

Technical Note

Project: Heywood Distribution Park

Subject: Plot H4 Geo-environmental Summary

Client:	Indurent Management Ltd		
Project No:	07290/C	Version:	Issue
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I Introduction

This technical note has been prepared for Plot H4 at Heywood Distribution Park (herein referred to as 'the site') outlined in red on UMC Drawing 23103-UMC-XXXX-SI-DR-A-0507-P03 in Appendix A. The technical note summarises the information presented in existing desk study and ground investigation reports for the site, and presents observations from a recent walkover carried out to record the current condition of the site.

It is understood that this technical note and the available reports will be submitted in support of an outline planning application for the development of the site within Use Classes E(g)(iii) (industrial processes), B2 (general industrial), B8 (storage and distribution, data centre) and removal of existing structures and hardstanding and associated works.

Also briefly outlined in this technical note are recommendations for further work required to support the proposed development of the site to be undertaken following submission of the outline planning application.

2 Limitations

All conclusions and recommendations made within this document are based upon and limited to the factual information obtained as part of this study. PJA will state where it has utilised and relied upon information obtained by others. It has been assumed that all third party information provided is true and accurate. No responsibility is accepted by PJA for the accuracy or completeness of such third party information.

There is a possibility that there may exist on site, conditions that could not be identified within the scope of the assessment or which were not reasonably identifiable from the available information. The conclusions drawn in the document are considered correct, although any

subsequent additional information may allow refinement of the conclusions.

This technical note is not intended to provide information on ground engineering constraints.

3 Sources of Information

The following documents made available to PJA at the time of writing have been reviewed to inform preparation of this technical note:

- Geoenvironmental Desk Study Report, 5986-JPG-XX-XX-RP-G-0604-S2-P03, JPG, January 2022
- Geoenvironmental Ground Investigation Report, 5986-JPG-XX-XX-RP-G-0605-S2-P03, JPG, January 2022

The pertinent desk study information is presented in Section 5 and the scope and findings of the ground investigation are briefly summarised in Section 6.

4 Site Walkover

4.1 Overview

PJA completed a site walkover on 7th June 2024, the findings of which are summarised in Sections 4.2 to 4.5. Photographs taken during the walkover are presented in Appendix B.

The site is located centrally in the wider Heywood Distribution Park and occupies an area of approximately 10.69 hectares. The site comprises:

- a raised area in the west with a cover of self-seeded scrubland which is bordered to the north, south and east by a concrete access road;
- an area of hardstanding in the east which is generally used for the storage of containers and container lorries;
- an area in the south comprising cleared land which was formerly occupied by a depot, and is in part used for the storage of vans and lorries; and
- an area in the north comprising hardstanding which is used for parking and established soft landscaping with a series of mature trees.

The southern area of the site is demarcated from the eastern and western areas of the site by metal fencing topped with barbed wire which passes along its northern boundary.

The northern, eastern and western areas of the site are accessed via double gates in the north east of the site, and the southern parcel is accessed off Mulberry Way to the south.

4.2 Northern Area

The northern area generally comprised hardstanding used for vehicle parking with soft landscaping around the perimeter. In the south western corner a hose pipe was noted along with a grated drainage cover in the central, low point suggesting this area may be used for washing vehicles.

Vegetation present around the perimeter of the northern area comprised grass and established trees and hedgerows.

The northern area is accessed from the north east.

4.3 Eastern Area

At the time of the walkover the eastern area was vacant. The surface was generally observed to be level and surfaced in a combination of reinforced concrete slabs and unsurfaced gravel areas. Surface water pooling was noted locally. Evidence of localised fuel/oil staining was noted on the concrete slabs within the eastern area. A discarded concrete core was noted during the walkover which was measured to be approximately 320mm in thickness with two layers of reinforcement at approximately 100mm and 200mm on a 200mm grid.

Infrastructure associated with the site's former use was noted which included an underground storage tank located to the west of the northern site entrance, which at the time of the walkover contained water. In addition, redundant electronic infrastructure was noted which appeared to be linked with an assumed drainage channel aligned east-west. The channel was covered with paving slabs and contained water at the time of the walkover. Lighting columns were observed across the area, although it is not known if they are operational.

A strip of vegetation approximately 10m to 20m wide was noted along the northern, eastern and southern boundaries. The western boundary of the eastern area is defined by an access road. Access to the eastern area is via an access point along the southern boundary of the northern area.

Small stockpiles comprising granular material, tarmac, and woodchip, and waste materials including insulation blocks, wooden pallets, tyres, aerosols, and plastic sheeting were observed in the eastern area.

4.4 Western Area

The western area was observed to be elevated approximately 1.50m above the remainder of the site and comprised scrubland vegetation including dense grasses, brambles, and young trees.

Groundwater and gas monitoring boreholes were noted in eastern and western areas of the northern parcel of land.

Evidence of underground services were recorded across the site in the form of manhole covers, grates, electrical boxes, and pipeline/cable markers.

4.5 Southern Area

The majority of the southern area was in use for truck storage at the time of the site walkover. The area was observed to be generally level and surfaces comprised a combination of concrete, asphalt, unsurfaced gravel areas, and strips of soft landscaping.

Demolition of a depot has taken place recently in the south west. This area was surfaced with concrete which is assumed to be a remnant floor slab. No other aboveground infrastructure associated with the former depot was identified.

There were no defined boundaries separating the southern area from land of the wider Heywood Distribution Park to the south and west. As mentioned in Section 4.1, metal fencing topped with barbed wire defined the northern boundary of the southern area and metal railings were present along the eastern boundary.

5 Geo-environmental Desk Study Findings

5.1 Site History

JPG carried out a review of historical maps as part of their desk study report prepared in January 2022. The earliest maps (1851 – 1891) indicate the site was undeveloped and used for agriculture , with ponds located on site.

It is understood that the majority of the site was occupied by aircraft maintenance works and railway sidings operated by the Ministry of Defence between 1930 and 1960.

Development associated with Heywood Distribution Park is indicated to have first taken place in the south and east of the site during the 1960s and 1970s.

Aerial imagery from 2000 records a pond in the eastern area of the site, which appears to have been infilled or dried out by 2013. All previous buildings are shown on aerial imagery to have been demolished by 2013 with the exception of the depot in the south west of the site.

5.2 Ground Conditions

5.2.1 Geology

The desk study indicates the presence of ‘landscaped ground’ across the majority of the site,

with the exception of the north eastern area. Glacial Till is recorded across the entire site. The majority of the site is underlain by mudstone, siltstone, and sandstone of the Pennine Lower Coal Measures Formation. A sandstone band of the Helpet Edge Rock passes from north west to south east through the site. Sandstone associated with Rough Rock of the Rossendale Formation encroaches on the south western corner of the site.

Two geological faults bound the site to the north east and south west, both trending in a north west to south east direction. The British Geological Survey (BGS) records a marine band trending north west to south east across the centre of the site.

5.2.2 Hydrogeology

Aquifer Designations

Superficial geology underlying the site is classified by the Environment Agency as a Secondary (Undifferentiated) Aquifer and the bedrock units are classified as Secondary A Aquifers.

The JPG report indicates that the vulnerability of both the superficial and bedrock geology is classed as low, based on low infiltration rates.

Abstraction Licenses

One active groundwater abstraction licence was identified in the desk study, situated 307m to the south west of the site associated with a dewatering well linked to a Viridor Waste Management Ltd landfill site.

Source Protection Zone

The site is not indicated to be located in a groundwater Source Protection Zone.

Groundwater Flooding

The desk study indicates that the site is located in an area where the risk of groundwater flooding is low.

5.2.3 Hydrology

Surface Water Features

The nearest surface water features are two ponds located approximately 150m to the south east of the site within the wider Heywood Distribution Park. Brightley Brook is located approximately 200m to the south of the site. The brook flows to the south west into a pond associated with Pilsworth Fishery.

Flood Zone

The site is indicated to be located in Flood Zone 1 and there are no available records of historical flood events based on information provided within JPG's desk study. The site does not benefit from flood defences.

Discharge Consents and Abstraction Licenses

JPG report one active discharge consents within 250m of the site boundary. The closest is positioned approximately 248m to the south of the site and relates to the discharge of sewage and trade effluent from a public house to Brightley Brook. It was noted on the site walkover that the pub is no longer present and it is assumed that the discharge has therefore lapsed.

No active, licensed surface water abstractions are indicated to be located within 1km of the site.

5.2.4 Coal Mining

The site is located within a Coal Mining Reporting Area. JPG obtained a Mining Report and Consultants Report, and no coal mining constraints were identified.

5.3 Pollution Incidents

The desk study report indicates that there are no recorded pollution incidents within 250m of the site which resulted in an impact to land.

5.4 Environmental Permits and Registers

JPG report three records of Control of Major Accidents Hazard (COMAH) sites within 500m of the site. The nearest COMAH site is an Eddie Stobart Logistics Upper Tier facility located immediately to the south the site.

The Eddie Stobart facility located immediately south of the site is indicated to have consent to store hazardous substances, however no information is provided in the JPG desk study regarding the exact type of hazardous substances.

5.5 Landfills

JPG identified two active landfills located 283m and 380m south west and west of the site respectively, both of which are operated by Viridor Waste Management Limited. The waste streams accepted at the landfills are not provided in the desk study.

There are indicated to be no historical landfills recorded within 500m of the site.

5.6 Radon

Information within JPGs desk study report indicates the site lies within an area where less than 1% of properties are above the radon action level. However, a review of the UK Radon map published online by the UK Health Security Agency indicates that the site lies within an area where 1% to 3% of properties are above the radon action level.

5.7 Potential Sources of Contamination

JPG considered the on-site potential sources of contamination to comprise:

- Potentially contaminated Made Ground/groundwater and hazardous ground gases/vapours associated with the site's historical uses.
- Potentially contaminated Made Ground/groundwater associated with infilled ponds.
- Potentially contaminated Made Ground/groundwater and ground gases/vapours associated with tanks on site.
- Potential landfill gases associated with active Viridor Waste Management Limited landfills located to the south west and west of the site.
- Potential hazardous mine gases associated with underground coal workings within 500m of the site.

5.8 Preliminary Conceptual Site Model

JPG completed a preliminary conceptual site model, which generally identified the potential risks to receptors as low to low/moderate. Moderate risks were identified in relation to potential hazardous ground gas/vapour generation and the potential impact they may pose to future site users, buildings and infrastructure, and construction workers.

5.9 Recommendations

To further assess risks to identified receptors, JPG recommended intrusive investigation to include:

- Boreholes and machine-excavated trial pits to confirm the extent, depth, and composition of Made Ground, superficial deposits and underlying bedrock and to facilitate the installation of monitoring standpipes.
- Collection and testing of soil and groundwater samples to inform generic quantitative risk assessment for human health and controlled waters.
- Gas and groundwater level monitoring.

6 Geo-environmental Ground Investigation Findings

6.1 Overview of Ground Investigation

JPG completed a ground investigation in October and November 2021 with the aim of identifying potential environmental issues that may present constraints to the proposed development of the site. The presence of the depot in the south west of the site precluded coverage of this area in the JPG ground investigation.

6.2 Ground Investigation Scope

6.2.1 Exploratory Holes

A summary of the quantity, type, maximum depth, and standpipe installation detail for exploratory holes completed as part of the ground investigation is presented in Table 1. Exploratory holes comprised both non-targeted and targeted positions.

Table 1: Summary of Exploratory Holes

Type	Quantity	Maximum Depth	Monitoring Standpipes	Type of Monitoring
Machine-excavated trial pits	14	3.20mbgl	N/A	N/A
Cable percussive boreholes	4	9.95mbgl	2	Gas and groundwater level
Windowless sample boreholes	26	6.00mbgl	7	Gas and groundwater level
Dynamic sample boreholes with rotary core follow-on	7	17.50mbgl	4	Gas and groundwater level

6.2.2 Environmental Laboratory Analysis

JPG submitted 21 Made Ground samples taken from depths ranging from ground level to 1.15mbgl for laboratory analysis. All Made Ground samples were scheduled for the following determinands:

- Total metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc)
- Free cyanide
- Speciated Polycyclic Aromatic Hydrocarbons (PAH)
- Water soluble sulphate
- pH
- Phenol
- Asbestos
- Soil Organic Matter

Selected soil samples were also analysed for:

- Calorific value
- Total chloride
- Total sulphate
- Total sulphide
- Ammoniacal nitrogen
- Hexavalent chromium
- Total Petroleum Hydrocarbons Criteria Working Group (TPHCWG)

Soil leachate and groundwater laboratory analysis was carried out for the following determinands:

- Arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc
- Cyanide (free)
- Phenol
- Speciated PAH
- Sulphate
- pH

6.3 Recorded Ground Conditions

6.3.1 Surfacing

JPG noted the northern, southern, and eastern areas of the site to be surfaced with reinforced concrete typically 150mm to 300mm thick, with a maximum recorded thickness of 450mm. Grass overlying Made Ground was encountered in the western area of the site and soft landscaped areas were observed in the south west.

6.3.2 Made Ground

JPG encountered Made Ground in all exploratory holes, ranging in depth from 0.20mbgl to 2.88mbgl. It was generally noted that the shallowest Made Ground was noted in the north of the site and thickest in the south of the site, where the full depth of Made Ground was not proven.

Made Ground was typically recorded as cohesive brown sandy, gravelly clay with gravel and occasional cobbles of sandstone and brick. Concrete boulders, fence posts, and metal were recorded locally.

Made Ground in the western area also included a cohesive, grey, slightly organic clay which was interpreted by JPG as relict topsoil.

Made Ground encountered in the south east of the site was noted to comprise sand and gravel of dark grey ash, reddish brown mudstone, burnt shale or sand, and gravel and cobbles of sandstone.

6.3.3 Till

Till was recorded beneath Made Ground as orange brown, mottled light grey, slightly sandy, slightly gravelly clay, with gravels generally described as subrounded to rounded sandstone. The base of the Till was proven at depths between 2.40mbgl and 12.50mbgl.

6.3.4 Pennine Lower Coal Measures Formation

Where encountered, bedrock was described as extremely weak to very weak mudstone and sandstone. Highly variable weathering of the mudstone bedrock was noted.

A coal seam was encountered in the eastern part of the southern area. The seam was recorded between 1.90mbgl and 2.00mbgl ranging in thickness from 0.55m to 0.90m.

6.3.5 Visual and Olfactory Evidence of Contamination

A summary of visual and olfactory contamination noted during the ground investigation is presented in Table 2.

Table 2: Summary of Contamination

Location	Depth (mbgl)	Stratum/Groundwater	Observations
WS126 – located along the northern boundary of the southern area in the location of a former tank	0.35 – 0.90	Granular Made Ground	Hydrocarbon odour
	0.50	Perched groundwater (granular Made Ground)	Hydrocarbon odour and staining
TP104 – Located along the western edge of the western area	1.85	Groundwater	Hydrogen sulphide odour

6.3.6 Groundwater

Perched water strikes were recorded locally in shallow Made Ground between 0.30m and 2.50mbgl, and occasional seepages were recorded in cohesive Till. A groundwater strike was encountered in BH102 at 7.50m within the bedrock strata.

Monitoring standpipes were installed in thirteen borehole locations. Six groundwater monitoring visits were completed between 18th November 2021 and 6th January 2022. A summary of groundwater level monitoring data is presented in Table 3.

Table 3: Groundwater Level Monitoring Summary

Location	Level (maOD)	Min Depth (mbgl) (Date)	Max Depth (mbgl) (Date)	Min Depth (maOD)	Max Depth (maOD)	Response Zone Stratum
WS101	119.85	0.29 (20/12/2021)	1.37 (25/11/2021)	119.56	118.48	Made Ground and Till
WS103	120.15	0.38 (01/12/2021)	0.87 (25/11/2021)	119.77	119.28	Made Ground and Till
WS109	117.50	0.49 (09/12/2021)	0.72 (18/11/2021)	117.01	116.78	Made Ground and Till
WS110	119.87	0.00 (18/11/2021)	0.53 (25/11/2021)	119.87	119.34	Made Ground
WS111	118.29	0.91 (09/12/2021)	1.90 (06/01/2022)	117.38	116.39	Till
WS125	Unknown	1.25 (18/11/2021)	4.79 (06/01/2022)	Unknown	Unknown	Unknown
BH101	117.89	0.00 (18/11/2021)	6.14 (06/01/2022)	117.89	111.75	Till and bedrock
DSRC101	119.28	2.57 (18/11/2021)	10.80 (06/01/2022)	116.71	108.48	Bedrock
DSRC103	117.71	0.56 (18/11/2021)	8.84 (06/01/2022)	117.15	108.87	Till and bedrock
DSRC105	119.64	5.48 (20/12/2021)	14.63 (06/01/2022)	114.16	105.01	Bedrock

6.4 Human Health Generic Quantitative Risk Assessment

Laboratory analytical results were screened against Generic Assessment Criteria (GAC) comprising LQM/CIEH Suitable 4 Use Levels (S4ULs) and Category 4 Screening Levels (C4SLs) for a commercial end use.

None of the determinands were recorded at concentrations above their respective GAC.

Asbestos fibres were recorded in Made Ground samples collected from TP109 between ground level and 0.50m and WS107 between 0.20m and 0.70m at a concentration of <0.001%. TP109 was located in the western vegetated area of the northern land parcel, whilst WS107 was located in the eastern area of the northern land parcel.

6.5 Controlled Waters Risk Assessment

6.5.1 Leachate Analysis

Fourteen Made Ground samples were scheduled for soil leachate analysis and the results compared against GAC based on Drinking Water Standards and/or Environmental Quality Standards (EQS). The majority of determinands were recorded below the relevant GAC.

Leachable fluoranthene concentrations were recorded above the GAC in three Made Ground samples comprising granular colliery spoil taken from TP103, TP115, and TP118. JPA note the sum of four PAHs was recorded slightly above the GAC in the sample obtained from TP103 at 0.30m to 0.70m.

6.5.2 Groundwater Analysis

Four groundwater samples were obtained from monitoring wells installed with response zones in the natural ground, with samples collected from depths between 1m and 5mbgl. It is noted that the response zone of one borehole spans Made Ground and Till. The laboratory analytical results were compared with their respective GAC. The majority of determinands were recorded below the relevant GAC.

JPG reported a slight exceedance of the GAC for fluoranthene in the groundwater sample taken from borehole DS/RC105 which is installed in the Pennine Lower Coal Measures Formation.

6.6 Ground Gas Risk Assessment

Gas monitoring wells were installed in thirteen of the exploratory locations, with the response zones located within each natural strata and within the varying types of Made Ground.

Six gas monitoring rounds were completed between 18th November 2021 and 6th January 2022. Methane was recorded at a maximum peak and steady concentration of 70.9%. Carbon dioxide was recorded at maximum peak and steady concentrations of 23.3% and 18.1%. The maximum positive flow rate recorded was 11.5l/hr.

JPG attributed the highest ground gas concentrations to the relict topsoil identified in the western area of the site. With the assumption that the relict topsoil would be removed from the site during earthworks, JPG identified the site as Characteristic Situation (CS) 2 in accordance with BS8485:2015+A1:2019.

6.7 Updated Conceptual Site Model

Following the ground investigation JPG produced an updated conceptual site model, which identified sources of contamination as asbestos fibres in Made Ground, slightly elevated leachable PAH in soil and in groundwater, and ground gases. JPG considered there to be a low/moderate risk to identified receptors from asbestos fibres, and moderate risks associated with ground gases.

6.8 Mitigation Measures

JPG recommended a programme of continuous and spot gas monitoring in shallow boreholes following earthworks to confirm the post-earthworks gas regime.

JPG recommended removal of soils around a former fuel storage tank in the south of the site in which visual and olfactory evidence of contamination was recorded.

Placement of a sufficient thicknesses of suitable validated clean cover soils was recommended by JPG in areas of proposed soft landscaping.

7 Recommendations

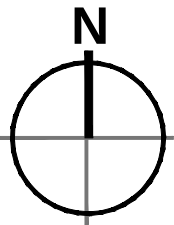
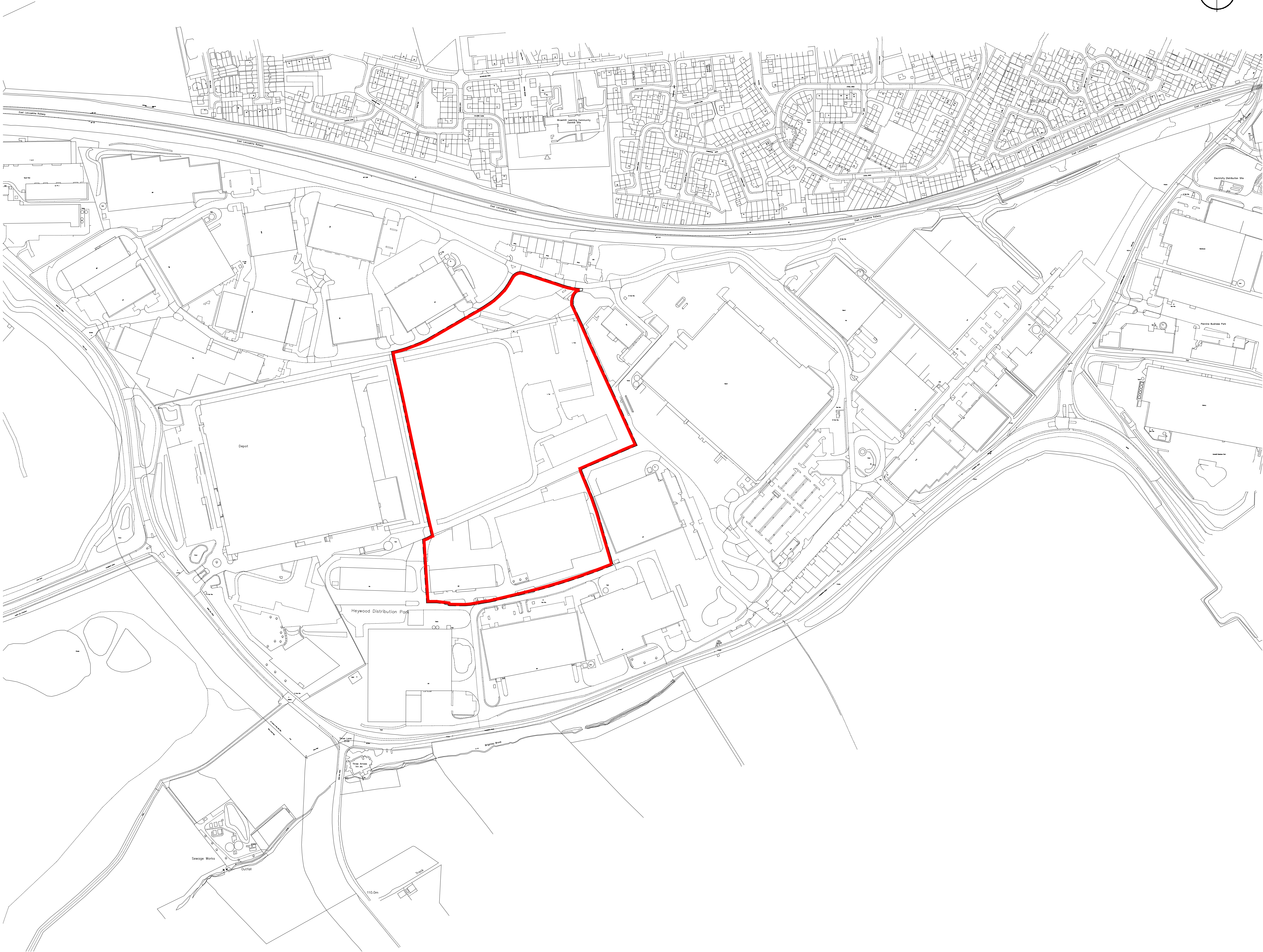
Further ground investigation is proposed following submission of the planning application to provide coverage of the south western part of the site where the former depot has recently been demolished. This will include soil and soil leachate testing, groundwater sampling and may include gas monitoring.

Supplementary investigation may be carried out in the location of the former tank in the southern area of the site to establish the requirement for excavation and removal of soils, given no exceedances of the GAC were recorded in this area of the site.

Cut and fill earthworks proposals for the site will be reviewed to determine whether the relict topsoil identified in the west of the site in the JPG ground investigation will be removed. Depending on the proposed earthworks, further gas monitoring may be carried out to refine the ground gas risk assessment.

It is assumed that further works can be secured via planning condition.

Appendix A Drawing



- Dimensions are in millimeters, unless stated otherwise.
- Scaling of this drawing is not recommended.
- It is the recipient's responsibility to print this document to the correct scale.
- All relevant drawings and specifications should be read in conjunction with this drawing.

Plot H4
26.40 acres (10.69 ha)

Ordnance Survey © Crown Copyright.
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Owner/Purchaser of Data: UMC Architects

P.03	Site boundary updated	RS	TDA	19.07.24
P.02	Client Logo updated	RS	TDA	19.07.24
P.01	Initial Issue	RS	TDA	13.03.24
rev	amendments	by	ckd	date

Heywood Distribution Park, Heywood

Site Location Plan - Plot H4

Information Container LOD:	LOD 100
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RIBA POW Stage:	2 - Concept Design
Document Suitability:	S1
Drawn / Checked:	RS / TDA
Date:	13.03.24
Scale:	1:2500 A1
UMC Project Number:	23103
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50m SCALE 1:2500