comprising:

- an unused gravel covered area to the east with concrete legato bricks and wooden planters;
- part of an asphalt covered carpark (Travis Street Carpark) to the west; and
- Baring Street intersecting the east and west portions in a northwest to southeast direction with footpaths running along each side.

The Site is bound to the north by Fairfield Street with Piccadilly Station beyond, to the south by Travis Street, to the east by the convergence of Travis Street onto Fairfield Street and to the west by the rest of Travis Street carpark.

2.2 Topography

The Site gently dips from a maximum elevation of 40.95m AOD in the northeast to a minimum elevation of 39.76 m AOD in the southwest corner. Topographic survey information is included as Appendix B.

2.3 Current Activities on Site

Buro Happold undertook a site walkover on 17th November 2025. The eastern portion of the Site comprises a triangular parcel of undeveloped land laid to gravel hardstanding, with concrete legato blocks and wooden planters around its vicinity (see Figure 2—1 and Figure 2—2). Baring Street bisects the Site in a slight northwest-to-southeast orientation, connecting Fairfield Street to Travis Street, and is lined with pavement to the east and west. The western extent of the Site marginally extends into Travis Street car park, which was in active use at the time of the walkover (see Figure 2—3). No sharps were noted within the Pigeon Triangle area during the walkover.

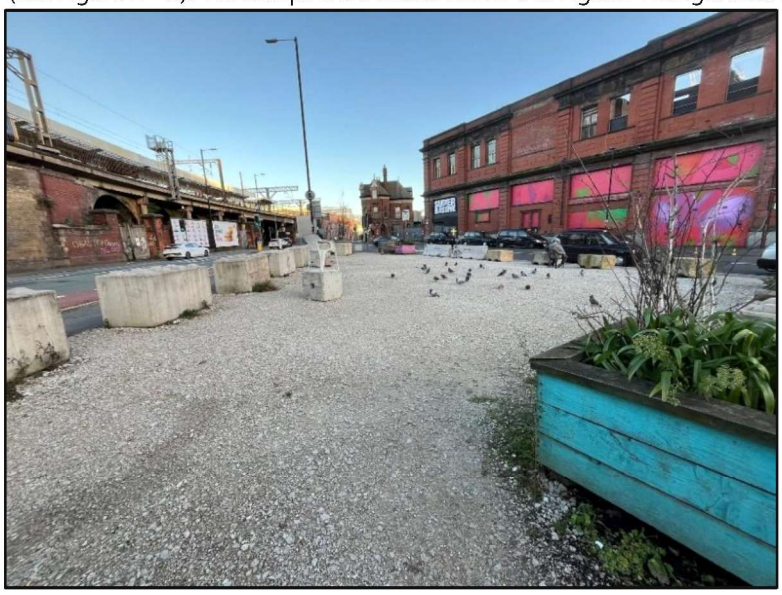


Figure 2—1 View from the northern end of Baring Street looking east at the triangular portion of unused land.

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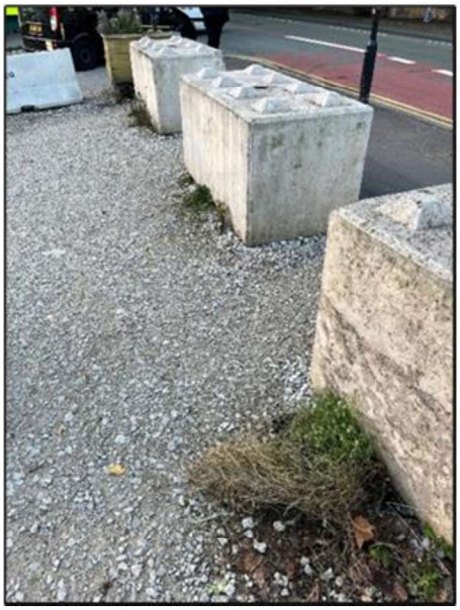


Figure 2—2 Closer view of the ground surface and legatos located in the eastern portion of the Site

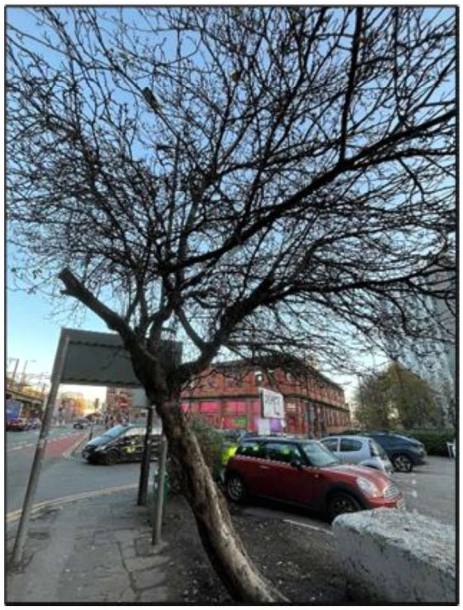


Figure 2—3 View from the northwest corner of the Site looking southeast. The extent of Travis Street carpark within the Site boundary is visible in the east of the picture.

2.4 Current Activities in the Surrounding Area

The Site is located in an urban area with the immediate and near surroundings comprising roads, Manchester Piccadilly Train station, car parking, multi-use entertainment venue, hotel, pub, student accommodation and Mayfield Park.

North: Fairfield Street runs along the northern boundary of the Site with Piccadilly Station beyond. A railway viaduct crosses Fairfield Street, running southwest from Piccadilly Station, approximately 10m from the northwest edge of the Site.

East: Travis Street crosses Fairfield Street. The Star & Garter pub (unoccupied) is approximately 30m east and railway viaduct runs southeast from Piccadilly Station over Fairfield Street, approximately 190m east.

South: Travis Street is immediately to the south, with the former Mayfield Depot buildings now used as multi-use space for arts, music, industry, culture and community events (including 'SUPERMASSIVE' Manchester immersive AV experience, Freight Island urban market and festival space and Warehouse Project club nights) located just beyond, approximately 15 m from the Site. Beyond Travis Street to the southwest is a carpark for the Manchester Marriott Hotel. Baring Street runs through the Site and continues southeast, towards Mancunian Way ring road. There is a cluster of student accommodation buildings from approximately 65m southwest of the Site and Mayfield Park is from approximately 130m southeast. The River Medlock meanders east to west through Mayfield Park and is approximately 126m to the south of the Site at its closest point.

West: Travis Street carpark extends to 80m west of the Site and within the west half of the carpark is a warehouse building that was noted to be derelict during site walkover. The Manchester Marriott Hotel is located beyond Travis Street carpark, approximately 85m west of the Site.

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2.5 Proposed Development

The proposed development comprises the creation of a public green space (see Figure **2—4**). Full Planning Application for public realm works including: re-grading and re-surfacing footpaths, highways, soft landscaping and planting of trees, replacement and reprovision of street lighting, CCTV, and street furniture, removal of car parking spaces, drainage, and associated works.

There will be a mix of hard and soft landscaping with soft landscaped areas consisting of tree, shrub and herbaceous planting areas, crevice and cascade gardens and sunken rain garden/swales. Hard landscape components are envisaged to comprise paving, stepping stones, concrete legato blocks, steel bar edging and log benches. It is anticipated that material will be excavated up to 1.5 mbgl with the intention of reusing suitable material to form raised landscaped mounds in the northern part of the Site.

The proposed drainage strategy incorporates soft landscaping and Sustainable Drainage Systems (SuDS) in the form of rain gardens and permeable paving with a permeable sub-base. The use of soft landscaping will reduce the impermeable area of the site by 60%. Any remaining surface water runoff will ultimately be conveyed into the proposed drainage network. However, the proposed permeable paving and raingardens will offer attenuation of surface water flows and above ground storage during extreme storm events. Perforated pipework sits within the permeable sub-base to collect surface water runoff and convey towards the rain gardens prior to discharging to the existing public sewer. This connection is subject to the agreement of United Utilities.

It is currently unknown whether the whole site will be tanked with sealed drainage across the proposed development. Or whether sealed drainage will only be used within the permeable paving and rain garden areas.



Figure 2—4 Snapshot of proposed development plans. Taken from drawing no. 0424-SEW-L-003005 rev.00 dated 27/10/2025.

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3 Environmental Setting

3.1 Geology

The anticipated site geology has been determined with reference to the relevant British Geological Survey (BGS) geological maps, namely sheet 85 (1:50,000 scale) [4, 5], BGS borehole records, the Groundsure report (Appendix C) available ground investigation information (Appendix A) and observations of the surface cover during the 2025 site walkover. The anticipated sequence of strata beneath the Site is presented in Table 3-1.

Table 3-1 - Summary of Anticipated Geology

Strata	Description	Depth to top [Approximate Thickness]	Aquifer status
Made Ground	Asphalt (car park and road) or gravel (unused area) onto grey silty gravelly SAND with gravel of ash, hardcore, tarmac, brick, and concrete	Surface [up to 0.8m, thickness not proven due to concrete obstruction]	N/A
Devensian Till	Gravelly clay / stiff clay / sand and clay.	0.60m [<1.80 m]	Secondary Aquifer (undifferentiated)
Chester Formation – sandstone	Red sandstone	1.52 to 3.4 [>8.54m thickness unproven]	Principal

3.2 Hydrogeology

The Devensian Till is classified as a Secondary Undifferentiated Aquifer which is assigned when it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of both rock types.

The Chester Formation sandstone is classified as a Principal Aquifer. These are layers of rock deposits that have high intergranular and/ or fracture permeability, meaning they usually provide a high level of water storage and may support water supply and/ or river base flow on a strategic scale. Groundwater flow direction is likely to be to the south/southwest towards the River Medlock based on topography and proximity of the river to the south. From previous investigation in the wider Mayfield area, groundwater is not anticipated above ~4m bgl at the Pigeon Triangle site (no groundwater was encountered during the 2009 investigation (Appendix A) up to a termination depth of 3.8m bgl).

There are ten records of groundwater abstractions within 1km of the Site. The nearest is 341m southeast and is for general cooling at Mosely Rubber Co. Ltd. The record is marked as historical but no end date is given. The nearest groundwater abstraction that is active is 966m southwest and is related to a heat pump at Manchester Metropolitan University. The Site is not within a Source Protection Zone. There are nine records of potable abstractions within 2km of the Site. They are all located between 1817m and 1848m NW and associated with commercial/ industrial/ public services at Interbrew UK Ltd. All the records are marked as historical with the most recent expiry date being March 2023.

The Site is classified as having Low vulnerability of groundwater in the secondary aquifer superficial geology and in the principal bedrock aquifer. This is defined as areas that provide the greatest protection from pollution and are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

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3.3 Hydrology and Drainage

The nearest surface water feature is the River Medlock which is located 126m south of the Site at its nearest point and runs approximately east to west. Additionally, Ashton Canal is located 391m north of the Site at its nearest point. The Site is within the Medlock (Lumb Brook to Irwell) WFD Surface water body catchment. Figure 3—1 shows the surface water features within the vicinity of the Site.

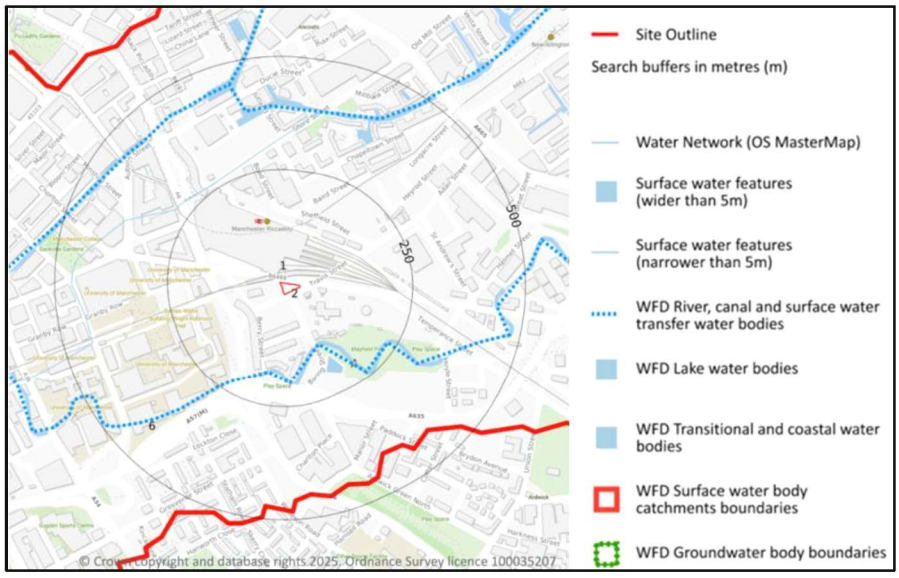


Figure 3—1 Surface water features near to the Site

3.4 Flood Risk

Groundsure data indicates the Site is not located within a flood risk zone. The risk of surface flooding at the Site has been determined as negligible for a 1 in 1000 year return period. Additionally, the highest risk of groundwater flooding on site or within 50m of the Site has been determined as Low.

3.5 Natural Hazards

Regulatory data relating to ground stability for the Site is summarised in Table 3-2 below with the full information presented in full in Appendix C.

Table 3-2 Potential natural hazards based on BGS Geosure data

Potential Hazard	Hazard Rating
Shrink swell	Very Low
Landslide	Very Low
Soluble Rocks	Negligible
Compressible Ground	Very Low
Collapsible Rocks	Very Low
Running Sand	Very Low

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3.6 Radon

The Groundsure reports that the Site is not within a radon affected area as less than 1% of properties are above the Action Level (1:50,000 scale). Therefore, no radon protection measures are required.

3.7 Mining

There are two records of surface ground workings within 250m of the Site and one record of non-coal mining under 1km from the Site (see Table 4-2). There are no records of BritPits within 500m or underground workings within 1km of the Site.

The Site is within a Coal Mining Reporting Area as defined by the Mining Remediation Authority. A Coal Authority Report was obtained and included as Appendix H in the 2015 Buro Happold Desk study report [6]. The following information has been extracted from the report:

- The Site is within the likely zone of influence from workings in 2 No. seams of coal at 1050 m to 1100 m depth which were last worked in 1958. Furthermore, reserves of coal do exist in the locality which could be worked in the future subject to feasibility, licences and planning consents.
- There are no recorded mine entries on Site or within 20 m of the Site boundary.
- In respect of opencast mining, the Site is not within the boundary of any past or present workings. In addition, there is no licence to extract or proposed licence to extract coal by opencast methods within the immediate vicinity of the Site.
- No subsidence, in respect of the Coal Mining Subsidence Act 1991, has been recorded in respect of the immediate Site area.

Given the geology of the Site, the Site history, the Coal Authority Report information and the shallow nature of the proposed development, the risk arising from former coal mining operations is considered to be low. Although the Coal Authority Report dates from 2015, it is considered to remain applicable as the conditions it describes, such as the depth and location of historic workings, the absence of mine entries and opencast activity, and the lack of recorded subsidence, are unlikely to have changed. No new licences or mining activity have been recorded in the area since the report was issued.

3.8 Railway Infrastructure

The Site is located immediately south of Manchester Piccadilly Railway Station and northwest of the former Mayfield Goods Station. The Groundsure Report (Appendix C) identifies several railway features within the Site boundary (see Figure 3—2 and Table 4-2). However, these are located on an elevated viaduct and do not intersect the Site at ground level and therefore are not considered to be sources of potential contamination at the site. Similarly, the active railway lines and associated infrastructure to the north, serving Manchester Piccadilly, are also elevated above the Site and area therefore not considered to be sources of potential contamination at the Site.

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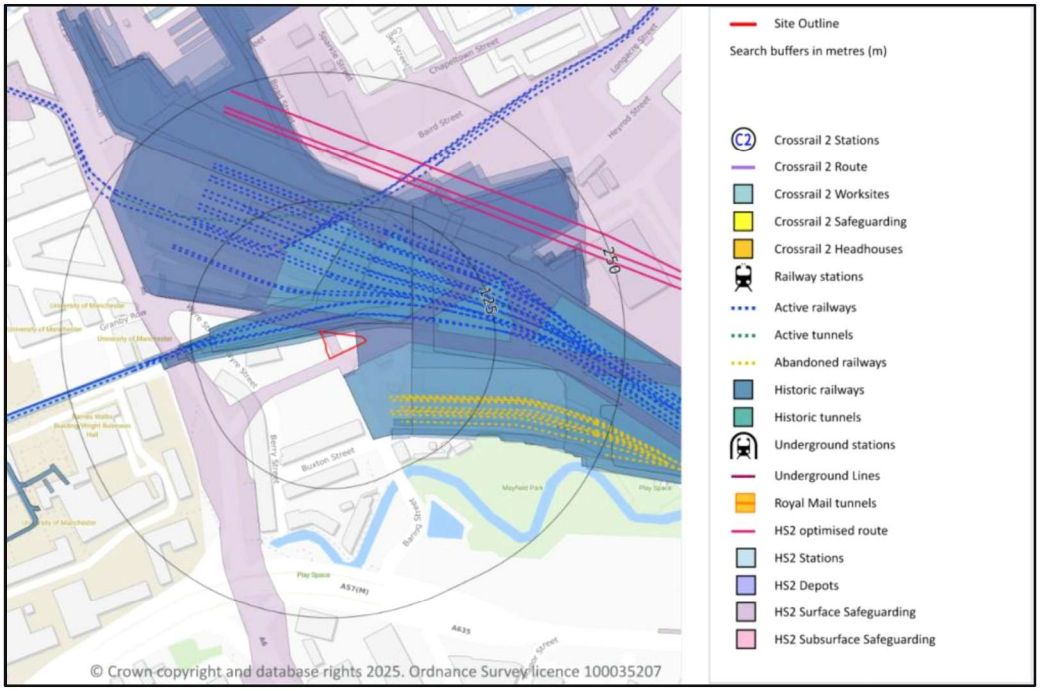


Figure 3—2 Railway infrastructure within the vicinity of the Site, taken from the Groundsure Report.

3.9 Unexploded Ordnance

A Preliminary UXO Risk Assessment was carried out by Buro Happold in accordance with CIRIA C681 [7] and is included in Appendix D. In addition to the consideration of the potential for aerial delivered UXO, consideration has also been given to mitigation factors, namely: (i) the extent of post-war development); and (ii) the extent of proposed intrusive works. The assessment concluded that the risks associated with UXO are Moderate. Therefore prior to ground investigation or enabling below ground works, a detailed UXO risk assessment is required.

An Explosive Ordnance (EO) Threat Assessment (EOTA) undertaken by Planit in 2017 is included as Appendix A in the 2017 Buro Happold desk study for the wider Mayfield Regeneration area [8]. The assessment concluded on the basis of Site setting, historical land usage, record of bombing, post war development and proposed intrusive work that the risks associated with UXO on site are Medium, consistent with the preliminary UXO risk assessment presented in Appendix D. Considering the findings of this assessment, a UXO Threat Mitigation Strategy is required to be in place prior to intrusive works at the Site. A review of these recommendations must be undertaken considering any additional, relevant information being provided (i.e. significant changes to the masterplan that require significant ground excavations). Since the Pigeon Triangle Site lies within this boundary and has seen minimal development since the 2017 assessment remains applicable.

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4 Site Setting

4.1 Site History

The Site history and that for the surrounding area has been completed using historic maps available between 1848 and 2010 and aerial imagery from Googe Earth Pro between 2000 and 2025. This history is summarised in Table 4-1 below. The maps are presented as part of the Groundsure report in Appendix C.

From the earliest mapping provided within the Groundsure report, the Site comprised residential houses, intersected by Boardman Street (same orientation to Baring Street is today) with the Star and Garter pub intersecting the site on the northern site boundary. Note: the Star and Garter pub moved to its current location ~40m E of the Site in the late 1800s/early 1900s and is now disused. By 1908, housing was cleared on the eastern portion of the site as surrounding industry expanded. By 1922 a small square structure is shown on the mapping on the eastern portion of the Site to the north. By 1932 a small T-shaped building was present to the east of Baring Street and historical mapping recorded this as 'Fairfield Street Garage' between 1948–1950. This T-shaped building was cleared by 1984. By 1932 the residential houses on the western portion of the site were reconfigured and by 1948 were shown as cleared. The site appears to have generally remained in this cleared state since then, with the exception of the area to the west of Baring street being redeveloped as a car park sometime between 1974 and 1984. By 2000, the eastern portion was grassed with footpaths, and more recently the grass has been replaced with gravel and concrete legato blocks.

By the late 19th century the surrounding area transitioned from mixed housing and small industry to a major transport and industrial hub, dominated by London Road Railway Station (now Manchester Piccadilly Railway Station) to the immediate north of the site associated with extensive railway sidings, and mills, dye works, and rubber works along the River Medlock to the south.

Mayfield Railway Station (located ~15m south of the Site at its nearest point) opened in the early 20th century. From the mid-20th century, goods yards and factories prevailed, while housing was cleared. By the 1970s, the railway sidings to the immediate north of the site were replaced by car parks and Mancunian Way (~200m S) was built. Since 2000, large-scale regeneration mainly to the south and southwest of the site has introduced student accommodation, warehouses, and Mayfield Park (2023) on the former industrial land, though the Site itself has remained largely unchanged.

Table 4-1 - Summary of site history and history of the surrounding area

Date	Site History	History of the Surrounding Area
1848 1:10,560	The Site is predominantly comprised of residential buildings. Boardman Street bissects the Site (current day Baring Street).	The Site is set within a predominantly residential area with some industrial uses. **North:** Birmingham Street (~60 m N) with terraced housing in between; London Road Station (~100 m N) elevated above street level, with railway sidings beyond (~150 m N). Further north (300–500 m) are residential and possible industrial buildings; canal (~400m N). **East:** Adjacent is junction of Birmingham St, Travis St, and Fairfield St; police station (~100 m E); Railway viaduct (~250m E) over Fairfield street running SE from London Road station; Residential dominates 300–750 m E/NE; ~800 m S along River Medlock are dye works and lime works. **South:** Travis St borders the Site; terraced housing within 100 m. River Medlock (~120 m SE) with cotton mill and dye works along the banks; reservoirs (~175m SE); beyond 300 m S are housing and green spaces.

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Date	Site History	History of the Surrounding Area
		West: Residential adjacent; London Road (~120 m W) with further terraced housing and some industry beyond. Gas works with two gas holders ~850 m W.
1851 1:1,056	The Star and Garter pub slightly crosses into the north of the Site.	**North:** A railway viaduct has been constructed ~50m N, running approx. parallel to northern border of Site and crossing Birmingham St. and Boardman St. **East**: No significant change. **South:** Buxton Street School (~60m S); Several boiler and engine houses and a reservoir associated with Mill / Print works (from ~100m S). **West:** Coal yard (~75m W); Red Lion pub (~90m SW).
1889-1891 1:500 1:2,500 1:10,560 (incomplete from 500m west)	Residential properties in east and north of Site have been cleared and Star and Garter pub no longer labelled.	The Site surroundings are now dominated to the North by extensive railway infrastructure and to the south by residential terraces and extensive industry beyond along the River Medlock. **North**: London Road station substantially expanded including extensive railway sidings and infrastructure with tanks (~90m and ~170m NE), goods yards (~175m NE); grain store (~190m NW); goods shed (~220m NW)) and replacing Birmingham St. and terraced housing; Fairfield St. now borders N of Site and is labelled as a tramway; additional railway line added to viaduct (~10m N); Phoenix Machinery Works (~300m NE);Goods station and associated railway infrastructure (~350m NE); Disused foundry (~400m N); Mills and printing works (~500-750m NE). **East:** Star and Garter Hotel (now disused pub, ~60m E); Mill (500m E); Brick works, foundry, sewing factory (~1km E). **South:** Extensive industrial area from 100m S along banks of River Medlock; Hanover Cotton Mill (~100-180m S); Mayfield Dye and Print Works (~100-250m SE); Mayfield Baths (~130m S); Ardwick Tannery (~175-260m S); Chapelfield India rubber Works (~225m-260m SE); Water Meter Works (~255m S); Medlock Cotton and India rubber Works (~175-230m SW); Disused Ardwick Bridge Chemical Works (~240-300m SW); Victoria University (~1km SW). **West:** Timber yard from adjacent to NW corner of Site; Coal yard (~75m W) no longer labelled; London Road labelled as a tramway; Manchester Nut and Bolt works (~200-260m SW); Jackson St. Cotton Mills (~190-275m SW): Iron works (~350m SW).
1905-1906 1:10,560	No significant change.	**North:** Smithy (~175m NE); Goods station (~350m NE) now Ancoats Goods station with additional goods shed and grain store, replacing printing works; disused foundry (~400m N) now clothing factory; Mills (~600m NE) now Vulcan Works (~600-800m NE). **East:** Area of clearance off Fairfield Street along railway viaduct (~250-500m E/SE); Dye Works, brick works and sewing factory (~800m E) no longer labelled, replaced with terraced housing. **South:** Reservoirs (~175m SE) have been infilled. **West:** Whitworth Street constructed running west off London Road (~180m NW), replacing some terraced housing; Chief fire engine station replaces terraced houses (~180m NW); Gas works (~850m W) moved to ~1km W and expanded with 7no. gas holders.
1908 1:2,500	Buildings east of Boardman St. have been cleared.	**North**: No significant change. **East:** Star and Garter Hotel (~60m E) now labelled as a public house; Police station (~100m E) no longer labelled. **South:** Ardwick Tannery (~175-260m S) no longer labelled and appears incorporated into Chapelfield India rubber works; Ice Works (~175m S); Medlock Cotton and India rubber works now Cotton and Leather works; Disused Ardwick Bridge Chemical Works (~240-300m SW) no longer labelled.

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Date	Site History	History of the Surrounding Area
		West: No significant change.
1915-1916 1:10,560	No significant change.	**North:** Additional railway lines and sidings added to London Road Station. **East**: Footbridge connecting London Road Station to Mayfield station constructed adjacent to E, over Fairfield St.; Additional railway lines constructed on railway viaduct on area of clearance. **South:** Mayfield Railway Station constructed just S of Travis St. (~25m – 250m S/SE), replacing terraced housing and Mayfield Dye and Print Works and connecting to railway viaduct running southeast from London Road Station; Area of cleared land (previously buildings associated with Mayfield Dye and Print Works remains between 100m and 250m SE; area of previous disused Ardwick Bridge Chemical works cleared; Brewery (~325m SE). **West**: Police station (~300m NW); Ice works (~320m NW).
1922-1923 1:2,500 1:10,560	No significant change.	**North:** Goods shed now labelled along the N of the goods yard (~175m NE). **East:** No significant change **South:** Evidence of earthworks in cleared area south of Mayfield station; cloth finishing works (~175m SW); Public Wash House added W of Mayfield Public Baths (~175m S); Midland Shirt Factory (~300m S). **West:** Gas meter test station (~200m NW).
1931-1934 1:2,500 1:10,560	Small building constructed in centre of Site on the east side of Boardman St. Residential buildings west of Boardman St. have been cleared. One larger building now crosses slightly into the west of the Site.	**North:** Smithy (~175m NE) no longer labelled; Phoenix Machinery Works (~300m NE) now Stationary Works; Bonded warehouse (~180m N). Area of clearance including ice works (~320m NW) for road expansion. **East**: No significant change **South:** Brewery (~325m SE) no longer labelled. **West:** Area of previous timber yard (adjacent to NW corner) now cleared; engineering works (~60m W); clothing factory (~190m NW).
1938 1:10,560	No significant change.	**North:** Substantial clearance of terraced housing beyond London Road station and associated railway lines (~250-400m N and NW). **East:** No significant change. **South:** No significant change. **West**: No significant change.
1948-1950 1:1,250 1:2,500	Small building in centre of Site labelled as Fairfield Street Garage (1:1,250 map only). All remaining buildings in west of Site have been cleared.	**North:** Fairfield St. no longer labelled as a tramway; Warehouses constructed in cleared area (~175m NE); Clothing works (~260m and ~265m NE); Scrap metal works (~255m NE); copper smiths (~300m NE). **East:** Previous row of buildings adjacent to public house (from ~80m E) now cleared and labelled as ruins. **South:** Mayfield Station building has reduced in size (~25m – 120m S/SE); Clearence of terraced housing beyond Travis St. (~15-100m S/SW and ~150-250m S); Chapelfield India rubber works expanded N, crossing the River Medlock; Mayfield Public Baths now labelled as ruins (~160m S); Ice factory (~175m S) now Mayfield Ice Factory; Public wash house now a dairy (~150m S); Leather and cloth factory (~160m S); Hanover Mills (100-180m S/SW) now includes printing machinery works, stationary works, printing works, braid and elastic factory and motor repair works; Medlock Cotton works now Medlock Cotton and Rubber works; Cloth finishing works (~175m SW) now labelled as disused works. **West:** All residential buildings adjacent to W cleared.
1950-1955 1:2,500 (partially incomplete from ~60m E)	Building in centre of Site no longer labelled as Fairfield Street Garage.	**North:** No significant change. **East:** No significant change up to ~60m E. Map is unclear beyond this point. **South:** Printing machinery works building (~75m S). **West:** No significant change.

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Date	Site History	History of the Surrounding Area
1956 1:10,560	No significant change.	**North:** Vulcan Works (~600m NE) no longer labelled. **East**: No significant change. **South**: No significant change. **West:** College (~300m NW); Dunlop Rubber Works (~850m W).
1960-1965 1:1,250 1:2,500	Boardman St. is now Baring St. as it is today.	**North:** London Road Station now labelled Piccadilly Station and footprint slightly altered at NW corner; Goods yard (~175m NE) cleared; Grain warehouses (~175m NW) now labelled just warehouses. Previous clothing works, stationary works, scrap metal works and coppersmiths buildings (~300m NE) now labelled as works or warehouses; Previous goods shed (~175m NE) now labelled as works. **East**: Footbridge adjacent to E no longer present. **South:** Mayfield Station is marked as a goods station and is shown to have expanded east; all of the works and factories from ~75m S are now labelled as just works or factory; large area to the south of previous cotton mills (~175m SW) and west of London Road has been cleared of buildings. **West:** Clearence of buildings west of London Road (~135m W); Manchester Nut and Bolt Works (~200m SW) now a depot; clearance and redevelopment of residential buildings (from ~175m W).
1969-1974 1:2,500 1:1,250 1:10,000	No significant change.	**North:** Railway lines and sidings, and warehouses and goods stations and sheds just N of Piccadilly Station building (~150m N) have been cleared and replaced by a car park; Rail house (~200m NW); Goods Yard (~175m NE) has been cleared and a large unlabelled warehouse building built ~190m NE. **East:** No significant change. **South:** Car park constructed ~10m S; Mancunian Way constructed ~200m S with works buildings cleared to make way; Victoria University (~1km SW) now labelled University and expanded north with new buildings so that it is now from 750m SW. **West:** College (~300m NW) expanded south from ~175m SW new buildings associated with college including depot (~200m W) now Estates and Engineering Depot, Chemical building (~180m SW); Electrical Engineering building and Wallis building (~210m SW).
1976-1977 1:1,250	No significant change.	**North:** No significant change. **East:** Remaining buildings adjoining the pub (~60m E) have been demolished; Electrical substation (~100m E); Conveyer constructed ~165m E connecting Mayfield Goods Station to a sorting office (~230m NE). **South:** No significant change. **West:** Remaining residential houses (~90 to 105m SW) replaced by large development of large building which is current Marriott Hotel (from ~80m W to ~180m SW).
1980-1981 1:10,000	No significant change.	**North:** Ancoats Goods Station (~350m NE) has been cleared. **East:** No significant change **South**: No significant change **West:** TV Studios ~600-750m SW.
1984-1988 1:1,250 1:10,000	Small building in centre of the Site has been cleared. Car park to the west has been constructed.	**North:** Additional car park added to Piccadilly Station (~50m NW); Previously cleared area (~150m NE) now a depot; area cleared from Ancoats Goods Station is now Piccadilly Trading Estate with several warehouses and depots. **East:** No significant change. **South:** Car park (~10m S) no longer labelled and Cartledge Street which previously formed southern border of the carpark no longer present. **West:** College (~from ~200m W/SW) now labelled University; Multi car park ~500m SW; Gas works (~850m W) now carpark.

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Date	Site History	History of the Surrounding Area
1991-1995 1:2,500 1:10,000	No significant change.	**North:** No significant change. **East:** No significant change. **South:** Mayfield Goods Station no longer labelled (1:2,500 map) **West:** No significant change.
2000 Aerial imagery	The portion of the Site to the east of Baring St. is grassed with footpath surrounding. The west is being used as a carpark.	**North:** North of Piccadilly station is dominated by industrial estates, large warehouses and carparks. **East:** No significant change. **South:** Railway tracks removed from previous Mayfield Goods Station; South of the Site (up to ~400m) is predominantly large warehouses of previous Hanover Mills and Mayfield Works area. Beyond is parks, green spaces and residential properties. **West:** Beyond London road is dominated by University buildings and Manchester City centre sprawls from ~350m NW.
2001 1:10,000	No significant change.	No significant change.
2003 Aerial imagery 1:1,250	No significant change.	**North:** New development added to the front of Piccadilly Station (~180m NW) **East**: No significant change. **South:** Construction is underway of four high rise student accommodation buildings in previous area of Hanover Mills (~100m S). **West:** No significant change
2009 Aerial imagery	No significant change.	**North**: No significant change **East:** Conveyor crossing Fairfield St. and railway tracks (~165m E) removed. **South:** High rise student accommodation buildings have been completed. **West:** Warehouse built in carpark (~45m W)
2010 1:10,000	No significant change.	**North:** Previous Fire station and police station now labelled as court. **East:** No significant change **South:** No significant change **West:** No significant change
2017 Aerial imagery	No significant change.	**North:** No significant change. **East:** No significant change. **South:** Roof has been removed from previous Mayfield Goods Station leaving exposed area of hardstanding and vegetation along where rail tracks had been; Warehouses removed and area of significant earthworks underway ~320m SE **West:** No significant change.
2021 Aerial imagery	A barrier has been added surrounding the grassed area in the east portion of the Site.	**North:** No significant change. **East:** No significant change. **South** Possible new layer of hardstanding added to previous Mayfield Goods Depot; Outdoor entertainment/ food venue ~80m SE; significant earthworks from ~230m SE and clearance of all remaining works buildings and warehouses. **West:** No significant change.
2023 Aerial imagery	Grassed area replaced by some form of hardstanding (likely the gravel as seen today). Continuous barrier surrounding replaced by individual concrete legato blocks.	**North:** No significant change. **East:** No significant change. **South:** Previous Mayfield Goods Station undergoing redevelopment with new warehouses constructed (~25m and ~55m SE); Mayfield Park green space developed on area of previous earthworks around River Medlock (~130m – 350m SE); area between south bank of River Medlock and Mancunian way remains cleared and undeveloped.

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Date	Site History	History of the Surrounding Area
		West: No significant change.
2025 1:10,000 Aerial imagery	No significant change.	**North:** No significant change. **East**: No significant change. **South:** No significant change. **West:** No significant change.

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4.2 Regulatory Data

Regulatory data relating to potentially contaminative uses is summarised in Table 4-2 below. This information was obtained from the Groundsure report, presented in full in Appendix C.

Table 4-2 - Summary of Regulatory Data

Item	Number [distance]	Information	Potential to Impact
Current Industrial Land Use			
Recent industrial land uses	15 [50-250m]	Electricity substations (83m NW, 115m E, 143m S, 193m N), Manchester Piccadilly Rail Station (105m NW), excess baggage company (127m NW), Track Brewing Company (150m NE), election workshop (158m NE), Piccadilly Metrolink (161m NW), gantry (173m SW), pump house (189m S), Hertz car hire (197m NW and 204m N), Manchester University Press (214m W), Europcar (247m N).	No
National Geographic Database (NGD) – Current or recent tanks	1 [50-250m]	Roofed storage tank, commercial activity: distribution or storage (150m NE). Status is obsolete.	No
Current or recent petrol stations	1 [250m-500m]	Unbranded (418m E)	No
Licensed industrial activities (Part A(1))	1 [250-500m]	Operator is Vodaphone Ltd and process is MCP, status is effective (500m NE).	No
Licensed industrial activities (Part A(2)/B)	4 [250-500m]	Waste Oil Burner (366m NE), Other Mineral Processes (368m SE), Non-ferrous Metal Foundry Processes (436m SE), Non-ferrous Metal Foundry Processes (479m N).	No
Radioactive Substance Authorisations	8 [250-500m]	2no related to The University of Manchester for Disposal of Radioactive Waste (369m SW) and keeping and use of radioactive materials (369m SW). Status of both is issued. 6no. related to Umist for disposal of radioactive waste, and keeping and use of radioactive materials. Status of 3no. have been revoked/cancelled and 3no. have been superseded by variation.	No
Licensed Discharge to controlled waters	2 [50-250m]	Both related to sewage effluent discharges as sewer storm overflow to the River Medlock. 1no. revoked in March 2021.	No
	18 [250-500m]	Sewage effluent discharges as sewer storm overflow to Shooters Brook, River Medlock and Dukes Tunnel. Fourteen revoked.	No
Pollution Incidents (EA/NRW)	1 [0-50m]	Pollutant described as 'diesel', dated 08/03/2001 (41m N). Water impact described as Category 4 (no impact). Land impact described as Category 3 (minor). Air impact described as Category 4 (no impact).	No
	2 [50-250m]	Pollutant described as 'diesel', dated 30/05/2001 (61m N). Water impact described as Category 4 (no impact). Land impact described as Category 3 (minor). Air impact described as Category 4 (no impact). Pollutant described as 'urban run-off, dated 31/07/2003 (194m S). Water impact described as Category 3 (minor). Land impact described as Category 4 (no impact). Air impact described as Category 4 (no impact).	No

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Item	Number [distance]	Information	Potential to Impact
	4 [250-500m]	Pollutant described as 'not identified', dated 31/07/2001 (304m SE). Water impact described as Category 4 (no impact). Land impact described as Category 3 (minor). Air impact described as Category 3 (minor). Pollutant described as 'diesel', dated 30/05/2001 (341m E). Water impact described as Category 4 (no impact). Land impact described as Category 4 (no impact). Air impact described as Category 4 (no impact). Pollutant described as 'not identified', dated 13/10/2001 (449m SE). Water impact described as Category 3 (minor). Land impact described as Category 4 (no impact). Air impact described as Category 3 (minor). Pollutant described as 'other', dated 22/02/2003 (471m N). Water impact described as Category 3 (minor). Land impact described as Category 4 (no impact). Air impact described as Category 4 (no impact).	No
None of the following were recorded within 500m: Electricity cables, gas pipelines, sites determined as Contaminated Land, Control of Major Accident Hazards (COMAH), regulated explosive sites, hazardous substance storage / usage, historical licensed industrial activities (IPC), pollutant release to surface waters, pollutant release to public sewers, list 1 dangerous substances, list 2 dangerous substances, pollution inventory substances, pollution inventory waste transfer, pollution inventory radioactive waste.			
Waste and Landfill			
Historical waste sites	2 [50-250m]	Scrap Yard dated 1991 (206m SE), Scrap Yard dated 1994 (208m SE)	No
	6 [250-500m]	Scrap Metal Works dated 1948 (254m NE), Scrap Metal Yard dated 1955, 1969, 1978, 1981 (447m N)	No
Licensed waste sites	8 [250m-500m]	2no. records associated with Ardwick Auto Spares, Metal Recycling Site (mixed MRS's) (334m SE), one surrendered and one revoked. 2no. records associated with Aggregate Recycling Yard, Treatment of waste to produce soil (357m SE), one issued and one surrendered. 2no. records associated with City Excavations Aggregate Yard, Inert & excavation Waste TS + treatment (370m SE), one issued and one surrendered. 2no. records associated with Pye Metals Ltd, Metal Recycling Site (mixed MRS's) (407m SE), both expired.	No
Waste exemptions	3 [50-250m]	Treatment of kitchen waste in a wormery (221m W), Use of waste in construction (250m SE), Use of waste in the construction of entertainment or educational installations etc (250m SE)	No

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Item	Number [distance]	Information	Potential to Impact
	52 [250-500m]	Use of waste in construction (284m SE); Deposit of waste from a railway sanitary convenience (300m E); Use of waste in construction (301m NE, 405m E, 406m E, 410m E); Storage of waste in a secure place (345m SE, 406m E, 410m E, 426m E, 421m N, 465m SE); Storage of waste in secure containers (405m E, 406m E, 410m E, 421m N); Crushing waste fluorescent tubes (405m E, 406m E); Manual treatment of waste (405m E, 406m E, 410m E, 465m SE); Recovery of scrap metal (405m E, 406m E, 420m NE, 410m E, 465m SE); Recovery of textiles (405m E, 406m E, 410m E, 465m SE); Sorting mixed waste (405m E, 406m E, 410m E, 465m SE); Treatment of waste food (405m E, 406m E); Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising (405m E, 406m E, 410m E, 465m SE); Burning waste in the open (406m E, 465m SE); Storage of sludge (406m E); Mechanical treatment of end-of- life tyres (406m E, 465m SE); Use of baled end-of-life tyres in construction (410m E); Treatment of waste aerosol cans (421m N); Screening and blending of waste (443m SE); Crushing and emptying waste vehicle oil filters (465m SE)	No
None of the following were recorded within 500m of the site: active or recent landfills, historical landfill (EA / NRW records, BGS or LA / mapping records).			
Past land use			
Historical industrial land uses	10 [on site]	Railway sidings and railway stations dated 1890 to 1994.	No (elevated above site level)
	13 [within 50m]	Railway sidings, railway stations and railway buildings dated 1890 to 1994.	No
	76 [50m-250m]	Railway buildings, goods stations, railway stations, police station, railway sidings, cotton mill, unspecified mills, unspecified commercial/ industrial, unspecified depots, goods yards, dye works, unspecified works, smithys, grain store, fire station, fire engine station.	No
	114 [250m-500m]	Unspecified works, unspecified tanks, goods stations, police stations, unspecified commercial/ industrial, unspecified station, railway buildings, goods sheds, unspecified ground workings, brewery, unspecified works, unspecified mill, iron works, chimneys, unspecified wharves, ice works, railway sidings, unspecified disused foundry, clothing foundry, unspecified workshop. clothing factories, unspecified warehouses, tyre works, infirmary.	No (due to distance and location hydraulically down gradient of the site)
Historical tanks	68 [50-250m]	Unspecified tanks, tanks and gas meter testing station (224m NW) dated 1891 to 1965.	No
	36 [250-500m]	Unspecified tanks and tanks.	No
Historical energy features	3 [50-250m]	2no. electricity substations (110m E and 214m S) dated 1977-1994 and 1948-1955, respectively, 1no. record of Gas Meter Testing Station (224m NW) dated 1948.	No
	7 [250-500m]	Electricity substations dated 1948 to 1998.	No
Historical garages	1 [on site]	1no. record of garage. Dated 1948.	Yes (although no record of tanks on site)
	2 [50m-250m]	1no. motor repair works (157m S), dated 1948. 1no. record of garage (240m S) dated 1970.	No
	20 [50-250m]	All records of garages.	No

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Item	Number [distance]	Information	Potential to Impact
None of the following were recorded within 500m of the site: historical petrol station, historical military land.			
Environmental Designations			
Nitrate Vulnerable Zones	3 [500m-2000m]	River Irk (Moston Brook to River Irwell) NVZ (824m N and >1km NW). Irkwell / Man. Ship Canal (Kearsley to Irlam Lock) NVZ (>1km NW)	No
None of the following were recorded within 500m of the site: Sites of Special Scientific Interest (SSSI), Ramsar sites, Special Areas of Conservation (SAC), Special Protection Areas (SPA), National Nature Reserves (NNR), Local Natural Reserves (LNR), Designated Ancient Woodland, Biosphere Reserves, Forest Parks, Marine Conservation Zones, Green Belt, Proposed Ramsar sites, Possible Special Areas of Conservation (pSAC), Potential Special Protection Areas (pSPA), Nitrate Sensitive Areas, SSSI Impact Risk Zones, SSSI Units.			
Visual and cultural designations			
Listed Buildings	1 [Within 50m]	Star And Garter Public House as Grade II from 1988.	No
	3 [50m-250m]	Train Shed And Undercroft At Manchester Piccadilly Station as Grade II. Sculptural Wall as Grade II. Former Goods Offices To Piccadilly Station as Grade II.	No
Conservation Areas	1 [50m-250m]	Whitworth Street and Princess Street, Manchester (143m W).	No
None of the following were recorded within 250m: World Heritage Sites, Area of Outstanding Natural Beauty, National Parks, Scheduled Ancient Monuments, Registered Parks and Gardens.			
Agricultural designations			
Agricultural Land Classification	1 [on site]	Site is identified as urban.	No
None of the following were recorded within 250m: Open Access Land, Tree Felling Licenses, Environmental Stewardship Schemes, Countryside Stewardship Schemes.			
Habitat designations			
None of the following were recorded within 250m: Priority Habitat Inventory , Habitat Networks, Open Mosaic Habitat, Limestone Pavement Orders.			
Mining and ground workings			
Surface ground workings	2 [50m-250m]	Ponds (150m E), Ponds (157m E).	No
Non-coal mining	1 [500m-2000m]	Building stone (951m E).	No
JPB mining areas	1 [on site]	In addition to being located inside an area where The Coal Authority have information on coal mining activities, Johnson Poole & Bloomer (JPB) have information such as mining plans and maps held within their archive of mining activities that have occurred within 1km of this property which may supplement this information. Please note, the plans held by JPB may also relate to non-mining records.	No
Coal mining	1 [on site]	The Site is located within a coal mining area as defined by the Coal Authority. A consultants coal mining report is recommended to further assess coal mining issues.	No
None of the following were recorded within >1km: BritPit, Underground workings, Underground mining extents, Historical Mineral Planning Areas, The Coal Authority non-coal mining, Research mining, Mining record office plans, BGS mine plans, Brine areas, Gypsum areas, Tin mining, Clay mining.			
Ground cavities and sinkholes			
Mining cavities	1 [500m-2000m]	1no. record 611m S. Mine address: Manchester, Greater Manchester	No
Reported recent incidents	1 [50m-250m]	1no. record 367m SE in 2016. Cause is unclassified. Sinkhole opened in torrential downpours. Possible former culvert collapse. Estimated diameter 12m	No

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Item	Number [distance]	Information	Potential to Impact
None of the following were recorded within 500m: Natural cavities, Historical incidents.			

4.2.1 Communication with Fire Service

Attempts were made to obtain clarification from the Greater Manchester Fire and Rescue Service regarding the nature of the Fairfield Street Garage identified on historical maps in 1948, including whether it operated as a fuel storage facility and if underground fuel tanks were likely to have been present. Initial enquiries were sent to the Systems Support mailbox (systemssupport@manchesterfire.gov.uk) and the Fire Safety Support mailbox (firesafetysupport@manchesterfire.gov.uk), requesting details on the garage's historical use, presence of fuel pumps or underground storage tanks, and any associated fire insurance plans.

The Systems Support team confirmed that their department only holds fire reports from 2009 onwards and advised contacting the Fire Safety Support team. A follow-up email was sent to Fire Safety Support, who responded that historical site-use records, including fuel storage and original building use, fall outside their remit and are not held by their department.

Further communication was made to the petroleum mailbox after identifying that the Petroleum Environmental Search Request Form link on the Fire Service website was not functioning. Clarification was sought regarding the availability of petroleum licensing records and the time period covered. At the time of writing, a response is awaited.

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5 Previous Studies

5.1 Available Reports

Four existing reports relevant to the Site have been reviewed and are summarised in this section. The reviewed reports were originally prepared for the wider Mayfield regeneration area, which encompasses the current Pigeon Triangle Site. These reports include:

- Ground Investigation Factual Report prepared by Ground Investigation and Piling Limited (GIP LTD) (October 2009) (Appendix A);Appendix A
- Mayfield SRF UK, Ground Engineering Desk Study Report by Buro Happold (September 2015) [6]; and
- Mayfield Regeneration, Geoenvironmental and Geotechnical Desk Study Report by Buro Happold (August 2017) [8].

5.1.1 GIP LTD Factual Report (Appendix A)

Ground Investigation and Piling LTD completed a ground investigation on 4th September 2009 on the instruction of British Railway Board (Residuary) Ltd and specified by Buro Happold. An excerpt of the exploratory hole location plan is provided in Figure 5—1 and the factual report in provided in Appendix A.

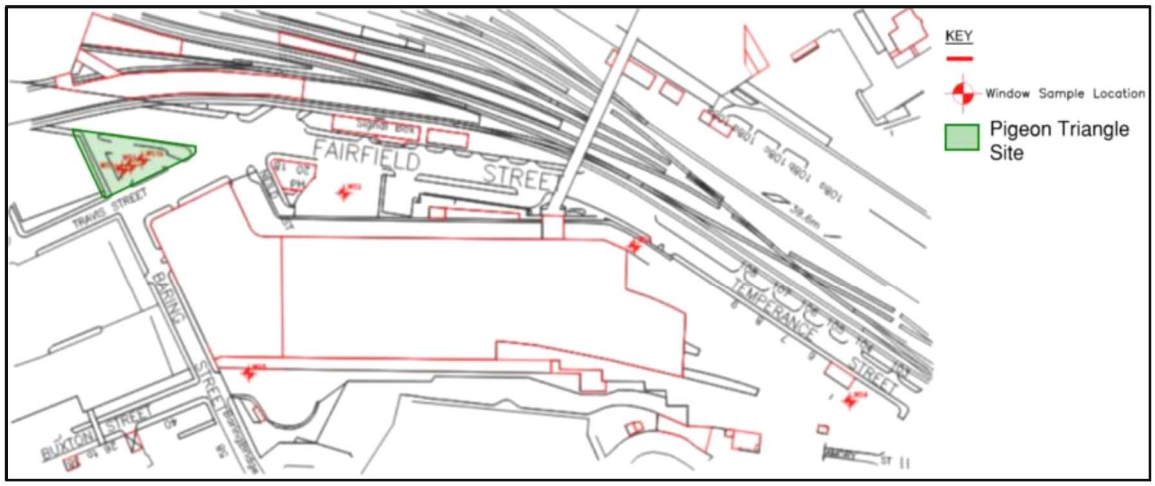


Figure 5—1 Exploratory hole location plan for GIP LTD ground investigation. Amended from Appendix D in the report

The purpose of the investigation was to determine the nature of the prevailing ground conditions and comprised the following:

- 7no. window sample boreholes between 0.35m and 3.80m bgl (no groundwater was encountered).
- 14 no. soil samples were submitted for chemical testing to determine soil concentrations of a suite of determinands.
- 10 no. soil samples were submitted for chemical testing to determine leachable concentrations of a suite of determinands.
- 3 no. groundwater/ground gas monitoring instruments were installed in WS02 and WS05 (approximately 75m east and 90m south of the Pigeon Triangle site, respectively) and groundwater and ground gas monitoring was undertaken on 16/09/09, 23/09/09 and 7/10/09.

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Three exploratory holes were positioned within the Pigeon Triangle site boundary (WS1, WS1a and WS1b). In each of the boreholes a concrete obstruction was encountered at 0.8m, 0.35m and 0.40m bgl, respectively and subsequently the position was abandoned upon engineers instruction. Made Ground was encountered in each borehole above the concrete obstruction and comprised turf onto grey silty gravelly SAND with gravel of ash, hardcore, tarmac, brick, and concrete. A layer of in situ tarmac was encountered in WS1a between 0.15 and 0.20mbgl. Information presented within the logs has been used to inform the anticipated site geology in Section 3.1.

5.1.2 Mayfield SRF UK Ground Engineering Desk Study Report (2015) [6].

Buro Happold was appointed by Turner & Townsend Limited to undertake site investigation works for the proposed Mayfield Masterplan development. The site boundary and a summary of the potentially contaminative historical uses for the wider Mayfield Site identified within the report is provided in Figure 5—2. The assessment of historical mapping undertaken as part of the current desk study is consistent with that presented in the 2015 Buro Happold desk study report. However, most of the historical sources of contamination identified within this 2015 desk study for the wider Mayfield site were considered not applicable to the Pigeon Triangle Site due to distance from the Site and location down hydraulic gradient (see Section 6.4).

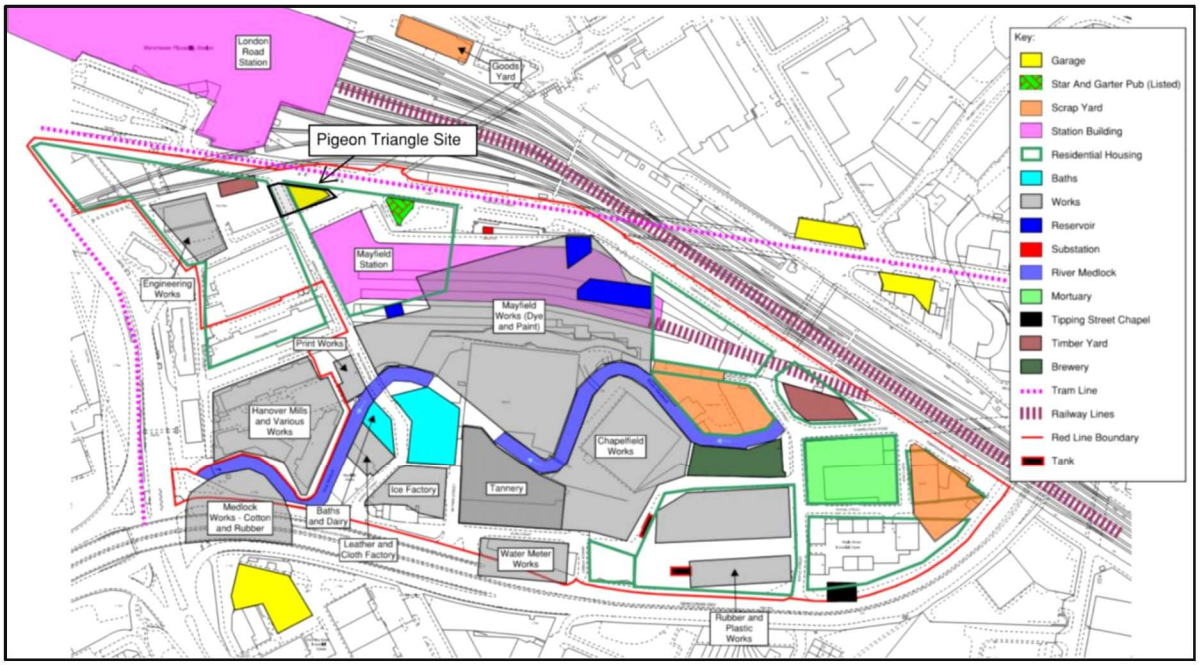


Figure 5—2 Site history summary amended from Figure 4 in the 2015 Buro Happold Desk Study report.

5.1.3 Mayfield Regeneration Geoenvironmental and Geotechnical Desk Study Report (2017) [8].

Buro Happold were commissioned by U+I to prepare a desktop Geoenvironmental and Geotechnical Study for the Mayfield Regeneration Site. Historical sources of contamination identified within this desk study were consistent with our assessment (Section 6.4).

During the 2017 site walkover sharps and needles were identified. (Note: The walkover undertaken in November 2025 by Buro Happold did not identify sharps within the Pigeon Triangle area.)

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6 Preliminary Geoenvironmental Risk Assessment

6.1 General Approach

In the UK, the assessment of risk from contamination is based on consideration of the conceptual site model and follows the "source-pathway-receptor" approach. If one of these three elements (source, pathway or receptor) is absent, it is considered that there is no risk of harm. If, however, there is considered to be a linkage between a given source and a given receptor, then a risk-based approach is used to assess the significance or impact of the linkage. Risks are defined as the probability of an event occurring combined with the severity of the consequence of that event. Particularly, to assess the risks to site end users posed by a given source, the sensitivity of each receptor is considered. For example, the concentration of contamination acceptable at a site to be developed as a residential property with a garden used to grow vegetables and accessible to young children is set lower than that for a commercial site where soil is exposed only in minor areas of landscaping and the only long-term users of the site are adults. Similarly, a site overlying a Principal Aquifer supplying potable water will be considered more stringently than a site overlying an impermeable geology with only minor seepages of groundwater.

6.2 Climate Change

It is accepted that the climate is changing and that this will affect future weather patterns. The Environment Agency [9] requires factoring climate change into risk assessments and remedial solutions. The British Standard, 'Adaptation to Climate Change – Principles, Requirements and Guidelines' [10] states that 'climate change impacts shall be assessed comprehensively…including…contamination' and should focus 'upon understanding the implications of future climate change trends and climate events over the full lifespan of a decision'. The National Planning Policy Framework [11] requires new development to contribute to 'mitigating and adapting to climate change' and to 'minimise vulnerability and increase resilience' to the range of impacts arising from climate change.

The changes to weather patterns in the UK may include: an increase in warmer weather; an increase in the frequency and intensity of rainfall events; and an increase in the duration and frequency of dry spells in the summer. Such events are also likely to become more extreme. There is the potential for these scenarios to impact upon potential contaminant migration pathways in particular with respect to both hazardous ground gas and contaminated groundwater via permeable strata, during both construction and operation of the proposed development.

In this particular instance, because of the nature of the ground conditions at the Site and the Proposed Development, no additional risks are considered applicable relating to this assessment as a result of climate change.

6.3 Conceptual site model

The potential risks posed to human health and the environment by ground contamination at this site have been evaluated by a generic quantitative risk assessment which incorporates the 'source-pathway-receptor' identification and assessment methodology in accordance with Land Contamination: Risk Management [9]. The risk assessment process therefore involves the identification of each source based on the information in this report, together with the identification of relevant pathway(s) and receptors. The potential risks to the receptors have been assessed by considering the potential effect of the source on the receptor as well as the likelihood of a pathway linking the two, i.e., a contaminant linkage as discussed above.

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6.4 Sources

The potential contamination sources at the Site have been identified from the review of regulatory data, historical maps and previous reports relevant to the Site and are summarised in Table 6-1. The 'Contaminants of Concern' in this risk assessment are based primarily on information from this review of historical information and by reference to relevant Industry Profile reports [12, 13], and R&D 66 [14].

Due to their distance and location hydraulically down gradient from the Site, and proposed plans not requiring excavation below the water table, the following potential sources identified in historical mapping and previous desk study reports for the wider Mayfield site [6, 8] (Figure 5—2), are not considered as sources of contamination for the Pigeon Triangle site: Mayfield goods station; dye and print works; tannery; cotton and rubber works; leather and cloth factory; rubber and plastic works; scrap yards; brewery; iron works; railway land; baths and dairy. Additionally, the engineering works present ~50m west of the Site from 1932 to 1960 has not been considered as a potential source of contamination due to its location across hydraulic gradient and the fact it has been redeveloped as a carpark from the 1980s.

Ground gas is not considered to be a risk with respect to the proposed end use as there is unlikely to be a source of ground gas at the Site for the following reasons:

- In accordance with BS 8576: 2013 [15] the generation potential of Made Ground with low degradable organic content including a high proportion of ash (as encountered during the GIP LTD 2009 ground investigation at the Site) is considered to be 'very low';
- The building once labelled as 'Fairfield Street Garage' in the eastern portion of the Site was demolished between 1974 and 1984 and the Site has remained in its current vacant state since then. Therefore the Made Ground has been in place for over 20 years and therefore in accordance with BS 8485: 2015 +A1: 2019 [16], the amount of degradable organic carbon is likely to be minimal;
- No tanks have been recorded at the site;
- The Factual Report by GIP LTD in 2009 (Appendix AAppendix A) reports total organic carbon (TOC) concentrations within the Made Ground of less than 5%, even where ash content was noted. Therefore, the degradable organic carbon content has been shown to be low;
- Although no tanks have been recorded on the site, and the potential risk from ground gas and vapours is therefore considered to be low; and
- This is a outdoor air scenario with substantial dilution in air of any potential ground gas.

Therefore, based on the above assessment it is considered unlikely that a source of ground gas is present at the site and therefore, ground gas has not been taken forward as a potential source of contamination in the risk assessment. It should be noted that results from the ground investigation will further assess whether there is a source of hydrocarbons associated with the historical garage and therefore, this assessment may need to be updated based on the investigation data.

Table 6-1 Summary of potential sources of contamination

Potential Source	Location	Likely Age	Potential Contaminants of Concern
Made Ground: associated with historical developments.	On site	>100 years	Asbestos, heavy metals, PAHs.
On site uses: historical garage, carparking.	On site	>80 years to present.	Asbestos, heavy metals, PAHs, TPHs, fuels and oils, VOCs and SVOCs.

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Potential Source	Location	Likely Age	Potential Contaminants of Concern
Surrounding historical industrial uses: timber yard.	From adjacent	>100 years	Heavy metals, PAHs, TPHs, fuels and oils.

6.5 Pathways and receptors

The presence of contamination (in soils, liquids or gases) has the potential to impact upon human and environmental receptors both in the short term (during construction) and in the long term (during use and occupation). Those receptors and the pathways that could link them to the sources identified in Table 6-1 are summarised below.

The accumulation of ground gases is not considered a viable pathway for creating explosive environments or causing asphyxiation, for the proposed end use for the following reasons:

- Limited source (see Section 6.4 above);
- This is an outdoor air scenario with substantial dilution in air of any potential ground gas;
- There is no building or confined space for ground gas to migrate into* that may cause an explosion or asphyxiation.

*It should be noted that one manhole is proposed within the eastern portion of the site. It is considered that potential risks from ground gas (albeit likely low) would primarily relate to Work Exposure Limits (WEL's; EH40) during groundworks and maintenance. Therefore, the potential for exposure to hazardous concentrations of ground gas in excavations and confined spaces and would be managed as part of good construction practice and health and safety controls during earthworks and confined space entry requirements during maintenance.

It should also be noted that should a different proposed use be planned (e.g. for a building) in future, this assessment of viable pathways will need to be reassessed and ground gas monitoring may need to be undertaken to appropriately assess the risk.

Table 6-2 Summary table of receptors and potential pathways

Receptor		Sensitivity	Pathway
Human Health	Investigation and construction workers	High	Direct/ dermal contact. Ingestion/ inhalation of soils.
	Future site users / visitors	High	Direct/dermal contact. Inhalation of contaminated dusts.
	Off-site occupiers / visitors of neighbouring land	High	Inhalation of contaminated dusts.
Controlled Waters	Principal aquifer (Chester formation sandstone)	Moderate	Migration via permeable strata and preferential pathways
	River Medlock	Moderate	Migration via permeable strata and preferential pathways
	Secondary Aquifers (Devensian Till)	Low	Migration via permeable strata and preferential pathways
Ecology	Flora and fauna	Low	Root uptake
Built environment	Buried concrete foundations. Potable water supply pipework	Moderate	Direct contact with contaminated material/ aggressive attack

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6.6 Assessment of risk

The assessment of the level of risk for each of the potential contaminant linkages identified above is summarised in Table 6-3. The table lists the potential sources identified above. For each source, an assessment is made, receptor by receptor as to the magnitude of the potential consequence (reflecting the potential severity of the hazard associated with that source and the sensitivity of the receptor).

Consideration has also been given to the level of uncertainty associated with each of these potential sources. For example, much of the information is based upon historical records which are likely to be partial and will not be complete, together with the limited nature of the existing site investigation data. Because of this uncertainty, the identification of the sources is based upon a conservative assessment of the potential location, nature and extent of the source. The probability or likelihood of the hazard being realised is then assessed by consideration of the directness / integrity of the exposure pathway that could link the receptor to the source. The assigned level of risk is determined by the terms of consequence and probability in accordance with C552 [17]. The final column describes the factors considered in the assessment and presents the justification for the assessed level of risk.

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Table 6-3 - Preliminary Risk Assessment

Source		**Receptor**/ Pathway	**Risk assessment** (following CIRIA C552)			Comment on hazard realisation
Origin	Contaminants of concern		Consequence	Probability	Risk	
Made Ground associated with historical developments On site uses: historical garage, carparking. Surrounding historical industrial uses: timber yard	Asbestos, heavy metals, PAHs, TPHs, fuels and oils, VOCs and SVOCs	**Description of the Source:** The first mapping available (mid-19th century) shows the site comprising residential houses, intersected by Boardman Street and including the Star and Garter pub. By the late 1800s, housing was cleared as surrounding industry expanded, leaving the Site largely vacant. A small building is shown on the mapping in 1932 and was later used as Fairfield Street Garage (1948–1950) before being cleared between 1974 and 1984. Boardman Street became Baring Street in the 1960s, and the Site remained mostly vacant. In the late 1980s, the last building was removed and a car park constructed on the western edge. By 2000, the eastern portion was grassed with footpaths, while the west continued as car park. Recent changes include replacing grass with gravel and addition of concrete legato blocks. A timber yard was present adjacent to the northwest of the Site from 1889 until 1908; other surrounding historical industries are not considered sources of contamination in relation to the proposed development due to distance, location down or cross hydraulic gradient from the site and the shallow nature of the earthworks required for the proposed development. As discussed in Section 6.4 it is considered that ground gas is not a source of contamination for the proposed development. Previous ground investigations at the Site encountered up to 0.8mbgl of Made Ground comprising turf onto grey silty gravelly SAND with gravel of ash, hardcore, tarmac, brick, and concrete. However, the full extent of Made Ground remains unknown due to termination on concrete obstructions between 0.35 and 0.8m bgl. No asbestos or visual or olfactory evidence of gross contamination was recorded within the Site.				
		Investigation and construction workers Direct / dermal contact. Ingestion / inhalation of contaminated soil.	Medium	Low	**Moderate/ Low**	Potential for exposure to contamination contained within Made Ground during investigations and earthworks. Extent of Made Ground unconfirmed. Period of exposure likely to be limited, confined to exploratory drilling, small excavations and service runs. Standard health and safety precautions will be used. Limited potential for hazardous gases to impact construction and maintenance workers in particular due to accumulation in deep excavations. Potential risks from ground gas (albeit likely low) would primarily relate to Work Exposure Limits (WEL's; EH40) during groundworks. Therefore, the potential for exposure to hazardous concentrations of ground gas in excavations and confined spaces and would be managed as part of good construction practice and health and safety controls during earthworks. *Mitigation can be achieved by appropriate investigation, adoption of good construction practice and maintaining a watching brief for unexpected contamination during investigation and construction.*
		Future site users / visitors Direct / dermal contact. Inhalation of soils / dusts. Ingestion of contaminated water supplies.	Medium	Low	**Moderate / Low**	Proposed future use as public green space with soft and hard landscaping. Potential for dust generation, direct contact and ingestion. Site won soils unlikely to be suitable of landscaping purposes. *Mitigation will be provided by appropriate investigation and assessment, removal/remediation of site soils (if necessary) as part of enabling works and use of chemically suitable soils in soft landscaped areas with a potential geotextile marker layer, dependent on results of the ground investigation. Additional mitigation can be achieved by maintaining a watching brief for unexpected contamination as part of a pre-agreed plan as per planning requirements including suitable assessment/remediation (as necessary).*
		Off-site occupiers / visitors of neighbouring land Inhalation of contaminated dusts.	Medium	Unlikely	**Low**	Site located in a predominantly industrial / commercial area. Potential for generation of dusts during investigation, earthworks and construction. Potential exposure time limited. *Mitigation of potential risks can be achieved by appropriate investigation and assessment, adoption of good construction practice (including dust suppression) and maintaining a watching brief for unexpected contamination during investigation and construction.*
		Degradation of Water quality **[Principal aquifer – Chester Formation sandstone]**	Medium	Low	**Moderate/ low**	There are no local groundwater or active potable supply abstractions. Site is not located in a Source Protection Zone. Potential for increased infiltration and promotion of leaching from Made Ground during investigation / construction. *Mitigation of potential risks can be achieved by appropriate investigation, assessment, adoption of good construction practice, maintaining a watching brief for unexpected contamination during investigation and construction, and appropriate design (including whether the proposed design includes sealed drainage / consideration of leachability of site-won soils to be protective of the aquifer).*

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Source		**Receptor**/ Pathway	**Risk assessment** (following CIRIA C552)			Comment on hazard realisation
Origin	Contaminants of concern		Consequence	Probability	Risk	
		Degradation of Water quality **[River Medlock]** Migration via permeable strata	Medium	Unlikely	**Low**	Potential for contaminated groundwater to migrate via drainage, permeable strata and surface run-off. Due to the distance of the River Medlock (126m south of the Site), risk is considered to be low. *Mitigation of potential risks can be achieved by appropriate investigation, assessment, adoption of good construction practice, maintaining a watching brief for unexpected contamination during investigation and construction, and appropriate design (including whether the proposed design includes sealed drainage / consideration of leachability of site-won soils to be protective of the surface water).*
		Flora and fauna Direct contact and root uptake	Mild	Unlikely	**Very low**	Proposed future use as public green space with soft and hard landscaping. Areas of soft landscaping will require chemically and horticulturally suitable imported soils. *Mitigation will be provided by appropriate investigation and assessment, removal/remediation of site soils (if necessary) as part of enabling works and use of chemically and horticulturally suitable soils in soft landscaped areas with a potential geotextile marker layer dependent on the results of the ground investigation.*
		Buildings/services - permeation of water supply pipework, degradation of concrete Direct contact/, aggressive attack/ below ground structures	Medium	Unlikely	**Low**	Potential for direct contact and permeation of potable water supply by certain contaminants (hydrocarbons) in pipework laid directly in Made Ground. Potential for degradation of concrete due to direct contact with aggressive ground conditions. *Mitigation of potential risks can be achieved by undertaking appropriate investigation, design and material selection.*

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7 Conclusions and Recommendations

7.1 Summary of contamination risks

An Initial Conceptual Site Model was developed and a Preliminary Risk Assessment with respect to ground contamination carried out for the Site on the basis of desk-based data. At this stage of this project the main sources of potential contamination have been identified and the potential risks have been qualitatively assessed. The assessment is based upon the Site in its current condition, but it also includes consideration of the potential risks associated with below ground works (e.g. site investigation and earthworks) and the potential future use (public space). A summary of the potentially significant risks (i.e. greater than Low) is presented below.

Table 7-1 Summary of potential risks

Receptor	Source	Potential risk
Investigation and construction workers	Made Ground associated with historical developments On site uses: historical garage, carparking. Surrounding historical industrial uses: timber yard	Moderate/ low
Future site users		
Controlled waters (Chester Formation, Principal Aquifer)		

Results from the ground investigation will further assess whether there is a source of hydrocarbons associated with the historical garage. The geoenvironmental interpretive report will therefore incorporate the findings of the ground investigation with associated review of the conceptual site model.

It should be noted that one manhole is proposed as part of the Proposed Development within the eastern portion of the site. It is considered that potential risks from ground gas (albeit likely low) would primarily relate to Work Exposure Limits (WEL's; EH40) during groundworks and maintenance. Therefore, the potential for exposure to hazardous concentrations of ground gas in excavations and confined spaces would be managed as part of good construction practice and health and safety controls.

It should also be noted that should a different proposed use be planned (e.g. for a building) in future, the ground gas risk assessment should be re-visited as ground gas monitoring may need to be undertaken to appropriately assess the risk to buildings and future users.

7.2 Recommendations

Ground Investigation

There are potential ground-related risks associated with the Site due to the former Site and surrounding use. Therefore, it is recommended that a ground investigation is completed to better understand these risks, with an ultimate aim to implement mitigation measures which safely eliminate, reduce or control them. The aims and objectives of the investigation should combine geotechnical and geoenvironmental aspects.

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The objectives will be to:

- Gain an understanding of the presence, extent and nature of Made Ground (including preliminary waste characterisation);
- Investigate the potential risks to human health and the environment from contamination, including assessment whether there is a source of hydrocarbons from the historical garage located on-site;
- Assess the anticipated ground conditions beneath the Site; and
- Undertake in-situ and laboratory testing of ground materials in order to assess geotechnical parameters for materials reuse and support development of the Earthworks Specification.

The results from the ground investigation to be reported in a Geoenvironmental Interpretative Report, suitable for submission to the local planning authority.

A watching brief should be undertaken during the ground investigation and subsequent groundworks for unexpected contamination.

Proposed Design

The following design recommendations are provided below

- Mitigation of risks (if present) identified as part of the ground investigation and subsequent assessment will be undertaken that may include removal/remediation of site soils (if necessary) as part of enabling works.
- Use of chemically suitable soils, including consideration of the potential for leaching/proposed landscaping design, will be made in soft landscaped areas with a potential geotextile marker layer, dependent on results of the ground investigation.
- Mitigation of potential risks to underground utilities and concrete can be achieved by undertaking appropriate investigation, design and material selection.

Health and Safety

Health and Safety recommendations are provided below:

- Based on the UXO assessment undertaken to date in relation to the site (Preliminary UXO Risk Assessment in Appendix D resulting in 'Moderate' risk and Explosive Ordnance (EO) Threat Assessment (EOTA) by Planit in 2017 resulting in a 'Medium' risk) a UXO Threat Mitigation Strategy is required prior to ground investigation and earthworks to manage the potential risks from UXO. Recommendations from this UXO Threat Mitigation Strategy should be implemented prior to ground investigation and earthworks.
- Implementation of good construction practice and health and safety controls in accordance with HSE guidance (HSE EH40) should be undertaken during investigation, earthworks and future maintenance to prevent the exposure of the workforce to potentially hazardous concentrations of ground gases (above WELs) when working in confined spaces.
- Adoption of good construction practice (including dust suppression) should be made during the investigation and groundworks
- During the 2017 site walkover, sharps and needles were identified. Although the walkover undertaken in November 2025 by Buro Happold did not identify any sharps within the Pigeon Triangle area, a watching brief should be maintained during the ground investigation and earthworks to mitigate potential risks

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[16] British Standards Institute, "BS 8486:2015+A1:2019 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.," 2019.

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Appendix A GIP LTD Ground Investigation Factual Report (2009)

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FACTUAL GROUND INVESTIGATION AND TEST REPORT FOR REDEVELOPMENT OF LAND TO THE SOUTH OF MANCHESTER PICCADILLY RAILYWAY STATION, MANCHESTER.

Date: 8th October 2009
Our Ref: DPS/17855

Client: British Railway Board (Residuary) Ltd
Whittles House
14 Pentonville Road
London
N1 9HF

Engineer: Buro Happold Ltd
2 Brewery Place
Brewery Wharf
Leeds
LS10 1NE

Report Status: Final

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2	**The Site**	1
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4	**Contamination Testing**	3
5	**Ground Conditions**	3
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APPENDICES

A	Window Sample Borehole Logs
B	Gas and Groundwater Monitoring Results
C	Contamination Test Results (SAL)
D	Exploratory Hole Location Plan - Drawing No.1
E	Notes on Site Investigation Reports

1 Introduction

1.1 It is proposed to redevelop an area of land located to the south of Piccadilly Railway Station in Manchester City Centre.

1.2 Upon the instruction of the client, British Railway Board (Residuary) Ltd and supervised by the Engineer, Buro Happold Ltd, a ground investigation was undertaken consisting of seven window sample boreholes. The purpose of the investigation was to determine the nature of the prevailing ground conditions. The form and extent of the investigation was specified and supervised by the Engineer in conjunction with the client.

1.3 This report contains a factual record of the fieldwork, laboratory test results, anticipated geology and strata encountered by this investigation.

2 The Site

2.1 The site itself is bounded to the north / east by Fairfield Street and Temperance Street, to the west by Baring Street and to the south by the River Medlock. The area of BH1/1a/1b comprised a triangular island of grass. BH2 was situated on a gravel covered car park to the rear of the Star and Garter public house and could be accessed via Nield Street. BH3 and BH4 were accessed via a padlocked gate at the junction of Travis Street and Fairfield Street. A cobbled ramp around 150m in length rises approximately 10m in elevation opening out onto a cobble and hardcore covered area where BH3 was located. To the south and east of this, separated by a steel fence, is what is believed to be former railway platforms with a corrugated steel roof. A narrow track leads south east from BH3 to BH4 beyond which the land opens out onto active railway lines. BH5 is accessed by another padlocked gate off Baring Street opposite Buxton Street. The gate opens out onto a rough concrete and cobbled yard upon which there are numerous rusted steel containers, broken wheelie bins, piles of rubble, used tyres and at least one storage tank. The land to the east and south of BH5 is inaccessible due to overgrown vegetation.

2.2 The location of the site and position of the exploratory holes, as determined initially by Buro Happold, are indicated upon the appended site plan (Drawing No.1).

3 Fieldwork

3.1 General Comments

3.1.1 The prevailing ground conditions were determined by the use of window sample boreholes (7 no). All exploratory works were carried out, where appropriate, in accordance with BS 5930 (Ref. 1).

3.2 Window Sample Boreholes

3.2.1 Seven window sample boreholes were sunk to depths of between 0.35m (BH 1A) and 3.80m (BH 2) below ground level.

3.2.2 At the request of Buro Happold environmental samples comprising a 1kg plastic tub, 250ml amber glass jar and 60ml glass amber vial (McCartney Vial) were taken for use in contamination testing and as an aid for the production of the appended engineer verified borehole logs.

3.3 Instrumentation and Monitoring

3.3.1 50mm internal diameter HDPE monitoring standpipes were installed within BH 2 & 5, monitoring of which has been carried out three times over a four week period. The results of this monitoring are included within the appendices.

4 Contamination Testing

4.1 A schedule of contamination testing was prepared by Buro Happold and carried out by SAL according to the specifications prepared by Buro Happold. The results of this testing are included within the appendices.

5 Ground Conditions

5.1 Anticipated Geology

5.1.1 The available geological information (Ref 2) shows the site to be underlain by superficial deposits in the form of Late Glacial Flood Gravels. This masks the solid geology beneath the site which comprises the Bunter Sandstone strata of the Triassic Period.

5.2 Strata Encountered

5.2.1 Reference should be made to the appended exploratory hole records for full details of the strata encountered by this investigation.

FOR AND ON BEHALF OF:
GIP LTD

D.P. Shuker HNC (Civils), F.G.S.
ENGINEERING GEOLOGIST

J.P.Hughes B.Sc., M.Sc., C.Geol., F.G.S., C.Sci. Eur.Geol
TECHNICAL DIRECTOR

References

1. British Standards Institution 5930 (1999); Code of Practice for Site Investigation.

2. British Geological Survey Sheet 85 'Manchester' Solid & Drift Editions 1:50,000 Series.

APPENDIX A



GROUND INVESTIGATION & PILING LTD
Competitor 130 Borehole Log

Borehole No. BH1
Page No. Sheet 1 of 1

Level (mAOD): 40.39
Date: 04/09/2009 to 04/09/2009
Coordinates E: 384933.75 N397725.59
Location: Manchester City Centre
Cased (m):
Client: British Railway Board (Residuary) Ltd
Diameter (mm):
Engineer: Buro Happold

DESCRIPTION OF STRATA	Legend	Depth (m bgl)	Level (m AOD)	Water Level (m bgl)	Samples/Tests Type	Samples/Tests Depth (m bgl)	SPT 'N' Value	Hand Vane (kPa)	Piezo /Gas Pipe
MADE GROUND:- Turf onto grey silty gravelly SAND with some cobbles of brick, concrete and hardcore. Gravel is angular to subangular brick, concrete, hardcore and ash - pockets of white ash from 0.60m to 0.70m					ES	0.30			
					ES	0.60			
MADE GROUND:- CONCRETE		0.80	39.59						
Borehole Complete									

SAMPLES / TESTS

U	Undisturbed Sample
D	Disturbed
B	Bulk
W	Water
S/C	SPT/CPT
▽	Water strike
▼	Water level

OTHER INFORMATION

1. Hand excavated service avoidance pit to 0.80m. Concrete obstruction in ground, moved to BH1A at engineers request.
2. No groundwater encountered.
3. ES = 1 tub, 250ml amber jar, 60ml McCartney Vial

Logged by	TPH	Project No. 17855
Checked by	DPS	

Ground Investigation & Piling Limited,Devonshire House, Ettingshall Road, Wolverhampton,WV2 2JT. Tel. 01902 459558 Fax 01902 459085

GROUND INVESTIGATION & PILING LTD
Competitor 130 Borehole Log

Borehole No. BH1A
Page No. Sheet 1 of 1

Level (mAOD): 40.50
Date: 04/09/2009 to 04/09/2009
Coordinates E: 384937.48 N397725.16
Location: Manchester City Centre
Cased (m):
Client: British Railway Board (Residuary) Ltd
Diameter (mm):
Engineer: Buro Happold

DESCRIPTION OF STRATA	Legend	Depth (m bgl)	Level (m AOD)	Water Level (m bgl)	Samples/Tests Type	Samples/Tests Depth (m bgl)	SPT 'N' Value	Hand Vane (kPa)	Piezo /Gas Pipe
MADE GROUND:- Turf onto dark grey gravelly SAND. Gravel is angular ash		0.15	40.35		ES	0.25			
MADE GROUND:- TARMAC (in situ)		0.20	40.30						
MADE GROUND:- Brown and dark grey very gravelly SAND. Gravel is angular to subangular hardcore and tarmac		0.35	40.15						
MADE GROUND:- CONCRETE									
Borehole Complete									

SAMPLES / TESTS

U	Undisturbed Sample
D	Disturbed
B	Bulk
W	Water
S/C	SPT/CPT
▽	Water strike
▼	Water level

OTHER INFORMATION

1. Hand excavated service avoidance pit to 0.35m. Concrete obstruction in ground, moved to BH1B at engineers request.
2. No groundwater encountered.
3. ES = 1 tub, 250ml amber jar, 60ml McCartney Vial

Logged by	TPH
Checked by	DPS

Project No. 17855

Ground Investigation & Piling Limited,Devonshire House, Ettingshall Road, Wolverhampton,WV2 2JT. Tel. 01902 459558 Fax 01902 459085

GROUND INVESTIGATION & PILING LTD
Competitor 130 Borehole Log

Borehole No. BH1B
Page No. Sheet 1 of 1

Level (mAOD): 40.48
Date: 04/09/2009 to 04/09/2009
Coordinates E: 384943.49 N397725.76
Location: Manchester City Centre
Cased (m):
Client: British Railway Board (Residuary) Ltd
Diameter (mm):
Engineer: Buro Happold

DESCRIPTION OF STRATA	Legend	Depth (m bgl)	Level (m AOD)	Water Level (m bgl)	Samples/Tests Type	Samples/Tests Depth (m bgl)	SPT 'N' Value	Hand Vane (kPa)	Piezo /Gas Pipe
MADE GROUND:- Turf onto grey brown silty gravelly SAND. Gravel is angular to subangular brick, ash, hardcore and concrete		0.40	40.08		ES	0.30			
MADE GROUND:- CONCRETE									
Borehole Complete									

SAMPLES / TESTS

U	Undisturbed Sample
D	Disturbed
B	Bulk
W	Water
S/C	SPT/CPT
▽	Water strike
▼	Water level

OTHER INFORMATION

1. Hand excavated service avoidance pit to 0.40m. Concrete obstruction in ground. Borehole abandoned at engineers instruction.
2. No groundwater encountered.
3. ES = 1 tub, 250ml amber jar, 60ml McCartney Vial.

Logged by	TPH
Checked by	DPS

Project No. 17855

Ground Investigation & Piling Limited,Devonshire House, Ettingshall Road, Wolverhampton,WV2 2JT. Tel. 01902 459558 Fax 01902 459085

GROUND INVESTIGATION & PILING LTD
Competitor 130 Borehole Log

Borehole No. BH2
Page No. Sheet 1 of 1

Level (mAOD): 39.77
Date: 04/09/2009 to 04/09/2009
Coordinates E: 385028.89 N397710.75
Location: Manchester City Centre
Cased (m):
Client: British Railway Board (Residuary) Ltd
Diameter (mm): 100
Engineer: Buro Happold

DESCRIPTION OF STRATA	Legend	Depth (m bgl)	Level (m AOD)	Water Level (m bgl)	Samples/Tests Type	Samples/Tests Depth (m bgl)	SPT 'N' Value	Hand Vane (kPa)	Piezo /Gas Pipe
MADE GROUND:- Dark grey sandy GRAVEL. Gravel is angular hardcore and brick		0.05	39.72		ES	0.30			
MADE GROUND:- Grey brown silty gravelly SAND with some cobbles of brick, quartz, cloth and timber. Gravel is angular to subrounded brick, rubber, quartz, hardcore, slate, timber and ash					ES	0.70			
					ES	1.00			
- becoming clayey and ash rich below 1.50m					ES	1.70			
POSSIBLE MADE GROUND:- Soft to firm brown very sandy gravelly friable CLAY occasionally tending to very clayey sand. Gravel is subangular to subrounded sandstone and quartz		1.90	37.87		ES	2.50			
Orange brown silty fine to medium SAND		3.20	36.57		ES	3.60			
Borehole Complete		3.80	35.97						

SAMPLES / TESTS

U	Undisturbed Sample
D	Disturbed
B	Bulk
W	Water
S/C	SPT/CPT
▽	Water strike
▼	Water level

OTHER INFORMATION

1. Hand excavated service avoidance pit to 1.20m.
2. No groundwater encountered.
3. 50mm ID HDPE standpipe installed to 3.0m (slotted from 1.0m to 3.0m) with gravel filter, bentonite seals from 3.80m to 3.0m and 1.0m to 0.30m and concrete to ground level. Lockable security cover fitted flush at surface.
4. ES = 1 tub, 250ml amber jar, 60ml McCartney Vial

Logged by	TPH
Checked by	DPS

Project No. 17855

Ground Investigation & Piling Limited,Devonshire House, Ettingshall Road, Wolverhampton,WV2 2JT. Tel. 01902 459558 Fax 01902 459085

GROUND INVESTIGATION & PILING LTD
Competitor 130 Borehole Log

Borehole No. BH3
Page No. Sheet 1 of 1

Level (mAOD): 49.87
Date: 04/09/2009 to 04/09/2009
Coordinates E: 385184.48 N397662.57
Location: Manchester City Centre
Cased (m):
Client: British Railway Board (Residuary) Ltd
Diameter (mm):
Engineer: Buro Happold

DESCRIPTION OF STRATA	Legend	Depth (m bgl)	Level (m AOD)	Water Level (m bgl)	Samples/Tests Type	Samples/Tests Depth (m bgl)	SPT 'N' Value	Hand Vane (kPa)	Piezo /Gas Pipe
MADE GROUND:- Rough grass onto dark grey silty gravelly SAND with occasional cobbles of brick and timber. Gravel is angular to subangular brick, concrete, roadstone, ash and tarmac		0.40	49.47		ES	0.20			
					ES	0.50			
MADE GROUND:- Grey GRAVEL. Gravel is subangular medium roadstone		0.70	49.17						
Borehole Complete									

SAMPLES / TESTS

U	Undisturbed Sample
D	Disturbed
B	Bulk
W	Water
S/C	SPT/CPT
▽	Water strike
▼	Water level

OTHER INFORMATION

1. Hand excavated service avoidance pit to 0.70m. Pit abandoned at 0.7m at engineers request, due to continuous side collapse.
2. No groundwater encountered.
3. ES = 1 tub, 250ml amber jar, 60ml McCartney Vial.

Logged by	TPH
Checked by	DPS

Project No. 17855

Ground Investigation & Piling Limited,Devonshire House, Ettingshall Road, Wolverhampton,WV2 2JT. Tel. 01902 459558 Fax 01902 459085

GROUND INVESTIGATION & PILING LTD
Competitor 130 Borehole Log

Borehole No. BH4
Page No. Sheet 1 of 1

Level (mAOD): 49.44
Date: 04/09/2009 to 04/09/2009
Coordinates E: 385246.41 N397616.43
Location: Manchester City Centre
Cased (m):
Client: British Railway Board (Residuary) Ltd
Diameter (mm):
Engineer: Buro Happold

DESCRIPTION OF STRATA	Legend	Depth (m bgl)	Level (m AOD)	Water Level (m bgl)	Samples/Tests Type	Samples/Tests Depth (m bgl)	SPT 'N' Value	Hand Vane (kPa)	Piezo /Gas Pipe
MADE GROUND:- Grey sandy GRAVEL with some cobbles. Gravel and cobbles are angular roadstone and occasional timber		0.40	49.04		ES	0.40			
Borehole Complete									

SAMPLES / TESTS

U	Undisturbed Sample
D	Disturbed
B	Bulk
W	Water
S/C	SPT/CPT
▽	Water strike
▼	Water level

OTHER INFORMATION

1. Hand excavated service avoidance pit to 0.40m. Concrete obstruction in ground. Borehole abandoned at engineers request.
2. No groundwater encountered.
3. ES = 1 tub, 250ml amber jar, 60ml McCartney Vial.

Logged by	TPH
Checked by	DPS

Project No. 17855

Ground Investigation & Piling Limited,Devonshire House, Ettingshall Road, Wolverhampton,WV2 2JT. Tel. 01902 459558 Fax 01902 459085

GROUND INVESTIGATION & PILING LTD
Competitor 130 Borehole Log

Borehole No. BH5
Page No. Sheet 1 of 1

Level (mAOD): 37.70
Date: 04/09/2009 to 04/09/2009
Coordinates E: 384996.22 N397634.52
Location: Manchester City Centre
Cased (m):
Client: British Railway Board (Residuary) Ltd
Diameter (mm): 100
Engineer: Buro Happold

DESCRIPTION OF STRATA	Legend	Depth (m bgl)	Level (m AOD)	Water Level (m bgl)	Samples/Tests Type	Samples/Tests Depth (m bgl)	SPT 'N' Value	Hand Vane (kPa)	Piezo /Gas Pipe
MADE GROUND Concrete		0.30	37.40						
MADE GROUND:- CONCRETE (to 0.30m) onto light grey sitly SAND and GRAVEL with some cobbles of brick hardcore and concrete. Gravel is angular ash, brick and concrete					ES	0.50			
					ES	1.00			
MADE GROUND:- Soft to firm grey and dark grey very sandy gravelly CLAY. Gravel is angular to subangular ash, brick and quartz		1.10	36.60		ES	1.10			
		1.50	36.20		ES	1.50			
MADE GROUND:- Light grey gravelly SAND. Gravel is angular ash and crushed brick		2.10	35.60						
Light brown clayey SAND with clay laminae and occasional quartz gravels		2.30	35.40		ES	2.20			
Light orange brown silty fine to coarse SAND		2.40	35.30						
Borehole Complete									

SAMPLES / TESTS

U	Undisturbed Sample
D	Disturbed
B	Bulk
W	Water
S/C	SPT/CPT
▽	Water strike
▼	Water level

OTHER INFORMATION

1. Hand excavated service avoidance pit to 1.10m.
2. No groundwater encountered.
3. 50mm ID HDPE standpipe installed to 2.30m (slotted from 2.30m to 1.0m) with gravel filter, bentonite seals from 2.40m to 2.30m and 1.0m to 0.3m with concrete to ground level. Lockable security cover fitted ats surface.
4. ES = 1 tub, 250ml amber jar, 60ml McCartney Vial.

Logged by	TPH	Project No. 17855
Checked by	DPS	

Ground Investigation & Piling Limited,Devonshire House, Ettingshall Road, Wolverhampton,WV2 2JT. Tel. 01902 459558 Fax 01902 459085

APPENDIX B



GIP Ltd
Ground Investigation & Piling Limited

Devonshire House, Ettingshall Road,
Wolverhampton. WV2 2JT.
Tel. 01902 459558 Fax. 01902 459085

STANDPIPE GAS & GROUNDWATER MONITORING RESULTS

CONTRACT No. 17855 | **SITE** Manchester City Centre | **CLIENT / ENGINEER** British Railway Board (Residuary) Ltd / Buro Happold

REPORT DATE 16/11/2009

CHECKED

NOTES

Borehole. ID No	Date/Time	CH_4 (%) (by Volume)	CO_2 (%) (by Volume)	O_2 (%) (by Volume)	Peak CH_4 (%) (by Volume)	Atmospheric Pressure (mbar)	Relative Pressure (mbar)	Gas Flow Rate (l/hr)	Air Temperature (^oC)	Operator Initials	CO (ppm)	H_2S (ppm)	N_2 & Inert Gases (%) (by Volume) (by difference)	Borehole Temperature (^oC)	Groundwater (mbgl)
MANCHBH2	16/09/2009 09:18	0.0	4.9	15.6	0.0	1021	0.27	0.3	14	AG	0	0	79.5	14	Dry
MANCHBH5	16/09/2009 09:46	0.0	7.3	11.8	0.0	1021	0.33	0.2	14	AG	0	0	80.9	14	Dry
MANCHBH2	23/09/2009 13:02	0.0	5.2	14.5	0.0	1004	-0.2	0.1	17	AG	0	0	80.3	17	Dry
MANCHBH5	23/09/2009 13:23	0.0	5.6	10.5	0.0	1004	-0.15	0	17	AG	0	0	83.9	17	Dry
MANCHBH2	07/10/2009 14:37	0.0	4.2	15.9	0.0	1000	0.09	-0.4	17	AG	0	0	79.9	17	Dry
MANCHBH5	07/10/2009 14:49	0.0	6.1	13.4	0.0	1000	0.14	-0.4	17	AG	0	0	80.5	17	Dry

APPENDIX C



Scientific Analysis Laboratories is a limited company registered in England and Wales (No 2514788) whose address is at Hadfield House, Hadfield Street, Manchester M16 9FE

Scientific Analysis Laboratories

Certificate of Analysis

Hadfield House
Hadfield Street
Combrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

Report Number: 176378-4

Date of Report: 05-Oct-2009

Customer: Ground Investigation & Piling Ltd
Devonshire House
Ettingshall Road
Wolverhampton
WV2 2JT

Customer Contact: Mr Andy McHugh

Customer Job Reference: 17855
Customer Purchase Order: 29685
Customer Site Reference: Manchester City Centre
Date Job Received at SAL: 08-Sep-2009
Date Analysis Started: 10-Sep-2009
Date Analysis Completed: 05-Oct-2009

The results reported relate to samples received in the laboratory
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with SAL SOPs

UKAS TESTING
1549

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Report checked and authorised by :
Mr Ross Walker
Customer Services Manager

Issued by : [redacted]

Index to symbols used in 176378-4

Value	Description
AR	As Received
M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C
2:1	Leachate to BS EN 12457-3 (2:1)
8:1	Leachate to BS EN 12457-3 (8:1)
N.D.	Not Detected
2	LOD Raised Due to Matrix Interference
9	LOD raised due to dilution of sample
W	Analysis was performed at another SAL laboratory
S	Analysis was subcontracted
U	Analysis is UKAS accredited
M	Analysis is MCERTS accredited
N	Analysis is not accredited

Notes

"Fill" samples are outside the scope of our MCERTS accreditation. Results are UKAS only

Waste Acceptance Criteria

Customer Sample Reference : BH1
SAL Sample Reference : 176378 001
SAL Reference : 176378
Project Site : Manchester City Centre
Customer Reference : 17855
Test Portion Mass (g) : 175
Depth : 0.30
Type : Topsoil

10:1 Leachate					Result	Units	2:1	8:1
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.017	ug/l		2
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.12	ug/l		12
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.22	ug/l		22
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00021	ug/l		0.02
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.034	ug/l		3
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.026	ug/l		2.6
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.0048	ug/l		0.5
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	ug/l		<.05
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.047	ug/l		5
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	ug/l		<1
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.0083	ug/l		0.8
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.024	ug/l		2
Chloride	Calc / IC	0.50	mg/kg	N	3.5	mg/l		0.35
Fluoride	Calc / IC	0.50	mg/kg	N	4.4	mg/l		0.44
Sulphate ion	Calc / IC	0.50	mg/kg	N	50	mg/l		5.0
Total Dissolved Solids	Calc	100	mg/kg	N	590	mg/l		<100
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	mg/l		<.1
pH	Calc / Probe			N		pH		9.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	WN	51	mg/l		5
Naphthalene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluorene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Phenanthrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Chrysene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(b/k)Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Indeno(123-cd)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Dibenzo(ah)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(ghi)Perylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
PAH(total)	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Diesel Range Organics	Calc / GC/FID (LV)	0.10	mg/kg	N	<0.10	mg/l		<.01
Total Petroleum Hydrocarbons	Calc / GC/FID (LV)	0.10	mg/kg	N	<0.10	mg/l		<.01
TPH Speciation	Calc / GC/FID	0	mg/kg	N	0			

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Note:- Sample failed to produce sufficient eluate within the specified time after vacuum filtration for 1 hour and centrifugation for 30 minutes. Therefore, the exact application of the two-step leaching test is precluded on technical grounds. (ref: Section 5.2.4 BS EN 12457-3:2002) Results are derived from a single step leaching at L/S 10/1 as prescribed by the EA guidance. (Ref Section C4.1.1 Guidance on Sampling and Testing of Wastes to meet Landfill Waste Acceptance Procedures Version 1 April 2005, Environment Agency)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : BH1
SAL Sample Reference : 176378 002
SAL Reference : 176378
Project Site : Manchester City Centre
Customer Reference : 17855
Test Portion Mass (g) : 175
Depth : 0.60
Type : Topsoil

10:1 Leachate					Result	Units	2:1	8:1
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.018	ug/l	3	2
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.16	ug/l	5.5	17
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.21	ug/l	41	18
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00031	ug/l	0.07	0.03
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.032	ug/l	5	3
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.042	ug/l	5.8	4.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	<0.0030	ug/l	3.9	<.3
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	ug/l	<.05	<.05
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.080	ug/l	18	7
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	ug/l	2	<1
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.012	ug/l	1.0	1.2
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.026	ug/l	4	2
Chloride	Calc / IC	0.50	mg/kg	N	5.6	mg/l	1.9	0.41
Fluoride	Calc / IC	0.50	mg/kg	N	3.8	mg/l	0.77	0.33
Sulphate ion	Calc / IC	0.50	mg/kg	N	63	mg/l	17	5.0
Total Dissolved Solids	Calc	100	mg/kg	N	630	mg/l	120	<100
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	mg/l	<.1	<.1
pH	Calc / Probe			N		pH	7.8	8.4
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	WN	28	mg/l	4	3
Naphthalene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluorene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Phenanthrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Chrysene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(b/k)Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Indeno(123-cd)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Dibenzo(ah)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(ghi)Perylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
PAH(total)	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Diesel Range Organics	Calc / GC/FID (LV)	0.10	mg/kg	N	<0.10	mg/l		<.01
Total Petroleum Hydrocarbons	Calc / GC/FID (LV)	0.10	mg/kg	N	<0.10	mg/l		<.01
TPH Speciation	Calc / GC/FID	0	mg/kg	N	0			

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : BH1B
SAL Sample Reference : 176378 003
SAL Reference : 176378
Project Site : Manchester City Centre
Customer Reference : 17855
Depth : 0.30
Test Portion Mass (g) : 175
Type : Topsoil

10:1 Leachate					Result	Units	2:1	8:1
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.033	ug/l	6	3
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.12	ug/l	7.3	12
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.38	ug/l	33	38
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00064	ug/l	0.04	0.07
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.088	ug/l	9	9
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.097	ug/l	8.3	9.9
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.21	ug/l	4.6	23
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	0.0070	ug/l	0.20	0.76
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.042	ug/l	7	4
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.024	ug/l	2	3
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.0080	ug/l	0.8	0.8
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.17	ug/l	4	18
Chloride	Calc / IC	0.50	mg/kg	N	3.8	mg/l	1.1	0.29
Fluoride	Calc / IC	0.50	mg/kg	N	4.8	mg/l	0.95	0.42
Sulphate ion	Calc / IC	0.50	mg/kg	N	47	mg/l	13	3.8
Total Dissolved Solids	Calc	100	mg/kg	N	690	mg/l	110	<100
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	mg/l	<.1	<.1
pH	Calc / Probe			N		pH	7.6	8.1
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	WN	81	mg/l	21	6
Naphthalene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluorene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Phenanthrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Chrysene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(b/k)Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Indeno(123-cd)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Dibenzo(ah)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(ghi)Perylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
PAH(total)	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Diesel Range Organics	Calc / GC/FID (LV)	0.10	mg/kg	N	<0.10	mg/l		<.01
Total Petroleum Hydrocarbons	Calc / GC/FID (LV)	0.10	mg/kg	N	<0.10	mg/l		<.01
TPH Speciation	Calc / GC/FID	0	mg/kg	N	0			

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : BH2
SAL Sample Reference : 176378 005
SAL Reference : 176378
Project Site : Manchester City Centre
Customer Reference : 17855
Depth : 1.70
Test Portion Mass (g) : 175
Type : Topsoil

10:1 Leachate					Result	Units	2:1	8:1
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.045	ug/l	8	4
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.070	ug/l	7.0	7.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.083	ug/l	15	8
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00063	ug/l	0.14	0.05
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.050	ug/l	9	5
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.065	ug/l	9.4	6.2
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.019	ug/l	12	0.7
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	ug/l	<.05	<.05
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.17	ug/l	35	15
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.026	ug/l	4	2
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.013	ug/l	2.2	1.2
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.051	ug/l	19	3
Chloride	Calc / IC	0.50	mg/kg	N	5.1	mg/l	1.9	0.35
Fluoride	Calc / IC	0.50	mg/kg	N	3.3	mg/l	0.34	0.33
Sulphate ion	Calc / IC	0.50	mg/kg	N	97	mg/l	30	7.4
Total Dissolved Solids	Calc	100	mg/kg	N	1100	mg/l	190	<100
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	mg/l	<.1	<.1
pH	Calc / Probe			N		pH	7.9	7.9
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	WN	30	mg/l	6	3
Naphthalene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluorene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Phenanthrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Chrysene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(b/k)Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Indeno(123-cd)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Dibenzo(ah)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(ghi)Perylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
PAH(total)	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Diesel Range Organics	Calc / GC/FID (LV)	0.10	mg/kg	N	<0.10	mg/l		<.01
Total Petroleum Hydrocarbons	Calc / GC/FID (LV)	0.10	mg/kg	N	<0.10	mg/l		<.01
TPH Speciation	Calc / GC/FID	0	mg/kg	N	0			

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : BH2
SAL Sample Reference : 176378 006
SAL Reference : 176378
Project Site : Manchester City Centre
Customer Reference : 17855
Test Portion Mass (g) : 175
Depth : 2.50
Type : Sand

10:1 Leachate					Result	Units	2:1	8:1
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	ug/l	<1	<1
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.0058	ug/l	1.0	0.5
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.043	ug/l	12	3
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	<0.00020	ug/l	0.05	<.02
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.020	ug/l	5	2
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	ug/l	1.2	<.5
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	<0.0030	ug/l	2.9	<.3
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	ug/l	<.05	<.05
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.055	ug/l	8	5
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	ug/l	2	<1
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	ug/l	2.4	<.5
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.033	ug/l	6	3
Chloride	Calc / IC	0.50	mg/kg	N	3.0	mg/l	1.2	0.20
Fluoride	Calc / IC	0.50	mg/kg	N	1.5	mg/l	0.15	0.15
Sulphate ion	Calc / IC	0.50	mg/kg	N	82	mg/l	26	6.0
Total Dissolved Solids	Calc	100	mg/kg	N	490	mg/l	<100	<100
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	mg/l	<.1	<.1
pH	Calc / Probe			N		pH	7.8	7.9
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	WN	27	mg/l	3	3
Naphthalene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluorene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Phenanthrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Chrysene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(b/k)Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Indeno(123-cd)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Dibenzo(ah)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(ghi)Perylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
PAH(total)	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Diesel Range Organics	Calc / GC/FID (LV)	0.10	mg/kg	N	<0.10	mg/l		<.01
Total Petroleum Hydrocarbons	Calc / GC/FID (LV)	0.10	mg/kg	N	<0.10	mg/l		<.01
TPH Speciation	Calc / GC/FID	0	mg/kg	N	0			

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : BH2
SAL Sample Reference : 176378 007
SAL Reference : 176378
Project Site : Manchester City Centre
Customer Reference : 17855
Test Portion Mass (g) : 175
Depth : 3.60
Type : Clay

10:1 Leachate					Result	Units	2:1	8:1
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	ug/l		<1
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.0060	ug/l		0.6
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.017	ug/l		2
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	<0.00020	ug/l		<.02
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.011	ug/l		1
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	ug/l		<.5
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	<0.0030	ug/l		<.3
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	ug/l		<.05
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	ug/l		<1
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	ug/l		<1
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	ug/l		<.5
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.054	ug/l		5
Chloride	Calc / IC	0.50	mg/kg	N	1.9	mg/l		0.19
Fluoride	Calc / IC	0.50	mg/kg	N	0.63	mg/l		0.06
Sulphate ion	Calc / IC	0.50	mg/kg	N	12	mg/l		1.2
Total Dissolved Solids	Calc	100	mg/kg	N	140	mg/l		<100
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	mg/l		<.1
pH	Calc / Probe			N		pH		7.9
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	WN	75	mg/l		8
Naphthalene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluorene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Phenanthrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Chrysene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(b/k)Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Indeno(123-cd)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Dibenzo(ah)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(ghi)Perylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
PAH(total)	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Diesel Range Organics	Calc / GC/FID (LV)	0.10	mg/kg	N	<0.10	mg/l		<.01
Total Petroleum Hydrocarbons	Calc / GC/FID (LV)	0.10	mg/kg	N	<0.10	mg/l		<.01
TPH Speciation	Calc / GC/FID	0	mg/kg	N	0			

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Note:- Sample failed to produce sufficient eluate within the specified time after vacuum filtration for 1 hour and centrifugation for 30 minutes. Therefore, the exact application of the two-step leaching test is precluded on technical grounds. (ref: Section 5.2.4 BS EN 12457-3:2002) Results are derived from a single step leaching at L/S 10/1 as prescribed by the EA guidance. (Ref Section C4.1.1 Guidance on Sampling and Testing of Wastes to meet Landfill Waste Acceptance Procedures Version 1 April 2005, Environment Agency)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : BH3
SAL Sample Reference : 176378 008
SAL Reference : 176378
Project Site : Manchester City Centre
Customer Reference : 17855
Depth : 0.20
Test Portion Mass (g) : 175
Type : Topsoil

10:1 Leachate					Result	Units	2:1	8:1
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.011	ug/l	2	1
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.088	ug/l	5.1	9.3
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.31	ug/l	40	30
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00021	ug/l	0.02	0.02
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.029	ug/l	4	3
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.045	ug/l	6.6	4.2
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.019	ug/l	2.8	1.8
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	ug/l	<.05	<.05
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.027	ug/l	4	3
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.011	ug/l	2	1
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	ug/l	<.5	<.5
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.080	ug/l	20	7
Chloride	Calc / IC	0.50	mg/kg	N	5.3	mg/l	1.8	0.38
Fluoride	Calc / IC	0.50	mg/kg	N	1.7	mg/l	0.29	0.15
Sulphate ion	Calc / IC	0.50	mg/kg	N	52	mg/l	13	4.3
Total Dissolved Solids	Calc	100	mg/kg	N	670	mg/l	120	<100
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	mg/l	<.1	<.1
pH	Calc / Probe			N		pH	8.0	7.8
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	WN	75	mg/l	13	7
Naphthalene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	0.0019	ug/l		0.21
Acenaphthylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	0.00045	ug/l		0.05
Acenaphthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	0.0037	ug/l		0.41
Fluorene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	0.0017	ug/l		0.19
Phenanthrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	0.00018	ug/l		0.02
Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	0.0021	ug/l		0.24
Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	0.00036	ug/l		0.04
Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	0.00009	ug/l		0.01
Benzo(a)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Chrysene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	0.00009	ug/l		0.01
Benzo(b/k)Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	0.00018	ug/l		0.02
Benzo(a)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Indeno(123-cd)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Dibenzo(ah)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(ghi)Perylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
PAH(total)	Calc / GC/MS (SIR)	0.00010	mg/kg	N	0.011	ug/l		1.2
Diesel Range Organics	Calc / GC/FID (LV)	0.90	mg/kg	N	<0.90	mg/l		(2) <.1
Total Petroleum Hydrocarbons	Calc / GC/FID (LV)	0.90	mg/kg	N	<0.90	mg/l		(2) <.1
TPH Speciation	Calc / GC/FID	0	mg/kg	N	0			

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : BH4
SAL Sample Reference : 176378 010
SAL Reference : 176378
Project Site : Manchester City Centre
Customer Reference : 17855
Test Portion Mass (g) : 175
Depth : 0.30
Type : Fill

10:1 Leachate					Result	Units	2:1	8:1
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.016	ug/l	2	1
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.076	ug/l	6.8	7.7
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.34	ug/l	42	33
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00058	ug/l	0.11	0.05
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.018	ug/l	3	2
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.017	ug/l	2.5	1.6
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.0058	ug/l	1.5	0.5
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	ug/l	<.05	<.05
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.14	ug/l	29	12
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	ug/l	1	<1
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	ug/l	<.5	<.5
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.038	ug/l	2	4
Chloride	Calc / IC	0.50	mg/kg	N	2.4	mg/l	0.55	0.20
Fluoride	Calc / IC	0.50	mg/kg	N	0.89	mg/l	0.19	0.08
Sulphate ion	Calc / IC	0.50	mg/kg	N	62	mg/l	13	5.3
Total Dissolved Solids	Calc	100	mg/kg	N	520	mg/l	<100	<100
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	mg/l	<.1	<.1
pH	Calc / Probe			N		pH	8.1	7.9
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	WN	59	mg/l	10	5
Naphthalene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluorene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Phenanthrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Chrysene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(b/k)Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Indeno(123-cd)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Dibenzo(ah)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(ghi)Perylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
PAH(total)	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Diesel Range Organics	Calc / GC/FID (LV)	0.10	mg/kg	N	<0.10	mg/l		<.01
Total Petroleum Hydrocarbons	Calc / GC/FID (LV)	0.10	mg/kg	N	<0.10	mg/l		<.01
TPH Speciation	Calc / GC/FID	0	mg/kg	N	0			

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : BH5
SAL Sample Reference : 176378 012
SAL Reference : 176378
Project Site : Manchester City Centre
Customer Reference : 17855
Depth : 1.10
Test Portion Mass (g) : 175
Type : Clay

10:1 Leachate					Result	Units	2:1	8:1
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.019	ug/l		2
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	2.0	ug/l		200
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.11	ug/l		11
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00027	ug/l		0.03
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.028	ug/l		3
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.033	ug/l		3.3
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.0072	ug/l		0.7
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	ug/l		<.05
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.069	ug/l		7
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	ug/l		<1
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	ug/l		<.5
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.031	ug/l		3
Chloride	Calc / IC	0.50	mg/kg	N	6.8	mg/l		0.68
Fluoride	Calc / IC	0.50	mg/kg	N	3.5	mg/l		0.35
Sulphate ion	Calc / IC	0.50	mg/kg	N	85	mg/l		8.5
Total Dissolved Solids	Calc	100	mg/kg	N	740	mg/l		<100
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	mg/l		<.1
pH	Calc / Probe			N		pH		7.6
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	WN	13	mg/l		1
Naphthalene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluorene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Phenanthrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Chrysene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(b/k)Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Indeno(123-cd)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Dibenzo(ah)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(ghi)Perylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
PAH(total)	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Diesel Range Organics	Calc / GC/FID (LV)	0.40	mg/kg	N	<0.40	mg/l		(2) <.04
Total Petroleum Hydrocarbons	Calc / GC/FID (LV)	1.0	mg/kg	N	<1.0	mg/l		(2) <.1
TPH Speciation	Calc / GC/FID	0	mg/kg	N	0			

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Note:- Sample failed to produce sufficient eluate within the specified time after vacuum filtration for 1 hour and centrifugation for 30 minutes. Therefore, the exact application of the two-step leaching test is precluded on technical grounds. (ref: Section 5.2.4 BS EN 12457-3:2002) Results are derived from a single step leaching at L/S 10/1 as prescribed by the EA guidance. (Ref Section C4.1.1 Guidance on Sampling and Testing of Wastes to meet Landfill Waste Acceptance Procedures Version 1 April 2005, Environment Agency)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : BH5
SAL Sample Reference : 176378 014
SAL Reference : 176378
Project Site : Manchester City Centre
Customer Reference : 17855
Depth : 2.20
Test Portion Mass (g) : 175
Type : Sand

10:1 Leachate					Result	Units	2:1	8:1
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.015	ug/l		1
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.014	ug/l		1.4
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.050	ug/l		5
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00052	ug/l		0.05
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.019	ug/l		2
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	ug/l		<.5
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	<0.0030	ug/l		<.3
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	ug/l		<.05
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.16	ug/l		16
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	ug/l		<1
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	ug/l		<.5
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.034	ug/l		3
Chloride	Calc / IC	0.50	mg/kg	N	4.0	mg/l		0.40
Fluoride	Calc / IC	0.50	mg/kg	N	1.5	mg/l		0.15
Sulphate ion	Calc / IC	0.50	mg/kg	N	49	mg/l		4.9
Total Dissolved Solids	Calc	100	mg/kg	N	490	mg/l		<100
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	mg/l		<.1
pH	Calc / Probe			N		pH		8.3
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	WN	30	mg/l		3
Naphthalene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Acenaphthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluorene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Phenanthrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Chrysene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(b/k)Fluoranthene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(a)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Indeno(123-cd)Pyrene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Dibenzo(ah)Anthracene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Benzo(ghi)Perylene	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
PAH(total)	Calc / GC/MS (SIR)	0.00010	mg/kg	N	<0.00010	ug/l		<.01
Diesel Range Organics	Calc / GC/FID (LV)	0.10	mg/kg	N	<0.10	mg/l		<.01
Total Petroleum Hydrocarbons	Calc / GC/FID (LV)	0.10	mg/kg	N	<0.10	mg/l		<.01
TPH Speciation	Calc / GC/FID	0	mg/kg	N	0			

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Note:- Sample failed to produce sufficient eluate within the specified time after vacuum filtration for 1 hour and centrifugation for 30 minutes. Therefore, the exact application of the two-step leaching test is precluded on technical grounds. (ref: Section 5.2.4 BS EN 12457-3:2002) Results are derived from a single step leaching at L/S 10/1 as prescribed by the EA guidance. (Ref Section C4.1.1 Guidance on Sampling and Testing of Wastes to meet Landfill Waste Acceptance Procedures Version 1 April 2005, Environment Agency)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
MCERTS Preparation

				SAL Reference	176378 001	176378 002	176378 003	176378 004	176378 005	176378 006	176378 007
				Customer Sample Reference	BH1	BH1	BH1B	BH2	BH2	BH2	BH2
				Test Sample	AR	AR	AR	AR	AR	AR	AR
				Depth	0.30	0.60	0.30	0.70	1.70	2.50	3.60
				Type	Topsoil	Topsoil	Topsoil	Topsoil	Topsoil	Sand	Clay
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Moisture	Grav (1 Dec) (40 C)	0.1	%	N	9.3	12	10	14	17	9.1	9.5
Moisture @ 105 C	Grav (1 Dec) (105 C)	0.1	%	N	10	12	10	16	17	16	9.6

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
MCERTS Preparation

				SAL Reference	176378 008	176378 009	176378 010	176378 011	176378 012	176378 013	176378 014
				Customer Sample Reference	BH3	BH3	BH4	BH5	BH5	BH5	BH5
				Test Sample	AR	AR	AR	AR	AR	AR	AR
				Depth	0.20	0.50	0.30	0.50	1.10	1.50	2.20
				Type	Topsoil	Fill	Fill	Sand	Clay	Sand	Sand
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Moisture	Grav (1 Dec) (40 C)	0.1	%	N	13	2.2	6.9	16	17	18	15
Moisture @ 105 C	Grav (1 Dec) (105 C)	0.1	%	N	13	2.6	15	18	19	16	14

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
Metals

				SAL Reference	176378 001	176378 002	176378 003	176378 004	176378 005	176378 006	176378 007
				Customer Sample Reference	BH1	BH1	BH1B	BH2	BH2	BH2	BH2
				Test Sample	M40	M40	M40	M40	M40	M40	M40
				Depth	0.30	0.60	0.30	0.70	1.70	2.50	3.60
				Type	Topsoil	Topsoil	Topsoil	Topsoil	Topsoil	Sand	Clay
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Arsenic	ICP/OES	2	mg/kg	M	21	23	21	21	27	10	<2
Cadmium	ICP/OES	1	mg/kg	M	<1	<1	<1	1	<1	<1	<1
Chromium	ICP/OES	1	mg/kg	M	17	25	32	19	15	31	5
Copper	ICP/OES	1	mg/kg	M	60	65	82	97	210	21	3
Lead	ICP/OES	1	mg/kg	M	140	170	230	940	370	18	3
Mercury	ICP/OES	1	mg/kg	M	1	<1	6	2	<1	<1	<1
Nickel	ICP/OES	1	mg/kg	M	19	21	23	24	31	38	4
Selenium	ICP/OES	3	mg/kg	M	<3	<3	<3	<3	<3	<3	<3
Zinc	ICP/OES	1	mg/kg	M	210	180	190	340	91	74	9

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
Metals

				SAL Reference	176378 008	176378 011	176378 012	176378 013	176378 014
				Customer Sample Reference	BH3	BH5	BH5	BH5	BH5
				Test Sample	M40	M40	M40	M40	M40
				Depth	0.20	0.50	1.10	1.50	2.20
				Type	Topsoil	Sand	Clay	Sand	Sand
Determinand	Method	LOD	Units	Symbol					
Arsenic	ICP/OES	2	mg/kg	M	30	16	90	26	<2
Cadmium	ICP/OES	1	mg/kg	M	2	<1	<1	<1	<1
Chromium	ICP/OES	1	mg/kg	M	25	12	19	9	8
Copper	ICP/OES	1	mg/kg	M	110	34	120	32	9
Lead	ICP/OES	1	mg/kg	M	370	480	900	2800	18
Mercury	ICP/OES	1	mg/kg	M	<1	1	3	1	<1
Nickel	ICP/OES	1	mg/kg	M	32	11	24	10	8
Selenium	ICP/OES	3	mg/kg	M	<3	<3	<3	<3	<3
Zinc	ICP/OES	1	mg/kg	M	280	93	89	42	20

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
Metals (Fill)

				SAL Reference	176378 009	176378 010
				Customer Sample Reference	BH3	BH4
				Test Sample	M40	M40
				Depth	0.50	0.30
				Type	Fill	Fill
Determinand	Method	LOD	Units	Symbol		
Arsenic	ICP/OES	2.0	mg/kg	U	3.3	12
Cadmium	ICP/OES	1.0	mg/kg	U	1.4	<1.0
Chromium	ICP/OES	1.0	mg/kg	U	4.7	20
Copper	ICP/OES	1.0	mg/kg	U	220	130
Lead	ICP/OES	1.0	mg/kg	U	19	59
Mercury	ICP/OES	1.0	mg/kg	U	<1.0	<1.0
Nickel	ICP/OES	1.0	mg/kg	U	3.1	26
Selenium	ICP/OES	3.0	mg/kg	U	<3.0	<3.0
Zinc	ICP/OES	1.0	mg/kg	U	57	220

SAL Reference: 176378
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Soil Analysed as Soil
Boron

				SAL Reference	176378 001	176378 002	176378 003	176378 004	176378 005	176378 006	176378 007
				Customer Sample Reference	BH1	BH1	BH1B	BH2	BH2	BH2	BH2
				Test Sample	AR	AR	AR	AR	AR	AR	AR
				Depth	0.30	0.60	0.30	0.70	1.70	2.50	3.60
				Type	Topsoil	Topsoil	Topsoil	Topsoil	Topsoil	Sand	Clay
Determinand	Method	LOD	Units	Symbol							
Boron (water-soluble)	ICP/OES	1	mg/kg	N	<1	<1	<1	<1	<1	<1	<1

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Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
Boron

				SAL Reference	176378 008	176378 009	176378 010	176378 011	176378 012	176378 013	176378 014
				Customer Sample Reference	BH3	BH3	BH4	BH5	BH5	BH5	BH5
				Test Sample	AR	AR	AR	AR	AR	AR	AR
				Depth	0.20	0.50	0.30	0.50	1.10	1.50	2.20
				Type	Topsoil	Fill	Fill	Sand	Clay	Sand	Sand
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Boron (water-soluble)	ICP/OES	1	mg/kg	N	<1	<1	<1	<1	<1	<1	<1

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
Total and Speciated USEPA16 PAH, Coronene and Phenols

				SAL Reference	176378 001	176378 002	176378 003	176378 004	176378 005	176378 006	176378 007
				Customer Sample Reference	BH1	BH1	BH1B	BH2	BH2	BH2	BH2
				Test Sample	M105	M105	M105	M105	M105	M105	M105
				Depth	0.30	0.60	0.30	0.70	1.70	2.50	3.60
				Type	Topsoil	Topsoil	Topsoil	Topsoil	Topsoil	Sand	Clay
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Naphthalene	GC/MS(MCERTS)	0.1	mg/kg	M	3.3	0.5	0.8	0.4	<0.1	<0.1	<0.1
Acenaphthylene	GC/MS(MCERTS)	0.1	mg/kg	U	2.2	0.2	0.5	<0.1	<0.1	<0.1	<0.1
Acenaphthene	GC/MS(MCERTS)	0.1	mg/kg	M	3.1	0.5	1.2	1.7	<0.1	<0.1	<0.1
Fluorene	GC/MS(MCERTS)	0.1	mg/kg	M	1.9	0.4	0.7	1.2	<0.1	<0.1	<0.1
Phenanthrene	GC/MS(MCERTS)	0.1	mg/kg	M	27	5.3	10	12	<0.1	<0.1	<0.1
Anthracene	GC/MS(MCERTS)	0.1	mg/kg	U	6.7	1.2	2.6	2.8	<0.1	<0.1	<0.1
Fluoranthene	GC/MS(MCERTS)	0.1	mg/kg	M	34	7.6	16	19	<0.1	<0.1	<0.1
Pyrene	GC/MS(MCERTS)	0.1	mg/kg	M	32	7.9	15	17	<0.1	<0.1	<0.1
Benzo(a)Anthracene	GC/MS(MCERTS)	0.1	mg/kg	M	14	3.5	7.5	8.0	<0.1	<0.1	<0.1
Chrysene	GC/MS(MCERTS)	0.1	mg/kg	M	16	4.3	8.3	9.0	<0.1	<0.1	<0.1
Benzo(b/k)Fluoranthene	GC/MS(MCERTS)	0.1	mg/kg	M	18	4.5	12	11	<0.1	<0.1	<0.1
Benzo(a)Pyrene	GC/MS(MCERTS)	0.1	mg/kg	M	13	3.2	7.1	6.8	<0.1	<0.1	<0.1
Indeno(123-cd)Pyrene	GC/MS(MCERTS)	0.1	mg/kg	M	5.1	1.1	3.3	2.8	<0.1	<0.1	<0.1
Dibenzo(ah)Anthracene	GC/MS(MCERTS)	0.1	mg/kg	M	2.4	0.6	1.5	0.5	<0.1	<0.1	<0.1
Benzo(ghi)Perylene	GC/MS(MCERTS)	0.1	mg/kg	M	6.1	1.5	3.9	3.4	<0.1	<0.1	<0.1
Polyaromatic Hydrocarbons (Total)	GC/MS(MCERTS)	0.1	mg/kg	U	190	43	92	94	<0.1	<0.1	<0.1
Coronene	GC/MS(MCERTS)	0.1	mg/kg	N	2.7	0.8	1.9	1.8	<0.1	<0.1	<0.1
Total Phenols	GC/MS(MCERTS)	0.1	mg/kg	N	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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Customer Reference: 17855

Soil Analysed as Soil

Total and Speciated USEPA16 PAH, Coronene and Phenols

				SAL Reference	176378 008	176378 011	176378 012	176378 013	176378 014
				Customer Sample Reference	BH3	BH5	BH5	BH5	BH5
				Test Sample	M105	M105	M105	M105	M105
				Depth	0.20	0.50	1.10	1.50	2.20
				Type	Topsoil	Sand	Clay	Sand	Sand
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Naphthalene	GC/MS(MCERTS)	0.1	mg/kg	M	43	3.5	<0.1	<0.1	<0.1
Acenaphthylene	GC/MS(MCERTS)	0.1	mg/kg	U	<0.1	1.4	<0.1	<0.1	<0.1
Acenaphthene	GC/MS(MCERTS)	0.1	mg/kg	M	100	2.7	<0.1	<0.1	<0.1
Fluorene	GC/MS(MCERTS)	0.1	mg/kg	M	48	2.3	<0.1	<0.1	<0.1
Phenanthrene	GC/MS(MCERTS)	0.1	mg/kg	M	570	27	0.5	<0.1	<0.1
Anthracene	GC/MS(MCERTS)	0.1	mg/kg	U	180	6.4	0.1	<0.1	<0.1
Fluoranthene	GC/MS(MCERTS)	0.1	mg/kg	M	710	27	0.9	<0.1	<0.1
Pyrene	GC/MS(MCERTS)	0.1	mg/kg	M	610	25	1.0	<0.1	<0.1
Benzo(a)Anthracene	GC/MS(MCERTS)	0.1	mg/kg	M	310	11	0.6	<0.1	<0.1
Chrysene	GC/MS(MCERTS)	0.1	mg/kg	M	300	13	0.8	<0.1	<0.1
Benzo(b/k)Fluoranthene	GC/MS(MCERTS)	0.1	mg/kg	M	420	11	1.3	<0.1	<0.1
Benzo(a)Pyrene	GC/MS(MCERTS)	0.1	mg/kg	M	240	9.1	1.2	<0.1	<0.1
Indeno(123-cd)Pyrene	GC/MS(MCERTS)	0.1	mg/kg	M	110	3.2	0.6	<0.1	<0.1
Dibenzo(ah)Anthracene	GC/MS(MCERTS)	0.1	mg/kg	M	21	1.5	0.3	<0.1	<0.1
Benzo(ghi)Perylene	GC/MS(MCERTS)	0.1	mg/kg	M	130	3.9	0.8	<0.1	<0.1
Polyaromatic Hydrocarbons (Total)	GC/MS(MCERTS)	0.1	mg/kg	U	3800	150	8.8	<0.1	<0.1
Coronene	GC/MS(MCERTS)	0.1	mg/kg	N	30	2.8	0.7	<0.1	<0.1
Total Phenols	GC/MS(MCERTS)	0.1	mg/kg	N	2.3	0.6	<0.1	<0.1	<0.1

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Customer Reference: 17855

Soil Analysed as Soil

Total and Speciated USEPA16 PAH, Coronene and Phenols (Fill)

				SAL Reference	176378 009	176378 010
				Customer Sample Reference	BH3	BH4
				Test Sample	M105	M105
				Depth	0.50	0.30
				Type	Fill	Fill
Determinand	**Method**	**LOD**	**Units**	**Symbol**		
Naphthalene	GC/MS(MCERTS)	0.1	mg/kg	U	0.3	0.1
Acenaphthylene	GC/MS(MCERTS)	0.1	mg/kg	U	<0.1	<0.1
Acenaphthene	GC/MS(MCERTS)	0.1	mg/kg	U	2.4	<0.1
Fluorene	GC/MS(MCERTS)	0.1	mg/kg	U	1.5	0.1
Phenanthrene	GC/MS(MCERTS)	0.1	mg/kg	U	17	0.3
Anthracene	GC/MS(MCERTS)	0.1	mg/kg	U	4.7	0.1
Fluoranthene	GC/MS(MCERTS)	0.1	mg/kg	U	29	1.6
Pyrene	GC/MS(MCERTS)	0.1	mg/kg	U	25	1.6
Benzo(a)Anthracene	GC/MS(MCERTS)	0.1	mg/kg	U	12	0.4
Chrysene	GC/MS(MCERTS)	0.1	mg/kg	U	14	0.6
Benzo(b/k)Fluoranthene	GC/MS(MCERTS)	0.1	mg/kg	U	13	0.5
Benzo(a)Pyrene	GC/MS(MCERTS)	0.1	mg/kg	U	12	0.3
Indeno(123-cd)Pyrene	GC/MS(MCERTS)	0.1	mg/kg	U	4.0	0.2
Dibenzo(ah)Anthracene	GC/MS(MCERTS)	0.1	mg/kg	U	0.7	0.1
Benzo(ghi)Perylene	GC/MS(MCERTS)	0.1	mg/kg	U	4.4	0.2
Polyaromatic Hydrocarbons (Total)	GC/MS(MCERTS)	0.1	mg/kg	U	140	6.1
Coronene	GC/MS(MCERTS)	0.1	mg/kg	N	2.8	<0.1
Total Phenols	GC/MS(MCERTS)	0.1	mg/kg	N	<0.1	<0.1

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
BTEX GRO MTBE

				SAL Reference	176378 001	176378 002	176378 003	176378 004	176378 005	176378 006	176378 007
				Customer Sample Reference	BH1	BH1	BH1B	BH2	BH2	BH2	BH2
				Test Sample	M105	M105	M105	M105	M105	M105	M105
				Depth	0.30	0.60	0.30	0.70	1.70	2.50	3.60
				Type	Topsoil	Topsoil	Topsoil	Topsoil	Topsoil	Sand	Clay
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Benzene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10	<10	<10
EthylBenzene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10	<10	<10
Meta/Para-Xylene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10	<10	<10
Methyl tert-Butyl Ether	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10	<10	<10
Ortho-Xylene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10	<10	<10
Toluene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10	<10	<10
Gasoline Range Organics	GC/MS (Headspace)	100	µg/kg	N	<100	<100	<100	<100	<100	<100	<100

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Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
BTEX GRO MTBE

				SAL Reference	176378 008	176378 011	176378 012	176378 013	176378 014
				Customer Sample Reference	BH3	BH5	BH5	BH5	BH5
				Test Sample	M105	M105	M105	M105	M105
				Depth	0.20	0.50	1.10	1.50	2.20
				Type	Topsoil	Sand	Clay	Sand	Sand
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Benzene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
EthylBenzene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
Meta/Para-Xylene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
Methyl tert-Butyl Ether	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
Ortho-Xylene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
Toluene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
Gasoline Range Organics	GC/MS (Headspace)	100	µg/kg	N	<100	<100	<100	<100	<100

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
BTEX GRO MTBE (Fill)

				SAL Reference	176378 009	176378 010
				Customer Sample Reference	BH3	BH4
				Test Sample	M105	M105
				Depth	0.50	0.30
				Type	Fill	Fill
Determinand	**Method**	**LOD**	**Units**	**Symbol**		
Benzene	GC/MS(Head Space)(MCERTS)	10	µg/kg	U	<10	<10
EthylBenzene	GC/MS(Head Space)(MCERTS)	10	µg/kg	U	<10	<10
Meta/Para-Xylene	GC/MS(Head Space)(MCERTS)	10	µg/kg	U	<10	<10
Methyl tert-Butyl Ether	GC/MS(Head Space)(MCERTS)	10	µg/kg	U	<10	<10
Ortho-Xylene	GC/MS(Head Space)(MCERTS)	10	µg/kg	U	<10	<10
Toluene	GC/MS(Head Space)(MCERTS)	10	µg/kg	U	<10	<10
Gasoline Range Organics	GC/MS (Headspace)	100	µg/kg	N	<100	<100

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
TPH Ali/Aro

				SAL Reference	176378 001	176378 003	176378 005	176378 006
				Customer Sample Reference	BH1	BH1B	BH2	BH2
				Test Sample	M105	M105	M105	M105
				Depth	0.30	0.30	1.70	2.50
				Type	Topsoil	Topsoil	Topsoil	Sand
Determinand	**Method**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons (C5 - C6 aliphatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100	<0.100	<0.100	<0.100
Total Petroleum Hydrocarbons (C6-C8 aliphatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100	<0.100	<0.100	<0.100
Total Petroleum Hydrocarbons (C8-C10 aliphatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100	<0.100	<0.100	<0.100
Total Petroleum Hydrocarbons (C10-C12 aliphatic)	GC/FID	1	mg/kg	N	(9) <10	(9) <10	<1	<1
Total Petroleum Hydrocarbons (C12-C16 aliphatic)	GC/FID (MCERTS)	2	mg/kg	M	**35**	**32**	<2	<2
Total Petroleum Hydrocarbons (C16-C21 aliphatic)	GC/FID (MCERTS)	1	mg/kg	M	**110**	**99**	**2**	<1
Total Petroleum Hydrocarbons (C21-C35 aliphatic)	GC/FID (MCERTS)	4	mg/kg	M	**92**	**230**	**31**	<4
Total Petroleum Hydrocarbons (C6 - C7 aromatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100	<0.100	<0.100	<0.100
Total Petroleum Hydrocarbons (C7-C8 aromatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100	<0.100	<0.100	<0.100
Total Petroleum Hydrocarbons (C8-C10 aromatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100	<0.100	<0.100	<0.100
Total Petroleum Hydrocarbons (C10-C12 aromatic)	GC/FID	1	mg/kg	N	(9) <10	(9) <10	<1	<1
Total Petroleum Hydrocarbons (C12-C16 aromatic)	GC/FID (MCERTS)	1	mg/kg	M	**11**	**19**	<1	<1
Total Petroleum Hydrocarbons (C16-C21 aromatic)	GC/FID (MCERTS)	1	mg/kg	M	**140**	**230**	<1	<1
Total Petroleum Hydrocarbons (C21-C35 aromatic)	GC/FID (MCERTS)	1	mg/kg	M	**360**	**670**	**3**	<1

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
TPH Ali/Aro

				SAL Reference	176378 007	176378 008	176378 013	176378 014
				Customer Sample Reference	BH2	BH3	BH5	BH5
				Test Sample	M105	M105	M105	M105
				Depth	3.60	0.20	1.50	2.20
				Type	Clay	Topsoil	Sand	Sand
Determinand	**Method**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons (C5 - C6 aliphatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100	<0.100	<0.100	<0.100
Total Petroleum Hydrocarbons (C6-C8 aliphatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100	<0.100	<0.100	<0.100
Total Petroleum Hydrocarbons (C8-C10 aliphatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100	<0.100	<0.100	<0.100
Total Petroleum Hydrocarbons (C10-C12 aliphatic)	GC/FID	1	mg/kg	N	<1	**31**	<1	<1
Total Petroleum Hydrocarbons (C12-C16 aliphatic)	GC/FID (MCERTS)	2	mg/kg	M	<2	**430**	<2	<2
Total Petroleum Hydrocarbons (C16-C21 aliphatic)	GC/FID (MCERTS)	1	mg/kg	M	<1	**1100**	<1	<1
Total Petroleum Hydrocarbons (C21-C35 aliphatic)	GC/FID (MCERTS)	4	mg/kg	M	<4	**660**	<4	<4
Total Petroleum Hydrocarbons (C6 - C7 aromatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100	<0.100	<0.100	<0.100
Total Petroleum Hydrocarbons (C7-C8 aromatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100	<0.100	<0.100	<0.100
Total Petroleum Hydrocarbons (C8-C10 aromatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100	<0.100	<0.100	<0.100
Total Petroleum Hydrocarbons (C10-C12 aromatic)	GC/FID	1	mg/kg	N	<1	(9) <10	<1	<1
Total Petroleum Hydrocarbons (C12-C16 aromatic)	GC/FID (MCERTS)	1	mg/kg	M	<1	**180**	<1	<1
Total Petroleum Hydrocarbons (C16-C21 aromatic)	GC/FID (MCERTS)	1	mg/kg	M	<1	**3200**	<1	<1
Total Petroleum Hydrocarbons (C21-C35 aromatic)	GC/FID (MCERTS)	1	mg/kg	M	<1	**5000**	**6**	<1

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
TPH Ali/Aro (Fill)

				SAL Reference	176378 010
				Customer Sample Reference	BH4
				Test Sample	M105
				Depth	0.30
				Type	Fill
Determinand	**Method**	**LOD**	**Units**	**Symbol**	
Total Petroleum Hydrocarbons (C5 - C6 aliphatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100
Total Petroleum Hydrocarbons (C6-C8 aliphatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100
Total Petroleum Hydrocarbons (C8-C10 aliphatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100
Total Petroleum Hydrocarbons (C10-C12 aliphatic)	GC/FID	1	mg/kg	N	(9) <10
Total Petroleum Hydrocarbons (C12-C16 aliphatic)	GC/FID (MCERTS)	2	mg/kg	U	(9) <20
Total Petroleum Hydrocarbons (C16-C21 aliphatic)	GC/FID (MCERTS)	1	mg/kg	U	**31**
Total Petroleum Hydrocarbons (C21-C35 aliphatic)	GC/FID (MCERTS)	4	mg/kg	U	**400**
Total Petroleum Hydrocarbons (C6 - C7 aromatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100
Total Petroleum Hydrocarbons (C7-C8 aromatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100
Total Petroleum Hydrocarbons (C8-C10 aromatic)	GC/MS(Head Space)(MCERTS)	0.100	mg/kg	N	<0.100
Total Petroleum Hydrocarbons (C10-C12 aromatic)	GC/FID	1	mg/kg	N	(9) <10
Total Petroleum Hydrocarbons (C12-C16 aromatic)	GC/FID (MCERTS)	1	mg/kg	U	(9) <10
Total Petroleum Hydrocarbons (C16-C21 aromatic)	GC/FID (MCERTS)	1	mg/kg	U	(9) <10
Total Petroleum Hydrocarbons (C21-C35 aromatic)	GC/FID (MCERTS)	1	mg/kg	U	**200**

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
TPH

					SAL Reference	176378 001	176378 002	176378 003	176378 004	176378 005	176378 006	176378 007
					Customer Sample Reference	BH1	BH1	BH1B	BH2	BH2	BH2	BH2
					Test Sample	M105	M105	M105	M105	M105	M105	M105
					Depth	0.30	0.60	0.30	0.70	1.70	2.50	3.60
					Type	Topsoil	Topsoil	Topsoil	Topsoil	Topsoil	Sand	Clay
Determinand	**Method**	**LOD**	**Units**	**Symbol**								
Total Petroleum Hydrocarbons (C10-C35)	GC/FID	1	mg/kg	M		**660**	**630**	**1800**	**1000**	**12**	**3**	**1**
Total Petroleum Hydrocarbons (C10 - C40 Mineral Oil:WAC)	GC/FID	1	mg/kg	N		**770**	**780**	**2000**	**1200**	**12**	**3**	**1**

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
TPH

					SAL Reference	176378 008	176378 011	176378 012	176378 013	176378 014
					Customer Sample Reference	BH3	BH5	BH5	BH5	BH5
					Test Sample	M105	M105	M105	M105	M105
					Depth	0.20	0.50	1.10	1.50	2.20
					Type	Topsoil	Sand	Clay	Sand	Sand
Determinand	**Method**	**LOD**	**Units**	**Symbol**						
Total Petroleum Hydrocarbons (C10-C35)	GC/FID	1	mg/kg	M		**14000**	**490**	**31**	**21**	**11**
Total Petroleum Hydrocarbons (C10 - C40 Mineral Oil:WAC)	GC/FID	1	mg/kg	N		**15000**	**580**	**38**	**26**	**15**

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
TPH (Fill)

					SAL Reference	**176378 009**	**176378 010**
					Customer Sample Reference	**BH3**	**BH4**
					Test Sample	**M105**	**M105**
					Depth	**0.50**	**0.30**
					Type	Fill	Fill
Determinand	**Method**	**LOD**	**Units**	**Symbol**		
Total Petroleum Hydrocarbons (C10-C35)	GC/FID	1	mg/kg	U	**1600**	**760**
Total Petroleum Hydrocarbons (C10 - C40 Mineral Oil:WAC)	GC/FID	1	mg/kg	N	**1800**	**900**

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
PCB EC7 (Fill)

					SAL Reference	**176378 009**	**176378 010**
					Customer Sample Reference	**BH3**	**BH4**
					Test Sample	**M105**	**M105**
					Depth	**0.50**	**0.30**
					Type	Fill	Fill
Determinand	**Method**	**LOD**	**Units**	**Symbol**		
Polychlorinated biphenyl BZ#101	GC/MS (HR)	0.05	µg/kg	U	(9) <0.50	(9) <0.50
Polychlorinated biphenyl BZ#118	GC/MS (HR)	0.05	µg/kg	U	(9) <0.50	(9) <0.50
Polychlorinated biphenyl BZ#138	GC/MS (HR)	0.05	µg/kg	U	(9) <0.50	**1.8**
Polychlorinated biphenyl BZ#153	GC/MS (HR)	0.05	µg/kg	U	(9) <0.50	**1.9**
Polychlorinated biphenyl BZ#180	GC/MS (HR)	0.05	µg/kg	U	(9) <0.50	**6.4**
Polychlorinated biphenyl BZ#28	GC/MS (HR)	0.05	µg/kg	U	(9) <0.50	(9) <0.50
Polychlorinated biphenyl BZ#52	GC/MS (HR)	0.05	µg/kg	U	(9) <0.50	(9) <0.50

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
PCB EC7

					SAL Reference	**176378 001**	**176378 002**	**176378 003**	**176378 004**	**176378 005**	**176378 006**	**176378 007**
					Customer Sample Reference	**BH1**	**BH1**	**BH1B**	**BH2**	**BH2**	**BH2**	**BH2**
					Test Sample	**M105**	**M105**	**M105**	**M105**	**M105**	**M105**	**M105**
					Depth	**0.30**	**0.60**	**0.30**	**0.70**	**1.70**	**2.50**	**3.60**
					Type	Topsoil	Topsoil	Topsoil	Topsoil	Topsoil	Sand	Clay
Determinand	**Method**	**LOD**	**Units**	**Symbol**								
Polychlorinated biphenyl BZ#101	GC/MS (HR)	0.05	µg/kg	M	**2.1**	**4.2**	**2.4**	(9) <0.50	<0.05	<0.05	<0.05
Polychlorinated biphenyl BZ#118	GC/MS (HR)	0.05	µg/kg	M	**1.6**	**2.8**	**1.6**	(9) <0.50	<0.05	<0.05	<0.05
Polychlorinated biphenyl BZ#138	GC/MS (HR)	0.05	µg/kg	M	**2.3**	**4.4**	**3.6**	**0.80**	<0.05	<0.05	<0.05
Polychlorinated biphenyl BZ#153	GC/MS (HR)	0.05	µg/kg	M	**1.1**	**2.2**	**2.2**	(9) <0.50	<0.05	<0.05	<0.05
Polychlorinated biphenyl BZ#180	GC/MS (HR)	0.05	µg/kg	M	(9) <0.50	**0.80**	**2.1**	**0.90**	<0.05	<0.05	<0.05
Polychlorinated biphenyl BZ#28	GC/MS (HR)	0.05	µg/kg	M	(9) <0.50	(9) <0.50	(9) <0.50	(9) <0.50	<0.05	<0.05	<0.05
Polychlorinated biphenyl BZ#52	GC/MS (HR)	0.05	µg/kg	M	**0.80**	**1.4**	**0.90**	(9) <0.50	<0.05	<0.05	<0.05

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
PCB EC7

				SAL Reference	176378 008	176378 011	176378 012	176378 013	176378 014
				Customer Sample Reference	BH3	BH5	BH5	BH5	BH5
				Test Sample	M105	M105	M105	M105	M105
				Depth	0.20	0.50	1.10	1.50	2.20
				Type	Topsoil	Sand	Clay	Sand	Sand
Determinand	Method	LOD	Units	Symbol					
Polychlorinated biphenyl BZ#101	GC/MS (HR)	0.05	µg/kg	M	1.5	0.22	0.08	<0.05	<0.05
Polychlorinated biphenyl BZ#118	GC/MS (HR)	0.05	µg/kg	M	0.90	0.10	0.05	<0.05	<0.05
Polychlorinated biphenyl BZ#138	GC/MS (HR)	0.05	µg/kg	M	4.7	0.42	0.11	<0.05	<0.05
Polychlorinated biphenyl BZ#153	GC/MS (HR)	0.05	µg/kg	M	2.0	0.23	0.08	<0.05	<0.05
Polychlorinated biphenyl BZ#180	GC/MS (HR)	0.05	µg/kg	M	1.3	0.23	0.08	<0.05	<0.05
Polychlorinated biphenyl BZ#28	GC/MS (HR)	0.05	µg/kg	M	(9) <0.50	<0.05	<0.05	<0.05	<0.05
Polychlorinated biphenyl BZ#52	GC/MS (HR)	0.05	µg/kg	M	(9) <0.50	<0.05	<0.05	<0.05	<0.05

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
% Stones

				SAL Reference	176378 001	176378 002	176378 003	176378 004	176378 005	176378 006	176378 007
				Customer Sample Reference	BH1	BH1	BH1B	BH2	BH2	BH2	BH2
				Test Sample	AR	AR	AR	AR	AR	AR	AR
				Depth	0.30	0.60	0.30	0.70	1.70	2.50	3.60
				Type	Topsoil	Topsoil	Topsoil	Topsoil	Topsoil	Sand	Clay
Determinand	Method	LOD	Units	Symbol							
Retained on 2mm Sieve	Grav	0.1	%	N	8.7	5.4	5.2	4.5	5.5	8.0	<0.1
Retained on 20mm Sieve	Grav	0.1	%	N	<0.1	<0.1	26.9	<0.1	<0.1	<0.1	<0.1
Retained on 50mm Sieve	Grav	0.1	%	N	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
% Stones

				SAL Reference	176378 008	176378 009	176378 010	176378 011	176378 012	176378 013	176378 014
				Customer Sample Reference	BH3	BH3	BH4	BH5	BH5	BH5	BH5
				Test Sample	AR	AR	AR	AR	AR	AR	AR
				Depth	0.20	0.50	0.30	0.50	1.10	1.50	2.20
				Type	Topsoil	Fill	Fill	Sand	Clay	Sand	Sand
Determinand	Method	LOD	Units	Symbol							
Retained on 2mm Sieve	Grav	0.1	%	N	6.9	23.9	51.9	6.2	<0.1	<0.1	<0.1
Retained on 20mm Sieve	Grav	0.1	%	N	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Retained on 50mm Sieve	Grav	0.1	%	N	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
Miscellaneous

SAL Reference	176378 001	176378 002	176378 003	176378 004	176378 005	176378 006	176378 007
Customer Sample Reference	BH1	BH1	BH1B	BH2	BH2	BH2	BH2
Test Sample	AR	AR	AR	AR	AR	AR	AR
Depth	0.30	0.60	0.30	0.70	1.70	2.50	3.60
Type	Topsoil	Topsoil	Topsoil	Topsoil	Topsoil	Sand	Clay

Determinand	Method	LOD	Units	Symbol							
Asbestos ID	PLM			SU	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Cyanide (Total)	Colorimetry	1	mg/kg	U	<1	1	<1	<1	<1	<1	<1
pH	Probe			M	8.3	8.0	8.2	8.3	8.0	7.7	7.9
pH	Probe			U	-	-	-	-	-	-	-
(Water Soluble) Sulphate ion expressed as SO4	2:1 Extraction/ICP/OES (TRL 447 T1)	0.01	g/l	N	0.02	0.02	0.01	0.02	0.03	0.03	<0.01
Sulphide	Colorimetry	10	mg/kg	N	<10	<10	<10	<10	<10	<10	<10

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
Miscellaneous

SAL Reference	176378 008	176378 009	176378 010	176378 011	176378 012	176378 013	176378 014
Customer Sample Reference	BH3	BH3	BH4	BH5	BH5	BH5	BH5
Test Sample	AR	AR	AR	AR	AR	AR	AR
Depth	0.20	0.50	0.30	0.50	1.10	1.50	2.20
Type	Topsoil	Fill	Fill	Sand	Clay	Sand	Sand

Determinand	Method	LOD	Units	Symbol							
Asbestos ID	PLM			SU	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Cyanide (Total)	Colorimetry	1	mg/kg	U	<1	<1	<1	<1	<1	<1	<1
pH	Probe			M	8.0	-	-	10.0	8.0	7.9	8.4
pH	Probe			U	-	8.8	8.3	-	-	-	-
(Water Soluble) Sulphate ion expressed as SO4	2:1 Extraction/ICP/OES (TRL 447 T1)	0.01	g/l	N	0.03	<0.01	0.03	0.03	0.05	0.05	0.03
Sulphide	Colorimetry	10	mg/kg	N	<10	<10	<10	<10	<10	<10	<10

SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
Miscellaneous

SAL Reference	176378 001	176378 002	176378 003	176378 004	176378 005	176378 006	176378 007
Customer Sample Reference	BH1	BH1	BH1B	BH2	BH2	BH2	BH2
Test Sample	M40	M40	M40	M40	M40	M40	M40
Depth	0.30	0.60	0.30	0.70	1.70	2.50	3.60
Type	Topsoil	Topsoil	Topsoil	Topsoil	Topsoil	Sand	Clay

Determinand	Method	LOD	Units	Symbol							
Loss on Ignition	Grav	0.1	%	N	5.3	5.7	6.3	7.1	9.0	3.4	0.7
Soil Organic Matter	Calc TOC/0.58	0.1	%	N	5.5	6.4	7.2	10	12	1.1	<0.1
Total Organic Carbon	OX/IR	0.1	%	N	3.2	3.7	4.1	6.0	6.9	0.6	<0.1

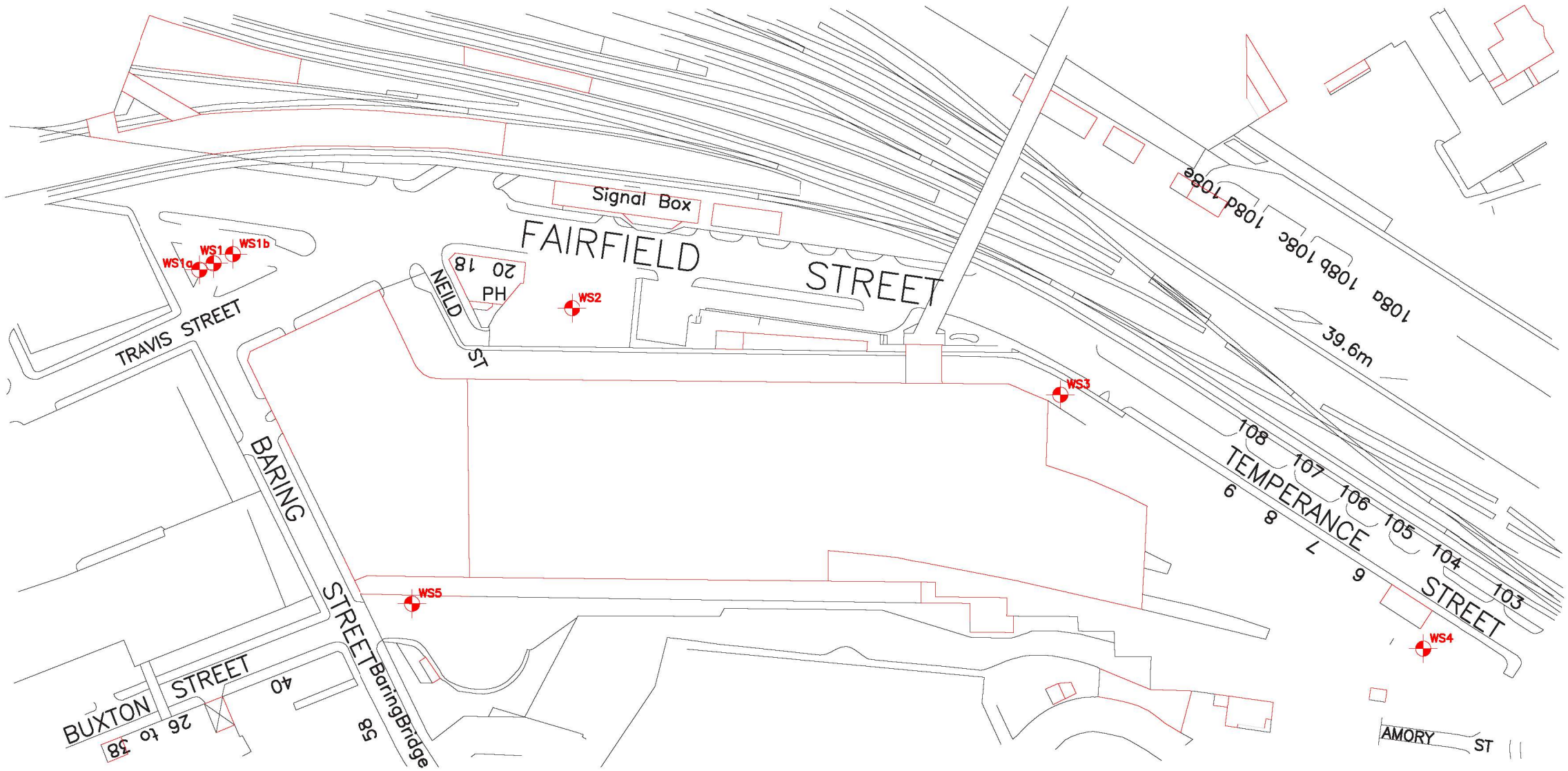
SAL Reference: 176378
Project Site: Manchester City Centre
Customer Reference: 17855

Soil Analysed as Soil
Miscellaneous

				SAL Reference	176378 008	176378 009	176378 010	176378 011	176378 012	176378 013	176378 014
				Customer Sample Reference	BH3	BH3	BH4	BH5	BH5	BH5	BH5
				Test Sample	M40	M40	M40	M40	M40	M40	M40
				Depth	0.20	0.50	0.30	0.50	1.10	1.50	2.20
				Type	Topsoil	Fill	Fill	Sand	Clay	Sand	Sand
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Loss on Ignition	Grav	0.1	%	N	**16**	**1.4**	**4.7**	**3.9**	**9.5**	**3.5**	**1.5**
Soil Organic Matter	Calc TOC/0.58	0.1	%	N	**32**	**8.0**	**20**	**4.9**	**12**	**3.2**	**0.3**
Total Organic Carbon	OX/IR	0.1	%	N	**18**	**4.6**	**12**	**2.8**	**6.7**	**1.9**	**0.2**

APPENDIX D





NOTES

KEY

Window Sample Location

Rev	Date	Detail	Made	Chk'd	App'd
A	7/10/09	EXPLORATORY HOLES ADDED BY GIP	AG	AG	

Client / Eng:

Buro Happold Ltd

Project:

Manchester City Centre

Title:

Approximate Exploratory Hole Locations

Co-ord check:	CAD: AG
Chk'd: AG	App'd: AG
Date: 7/10/09	Scale: DO NOT SCALE

GIP Ltd
Ground Investigation & Piling Limited
DEVONSHIRE HOUSE
ETTINGSHALL ROAD
WOLVERHAMPTON
WV2 2LT.
TEL:01902 456556
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E-MAIL: info@gipuk.com

No. GIP 17855

Rev: A

cm A3

APPENDIX E



General Notes

1. The copyright of this report and other plans and documents prepared by Ground Investigation and Piling Limited are owned by them. No such report plan or document may be produced, published or adapted without the written consent of Ground Investigation and Piling Limited. Copies of this report may however, be made and distributed by the Client as an expedient in dealing with matters related to its commission.

2. This report is provided for sole use by the client and is confidential to the Client and the Clients professional advisors. No responsibility whatsoever for the contents of the report will be accepted to any other person other than the client.

3. The report and/or opinion will be prepared for the specific purpose stated in the document and in relation to the nature and extent of proposals made available to us at the time of your enquiry. The recommendations should not be used for other schemes on or adjacent to the site without further reference to Ground Investigation and Piling Limited. The assessment of the factual data will be provided to assist the client and his Engineer and/or advisors in the preparation of their designs.

4. The report will be based on the ground conditions encountered in the exploratory holes together with results of field and laboratory testing in the context of the proposed development. Conditions between exploratory holes have been interpolated, however soils and rock conditions are highly variable and may differ from our interpolation There may be conditions, appertaining to the site, which may not be revealed by the investigation, and which may not be taken into account in the report.

5. Methods of construction and/or design other than those proposed by the designers or referred to in the report may require consideration during the evolution of the proposals and further assessment of the geotechnical data would be required to provide discussion and recommendation appropriate to these methods.

6. The accuracy of the results reported will depend upon the technique of measurement, investigation and test used and these values should not be regarded necessarily as characteristic of the strata as a whole. Where such measurements are critical, the technique of the investigation will need to be reviewed and supplementary investigation undertaken in accordance with the advice of the company where necessary.

7. Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes, or on possible presence of a feature based on either visual, verbal, written, cartographical, photographic or published evidence, this will be for guidance only and no liability can be accepted for its accuracy.

8. Ground conditions should be monitored during the construction of the works and the recommendations of the report re-evaluated on the light of these data by the supervising geotechnical engineers.

9. Any comments on groundwater conditions will be based on observations made at the time of the investigation, unless specifically stated otherwise. It should be noted, however, that the observations are subject to the method and speed of the boring, drilling or excavation and that groundwater levels will vary due to seasonal or other effects.

10. Unless specifically stated, the investigation will not take into account possible effects of mineral extraction.

11. The economic viability of the proposals referred to in the report, or of the solutions put forward to any problems encountered, will depend on very many factors in addition to geotechnical considerations hence its evaluation will be outside the scope of the report.

Appendix B Topographical and Utility Survey

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Grid: Local Plane Metric related to National Grid at survey control SC10
Levels: OS Datum from GNSS positioning converted using the National Geoid Model OSGM02

Notes
related to Project No.19479, originally surveyed September 2017

Topographical Survey Legend

BUILDINGS AND WALLS
Building
Building Over Raised
Ruin
Passage
Wall with Height
Retaining Wall

FENCE STYLES AND DESCRIPTIONS
Close Boarded
Corrugated Iron
Chestnut Paling
Chainlink
Hurdrail
Interwoven
Iron Railings
Lattice
Miscellaneous
Palisade
Post & Chain
Post & Rail
Post & Wire
Post & Barbed Wire
Wire mesh
Wills
Gate
Fence Envelope

ROADS
Kerbs
Edge of Surfacing
Pedestrian Crossing
Track
Footpath

STREET FURNITURE
Bollards Beacon
Bus Stop
Bollard
Cats Eye
Coal Chute
Closed Circuit TV
Drain
Electricity Pole
Flood Light
Flag Staff
Lamp Post
Letter Box
Name Plate (street)
Mooring Ring
Mile Post or Mooring Post
Service Marker
Mile Stone
Post
Parking Meter
Reflector Post
Reading Gas
Road Sign
Speed Camera
Information Sign
Stop
Traffic Light
Telegraph Pole
Traffic Light Push Button Post
Traffic Light Control
Control Box
British Telecom Box
Electricity Box
Box Box

INSPECTION CHAMBERS AND TYPES
Inspection Cover
Inspection Cover (Disc)
Manhole
British Telecom Cover
Inspection Cover (Comms)
Cable TV
Inspection Cover Traffic Signals
Gully
Kerb Outlet
Vent Pipe
Down Pipe
Rain Water Pipe
Soil Pipe
Gas Pipe
Unable to lift cover
Stop Tap
Stop Valve
Lamphole
Hydrant
Earth Rod
Gas Valve
Water Meter
Washout
Reading Eye

GEOTECHNICAL INFORMATION
Borehole
Trial Pit
Monitor Pit
Probe Hole
Window Sample

GENERAL INFORMATION
Petrol Pump
Basement Light
Footbridge
Slab Type Channel
Slot Type Channel
Strike Type Channel
Tactile Paving
Dwarf Barrier
Columns
Excavation
Gar Vacuum
Offset Pill
Air Valve
Trough
Chimney
Telephone Call Box

OVERHEAD FEATURES
Electricity Pylon
Electricity
Telephone

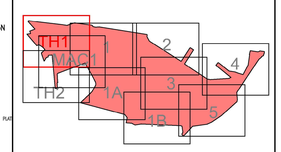
WATER FEATURES
Canal
Stream
Ditch
Weir
Culvert
Drip (Land Drain)
Spring

RELIEF AND VEGETATION
Hedge
Edge of wood/Bushes
Stump
Individual Tree
Slopes with Height Breather Bars 1in
Cliff Face
Mound
Reeds

LEVEL AND HEIGHT INFORMATION
Standard Spot Height
Precision Spot Height
Bed Level
Water Level
Soffit Level
Threshold Level
Cover Level
Invert Level
Sump Level
Floor Level
Finished Floor Level
Top of Tank Level
Kerb Level
Ground Level
Ridge Top Level
Flat Roof Level
Top of Canopy Level
Underside of Canopy Level
Window Sill Level
Window Head Level
Springing Level
Arch Level
Cable Level
Top of Wall Level
Underside of Beam Level
Diamond Height

SURVEY INFORMATION SIGNS
Permanent Ground Marker
O.S. Trig Station
O.S. Bench Mark

Sheet Index



Rev.	Date	Description
A	24/01/24	Additional Utility survey data added to Area 1A
B	07/02/24	Additional Utility survey data added to Area 1A

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www.malcolmhughes.co.uk
survey@mhls.co.uk

Accreditations

Client
BURO HAPPOLD LTD
CAMDEN MILL, LOWER BRISTOL ROAD
BATH, BA2 3DQ

Project
MANCHESTER MAYFIELD STATION
FAIRFIELD STREET, MANCHESTER
M1 2QF

Drawing Title
TOPOGRAPHICAL SURVEY (3D)

Surveyed by	Drawn by	Survey Date
RP	AW 02/10/23	September 2023
Checked by	Approved by	Scale
EAD 02/10/23		1 : 200

Drawing No. 19479-TH-Topo1
Revision B

Grid: Local Plane Metric related to National Grid at survey control SC10
Levels: OS Datum from GNSS positioning converted using the National Geoid Model OSGM02

Notes
related to Project No.19479, originally surveyed September 2017

Topographical Survey Legend

BUILDINGS AND WALLS
Building
Building Under Raised
Ruin (RUIN)
Pylon
Wall with Height Retaining Wall (WALL 452.36m / RETW)

FENCE STYLES AND DESCRIPTIONS
Chain Boundary C/B
Corrugated Iron C/I
Chestnut Paling C/P
Chainlink C/L
Handrail H/R
Interwoven WK
Iron Railings I/R
Lattice L/Y
Miscellaneous Misc
Palisade PAL
Post & Chain P/C
Post & Rail P/R
Post & Wire P/W
Post & Barbed Wire B/W
Wire mesh W/M
Stile
Gate
Fence Envelope

ROADS
Kerbs
Edge of Surfacing
Pedestrian Crossing (PC)
Track
Footpath (FP)

STREET FURNITURE
Bollards Bessen
Bus Stop
Bollard
Cats Eye
Coal Chute
Closed Circuit TV
Drain
Electricity Pole
Flood Light
Flag Staff
Lamp Post
Letter Box
Horse Picks (shoe)
Mooring Ring
Mile Post or Marking Post
Service Marker
Mile Stone
Post
Parking Meter
Reflector Post
Reading Eye
Road Sign
Speed Camera
Information Sign
Stop
Traffic Light
Telegraph Pole
Traffic Light Push Button Post
Traffic Light Control
Control Box
British Telecom Box
Electricity Box
Gas Box

INSPECTION CHAMBERS AND TYPES
Inspection Cover
Inspection Cover (Disc)
Manhole
British Telecom Cover
Inspection Cover (Comms)
Cable TV
Inspection Cover Traffic Signals
Gully
Kerb Outlet
Vent Pipe
Down Pipe
Rain Water Pipe
Soil Pipe
Gas Pipe
Unable to lift cover
Stop Tap
Stop Valve
Lamphole
Hydrant
Earth Rod
Gas Valve
Water Meter
Washout
Reading Eye

GEOTECHNICAL INFORMATION
Borehole
Trial Pit
Monitor Pit
Probe Hole
Window Sample

GENERAL INFORMATION
Petrol Pump
Basement Light
Footbridge
Dish Type Channel
Slot Type Channel
Strike Type Channel
Tactile Paving
Kerb Starter
Column
Excavation
Gas Vacuum
Offset, FD
Air Valve
Trough
Chimney
Telephone Call Box

OVERHEAD FEATURES
Electricity Pylon (EPYLON)
Electricity
Telephone

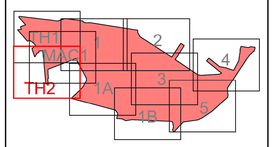
WATER FEATURES
Canal
Stream
Ditch
Weir
Culvert
Drip (Level Drain)
Spring

RELIEF AND VEGETATION
Hedge
Edge of wood/Bushes
Stump (STUMP)
Individual Tree
Slopes with Height Greater than 1m
Cliff Face
Marsh
Reeds

LEVEL AND HEIGHT INFORMATION
Standard Spot Height
Precision Spot Height
Bed Level
Water Level
Soffit Level
Threshold Level
Cover Level
Invert Level
Pipe Soffit Level
Floor Level
Finished Floor Level
Top of Tank Level
Eave Level
Ridge Level
Rain Up Level
Flat Roof Level
Top of Canopy Level
Underside of Canopy Level
Window Sill Level
Window Head Level
Springing Level
Arch Level
Cable Level
Top of Wall Level
Underside of Beam Level
General Height

SURVEY INFORMATION SIGNS
Permanent Ground Marker
O.S. Trig Station
O.S. Bench Mark

Sheet Index



Rev.	Date	Description
A	24/01/24	Additional Utility survey data added to Area 1A
B	07/02/24	Additional Utility survey data added to Area 1A

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survey@mhls.co.uk

Accreditations

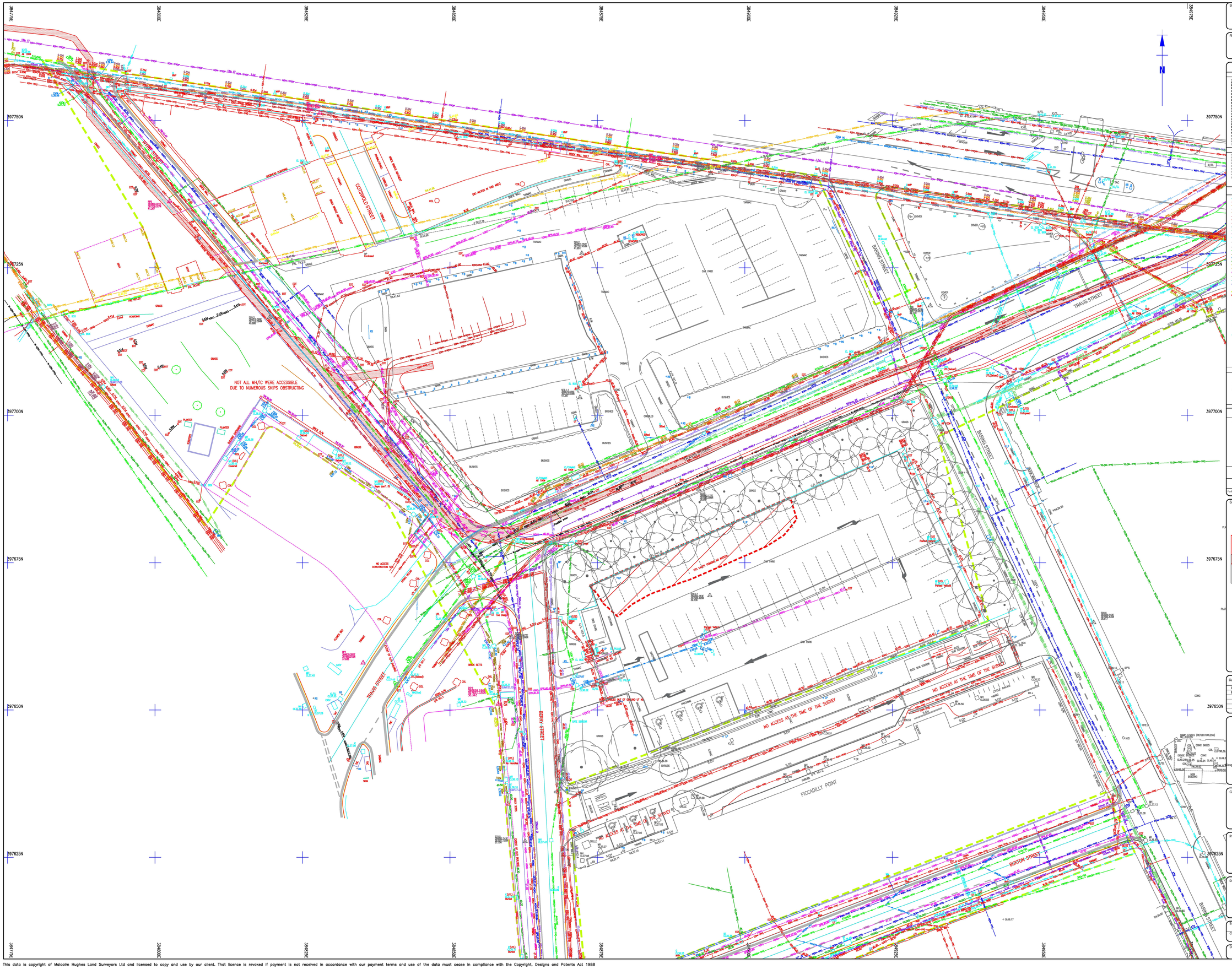
Client
BURO HAPPOLD LTD
CAMDEN MILL, LOWER BRISTOL ROAD
BATH, BA2 3DQ

Project
MANCHESTER MAYFIELD STATION
FAIRFIELD STREET, MANCHESTER
M1 2QF

Drawing Title
TOPOGRAPHICAL SURVEY (3D)

Surveyed by	Drawn by	Survey Date
RP	AW 02/10/23	September 2023
Checked by	Approved by	Scale
EAD 02/10/23		1 : 200

Drawing No. 19479 / TH-Topo2
Revision B



Survey Notes

Grid: Local Plane Metric related to National Grid at survey control SC10

Levels: OS Datum from GNSS positioning converted using the National Geoid Model OSGM02.

Notes

related to Project No.19479, originally surveyed September 2017

Survey Legend

STREET FURNITURE

Air Valve	○ AV	Bus Stop	⊕ BSP
Bus Stop	⊕ BS	Stop Tap	⊕ ST
Bollard	○ B	Stop Valve	⊕ SV
Bollard Tray	⊕ Bol	Traffic Light	⊕ TL
Cable Chamber	⊕ CC	Traffic Light	⊕ TL
Closed Circuit TV	⊕ CCTV	Traffic Light Push Button Post	⊕ TLP
Down Pipe	⊕ DP	Traffic Light Control	⊕ TLC/P
Drain	○ D	Weir Plate	⊕ WP
Earth Rod	⊕ ER	Wash Down	⊕ WD
Electricity Pole	⊕ EP	Washout	⊕ WO
Flood Light	⊕ FL	Control Box	☐ C/BOX
Gas Riser	⊕ GR	Car Vacuum	☐ VAC
Hydrant	⊕ FH	Car Air	☐ AIR
Lamp Post	⊕ LP	Junction Box	☐ JB
Level Marker	⊕ LM	Telephone	☐ TEL/P/ CCTV
Offset Pit	⊕ OP	Telephone Call Box	☐ TCP
Post	⊕ P	Petrol Pump	☐ PP
Parking Meter	⊕ PM	Gas Valve	☐ GV
Pipe Riser	⊕ PR	Gas Drainage Channel	═ GDC
Rain Water Pipe	⊕ RWP	Slot Drainage Channel	═ SDC
Rodding Eye	⊕ RE	Grate Drainage Channel	═ GDC
Road Sign	⊕ RS		
Speed Camera	⊕ S/CAM		

INSPECTION CHAMBERS

Inspection Cover	☐ IC
Inspection Cover (Elec)	☐ E/IC
Gully	☐ G
British Telecom Cover	☐ BT
Inspection Cover (Comms)	☐ IC/COM
Gas	☐ G/IC
Inspection Cover Traffic Signals	☐ IC/TL
Gully	☐ G
Kerb Outlet	☐ KO

OVERHEAD FEATURES

Electricity Pylon

Electricity

Telephone

LEVEL AND HEIGHT INFORMATION

Cover Level	= CL(E.G)
Invert Level	= I.L(E.I)
Reduced Dist. Level	= RDL(A.D)
Sump Level	= SUMP(S.P)

UNDERGROUND SERVICES KEY

- TV(B2) — Cable TV Cables
- CCTV(B2) — CCTV Cables
- COM(B2) — Communications Cable
- DUB(2) — Empty Ducting
- EA(B2) — Earth Cable
- HV(B2) — HV Electricity Cable
- E(B2) — Electricity Cable
- FGL(B2) — Fuel Gauge Line
- F(B2) — Fuel Line
- V(B2) — Fuel Vent Line
- G(B2) — Gas Pipe
- H(B2) — Heating Pipe
- R(B2) — Recovery Pipe
- UB(2) — Water Distribution Pipe
- CWS(B2) — Sewer Combined
- FWS(B2) — Sewer Foul
- SWS(B2) — Sewer Surface Water
- TEL(B2) — British Telecom
- TL(B2) — Traffic Light Cable
- UB(2) — Unidentified Duct
- UB(2) — Unidentified GPR or electricity/gas trace
- VR(B2) — Vehicle Recovery Pipe
- W(B2) — Vehicle Detection Fuel
- W(B2) — Water pipe
- End of Main
- Vehicle Recovery
- Area with Access
- GPR Detected Anomaly Point/Trench
- GPR Detected Rebar
- GPR Detected Structural Void
- GPR Detected Structure
- GPR Line Data
- GPR Detected Anomaly Point Directional
- GPR Transect

NOTES

Electromagnetic and Ground Penetrating Radar technique have been used in the detection of underground services. Nuturea and Non-conductive services may not be detected by these methods of protections and we recommend that that excavations should be undertaken to confirm identification, location and depth of features where these are critical to design or site works.

Please note that not all buried pipes, cables and ducts can be detected and mapped in consideration of their depth, location material type, geology and proximity to other utilities.

All reasonable effort and care has been made in searching available record drawings. The completeness of the underground service information supplied to and by us cannot be guaranteed.

Where services are non-metallic or not proven on site, positions are taken from records, trench scars and surface detail.

Pipe sizes which cannot be obtained by visual survey are taken from utilities record drawings or marker plates where available.

Services shown as Taken From Records (TFR) or PARAR GL.D have not been proven on site.

This diagram below describes the depth information obtained in detail.

The CAD layering may contain further information.

Collected data from GPR has not been goal processed unless specified elsewhere in relation to the survey drawing.

All utilities inspected and measured at Inspection Covers or Marker Posts are considered to be +,-0.1, for a radius up to 5m from the chamber wall.

DRAWING INFORMATION

AD	Assumed Double
BA	Backdrop
D	Double
DT	Depth
GPR	Ground Penetrating Radar
MUP	No Visible Pipe
NL	No Level
TFR	Taken From Records
TP	Trial Pit
UTS	Unable To Survey
US	Unable To Bod
UTS	Unable To Survey
UC	Unable To Cover Found

PIPE MATERIAL

AC	Asbestos Cement
BR	Brick
CI	Cast Iron
CO	Concrete
DI	Ductile Iron
PE	High Density Polythene Pipe
PVC	Polyvinyl Chloride
SI	Spun Iron
V	Vitrified
VCL	Vitrified Clay

TYPICAL FEATURE DEPTH ANNOTATION

ELECTRO MAGNETIC DETECTION — APPROX DEPTH TO CENTRE — CABLE/FIBRE OPTIC

GRAVITY DRAIN (VISUAL) OBSERVATION — APPROX DEPTH TO INVERT

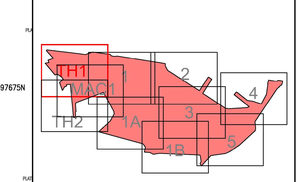
GROUND PENETRATING RADAR — APPROX DEPTH TO EXISTING CROWN

BSI PAS128:2022 QUALITY LEVEL INFORMATION

SURVEY TYPE		QUALITY LEVEL	DESCRIPTION
B -	Detection	QL-B4 NTR	Location not detected on site, taken from records.
		QL-B4 N/S	A utility segment that has not been detected but is suspected to exist Denotes assumed route only
		QL-B3	Horizontal detection by one geophysical technique only Denotes utility segments with weak signals / no depth information
		QL-B2	Horizontal and vertical detection by one geophysical technique only (Electromagnetic Detector/Ground Penetrating Radar) Medium confidence level for position and depth.
		QL-B1	Horizontal and vertical detection by multiple geophysical techniques (Electromagnetic Detector/Ground Penetrating Radar) High confidence level for position and depth.
A -	Verification	QL-A	Horizontal and vertical location of the utility established by visual inspection of manholes and inspection chambers or by use of targeted excavations (vacuum excavation and trial pits).
OTHER ANNOTATIONS		(F)	Denotes utility segments that have been detected through the use of GPR Post Processing.

Further information on PAS128 can be found on our resource website: www.pas128.co.uk

Sheet Index



Rev.	Date	Description
A	24/01/24	Additional Utility survey data added to Area 1A
B	07/02/24	Additional Utility survey data added to Area 1A

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scotland@mhls.co.uk

Accreditations: RICS, The Survey Association, RICS, Alcumus SafeContractor, Exor

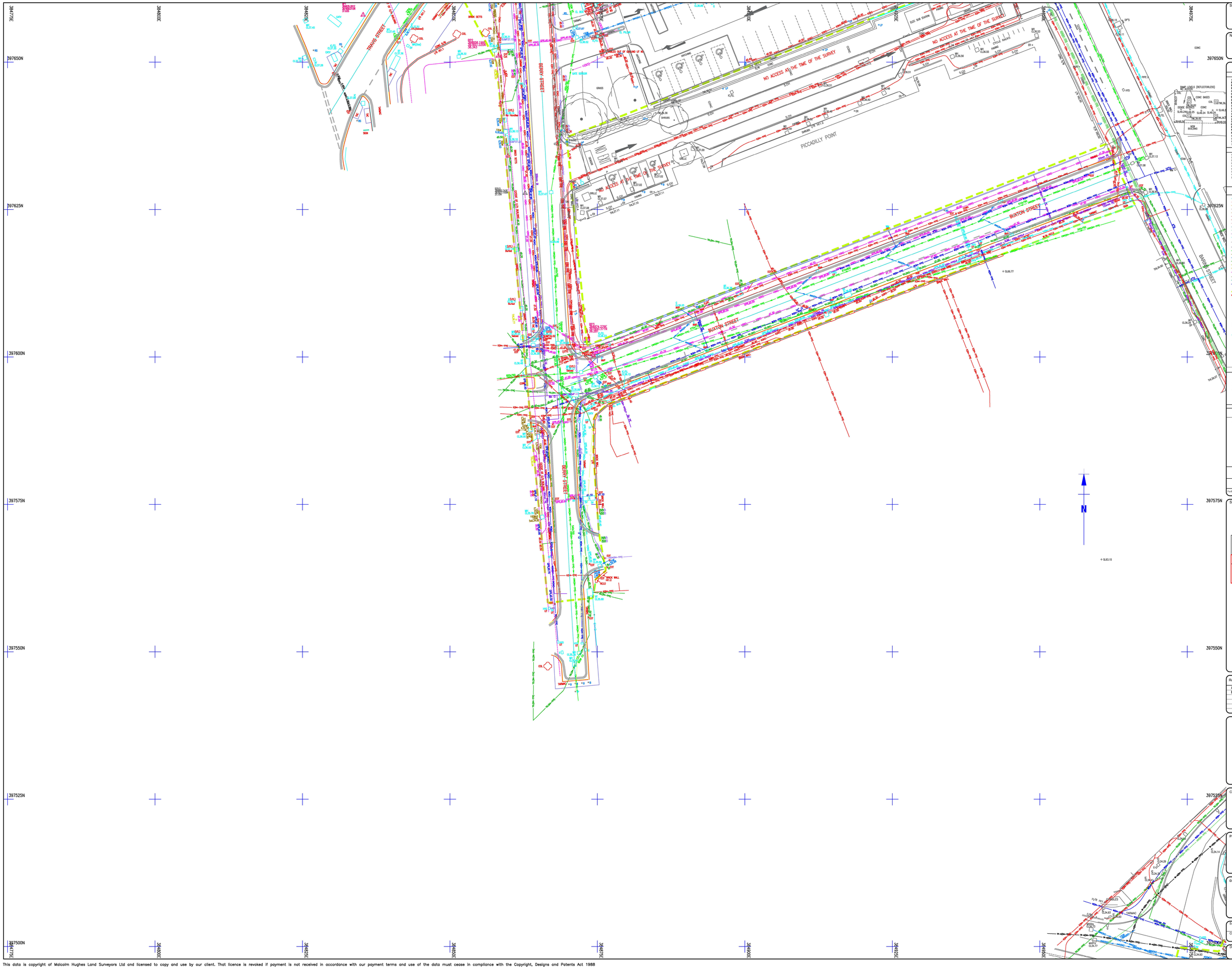
Client: Buro Happold Ltd.
Canal Suite, Churchgate House
56 Oxford Street, Manchester M1 6EU

Project: Mayfield, Manchester

Drawing Title: Utility Mapping Survey (2D)

Surveyed by	JB/PG	Drawn by	PS 11/10/23
Checked by	DJ 04/01/24	Approved by	
Survey Date	October 2023		
Scale	A0@1:200		
Drawing No	19479-TH-UG1	Revision	B

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Survey Notes

Grid: Local Plane Metric related to National Grid at survey control SC10

Levels: OS Datum from GNSS positioning converted using the National Geoid Model OSGM02.

Notes

related to Project No.19479, originally surveyed September 2017

Survey Legend

STREET FURNITURE

Air Valve	AV	Bus Stop	BSP
Bus Stop	BS	Stop Tap	ST
Bollard	B	Stop Valve	SV
Bollard Tray	Bol	Traffic Light	TL
Cable Chamber	CC	Traffic Light	TL
Closed Circuit TV	CCTV	Traffic Light Push Button Post	TLP
Down Pipe	DP	Traffic Light Control	TLC/P
Drain	D	Weld Plate	WP
Earth Rod	ER	Water Valve	WV
Electricity Pole	EP	Washout	WO
Flood Light	FL	Control Box	C/BOX
Gas Riser	GR	Car Vacuum	VAC
Guy Wire	GW	Car Air	AIR
Hydrant	FH	Junction Box	JB
Lamp Post	LP	Electricity Box	ELEC BOX
Marker Post	MP	Telephone Cab Box	TCP
Offset Pit	OP	Petrol Pump	PP
Post	P	Slot Drainage Channel	SDC
Parking Meter	PM	Slot Drainage Channel	SDC
Pipe Riser	PR	Grate Drainage Channel	GDC
Rain Water Pipe	RWP		
Rodding Eye	RE		
Road Sign	RS		
Speed Camera	S/CAM		

INSPECTION CHAMBERS

Inspection Cover	IC
Inspection Cover (Elec)	IC/EL
Gully	G
British Telecom Cover	BT
Inspection Cover (Comms)	IC/COM
Gully	G/CL
Inspection Cover Traffic Signals	IC/TL
Gully	G
Kerb Outlet	KO

OVERHEAD FEATURES

Electricity Pylon	
Electricity	
Telephone	

LEVEL AND HEIGHT INFORMATION

Cover Level	= CL/E.45
Invert Level	= I.L/D.15
Reducing Size Level	= RS/S4.15
Sump Level	= SUMP/D.15

UNDERGROUND SERVICES KEY

TV(BZ)	Cable TV Cable
CCTV(BZ)	CCTV Cable
COM(BZ)	Communications Cable
DUB(Z)	Empty Ducting
EA(BZ)	Earth Cable
HV(BZ)	HV Electricity Cable
E(BZ)	Electricity Cable
G(BZ)	Fuel Gauge Line
F(BZ)	Fuel Line
V(BZ)	Fuel Vent Line
G(BZ)	Gas Pipe
H(BZ)	Heating Pipe
	GPR Detected Anomaly Unidentified
I(BZ)	Street Lighting Main
CWS(BZ)	Sewer Combined
FWS(BZ)	Sewer Foul
SWS(BZ)	Sewer Surface Water
TEL(BZ)	British Telecom
TL(BZ)	Traffic Light Cable
U(BZ)	Water Pipe Undefined (GPR or electro location trace
V(BZ)	Vapour Recovery Pipe
W(BZ)	Vehicle Detection Fed
	Water pipe
EOT	End of trace
	Manhole Access Recovery
	Access Chamber
	GPR Detected Anomaly Area/Point
	GPR Detected Rebar
	GPR Detected Structural Feature
	GPR Detected Structure
	GPR Line Data
	GPR Detected Anomaly Point Directional
	GPR Transect

NOTES

Electromagnetic and Ground Penetrating Radar technique have been used in the detection of underground services, features and anomalies shown on this survey plan. Whilst we have followed best practice and we recommend that trial excavations should be undertaken to confirm identification, location and depth of features where these are critical to design or site works.

Please note that not all buried pipes, cables and ducts can be detected and mapped in consideration of their depth, location, material type, geology and proximity to other utilities.

All reasonable effort and care has been made in searching available record drawings. The completeness of the underground service information supplied to and by us cannot be guaranteed.

Where services are non-metallic or not proven on site, positions are taken from records, kerb sizes and surface detail.

Pipe sizes which cannot be obtained by visual survey are taken from utilities record drawings or marker plates where available.

Services shown as Taken From Records (TFR) or PAS128 QL-D have not been proven on site.

The diagram below describes the depth information obtained in detail.

The CAD layering may contain further information.

Collected data from GPR has not been post processed unless specified elsewhere or denoted on the survey drawing.

All utilities inspected and measured at Inspection Covers or Manholes are considered to be a QL-A for a radius up to 5m from the chamber wall.

DRAWING INFORMATION

AD	Assumed Route
BA	Backdrop
D	Depth
E.o.T	End of Trace (Including Radar
MAP	No Visible Plate
NL	No Lid Found
TR	Topical Lid
TFR	Taken From Records
U	Unable
UTE	Unable To Survey
UR	Unable To Rod
UT	Unable To Lift
UTL	Unable To Locate

PIPE MATERIAL

AC	Asbestos Cement
BR	Brick
CI	Cast Iron
CO	Concrete
DI	Ductile Iron
GRP	Glass Reinforce Pipe
PVC	Polyvinyl Chloride
ST	Spun Iron
VC	Vitrified
VCL	Vitrified Clay

TYPICAL FEATURE DEPTH ANNOTATION

ELECTRO MAGNETIC DETECTION — APPROX DEPTH TO CENTRE — CABLE/FIBRE OPTIC

GRAVITY DRAIN (VISUAL) OBSERVATION — APPROX DEPTH TO INVERT

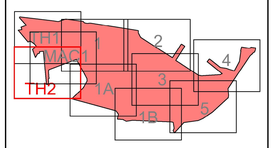
GROUND PENETRATING RADAR — APPROX DEPTH TO EXTERNAL CROWN

PAS128:2022 QUALITY LEVEL INFORMATION

SURVEY TYPE		QUALITY LEVEL	DESCRIPTION
B	Detection	QL-B4 TFR	Location not detected on site, taken from records.
		QL-B4 N/S	A utility segment that has not been detected but is suspected to exist Denotes assumed route only
		QL-B3	Horizontal detection by one geophysical technique only Denotes utility segments with small signals / no depth information
		QL-B2	Horizontal and vertical detection by one geophysical technique only (Electromagnetic Detector/Ground Penetrating Radar). Medium confidence level for position and depth.
		QL-B1	Horizontal and vertical detection by multiple geophysical techniques. (Electromagnetic Detector/Ground Penetrating Radar). High confidence level for position and depth.
A	Verification	QL-A	Horizontal and vertical location of the utility established by visual inspection of manholes and inspection covers or by use of targeted excavations (vacuum excavation and trial pits).
OTHER ANNOTATIONS		(P)	Denotes utility segments that have been detected through the use of GPR Post Processing.

Further information on PAS128 can be found on our resource website: www.pas128.co.uk

Sheet Index



Rev.	Date	Description
A	24/01/24	Additional Utility survey data added to Area 1A
B	07/02/24	Additional Utility survey data added to Area 1A

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scotland@mhls.co.uk

Accreditations

Client
Buro Happold Ltd.
Canal Suite, Churchgate House
56 Oxford Street, Manchester M1 6EU

Project
Mayfield, Manchester

Drawing Title
Utility Mapping Survey (2D)

Surveyed by	JB/PG	Drawn by	PS 11/10/23
Checked by	DJ 04/01/24	Approved by	
Survey Date	October 2023	Scale	A0@1:200

Drawing No: 19479-TH-UG2 — Revision: A

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Grid: Local Plane Metric related to National Grid at survey control SC10

Levels: OS Datum from GNSS positioning converted using the National Geoid Model OSGM02

Notes

related to Project No.19479, originally surveyed September 2017

Topographical Survey Legend

BUILDINGS AND WALLS

Building
Building Over Raised
Ruin (RUIN)
Passage (PASS)
Wall with Height / Retaining Wall (Wall 457.8m / R/W)

FENCE STYLES AND DESCRIPTIONS

Close Boarded C/B
Corrugated Iron C/I
Chestnut Paling C/P
Chainlink C/L
Handrail H/R
Interwoven IBE
Iron Railings I/R
Lattice L/T
Miscellaneous Misc
Palisade PAL
Post & Chain P/C
Post & Rail P/R
Post & Wire P/W
Post & Barbed Wire B/W
Wire mesh W/M
Stile
Gate
Fence Envelope

ROADS

Kerbs
Edge of Surfacing
Pedestrian Crossing (PC)
Track (Track)
Footpath (FP)

STREET FURNITURE

Bollards BB
Bus Stop BS
Bollard B
Cats Eye CE
Coal Chute CC
Closed Circuit TV CCTV
Drain DR
Electricity Pole EP
Flood Light FL
Flag Staff FS
Lamp Post LP
Letter Box LB
Name Plate (street) NP
Mooring Ring MR
Mile Post or Mooring Post MP
Service Marker MK
Mile Stone MS
Post P
Parking Meter PM
Reflector Post RP
Rodding Eye RE
Road Sign RS
Speed Camera S/CAM
Information Sign SIGN
Stop ST
Traffic Light TL
Telegraph Pole TP
Traffic Light Push Button Post TLP
Traffic Light Control TLC/P
Control Box C/BOX
British Telecom Box BT BOX
Electricity Box EL BOX
Gas Box GAS BOX

INSPECTION CHAMBERS AND TYPES

Inspection Cover IC
Inspection Cover (Elec) IC/EL
Manhole MH
British Telecom Cover BT
Inspection Cover (Comms) IC/TCOM
Cable TV CATV
Inspection Cover Traffic Signals IC/TL
Gully G
Kerb Outlet KO
Vent Pipe VP
Down Pipe DP
Rain Water Pipe RWP
Soil Pipe SWP
Gas Pipe G~PIPE
Unable to lift cover U/L
Stop Tap ST
Stop Valve SV
Lamphole LH
Hydrant HYD
Earth Rod ER
Sea Valve SV
Water Meter WM
Washout WO
Rodding Eye RE

GEOTECHNICAL INFORMATION

Borehole BH
Trial Pit TP
Monitor Pit MON
Probe Hole PH
Window Sample WS

GENERAL INFORMATION

Petrol Pump PP
Basement Light BL
Footbridge FB
Dish Type Channel
Slot Type Channel
Strike Type Channel
Tactile Paving TAC
Kerb Starter C/SR
Column COL
Excavation EXC
Car Vacuum VAC
Offset Pill SP
Air Valve AV
Trough C/TR
Chimney CHY
Telephone Call Box TCB

OVERHEAD FEATURES

Electricity Pylon E.P.YLON
Electricity / Telephone (EL / TEL)

WATER FEATURES

Canal
Stream
River
Weir
Culvert
Drift (Land Drain)
Spring SPR

RELIEF AND VEGETATION

Hedge
Edge of wood/Bushes
Stump STUMP
Individual Tree
Slopes with Height Breather Stem T.H.
Cliff Face
Marsh
Reeds

LEVEL AND HEIGHT INFORMATION

Standard Spot Height 133.45
Precision Spot Height 123.456
Bed Level BLD.00
Water Level WL24.02
Soffit Level SLD5.83
Threshold Level THSB.88
Cover Level CL26.45
Invert Level IL35.15
Pipe Soffit Level PSLD.00
Floor Level FL00
Finished Floor Level FFL8.00
Top of Tank Level TT7.00
Sump Level SLD.00
Roof Level RL8.00
Ridge Top Level RHL8.00
Flat Roof Level FRL7.00
Top of Conveyor Level TOP/CY2.00
Underside of Conveyor Level USP/CY8.00
Window Sill Level WSL8.00
Window Head Level WHL8.00
Springing Level SPL8.00
Arch Level ALT.00
Cable Level CHTL00
Top of Wall Level TWL10.00
Underside of Beam Level UBL8.88
Diamond Height HTD.00

SURVEY INFORMATION SIGNS

Permanent Ground Marker
O.S. Trig Station
O.S. Bench Mark

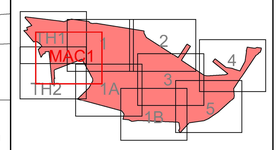
INSPECTION CHAMBERS AND TYPES

Inspection Cover (Elec) IC/EL
Manhole MH
British Telecom Cover BT
Inspection Cover (Comms) IC/TCOM
Cable TV CATV
Inspection Cover Traffic Signals IC/TL
Gully G
Kerb Outlet KO
Vent Pipe VP
Down Pipe DP
Rain Water Pipe RWP
Soil Pipe SWP
Gas Pipe G~PIPE
Unable to lift cover U/L
Stop Tap ST
Stop Valve SV
Lamphole LH
Hydrant HYD
Earth Rod ER
Sea Valve SV
Water Meter WM
Washout WO
Rodding Eye RE

GEOTECHNICAL INFORMATION

Borehole BH
Trial Pit TP
Monitor Pit MON
Probe Hole PH
Window Sample WS

Sheet Index



Rev.	Date	Description
A	24/01/24	Additional Utility survey data added to Area 1A
B	07/02/24	Additional Utility survey data added to Area 1A

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survey@mhls.co.uk

Accreditations

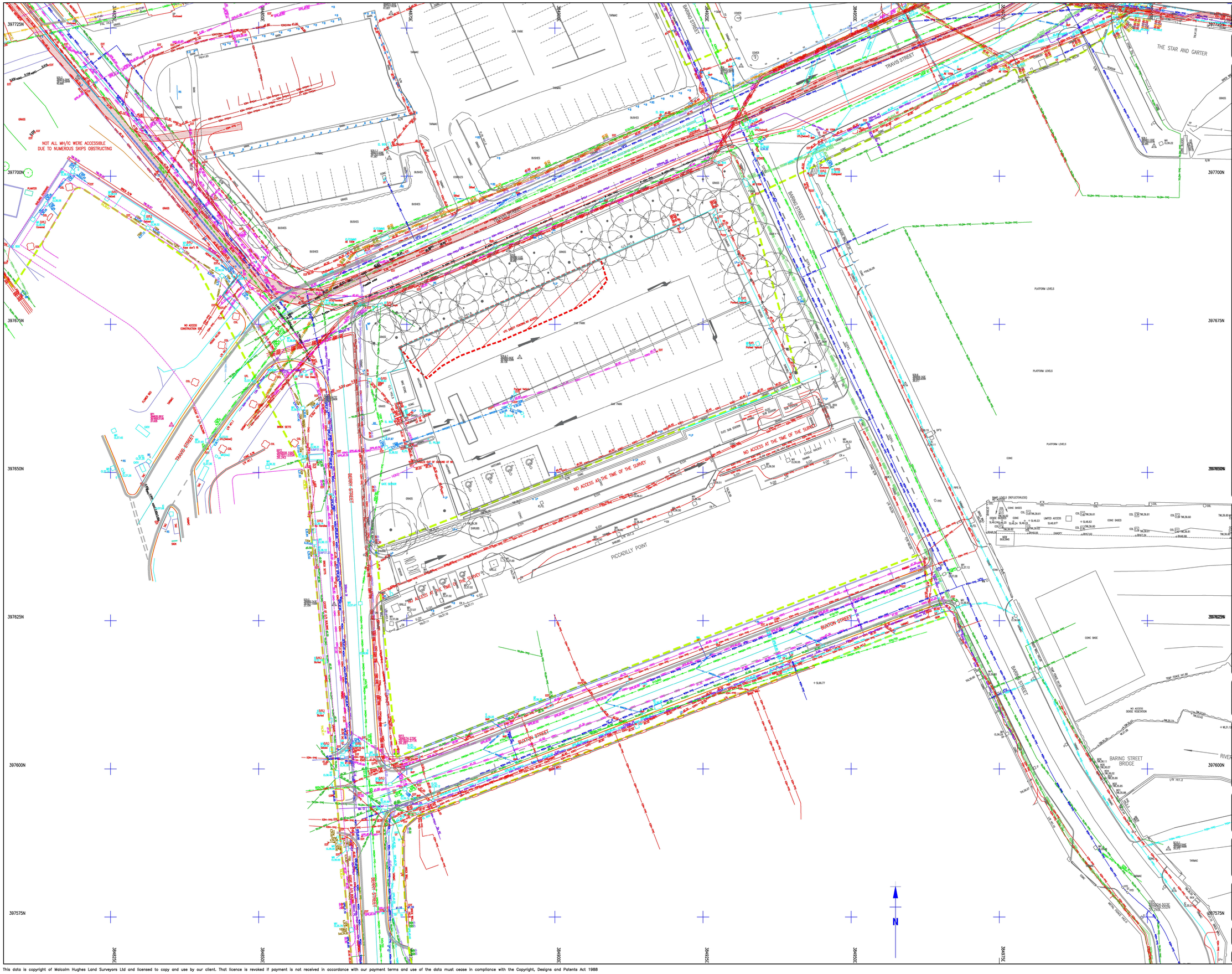
Client
BURO HAPPOLD LTD
CAMDEN MILL, LOWER BRISTOL ROAD
BATH, BA2 3DQ

Project
MANCHESTER MAYFIELD STATION
FAIRFIELD STREET, MANCHESTER
M1 2QF

Drawing Title
TOPOGRAPHICAL SURVEY (3D)

Surveyed by	Drawn by	Survey Date
CG	IC 14/11/23	November 2023
Checked by	Approved by	Scale
PK 14/11/23		1 : 200

Drawing No: 19479 / MAC-1
Revision: B



Survey Notes

Grid: Local Plane Metric related to National Grid at survey control SC10

Levels: OS Datum from GNSS positioning converted using the National Geoid Model OSGM02.

Notes

related to Project No.19479, originally surveyed September 2017

Survey Legend

STREET FURNITURE

Air Valve	○ AV	Bus Stop	○ BSP
Bus Stop	○ BS	Stop Tap	○ ST
Bollard	○ B	Stop Valve	○ SV
Bollard Tray	○ Bol	Traffic Light	○ TL
Bollard Tray	○ BT	Traffic Light Box	○ TLB
Closed Circuit TV	○ CCTV	Traffic Light Push Button Post	○ TLP
Down Pipe	○ DP	Traffic Light Control	○ TLC/P
Drain	○ D	Weld Plate	○ WP
Electric Box	○ EB	Water Meter	○ WM
Electricity Pole	○ EP	Washout	○ WO
Flood Light	○ FL	Control Box	□ C/BOX
Gas Riser	○ GR	Car Vacuum	□ VAC
Hydrant	○ FH	Car Air	□ AIR
Lamp Post	○ LP	Junction Box	□ JB
Marker Marker	○ MP	Gas Governor	□ GOV
Meter PR	○ GP	Telephone Cab Box	□ TCP
Post	○ PO	Petrol Pump	□ PP
Parking Meter	○ PM	Gas Drainage Channel	GDC
Pipe Riser	○ PR	Gas Drainage Channel	GDC
Rain Water Pipe	○ RWP	Slot Drainage Channel	SDC
Rodding Eye	○ RE	Grate Drainage Channel	GDC
Road Sign	○ SI		
Speed Camera	○ SC/M		

INSPECTION CHAMBERS

Inspection Cover	□ IC	Electricity Pylon	
Inspection Cover (Elec)	□ IC/EL	Electricity	
Gully	□ G	Telephone	
British Telecom Cover	□ BT		
Inspection Cover (Comms)	□ IC/COM		
Gully	□ G/TL		
Inspection Cover Traffic Signals	□ IC/TL		
Gully	□ G		
Kerb Outlet	□ KO		

OVERHEAD FEATURES

LEVEL AND HEIGHT INFORMATION

Cover Level	+ CL(M.AD
Invert Level	+ IL(S.IS
Reducing Skin Level	+ RS(A.IS
Survey Level	+ SL(M(GS.19

UNDERGROUND SERVICES KEY

TV(BZ)	Cable TV Cable
CCTV(BZ)	CCTV Cable
COM(BZ)	Communications Cable
DUB(Z)	Empty Ducting
EA(BZ)	Earth Cable
HV(BZ)	HV Electricity Cable
E(BZ)	Electricity Cable
GJ(BZ)	Fuel Gauge Line
F(BZ)	Fuel Line
V(BZ)	Fuel Vent Line
G(BZ)	Gas Pipe
HEA(BZ)	Heating Pipe
IN(BZ)	Inconclusive Anomaly (GPR Detected)
LB(Z)	Street Lighting Mast
CWS(BZ)	Sewer Combined
FWS(BZ)	Sewer Foul
SWS(BZ)	Sewer Surface Water
TEL(BZ)	Telephone Cable
TL(BZ)	Traffic Light Cable
U(BZ)	Unknown Cable
UR(Z)	Unidentified GPR or electro-location trace
VR(BZ)	Vapour Recovery Pipe
W(BZ)	Vehicle Detection Fuel
	Water pipe
EOT	End of trace
	Survey Boundary
	Access
	GPR Detected Anomaly Area/Chart
	GPR Detected Rebar
	GPR Detected Structural Feature
	GPR Detected Services
	GPR Low Data
	GPR Detected Anomaly Point Directional
	GPR Transect

NOTES

Electromagnetic and Ground Penetrating Radar technique have been used in the detection of underground services, features and anomalies shown on this survey plan. Due to the limitations of these processes and as recommended that that excavations should be undertaken to confirm identification, location and depth of features where these are critical to design or site works.

Please note that not all buried pipes, cables and ducts can be detected and mapped is consequence of their depth, location, material type, geology and proximity to other utilities.

All reasonable effort and care has been made in searching available record drawings. The completeness of the underground service information supplied to and by us cannot be guaranteed.

Where services are non-metallic or not proven on site, positions are taken from records, trench scars and surface detail.

Pipe sizes which cannot be obtained by visual survey are taken from utilities record drawings or market drains where available.

Services shown as Taken From Records (TFR) or PAS128 QL-D have not been proven on site.

This diagram below describes the depth information obtained in detail.

The CAD layering may contain further information.

Collected data from GPR has not been goal processed unless specified elsewhere or denoted on the survey drawing.

All utilities inspected and measured at Inspection Covers or Marker Posts are considered to be a QL-A for a radius up to 5m from the chamber wall.

DRAWING INFORMATION

AD	Assumed Route
BA	Backdrop
CL	Cable
D	Depth
GPR	Ground Penetrating Radar
NAD	No Visible Plant
SL	Spot Level
TFR	Taken From Records
U	Unknown
UTS	Unable To Survey
UR	Unable To Rod
UL	Unable To Lift
UO	Unable To Open Cover/ Frame

PIPE MATERIAL

AC	Asbestos Cement
BR	Brick
CI	Cast Iron
CO	Concrete
DI	Ductile Iron
PE	High Density Polythene Pipe
PVC	Polyvinyl Chloride
SI	Spun Iron
ST	Steel
VC	Vitrified Clay

TYPICAL FEATURE DEPTH ANNOTATION

ELECTRO-MAGNETIC DETECTION: APPROX DEPTH TO CENTRE — CABLE/FIBRE OPTIC

GRAVITY DRAIN (VISUAL) OBSERVATION: APPROX DEPTH TO INVERT

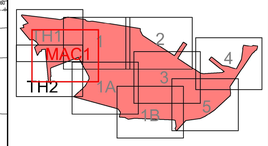
GROUND PENETRATING RADAR: APPROX DEPTH TO EXTERNAL CROWN

PAS128:2022 QUALITY LEVEL INFORMATION

SURVEY TYPE		QUALITY LEVEL	DESCRIPTION
B	Detection	QL-B4 TFR	Location not detected on site, taken from records.
		QL-B4 NS	A utility segment that has not been detected but is suspected to exist. Denotes assumed route only
		QL-B3	Horizontal detection by one geophysical technique only. Denotes utility segments with weak signals / no depth information
		QL-B2	Horizontal and vertical detection by one geophysical technique only (Electromagnetic Detection/Ground Penetrating Radar). Medium confidence level for position and depth.
		QL-B1	Horizontal and vertical detection by multiple geophysical techniques. (Electromagnetic Detection/Ground Penetrating Radar). High confidence level for position and depth.
A	Verification	QL-A	Horizontal and vertical location of the utility established by visual inspection and trial hole (trial excavation by hydro vac or targeted excavations (vacuum excavation and trial pits).
OTHER ANNOTATIONS		(P)	Denotes utility segments that have been detected through the use of GPR Post Processing.

Further information on PAS128 can be found on our resource website: www.pas128.co.uk

Sheet Index



Rev.	Date	Description
A	24/01/24	Additional Utility survey data added to Area 1A
B	07/02/24	Additional Utility survey data added to Area 1A

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scotland@mhls.co.uk

Accreditations: RICS, The Survey Association, RICS, RISQS (QUALIFIED), Achilles

Client: Buro Happold Ltd.
Canal Suite, Churchgate House
56 Oxford Street, Manchester M1 6EU

Project: Mayfield, Manchester

Drawing Title: Utility Mapping Survey (2D)

Surveyed by	JB/PG	Survey Date	October 2023
Drawn by	IC 18/11/23	Scale	A0@1:200
Checked by	DJ 04/01/24	Approved by	
Drawing No	19479-TMAC-UG1	Revision	B

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Grid: Local Plane Metric related to National Grid at survey control SC10

Levels: OS Datum from GNSS positioning converted using the National Geoid Model OSGM02

Notes

related to Project No.19479, originally surveyed September 2017

Topographical Survey Legend

BUILDINGS AND WALLS

Building
Building Under Raised
Footbridge
Ruin (RUIN)
Passage (PAS)
Wall with Height Retaining Wall (Wall, HT1.8m, R/W)

FENCE STYLES AND DESCRIPTIONS

Chain Barrelled C/B
Corrugated Iron C/I
Chestnut Paling C/P
Chainlink C/L
Handrail H/R
Interwoven IWF
Iron Railings I/R
Lattice L/F
Miscellaneous Misc
Palisade PAL
Post & Chain P/C
Post & Rail P/R
Post & Wire P/W
Post & Barbed Wire B/W
Wire mesh W/M
Stile
Gate
Fence Envelope

ROADS

Kerbs
Edge of Surfacing
Pedestrian Crossing (PC)
Track (Track)
Footpath (FP)

STREET FURNITURE

Bollards Beacon
Bus Stop
Bollard
Cats Eye
Coal Chute
Closed Circuit TV
Drain
Electricity Pole
Flood Light
Flag Staff
Lamp Post
Letter Box
Name Plate (street)
Mooring Ring
Mile Post or Marking Post
Service Marker
Mile Stone
Post
Parking Meter
Reflector Post
Reading Eye
Road Sign
Speed Camera
Information Sign
Stay
Traffic Light
Telegraph Pole
Traffic Light Push Button Post
Traffic Light Control (T/LCP)
Control Box (C/BOX)
British Telecom Box (BT BOX)
Electricity Box (EL BOX)
Gas Box (GAS BOX)

INSPECTION CHAMBERS AND TYPES

Inspection Cover (IC)
Inspection Cover (Elec) (IC/EL)
Manhole (MH)
British Telecom Cover (BT)
Inspection Cover (Comms) (IC/COM)
Cable TV (CATV)
Inspection Cover Traffic Signals (IC/TL)
Gully (G)
Kerb Outlet (KO)
Vent Pipe (VP)
Down Pipe (DP)
Rain Water Pipe (RWP)
Soil Pipe (SWP)
Gas Pipe (G-PIPE)
Unable to lift cover (UTL)
Stop Tap (ST)
Stop Valve (SV)
Lamphole (LH)
Hydrant (HYD)
Earth Rod (ER)
Gas Valve (GV)
Water Meter (WM)
Washout (WO)
Reading Eye (RE)

GEOTECHNICAL INFORMATION

Borehole (BH)
Trial Pit (TP)
Monitor Pit (MON)
Probe Hole (PH)
Window Sample (WS)

GENERAL INFORMATION

Petrol Pump (PP)
Basement Light (BL)
Building (B)
Slab Type Channel (S/CH)
Slot Type Channel (SLOT/CH)
Strike Type Channel (STRIKE/CH)
Tactile Paving (TAC)
Drain Marker (C/MK)
Column (COL)
Excavation (EXC)
Gas Vacuum (GV)
Offset, Fill (OF)
Air Valve (AV)
Trough (T)
Chimney (CHY)
Telephone Call Box (TCB)

OVERHEAD FEATURES

Electricity Pylon (E.PYLON)
Electricity (E)
Telephone (TEL)

WATER FEATURES

Canal
Stream
Ditch
Weir
Culvert (Culv)
Drip (Land Drain)
Spring (SPR)

RELIEF AND VEGETATION

Hedge
Edge of wood/Bushes
Stump (STUMP)
Individual Tree
Slopes with Height Breather Stem Tch
Cliff Face
Marsh
Reeds

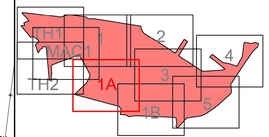
LEVEL AND HEIGHT INFORMATION

Standard Spot Height (+ 123.45)
Precision Spot Height (+ 123.456)
Bed Level (+ BL23.00)
Water Level (+ WL24.32)
Soffit Level (+ SL25.62)
Threshold Level (+ THR.88)
Cover Level (+ CL26.45)
Invert Level (+ IL25.15)
Pipe Soffit Level (+ PSL8.00)
Floor Level (+ FL8.00)
Finished Floor Level (+ FFL8.00)
Top of Tank Level (+ TT7.00)
Sump Level (+ SL8.00)
Weir Level (+ WL8.00)
Flood Top Level (+ FTL8.00)
Pot Roof Level (+ PR7.00)
Top of Canopy Level (+ TOP/CY7.00)
Underside of Canopy Level (+ SOF/CY8.00)
Window Sill Level (+ WSL8.00)
Window Head Level (+ WHL9.00)
Springing Level (+ SPL8.00)
Arch Level (+ AL7.00)
Cable Level (+ CHTL00)
Top of Wall Level (+ TW.10.00)
Underside of Beam Level (+ UBL8.88)
Element Height (+ HTL00)

SURVEY INFORMATION SIGNS

Permanent Ground Marker
O.S. Trig Station
O.S. Bench Mark

Sheet Index



Rev.	Date	Description
A	24/01/24	Additional Utility survey data added to Area 1A
B	07/02/24	Additional Utility survey data added to Area 1A

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survey@mhls.co.uk

Accreditations: RICS, The Survey Association, RICS

Client:
BURO HAPPOLD LTD
CAMDEN MILL, LOWER BRISTOL ROAD
BATH, BA2 3DQ

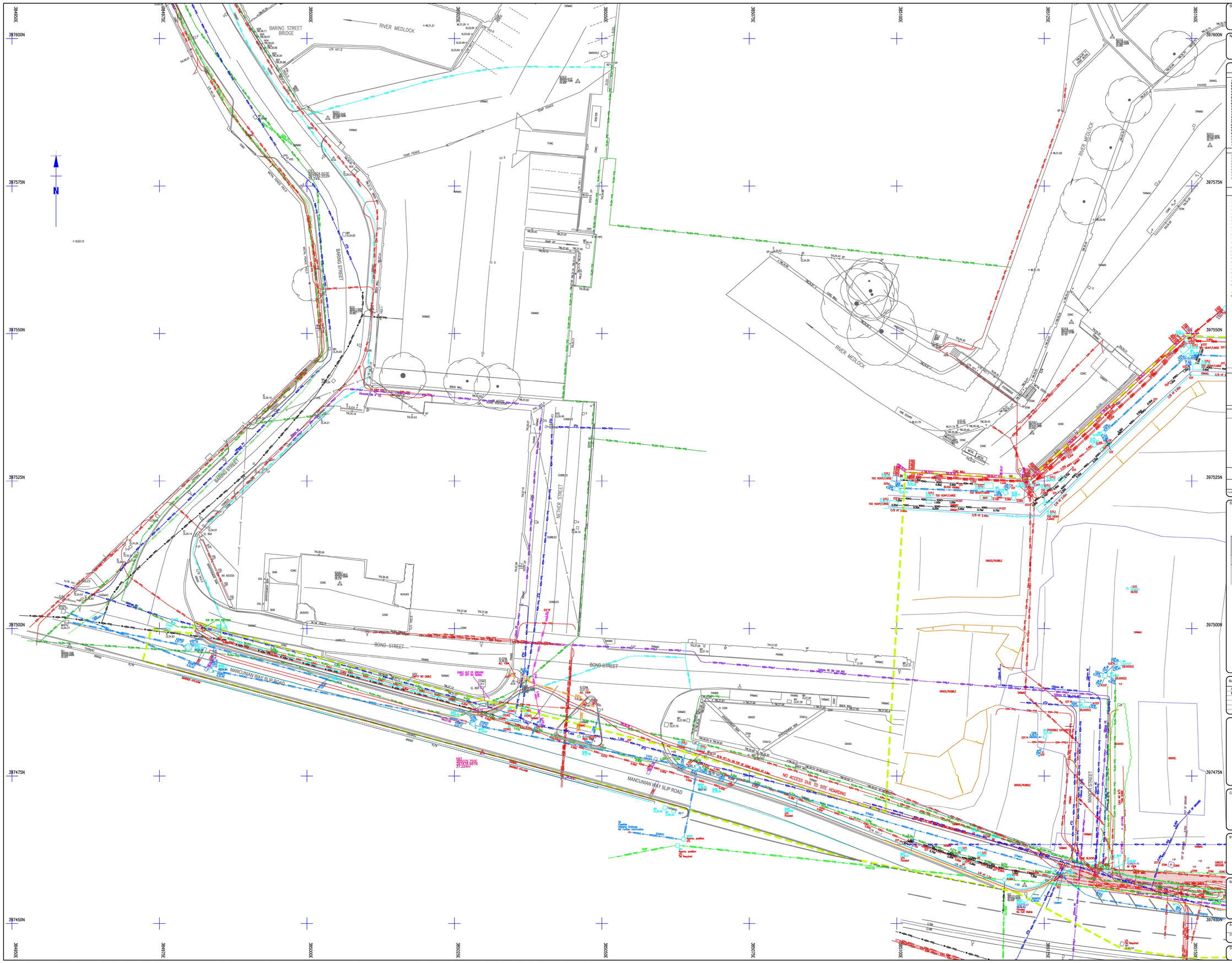
Project:
MANCHESTER MAYFIELD STATION
FAIRFIELD STREET, MANCHESTER
M1 2QF

Drawing Title:
TOPOGRAPHICAL SURVEY (3D)

Surveyed by	Drawn by	Survey Date
HA	IC 08/12/23	December 2023
Checked by	Approved by	Scale
ED 08/12/23		1 : 200

Drawing No: 19479-Area1A-Topo1

Revision: B



Survey Notes

Grid: Local Plane Metric related to National Grid at survey control SC10

Levels: OS Datum from GNSS positioning converted using the National Geoid Model OSGM02.

Notes

related to Project No.19479, originally surveyed September 2017

Survey Legend

STREET FURNITURE

Air Valve	○ AV	Bus Stop	○ BST
Bus Stop	○ BS	Stop Tap	○ ST
Bollard	○ B	Bollard	○ B
Bollard Tray	○ Bol	Traffic Light	○ TL
Cable Duct	○ CD	Traffic Light	○ TL
Closed Circuit TV	○ CCTV	Traffic Light Push Button Post	○ TLP
Down Pipe	○ DP	Traffic Light Control	○ TLC/P
Drain	○ D	Vent Pipe	○ VP
Earth Rod	○ ER	Water Meter	○ WM
Electricity Pole	○ EP	Washout	○ WO
Flood Light	○ FL	Control Box	□ C/BOX
Gas Riser	○ GR	Car Vacuum	□ VAC
Guard Rail	○ GR	Car Air	□ AIR
Hydrant	○ FH	Junction Box	□ JB
Lamp Post	○ LP	Gas Governor	□ GR GOV
Marker Marker	○ MM	Telephone Cat. Box	□ TCP
Offset Pit	○ OP	Petrol Pump	□ PP
Post	○ P	Gas Drainage Channel	GAS
Parking Meter	○ PM	Gas Drainage Channel	GAS
Pipe Riser	○ PR	Slot Drainage Channel	SLOT
Rain Water Pipe	○ RWP	Slot Drainage Channel	SLOT
Rodding Eye	○ RE	Grate Drainage Channel	GRATE
Road Sign	○ S		
Speed Camera	○ S/CAM		

INSPECTION CHAMBERS

Inspection Cover	□ IC	Electricity Pylon	
Inspection Cover (Elec)	□ IC/EL	Electricity	
Manhole	□ MH	Telephone	
British Telecom Cover	□ BT		
Inspection Cover (Comms)	□ IC/COM		
Gully	□ G		
Inspection Cover Traffic Signals	□ IC/TL		
Gully	□ G		
Kerb Outlet	□ KO		

OVERHEAD FEATURES

LEVEL AND HEIGHT INFORMATION

Cover Level	+ CL(6.45)
Invert Level	+ IL(5.15)
Reducing Slab Level	+ RS(5.13)
Sump Level	+ SUMP(3.15

UNDERGROUND SERVICES KEY

TV(BZ)	Cable TV Cable
CCTV(BZ)	CCTV Cable
COM(BZ)	Communications Cable
DUB(Z)	Empty Ducting
EA(BZ)	Earth Cable
HV(BZ)	HV Electricity Cable
E(BZ)	Electricity Cable
GJ(BZ)	Fuel Gauge Line
F(BZ)	Fuel Line
V(BZ)	Fuel Vent Line
G(BZ)	Gas Pipe
H(BZ)	Heating Pipe
R(BZ)	GPR Detected Anomaly Raster
I(BZ)	Sewer Rising Main
CWS(BZ)	Sewer Combined
FWS(BZ)	Sewer Foul
SWS(BZ)	Sewer Surface Water
TEL(BZ)	British Telecom
TL(BZ)	Traffic Light Cable
U(BZ)	Water Pipe (Undefined GPR or electrolocation trace
VT(BZ)	Vapour Recovery Pipe
W(BZ)	Vehicle Detection Fuel
	Water pipe
EOT	End of trace
	GPR Anomaly Survey Boundary
	Road GPR Access
	GPR Detected Anomaly Area/Chart
	GPR Detected Rebar
	GPR Detected Structural Feature
	GPR Detected Structure
	GPR Low Data
	GPR Detected Anomaly Point Directional
	GPR Transect

NOTES

Electromagnetic and Ground Penetrating Radar technique have been used in the detection of underground services, features and anomalies shown on this survey plan. Both have their limitations in provisions and we recommend that trial excavations should be undertaken to confirm identification, location and depth of features where these are critical to design or site works.

Please note that not all buried pipes, cables and ducts can be detected and mapped in consideration of their depth, location material type, geology and proximity to other utilities.

All reasonable effort and care has been made in searching available record drawings. The completeness of the underground service information supplied to and by us cannot be guaranteed.

Where services are non-metallic or not proven on site, positions are taken from records, trench scars and surface detail.

Pipe sizes which cannot be obtained by visual survey are taken from utilities record drawings or market plans where available.

Services shown as Taken From Records (TFR) or PARSR QL.01 have not been proven on site.

This diagram below describes the depth information retained in detail.

The CAD layering may contain further information.

Collected data from GPR has not been post processed unless specified elsewhere or denoted on the survey drawing.

All utilities inspected and measured at Inspection Covers or Manholes are considered to be a QL A for a radius up to 5m from the chamber wall.

DRAWING INFORMATION

AD	Assumed Route
BA	Backdrop
D	Depth
E	Electric
GPR	Ground Penetrating Radar
NVP	No Visible Plant
TBC	To Be Confirmed
TE	Topsoil Level
TFR	Taken From Records
U	Unknown
UTE	Unable To Survey
UR	Unable To Rod
UTR	Unable To Rod
UTJ	Unable To Lift
VP	Vapour Recovery Point

PIPE MATERIAL

AC	Asbestos Cement
BR	Brick
CI	Cast Iron
CO	Concrete
DI	Ductile Iron
MDPE	Medium Density Pipe
PVC	Polyvinyl Chloride
S	Spun Iron
V	Vitrified
VC	Vitrified Clay

TYPICAL FEATURE DEPTH ANNOTATION

ELECTRO-MAGNETIC DETECTION: APPROX DEPTH TO CENTRE — CABLE/FIBRE OPTIC

GRAVITY DRAIN (VISUAL) OBSERVATION: APPROX DEPTH TO INVERT

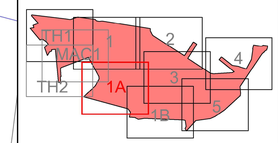
GROUND PENETRATING RADAR: APPROX DEPTH TO EXTERNAL CROWN

BSI PAS128:2022 QUALITY LEVEL INFORMATION

SURVEY TYPE		QUALITY LEVEL	DESCRIPTION
B	Detection	QL-B4 TFR	Location not detected on site, taken from records.
		QL-B4 NVI	A utility segment that has not been detected but is suspected to exist. Denotes assumed route only
		QL-B3	Horizontal detection by one geophysical technique only. Denotes utility segments with small signals / no depth information.
		QL-B2	Horizontal and vertical detection by one geophysical technique only (Electromagnetic Detector/Ground Penetrating Radar). Medium confidence level for position and depth.
		QL-B1	Horizontal and vertical detection by multiple geophysical techniques. (Electromagnetic Detector/Ground Penetrating Radar). High confidence level for position and depth.
A	Verification	QL-A	Horizontal and vertical location of the utility established by visual inspection at manholes and inspection chambers or by use of targeted excavations (vacuum excavation and trial pits).
OTHER ANNOTATIONS		(F)	Denotes utility segments that have been detected through the use of CCTV Pipe Processing.

Further information on PAS128 can be found on our resource website: www.pas128.co.uk

Sheet Index



Rev.	Date	Description
A	24/01/24	Additional Utility survey data added to Area 1A
B	07/02/24	Additional Utility survey data added to Area 1A

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Accreditations: RICS, The Survey Association, RICS Geomatics, ICES, Safe Contractor

Client: Buro Happold Ltd.
Canal Suite, Churchgate House
56 Oxford Street, Manchester M1 6EU

Project: Mayfield, Manchester

Drawing Title: Utility Mapping Survey CCTV1 (2D)

Surveyed by: JB	Drawn by: IV 03/01/24	Survey Date: November 2023	
Checked by: DJ 04/01/24	Approved by	Scale: A0@1:200	

Drawing No: 61000-Area1A-UG-CCTV1 | Revision: B

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Grid: Local Plane Metric related to National Grid at survey control SC2
Levels: Levels related to job 19479

Notes
related to Project No.19479, originally surveyed September 2017

Topographical Survey Legend

BUILDINGS AND WALLS

Building
Building Under Raised
Portakabin
Ruin (RUIN)
Passage
Wall with Height
Retaining Wall (WALL 600 H)

GENERAL INFORMATION

Petrol Pump (PP)
Basement Light (BL)
Flowerbed
Dish Type Channel (DISH)
Slot Type Channel (SLOT)
Strike Type Channel (STRIKE)
Tactile Paving (TAC)
Crash Barrier (CRB)
Column (COL)
Excavation (EXC)
Gas Valve/pit (GAS)
Offset, FB (OFF)
Air Valve (AV)
Trough (TR)
Chimney (CHY)
Telephone Cell Box (TCB)

FENCE STYLES AND DESCRIPTIONS

new Bounded (C/B)
Corrugated Iron (C/I)
Chestnut Paling (C/P)
Chainlink (C/L)
Handrail (H/R)
Interwoven (IW)
Iron Railings (I/R)
Lattice (L/T)
Miscellaneous (Misc)
Palisade (PAL)
Post & Chain (P/C)
Post & Rail (P/R)
Post & Wire (P/W)
Post & Barbed Wire (B/W)
Wire mesh (W/M)
Stile
Gate
Fence Envelope

OVERHEAD FEATURES

Electricity Pylon (EPYLON)
Electricity (ELS)
Telephone (TELS)

ROADS

Kerbs
Edge of Surfacing
Pedestrian Crossing (PC)
Track
Footpath

WATER FEATURES

Canal
Stream
Ditch
Weir
Culvert (CUL)
Drip (Land Drain) (DRN)
Spring (SPR)

STREET FURNITURE

Bollards Beacon (BB)
Bus Stop (BS)
Bollard (B)
Cats Eye (CE)
Coal Chute (CC)
Head Circuit TV (CCTV)
Drain (DR)
Electricity Pole (EP)
Flood Light (FL)
Flag Staff (FS)
Lamp Post (LP)
Letter Box (LB)
Horse Poles (shred) (HP)
Mooring Ring (MR)
Mile Post or Mooring Post (MP)
Service Marker (MK)
Mile Stone (MS)
Post (P)
Parking Meter (PM)
Reflector Post (RP)
Rodding Eye (RE)
Road Sign (S)
Speed Camera (S/CAM)
Information Sign (SIGN)
Stay (ST)
Traffic Light (TL)
Telegraph Pole (TP)
Traffic Light Push Button Post (TLP)
Traffic Light Switch (TLS/P)
Control Box (C/BOX)
British Telecom Box (BT BOX)
Electricity Box (EL BOX)
Gas Box (GAS BOX)

RELIEF AND VEGETATION

Hedge
Edge of wood/Bushes
Stump (STUMP)
Individual Tree
Slopes with Height Greater than 1m
FT Fence
Trench
Reeds

INSPECTION CHAMBERS AND TYPES

Inspection Cover (IC)
Inspection Cover (Elec) (IC/EL)
Manhole (MH)
British Telecom Cover (BT)
Inspection Cover (Comms) (IC/COM)
Cable TV (CATV)
Inspection Cover Traffic Signals (IC/TL)
Gully (G)
Kerb Outlet (KO)
Vent Pipe (VP)
Down Pipe (DP)
Rain Water Pipe (RWP)
Soil Pipe (SWP)
Gas Pipe (G~PIPE)
Unable to lift cover (UTL)
Stop Tap (ST)
Stop Valve (SV)
Lamphole (LH)
Hydrant (HYD)
Earth Rod (ER)
Gas Valve (GV)
Water Meter (WM)
Washout (WO)
Rodding Eye (RE)

SURVEY INFORMATION DRGNS

Permanent Ground Marker
O.S. Trig Station
O.S. Bench Mark

GEOTECHNICAL INFORMATION

Borehole (BH)
Trial Pit (TP)
Monitor Pits (MON)
Probe Hole (PH)
Window Sample (WS)

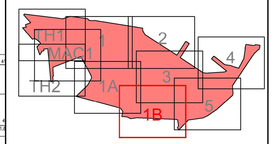
LEVEL AND HEIGHT INFORMATION

Woodend Spot Height (133.45)
Predicted Spot Height (133.456)
Bed Level (BL23.00)
Water Level (WL24.02)
Sluice Level (SL25.02)
Threshold Level (TH26.88)
Cover Level (25.45)
Invert Level (23.15)
Pipe Soffit Level (PS25.00)
Floor Level (FL26.00)
Finished Floor Level (FF25.80)
Top of Tank Level (TT7.00)
Sump Level (SL6.00)
Roof Level (RL8.00)
Ridge Up Level (RH26.80)
Flat Roof Level (FR27.00)
Top of Canopy Level (TOP27.00)
Underside of Canopy Level (SOF27/26.50)
Window Sill Level (WSL8.00)
Window Head Level (WHL9.00)
Springing Level (SPL8.00)
Arch Level (AL7.00)
Cable Level (CHRL55)
Top of Wall Level (TL5.00)
Underside of Beam Level (UBL8.88)
Element Height (HT6.00)

SURVEY INFORMATION DRGNS

Permanent Ground Marker
O.S. Trig Station
O.S. Bench Mark

Sheet Index



Rev.	Date	Description
A	2nd/01/24	Additional Utility survey data added to Area 1A
B	01/02/024	Additional Utility survey data added to Area 1A

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Accreditations: RICS, The Survey Association, RICS, Network Rail Approved, Acheson

Client
LANDSEC U & I GROUP LTD
100 VICTORIA STREET
LONDON, DW1E 5JL

Project
MAYFIELD PHASE 1b
MANCHESTER

Drawing Title
TOPOGRAPHICAL SURVEY (3D)

Surveyed by	Drawn by	Survey Date
PS	AS 16/11/23	November 2023
Checked by	Approved by	Scale
ED 16/11/23		1 : 200

Drawing No. 61000-Area1B-Topo-1
Revision B

Survey Notes

Grid: Local Plane Metric related to National Grid at survey control SC10

Levels: OS Datum from GNSS positioning converted using the National Geoid Model OSGM02.

Notes

related to Project No.19479, originally surveyed September 2017

Survey Legend

STREET FURNITURE

Air Valve	○ AV	Bus Stop	⊕ BSP
Bus Stop	⊕ BS	Stop Tap	⊕ ST
Bollard	○ B	Stop Valve	⊕ SV
Bollard Tray	⊕ Bol	Traffic Light	⊕ TL
Cable Duct	○ CD	Traffic Lights	⊕ TLs
Closed Circuit TV	⊕ CCTV	Traffic Light Push Button Post	⊕ TLP
Down Pipe	⊕ DP	Traffic Light Control	⊕ TLC/P
Drain	○ D	Vent Pipe	⊕ VP
Earth Rod	⊕ ER	Water Tap	⊕ WT
Electricity Pole	⊕ EP	Washout	⊕ WO
Flood Light	⊕ FL	Control Box	☐ C/BOX
Gas Riser	⊕ GR	Car Vacuum	☐ VAC
Hydrant	⊕ FH	Car Air	☐ AIR
Lamp Post	⊕ LP	Junction Box	☐ JB
Meter Chamber	⊕ MC	Junction Box GOV	☐ JB GOV
Offset Pit	⊕ OP	Telephone Cat. Box	☐ TCP
Post	⊕ P	Petrol Pump	⊕ PP
Parking Meter	⊕ PM	Gas	GAS
Pipe Riser	⊕ PR	Gas Drainage Channel	GAS
Rain Water Pipe	⊕ RWP	Slot Drainage Channel	SDC
Rodding Eye	⊕ RE	Grate Drainage Channel	GDC
Road Sign	⊕ S		
Speed Camera	⊕ S/CAM		

INSPECTION CHAMBERS

Inspection Cover	☐ IC	Electricity Pylon	
Inspection Cover (Elec)	☐ IC/EL	Electricity	
Unknown	☐ IC	Telephone	
British Telecom Cover	☐ BT		
Inspection Cover (Comms)	☐ IC/COM		
Junction	☐ J/CH		
Inspection Cover Traffic Signals	☐ IC/TL		
Gully	☐ G		
Kerb Outlet	☐ KO		

OVERHEAD FEATURES

LEVEL AND HEIGHT INFORMATION

Cover Level	+ CL/E.45
Invert Level	+ IL/E.15
Reducing Skin Level	+ RS/4.15
Sump Level	+ SUMP/E.15

UNDERGROUND SERVICES KEY

TV(B2)	Cable TV Cable
CCTV(B2)	CCTV Cable
COM(B2)	Communications Cable
DU(B2)	Empty Ducting
EA(B2)	Earth Cable
HV(B2)	HV Electricity Cable
E(B2)	Electricity Cable
GJ(B2)	Fuel Gas(or) Line
F(B2)	Fuel Line
V(B2)	Fuel Vent Line
G(B2)	Gas Pipe
H(B2)	Heating Pipe
R(B2)	Sewer Diverted Abnormally Large Pipe
J(B2)	Sewer Joining Main
CWS(B2)	Sewer Combined
FW(B2)	Sewer Foul
SWS(B2)	Sewer Surface Water
TEL(B2)	Multiple Telecom
TL(B2)	Traffic Light Cable
U(B2)	Unknown Cable
UB(B2)	Unidentified (CPR) or electric location trace
VR(B2)	Vapour Recovery Pipe
W(B2)	Vehicle Detection Fuel
WM(B2)	Water pipe
	End of trace
	Abnormally Accurate Survey Boundary
	Access
	GPR Detected Abnormally Anomalous
	GPR Detected Rebar
	GPR Detected Structural Feature
	GPR Detected Structure
	GPR Low Data
	GPR Detected Abnormally Fixed Obstruction
	GPR Transect

NOTES

Electromagnetic and Ground Penetrating Radar techniques have been used in the detection of underground services. Buttons and other surface fittings may mask signals from buried services or obstructions and we recommend that trial excavations should be undertaken to confirm identification, location and depth of features where these are critical to design or site works.

Please note that not all buried pipes, cables and ducts can be detected and mapped to consideration of their depth, location, material type, geology and proximity to other utilities.

All reasonable effort and care has been made in searching available record drawings. The completeness of the underground service information supplied to and by us cannot be guaranteed.

Where services are non-metallic or not proven on site, positions are taken from records, trench scars and surface detail.

Pipe sizes which cannot be obtained by visual survey are taken from utilities record drawings or market drains where available.

Services shown as Taken From Records (TFR) or PARAPI GLO have not been proven on site.

This diagram below describes the depth information obtained in detail.

The CAD layering may contain further information.

Collected data from GPR has not been post processed unless specified elsewhere or denoted on the survey drawing.

All utilities inspected and measured at Inspection Covers or Manholes are considered to be ± 50 .5 for a notes up to 5m from the chamber wall

DRAWING INFORMATION

AD	Assumed Route
BA	Backdrop
D	Depth
DL	Direct Line-Locating Radar
MAP	No Visible Plant
NL	No Lines
SL	Signal Lost
TFR	Taken From Records
U	Unable To Survey
US	Unable To Bed
UT	Unable To Trace
UV	Unable To Survey Fixed

PIPE MATERIAL

AC	Asbestos Cement
BR	Brick
CI	Cast Iron
CO	Concrete
DI	Ductile Iron
GRP	Glass Reinforce Pipe
PVC	Polyvinyl Chloride
SI	Spun Iron
ST	Steel
VC	Vitrified Clay

TYPICAL FEATURE DEPTH ANNOTATION

ELECTRO-MAGNETIC DETECTION: APPROX DEPTH TO CENTRE — CABLE/FIBRE OPTIC

GRAVITY DRAIN (VISUAL OBSERVATION): APPROX DEPTH TO INVERT

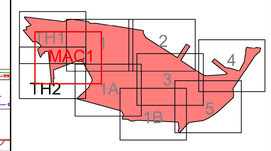
GROUND PENETRATING RADAR: APPROX DEPTH TO EXTERNAL CROWN

BSI PAS128:2022 QUALITY LEVEL INFORMATION

SURVEY TYPE		QUALITY LEVEL	DESCRIPTION
B	Detection	QL-04 TFR	Location not detected on site, taken from records.
		QL-04 A/S	A utility segment that has not been detected but is suspected to exist Denotes assumed route only
		QL-03	Horizontal detection by one geophysical technique only Denotes utility segments with small signals / no depth information
		QL-02	Horizontal and vertical detection by one geophysical technique only (Electromagnetic Detection/Ground Penetrating Radar). Medium confidence level for position and depth.
		QL-01	Horizontal and vertical detection by multiple geophysical techniques (Electromagnetic Detection/Ground Penetrating Radar). High confidence level for position and depth.
A	Verification	QL-A	Horizontal and vertical location of the utility established by visual inspection of trial excavations and/or the use of targeted excavations (vacuum excavation and trial pits)
OTHER ANNOTATIONS		PT	Denotes utility segments that have been detected through the use of CPT/Trial Processing

Further information on PAS128 can be found on our insurance website: www.pas128.co.uk

Sheet Index



Rev.	Date	Description
A	24/01/24	Additional Utility survey data added to Area 1A
B	07/02/24	Additional Utility survey data added to Area 1A

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Client: Buro Happold Ltd.
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Project: Mayfield, Manchester

Drawing Title: Utility Mapping Survey -CCTV1 (2D)

Surveyed by: JB	Drawn by: AS 13/12/23	Survey Date: November 2023	
Checked by: DJ 13/12/23	Approved by	Scale: A0@1:200	

Drawing No: 61000-Area1B-UG1-CCTV1 — Revision: B

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Appendix C Groundsure Report

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Appendix D Preliminary UXO Risk Assessment

This Preliminary UXO Risk Assessment has been carried out by Buro Happold in accordance with CIRIA C681. The purpose of the preliminary risk assessment is a qualitative screening exercise to assess the likelihood of finding UXO at the site. This can then be used to make an informed decision if further UXO specific risk management is required.

The assessment is based on data obtained from a desktop review of information, including site location, bombing records, historical uses, historical development and proposed development. Information has also been obtained from the Explosive Ordnance Threat Assessment prepared by Planit in 2017 for the Mayfield Regeneration site and provided as Appendix A in the 2017 Buro Happold Desk study report [8].

Item	Comments	Score
Site Setting	The Site is located in Manchester City Centre to the immediate southeast of Manchester Piccadilly Railway Station, centred on National Grid Reference SJ 84930 97730. The Site covers some 0.064 ha and is currently occupied by a triangular parcel of unused land, Baring St and a small section of a carpark.	4
Site description and historical land usage	The surrounding area developed into a major transport and industrial hub from the late 19th century, dominated by railway infrastructure, goods yards, and factories, with extensive bombing targets during WWII. Post-war clearance and redevelopment replaced housing with open land and car parks. The Site itself has remained largely open since the mid-20th century, with limited structures. Site is near to several industrial and strategic installations key to the war effort including mills, quarries and railway infrastructure.	8
Record of bombing	Area of known WWII bombing – Luftwaffe air raids targeting Manchester; Manchester Blitz December 1940	8
Level of post war development	Minimal post war development (<10% of the site)	0
Level of proposed intrusive works	Small proposed development (<10% of site)	-5
Assessed Risk	Moderate	20 -5
Recommendations	The assessment found risk associated with UXO to be moderate, therefore a detailed UXO risk assessment is required.	
Attachments	Table D-1 - Potential aerial delivered UXO hazards Table D—2- Mitigation factors Table D—3- Final score summary	

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Table D—1 Scoring process for indicators of potential aerial delivered UXO hazards

Data Item	Increasing Potential for aerial delivered UXO Hazards →			
	1	**2**	**4**	**8**
A - Site Setting	Rural	Small towns	Cities Large Towns	
B - Site description and historical land usage	Greenfield site only Agricultural land only	Residential only Within 10 mile radius of site of previous military use Within 5 mile radius of wartime[1] for following: Railway marshalling yard Power station Gas works Port Industrial centre	Within 5 mile radius of site of previous military use Within 1 mile radius of wartime[1] for following: Railway marshalling yard Power station Gas works Port Industrial centre On wartime[1] flight paths	Within 1 mile radius of site of previous military use Former wartime[1]: Railway marshalling yard Power station Gas works Port Industrial centre
C – Record of bombing	No history of WWII bombing	Within 10 mile radius of area of known WWII bombing	Within 5 mile radius of area of known WWII bombing	Area of known WWII bombing

[1]Wartime refers to the site being in use at the time of WWI and WWII when its significance may have caused it to be the target of an enemy attack.

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Table D—2 Scoring process for considering mitigation factors

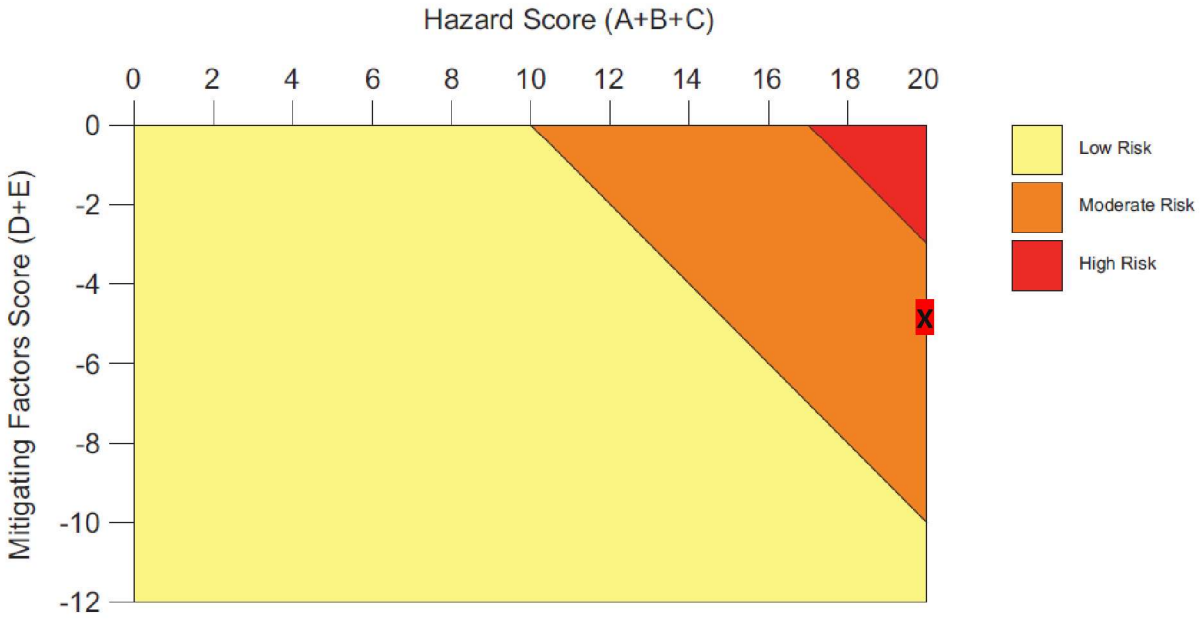
Data Item	Decreasing Potential for aerial delivered UXO Hazards ←				
	-6	**-5**	**-3**	**-1**	**0**
D - Level of post war development	Whole site redevelopment (100% of the site)	Significant post war development (>80% of the site)	Moderate level of post war development (<80% and ≥45% of the site)	Some post war development (<45% and ≥10% of the site)	Minimal post war development (<10% of the site)
E - Level of proposed intrusive works in areas not subject to post war development[1]	Very Small (<5%)	Small (<10%)	Some (<45% and ≥10%)	Moderate (<80% and ≥45%)	Significant (>80%)

[1]Only if the level of post-war development is known and can be quantified in terms of site area and an approximation of depth should a mitigation factor be applied.

Table D—3 Final score is based on the sum of rows A, B, C, D and E in Table D—1 and Table D—2

Final Hazard Score	Risk of encountering an Aerial dropped UXO	Implication
-9 - 9	Low Risk	No further UXO risk assessment likely to be required
10 - 17	Moderate Risk	Detailed UXO Risk Assessment required
17 - 20	High Risk	Detailed UXO Risk Assessment required.

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This risk assessment methodology is intended as a generic tool. A small number of sites with unusual site-specific conditions may require additional consideration of the hazard scoring.

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