

SURFACE WATER DRAINAGE STRATEGY

FOR

**PROPOSED SINGLE STOREY EXTENSION
AT
THE SHAMROCK,
BENGAL STREET,
MANCHESTER
M4 6AQ**

FOR

**JOSEPH HOLT LTD
THE BREWERY
EMPIRE STREET
CHEETHAM
MANCHESTER
M3 1JD**

BJH14/BC/FEBRUARY 2025

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1.0 Introduction

- 1.1 This drainage strategy has been prepared by Crawford & Co Ltd to accompany a planning application for the construction of single storey extension at the site of the existing The Shamrock PH, Bengal Street, Manchester M4 6AQ
- 1.2 The purpose of this report is to assess the existing drainage regime serving the application site and put forward suitable proposals for drainage of surface water flows from the proposed development area.
- 1.3 This assessment has been prepared in accordance with the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG) to the NPPF, alongside relevant local policy and guidance.
- 1.4 Given the site is under 1 hectare in area, is located entirely within Flood Zone 1 (plus at low risk of flooding from all identified sources) and does not propose a change of use to a higher flood risk vulnerability classification, a site-specific Flood Risk Assessment is not required to accompany a planning application. Nonetheless, in accordance with local policy, a surface water drainage strategy for the proposed development has been developed.
- 1.5 This report concludes that suitable provision for the disposal of surface water run-off from the proposed development is capable of being provided.

2.0 Site Development and Development Proposals

- 2.1 The site is located at the Shamrock public house in Manchester, with the centre of the site located at approximately at National Grid Co-ordinates SJ 384995 398815. The site is bound to the north by Silk Street and east by residential properties, to the south by George Leigh Street and to the west by Bengal Street, from which access to the site is gained. The postcode for the site is M4 6AQ.
- 2.2 The site comprises an existing public house and beer garden area. The site extends to approximately 0.0403 Ha (403m²), however the proposed works are comprises of a 14m x 7m (100m²) single storey flat roof extension to the public house. It is intended that the existing access will be retained.

Geological Context

- 2.3 A Phase II Geoenvironmental Report was prepared by GroundSolve Ltd in August 2024, which included intrusive site investigation works to ascertain the geological conditions on-site. This included excavating 3No trial pits to 2.25m below ground level (bgl) and groundwater monitoring. The observed geology on-site was consistent with the BGS maps, with each trial pit finding made ground comprising of brick rubble from infilled basements, overlying stiff sandy clay to a maximum depth of 2.25m. There was no groundwater observed during the test. The level of the site does not vary greatly over the entire area.

Existing Drainage Regime

- 2.4 Sewer records from United Utilities for the area surrounding the site, with a copy of the records included in Appendix E. The records show a combined sewer, 685mm diameter brick culvert 4.97m deep along Silk Street.
- 2.5 A CCTV survey of the existing drainage serving the public house has been undertaken by Rota-Rod Ltd. The public house discharges foul and surface water flows to a combined system before discharging from existing MH4 to the United Utilities combined brick culvert in Silk Street.
- 2.6 The CCTV survey traced the water sewer serving the public house through to the combined brick sewer in Silk Street. A copy of the CCTV survey plan is included in Appendix D.

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Development Proposals

- 2.7 It is proposed to demolish existing single storey flat roof and corrugated roof structure and construct new single storey flat roof extension and extend the existing 2 storey pitched roof.

3.0 Surface Water Drainage Strategy

- 3.1 This section outlines the drainage strategy for the disposal of surface water from the development. This strategy has been developed with all relevant national and location standards and guidance, including CIRIA C753 (The SuDS Manual), DEFRA's Non-statutory Technical Standards for Sustainable Drainage Systems, Technical Guidance to the NPPF, and Part H of the Building Regulations.

Design Guidance and SuDS

- 3.2 The PPG to the NPPF recommends that priority should be given to the use of Sustainable Drainage Systems (SuDS) as they are designed to control surface water run-off where it falls and mimic natural drainage characteristics as closely as possible. Sustainable drainage systems (SuDS) also provide opportunities for the following:

- Reducing the causes and impacts of flooding;
- Removing pollutants from urban run-off at source;
- and combining water management and green space with benefits for amenity, recreation and wildlife.

- 3.3 SuDS encompass a wide range of drainage techniques intended to minimise the rate of discharge, volume and environmental impact of run-off and include:

- Pervious pavements;
- Swales and basins;
- Rainwater reuse;
- Infiltration trenches and filter drains; and
- Ponds and wetlands.

- 3.4 When used across a site, these techniques control the rate of discharge, attenuate flow, provide storage and improve water quality. The combination of techniques that are appropriate will be dependent upon ground conditions, topography and other site-specific characteristics.

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- 3.5 The Building Regulations part H3 stipulates that rainwater from roofs and paved areas is carried away from surface to discharge to one of the following, listed in order of priority:
- a) An adequate soakaway or some other adequate infiltration system; where that is not practical;
 - b) A watercourse; or, where that is not practical
 - c) A sewer.

Site Constraints and Outfall

- 3.6 As mentioned in Section 2, a Phase II Geoenvironmental Report was prepared by GroundSolve Ltd which included an element of intrusive site investigation on-site. The report includes an assessment of the underlying soils encountered on-site and advised the permeability of the soils will not be sufficient for soakaways as a means of draining run-off from the site.
- 3.7 The next most hierarchically appropriate outfall is a watercourse. Given the site is bound on all edges with no watercourses in the vicinity, an outfall to a watercourse is not feasible and has therefore been discounted as an option.
- 3.8 An outfall to a sewer is therefore required. As stated in Section 2 of this report, United Utilities drainage records show a 685mm diameter 4.97m deep combined sewer along the site's boundary with Silk Street.
- 3.9 It is therefore concluded that no other outfall other than the combined sewer in Silk Street is available or feasible from the site. In accordance with United Utilities policy on surface water discharges to combined sewers, a public combined sewer is considered an appropriate outfall when all other options have been discounted. The proposed surface water drainage strategy has therefore been produced to adopt this sewer as an outfall.

Surface Water Drainage Strategy

- 3.10 As discussed, surface water run-off from the proposed development will discharge to the United Utilities combined sewer in Silk Street. A survey of the existing drainage serving the existing buildings found that foul and surface water flows currently drain to this sewer via a combined outfall (MH4), and therefore run-off from the new flat roof extension & extending existing pitched roof will be indirectly connected to the combined sewer via a existing connection.

- 3.11 The existing public house will be relatively unchanged as a result of the development and therefore the drainage for the public house will also remain unchanged. This public house will therefore continue to drain as per the existing situation.
- 3.12 The drainage for the new flat roof will therefore be served by a dedicated surface water system prior to discharging to the existing on-site combined water network. The proposed strategy will employ new geocellular tank to provide attenuation of surface water run-off from the new flat roof & outside area before discharging to the existing sewer network at a restricted discharge rate.
- 3.13 Run-off from the drainage system serving the new flat roof will be restricted to the greenfield run-off rate refer to calculation included in Appendix C.

Table 1: Greenfield Run-off Rates (ICP SuDS Method)

Storm Event (year)	1 in 1	1 in 30	1 in 100	QBAR
Discharge Rate (l/s)	0.2	0.5	0.5	0.3

- 3.14 An orifice plate will be utilised to restrict discharge from the attenuation tank to the greenfield run-off rates for the 1 in 1 year, 1 in 30 year and 1 in 100 year events during said storm events. Calculations included in Appendix C show the proposed attenuation tank has been sized to accommodate the 1 in 100-year storm event with a 40% allowance for the effects of climate change.
- 3.15 Given the relatively low discharge rates from the site, the orifice plate has been sized at 17mm in diameter to achieve these rates. Given the relatively small diameter of this, the risk of blockage can increase if the system does not include adequate sediment and debris control. The proposed strategy will therefore regular maintenance.
- 3.16 CIRIA C753 provides guidance on pollution control measures. Run-off from roofs such as the proposed flat roof extension, are considered to have a low hazard potential. As such, it is considered appropriate for the run-off from the new roof areas to drain via the proposed SuDS features as described above.

Maintenance

- 3.17 All new surface water infrastructure will be designed and constructed in accordance with the Building Regulations and best practice as appropriate.

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- 3.18 The drainage system will remain under the private ownership of the applicant and be maintained by the public house management team. Suitable maintenance regimes for SuDS, incorporating advice from the system manufacturers and installers, will be developed by the site management and implemented prior to occupation of the new extension. A summary of typical items to be included is given in Table 2 below.

Table 2: SuDS Maintenance Schedule

Drainage Feature	Inspection and Maintenance	Frequency
Geocellular soakaways*	Clean and dispose of silt build- up	Regular (as required, typically monthly)
	Ensure inlets and pre-treatment structures are clear and free of debris	Regular (as required)
	Inspection if infiltration decreases. Uncover, inspect, and remediate as appropriate, including cleaning and replacement of infiltration media and surface. Reinstate as required	Remedial work (as required)
Flow control structure*	Inspect and remove any sediment	Annually
	Inspect flow control and repair as necessary	Annually

4.0 Foul Water Drainage Strategy

Existing Foul Water Drainage

- 4.1 As discussed in Section 2 of this report, the existing buildings on-site are served by an on-site network of sewers which discharge to the combined sewer within Silk Street, to the north of the site.
- 4.2 The existing public house building discharges foul water flows via gravity to the combined sewer in Silk Street and has been traced via CCTV from the site to the outfall shown on the United Utilities sewer records in Appendix E.

Proposed Foul Water Strategy

- 4.3 Foul water effluent generated by the proposed single storey flat roof extension will connect to the foul water system serving the existing public house, and therefore also discharge via the United Utilities combined sewer in Silk Street.

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- 4.4 The proposed foul water sewer serving the new flat roof extension will be designed in accordance with the Building Regulations Part H and current best practice would be followed, as appropriate. The sewer will remain under private ownership and be the responsibility of site management.

5.0 Summary and Conclusion

- 5.1 This surface water drainage strategy has been prepared by Crawford & Co Ltd to accompany a planning application for the construction of single storey flat roof extension at the site of the existing The Shamrock public house in Manchester.
- 5.2 This report has been prepared in accordance with the requirements of National and Local Planning Policy to accompany a planning application and demonstrate suitable surface water and foul water drainage strategies for the proposed development.
- 5.3 The existing public house drains via an existing sewer system to the United Utilities combined foul and surface water sewer in Silk Street.
- 5.4 Intrusive site investigation works have determined that infiltration drainage features are not feasible on-site due to the ground conditions discovered during the works. Given the lack of watercourse or surface water sewer in the vicinity of the site, the only feasible outfall from the site is the combined sewer in Silk Street.
- 5.5 The proposed flat roof extension will discharge the surface water via a new attenuation tank and the new foul water to the existing combined sewer system serving the public house.
- 5.6 New geocellular attenuation tank will be provided on-site as part of the detailed design stage. Flows from the site will be restricted to the greenfield run-off rate for all storm events up to and including the 1 in 100-year storm event, plus a 40% allowance for climate change.
- 5.7 A gravity foul water connection from the proposed extension can be made to the existing foul water network on-site, which ultimately discharges to the United Utilities combined drain in Silk Street.

Conclusions

- 5.8 In conclusion, this report has demonstrated that the proposed development:
- Is in accordance with the National Planning Policy Framework;
 - Will employ a surface water drainage strategy based on the principles of sustainable drainage;
 - Will not increase flood risk either on-site or elsewhere.
- 5.9 The proposals are therefore considered to fully comply with national, regional and local planning policy.

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Appendix A

GroundSolve Ltd Phase II Geoenvironmental Report Extracts

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**PHASE 2 GROUND INVESTIGATION:
THE SHAMROCK PUB, BENGAL
STREET**

GSL3127

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VERSION 1

16 AUGUST 2024

FINAL

Prepared for:

Prepared by: Alex Ridge

John Dixon & Associates LTD

GroundSolve Ltd

DOCUMENT CONTROL

Report No.	GSL312
Report	FINAL
Version	1
Project	Alex
Date of	16/08/2024

This report has been prepared by GroundSolve Ltd with all reasonable care and diligence, within the best practice and guidance current at the time of issue within the proposed redline boundary and proposed Site end use as presented by the Client.

This report is confidential to the Client and GroundSolve Ltd accepts no responsibility whatsoever to third parties to whom this report is presented.

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Version No.	Description of Issue / Revision	Date of Issue	Author	Reviewed By	Approved By
1	FINAL	02/08/2024	Alex Ridge	Eve Rowland	James Thorburn
			BSc (Hons)	MESci (Hons) FGS	BSc FGS

EXECUTIVE SUMMARY

Introduction	GroundSolve Ltd (GSL) was commissioned by John Dixon & Associates LTD to undertake a site investigation at the Shamrock Pub, Bengal Street. This report presents the findings of the site investigation and makes recommendations based upon those findings. It is to be read in conjunction with the desk study and Preliminary Risk Assessment (GSL report ref: 3046R01-1 - Phase I PRA).
Site Location and Name:	The Shamrock Pub, Bengal Street , The Shamrock Inn, 17 Bengal St, Ancoats, Manchester M4 6AQ.
Land Use History	The site has comprised commercial and residential land use from at least 1848. Circa 1953 a public house located in the south of the site ceases to exist, and instead a property, in the northwest of the site, which once comprised three plots is shown to have a new public house present. The site configuration is not believed to have changed since this date. A substation is present adjacent to east of the site since 1970s.
Development	It is understood that the development will comprise of 2-storey extension to the existing Shamrock Pub to extend seating capacity.
Geoenvironmental Setting	Geology: The site is underlain by Made Ground of brick and gravel backfill, which overlies cohesive glacial till underlain by bedrock of the Chester Pebble Beds Formation. Hydrogeology: The Glacial Till is a Secondary Undifferentiated Aquifer. The Chester Pebble Formation is classified as a Principal Aquifer. The nearest groundwater abstraction point is located 1202m to the west of the site. The site is not situated within a source protection zone. Hydrology: The nearest surface water feature is a Canal 260m southwest of the site. All surface water features within 1000m of the site are limited to those associated with the canals. Mining & Quarrying: Great Mine Limestone seam (Hole High Limestone Group) runs approximately 850m southeast of the site, oriented southeast to northwest, however is limited in extent toward the site due to an erosional unconformity. The site is not impacted by activity associated with historical working of the limestone. Unexploded Ordnance: A non-specialist UXO screening exercise in general accordance with CIRIA report C681 indicates a low to moderate risk. A

	preliminary risk assessment was undertaken and concluded a detailed desk study was not needed.
Phase 1 Preliminary Risk Assessment	Based on the former land uses at the site the potential for contamination to be present is considered relatively high. Based upon the results of the current and previous ground investigations, plausible contaminant linkages have been identified. The receptors of concern are human health and groundwater.
Scope of Phase 2 Site Investigation	The scope of ground investigation works carried out at the site by GroundSolve comprised: • 3 Machine excavated trial pits to a maximum depth of 2.25 mbgl; • Laboratory testing for chemical contamination and geotechnical.
Findings of the Phase 2 Ground Investigation	The ground conditions at the site (from ground level, down) comprise: Made Ground Bituminous slab, over gravels and red brick concrete cobbles (demolition rubble); over Glacial Till¹ From 1.00m described as stiff grey sandy clay proven to a depth of 2.25 ¹ <i>The Glacial Till is was only encountered in TP01, however is likely to be present under existing concrete slabs at the bases of the historical basement structures</i> No groundwater was encountered.

	Elevated PAHs were present however did not exceed relevant GACs, along with an exceedance of Dibenzo(a,h)anthracene which was elevated above commercial GACs with 1% OM
Phase 2 Conclusions – Geoenvironmental	Human Health: Slightly elevated levels of PAHs are present. However, subject to EHO approval is not considered a significant risk. An exceedance of Dibenzo(a,h)anthracene was identified within the made ground around TP01. This impacted material will be under hard standing post construction, eliminating plausible SPR linkages. Made Ground across the site, is classified as hazardous from a waste characterisation standpoint, and as such if taken off site should be disposed of accordingly. Plant growth: No unacceptable risks (based on current proposed development plans) Controlled Waters: No unacceptable risks. Ground Gases (Human Health / Property): No radon protective measures are indicated by the current guidance. Water Supply Pipework: Based on a brownfield classification and the presence of hydrocarbon contamination, barrier pipe will be required. GroundSolve recommend that discussions be undertaken with the relevant water supply company at the earliest opportunity.
Reuse of Site-won Materials	Made ground (where present) on site is chemically not suitable for use in any soft standing areas, and will only be suitable for reuse under hard standing. Following treatment the majority of the made ground should be suitable for reuse as engineered fill (subject to additional testing and specification) (subject to the necessary approvals/consents)
Foundations	Existing relict foundations and basements will need to be grubbed out and replaced with a suitably engineered fill. The foundations could then take the form of a conventional reinforced concrete raft based on an allowable bearing capacity of 50kN/m ²
Buried Concrete	It is recommended that DS-1 and AC-1 be adopted for the design of all buried

	concrete equating to a designated concrete class DC-2
Further Work	It would be prudent to undertake a formation inspection of the underlying natural strata once the existing basement and floor slabs have been removed.
This summary forms part of a Tier 2 Risk Assessment (Ground Condition) report prepared by GroundSolve Ltd and contains an overview of the key findings and conclusions. The summary should not be treated as an independent document.	

1 Introduction

GroundSolve Ltd (GSL) was commissioned John Dixon & Associates Ltd to undertake a second phase site investigation and contaminated land risk assessment for the Shamrock Pub on Bengal Street, Manchester referred to as The Shamrock Pub, Bengal Street (the "Site").

This report has been devised to generally comply with the relevant principles and requirements of a range of guidance including:

- Part IIA of the Environment Protection Act, 1990;
- BS5930:2015 +A1:2020: "Code of practice for site investigations";
- BS10175: 2011 +A2:2017 "Investigation of Potentially Contaminated Sites - Code of Practice";
- The Building Regulations 2010. Part C (HM Government 2013)
- Environment Agency: Land Contamination Risk Management (LCRM), Version 3, October 2020;
- Environment Agency (2017) "The Environment Agency's Approach to Groundwater Protection" November 2018 Version 1.2;

1.1 Objectives

The purpose of the report is to provide an assessment of the site using published information and information on conditions at the site in relation to the proposed commercial development.

The findings and conclusions of the risk assessments have been set out and recommendations given for the proposed commercial end use. If there is a subsequent change in the proposed land, the risk assessments and conclusions should be reviewed to determine whether they are still applicable for the revised end use.

This document is a working document and may need to be updated, in agreement with the relevant regulatory bodies, at any stage during development dependent on the conditions encountered. This version of this document is to be issued to regulators for approval (Manchester City Council).

1.2 Proposed Development

The proposed development of the site is understood to comprise:

- The demolition of the single storey existing buildings within the central part of the site;
- The removal from site or the treatment of any contaminated material encountered during demolition;
- The construction of two storey extension to the main public house building to extend seating capacity and provide an extension of lounge area to the existing pub structure. The existing hard standing area will be used as a garden area.

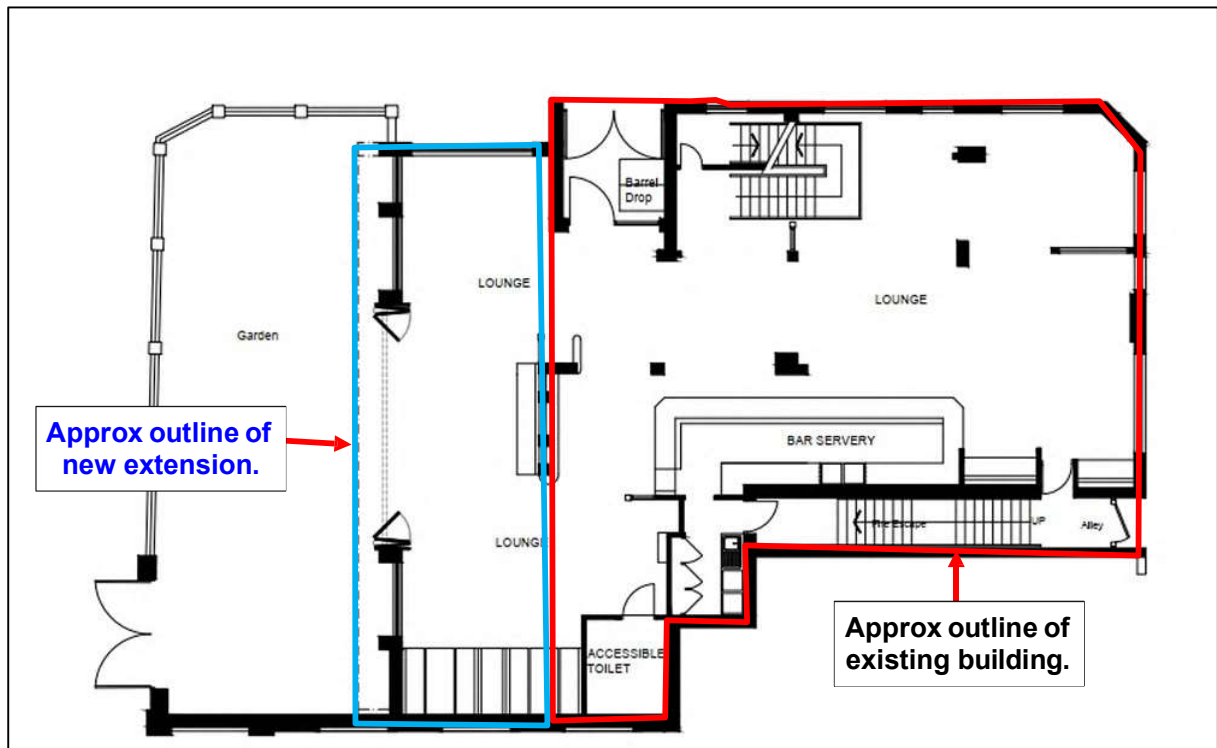


Figure 1 – Extract from Proposed Development Plan

1.3 Previous Investigations

A phase one desk study report was undertaken by GroundSolve Ltd (GSL). Findings of the desk study can be found in

Section 2

1.4 Limitations

This report has been prepared for the sole use of John Dixon and Associates Ltd. No other third party may rely upon or reproduce the contents of this report without the written approval of GroundSolve Ltd. If any unauthorised third party comes into possession of this report, they rely on it entirely at their own risk.

The current buildings occupy the majority of the site, therefore limiting the areas where an intrusive investigation could be carried out. Three machine excavated trial pits were limited to the southern part of the site, which is currently used as a storage yard.

2 SITE DETAILS AND DESCRIPTION

Table 2.1 Current Site Overview.

Site name	The Shamrock Pub, Bengal Street
Site address	The Shamrock Inn, 17 Bengal St, Ancoats, Manchester M4 6AQ
National Grid Reference (NGR)	384995 , 398815
Approximate Site area	
Site shape	Irregular, with a length of 26m (northwest to southeast) and 17m width (northeast to southwest).
General topography and ground levels	The site is generally flat, however no topographical data has been provided.

Table 2.2 – Summary of Description of the Site and its Environs

Current Use:	Current land use on the site is as a delivery yard for the Shamrock Pub, which is temporarily closed.
Access	Via Bengal Street, with a 4.50m access gate leading to the yard.
Existing Buildings & Structures	Existing structure on the site is the Shamrock Pub, with some associated outbuildings understood to be used for storage.
Site Surface	The site surface comprises of asphalt with evident scaring noted during the field work.
Vegetation	No vegetation is present on the site
Storage Tanks	Below Ground Tanks: No evidence/none suspected. Above Ground Tanks: None present.
Services	Services running into the property include gas (LP) to the main building and electric running into the site between the building and the yard area. Whilst the investigation took place, a signal was identified on the CAT and Genny Power setting, running along the boundary of the yard and storage garages.
Asbestos	No potential Asbestos Containing Materials (ACMs) noted in the buildings or on the ground surface. However, a refurbishment / demolition asbestos survey will be required prior to demolition
Waste Disposal/ Materials Storage	Site materials storage limited to heras fencing, general metal waste and redundant signage (See photos in Appendix B)
Surrounding Area	Residential and commercial units on all site boundaries.
Local / Background Knowledge	The site has comprised commercial and residential land use from at least 1848. Circa 1953 a public house located in the south of the site ceases to exist, and instead a property in the northwest of the site which once comprised three plots is shown to have a new public house present. The site configuration is not believed to have changed since this date. Substation present adjacent to east of the site since 1970s.

A photographic survey of the site was undertaken on 03/07/24 and is presented in **Appendix B**.

3 PREVIOUS INVESTIGATIONS

3.1 Review

A summary of the findings from previous reports is given in **Table 3.1** below:

Table 3.1: Summary of Previous Investigations.

Summary of main findings from the previous reports	
Site History	The site has comprised commercial and residential land use from at least 1848. Circa 1953, a public house located in the south of the site ceases to exist, and instead a property in the northwest of the site which once comprised three plots is shown to have a new public house present. The site configuration is not believed to have changed since this date. A substation is present adjacent to east of the site since 1970s.
Geological Setting	Published geology indicates the underlying site geology comprises superficial deposits of glacial till (clay) with bedrock geology consisting of Sandstone. Due to the historical land use on site, it is likely that made ground will be encountered. Great Mine Limestone seam (Hole High Limestone Group) runs approximately ~850m south east of the site, running south east to north west, however is limited in extent toward the site due an erosional unconformity. The site is likely not impacted by activity associated with historical working of the limestone.
Mining	No onsite mining or extraction is noted to have occurred; it is unlikely the site has been influenced by any activity.
Hydrogeology	The superficial deposits are classified as a Secondary Undifferentiated Aquifer, and the bedrock is classified as a Principal Aquifer. No potable extractions are recorded within 1000m. The closest extraction is 1202m west of site. The site is not situated within a source protection zone.

Potential Contamination Sources	On site: Made Ground – Historic buildings and potential basement located within the southern part of the site. The infilled basement will likely to have been backfilled with demolition material from the former buildings. Potential for asbestos (ACMs), heavy metals, PAHs. There is a low potential for ground gas. Service Yard – Limited potential for small scale hydrocarbon spillages from vehicle movements and storage of materials. Off-site: Substation(s) – There is a substation present adjacent to the eastern boundary, identified on the 1978 historical mapping. PCBs were used as insulating oil within substations from the 1950s up to 1981. There is the potential that PCBs were used on the adjacent site. However, PCBs are typically not very mobile and the underlying ground conditions are likely to reduce migration on to the site. It is recommended that the fieldwork confirms ground conditions and absence of any impacted soils from adjacent substation. Historical Industrial land uses - The surrounding areas have had numerous industrial land uses dating back to the 1800s. Within 250m of the site there has been railway sidings and buildings, garages, mills and depots. There are no specific risks identified from the past industrial land uses to the study site.
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4 FIELDWORK

4.1 Introduction

The fieldwork was carried out 03/07/2024. GroundSolve personnel were present to supervise all work, describe the ground encountered, and take samples. Fieldwork procedures were undertaken in accordance with the relevant sections of:

- BS5930:2015 + A1:2020 "Code of Practice for Site Investigations;"
- BS10175:2011 + A2:2017 "Investigation of Potentially Contaminated Sites – Code of Practice."

The investigation included:

- 3 No. machine excavated trial pits to maximum depth of 2.25m bgl,
- Sampling for chemical and geotechnical testing of soils,
- Description of the ground encountered in accordance with BS5930:2015 + A1:2020, Code of Practice for Site Investigations.

4.2 Trial Pits

3No. trial pits (TP01 - TP03) were dug using an 8-tonne excavator. The exploratory hole locations are included on Drawing No. 2 in **Appendix A** along with logs and photographs presented in **Appendix B**.

4.3 Samples and Sample Containers

Soil samples for chemical analysis each comprised a pair of samples: a plastic tub for metals and inorganics and an amber glass jar for organics.

Soil samples were stored in cool boxes with ice packs and dispatched directly to the testing laboratory, for all phases of the investigation.

Samples for physical testing comprising 4 Point Atterberg and Moisture Content tests were dispatched to The Testing Laboratory (TTL) a UKAS accredited laboratory.

5 LABORATORY TESTING

5.1 Chemical Laboratory Testing

Chemical samples were submitted to a UKAS accredited laboratory in accordance with ISO17025 and are also MCERTS accredited for soil analysis in accordance with the Environment Agency's scheme. The laboratory carries out Quality Assurance and Quality Control in accordance with BS ISO 17025 and participate in external laboratory comparison and quality control schemes. Details of the accreditation and the methods of analysis are provided on the relevant test reports.

The selection of samples for laboratory testing and analytes to be determined were made based on the preliminary CSM and relevant observations during the investigations. The sample selection rationale is as follows:

- To gain a good coverage across the Site of the various material types and strata encountered;
- To investigate the specific locations of previous potentially contaminative land uses as identified within the Phase 1 desk study and subsequent CSM (i.e. adjacent the boundary of the substation and the area of site used as a service yard, with potential for small scale hydrocarbon spillages);
- To fully characterise the potential made ground materials within the identified higher-risk areas.

The selected soil samples were tested for a range of typical contamination indicators including specific tests for contaminants suspected as being present from the desk study, CSM, and observations made on-site. Tests were also performed which were used to support the modelling of contaminant transport and impacts (e.g. TOC) and for waste classification purposes.

Each of the soil samples were analysed for the 'total' concentration of a suite of potential contaminants.

The results of the laboratory analysis are presented in **Appendix D**. The various suites of analysis for the soil are presented in **Table 5.1** below:

Table 5.1: Suites of Analysis for Environmental Soil Samples

Determinand	Number of Samples
Index Tests	-
Asbestos Screen / Quantification	4
pH	4
Metals	-
As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn (all totals)	4
Inorganics	-
Acid Soluble Sulphate	4
Cyanide - Total	4
Sulphate (2:1 extract on soil samples)	4
Organics	-
Phenols - Total (monohydric)	4
Total Organic Carbon (TOC)	4
PAH (Speciated USEPA 16)	4
Speciated TPH (C5-C35)	1
Benzene, Toluene, Ethyl Benzene, Xylenes (BTEX);	1

5.2 Physical Laboratory Testing

Samples were submitted to Professional Soils Laboratory (PSL) who are UKAS accredited in accordance with ISO17025. The following geotechnical testing was undertaken with the results of this testing presented in are presented in **Appendix E**. The various suites of analysis for the soil are presented in **Table 5.2**:

Table 5.2: Summary of Physical Testing

Determinant	Samples Used in Testing
Index Tests	
Atterberg	2
Moisture Content	2

6 GROUND CONDITIONS

6.1 General

The site investigations have allowed the site-specific ground conditions to be described and this information was used to provide an improved conceptual ground model. The geology encountered during the site investigations was generally consistent with existing publicly available information online on the British Geological Survey (BGS) GeoIndex (onshore) viewer. A summary of the general strata encountered across the site is provided in the following sub sections.

6.2 Ground Surface

The ground surface across the site comprises asphalt of 0.05m thickness, with evidence of scaring noted.

6.3 Anthropogenic Materials

Made ground was encountered in all exploratory holes and comprised of loose grey slightly silty sandy gravel of bituminous material, limestone and red brick and ranged in thickness from 0.35m and 0.85m. This material was underlain by loose angular cobbles of red brick in TP02 and TP03, likely backfill of historical basements associated with the previous properties on the site. Evidence of basement structures was seen on the sides of the excavations, as well as the presence of a fireplace, and a tank (suspected hot water tank) with piping identified in TP02. In both TP02 and TP03 a concrete slab was encountered at 2.10 (TP03) and 2.20m (TP02) bgl, which proved difficult to excavate through with a hydraulic breaker attachment. TP01 encountered potentially reworked brown clay with red brick cobbles and coal fragments, to a depth of 1.00m bgl.

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

6.4 Natural Deposits

Underlying the Made Ground in TP01, natural deposits consistent with the anticipated glacial till were encountered and described as stiff grey sandy clay.

Soil classification tests were carried out on the glacial till samples which revealed TP01 at 2.00m consistent with a clay of high plasticity with a liquid limit of 54%, plastic limit of 26%, plasticity index of 28% and a moisture content of 32%. The sample from TP01 taken at 1.30m bgl recorded a clay

of intermediate plasticity with a liquid limit of 44%, plastic limit of 20%, plasticity index of 24% and a moisture content of 28%, with both samples classified as desiccated. All results are presented in **Appendix E**.

6.5 Bedrock

Bedrock was not encountered during this investigation.

6.6 Groundwater

No groundwater was encountered in any of the exploratory holes.

6.7 Surface Water

No surface water is located on or proximal to the site.

7 GENERIC QUANTITATIVE RISK ASSESSMENT

7.1 Assessment for the Protection of Human Health

The results of the soil analyses are presented below, where they have been compared to suitable generic assessment criteria (GACs), in order to allow a generic quantitative risk assessment (GQRA) to be carried out for the site and the proposed development.

The Category 4 Screening Levels (C4SLs) published by DEFRA (2014) have been adopted in the first instance, which have been published for six substances to date. Where a C4SL is unavailable, the “Suitable 4 Use Levels” (S4ULs) published by LQM/CIEH (2015) have been adopted.

These criteria have been derived using the CLEA model for a range of standard end-use scenarios and a range of soil organic matter (SOM) contents. It should be noted that the C4SL values are derived on the basis of a “low level of toxicological concern”, while the S4UL values are based on a “tolerable” or “minimal” level of risk. As such, the S4ULs describe a lower level of risk than the C4SLs, and are equivalent to the former Soil Guideline Values (SGVs, published by the Environment Agency) and the previous editions of the LQM/CIEH GAC values.

The GQRA is based on a soil with a Soil Organic Matter of 1.0%, for a commercial end use. A full summary of the chemical test results is presented in **Appendix F**.

7.2 Results

Metals

The results from the metal analysis have recorded very low concentrations with no exceedances of the applicable GACs.

Table 7.1: Metals Suite

Metals	Min (mg/kg)	Max (mg/kg)	Average (mg/kg)	Count	Adopted Guideline (mg/kg)	Source	Exceedances
Arsenic	8.8	42.8	18.08	4	640	C4SL	0
Cadmium	< 0.5	0.8	0.8	4	410	C4SL	0
Copper	32.9	169	74.58	4	68000	S4UL	0
Lead	26	673	210.15	4	2300	C4SL	0
Mercury	< 0.5	1	1	4	58	S4UL	0
Nickel	27.1	33.1	31.33	4	980	S4UL	0
Total Phenols	< 5	< 5	< 5	4	440	S4UL	0
Selenium	< 1.0	< 1.0	< 1.0	4	12000	S4UL	0
Zinc	63.3	233	127.85	4	730000	S4UL	0

GroundSolve conclude that the risk from metal concentrations to the proposed development is considered low.

PAHs

All samples selected for analysis have generally recorded low PAHs, with the exception of 1 No. exceedance for Dibenzo(a,h)anthracene within TP01 at a depth of 0.30m bgl. The exceedance of dibenzo(ah)anthracene is discussed further in **Section 7.6**.

Table 7.2: Polyaromatic Hydrocarbons

Polyaromatic Hydrocarbons (PAH)	Min (mg/kg)	Max (mg/kg)	Average (mg/kg)	Count	Adopted Guideline (mg/kg)	Source	Exceedances
Acenaphthene	< 0.5	0.6	0.6	4	84000	S4UL	0
Acenaphthylene	< 0.5	1.1	0.85	4	83000	S4UL	0
Anthracene	< 0.5	3.8	2.23	4	520000	S4UL	0
Benzo(a)anthracene	< 0.5	20.5	11.13	4	170	S4UL	0
Benzo(a)pyrene	< 0.5	22.7	12.57	4	77	C4SL	0
Benzo(b)fluoranthene	< 0.5	21	11.07	4	44	S4UL	0
Benzo(g,h,i)perylene	< 0.5	16	7.7	4	3900	S4UL	0

Benzo(k)fluoranthene	< 0.5	19.9	10.73	4	1200	S4UL	0
Chrysene	< 0.5	23.9	12.53	4	350	S4UL	0
Dibenzo(a,h)anthracene	< 0.5	6	2.73	4	3.5	S4UL	1
Fluoranthene	< 0.5	22.9	13.37	4	23000	S4UL	0
Fluorene	< 0.5	0.6	0.6	4	63000	S4UL	0
Indeno(1,2,3-c,d)pyrene	< 0.5	17.3	8.17	4	500	S4UL	0
Naphthalene	< 0.5	0.8	0.8	4	190	S4UL	0
Phenanthrene	< 0.5	5.1	4	4	22000	S4UL	0

Polyaromatic Hydrocarbons (PAH)	Min (mg/kg)	Max (mg/kg)	Average (mg/kg)	Count	Adopted Guideline (mg/kg)	Source	Exceedances
Pyrene	< 0.5	22.5	12.6	4	54000	S4UL	0

Petroleum Hydrocarbons (PHC)

No hydrocarbon impacted material was encountered during the fieldwork.

Table 7.3: Petroleum Hydrocarbons

Petroleum Hydrocarbons	Min (mg/kg)	Max (mg/kg)	Average (mg/kg)	Count	Adopted Guideline (mg/kg)	Source	Exceedances
Aliphatic C5-C6	< 0.01	< 0.01	< 0.01	3	3200	S4UL	0
Aliphatic C6-C8	< 0.01	< 0.01	< 0.01	3	7800	S4UL	0
Aliphatic C8-C10	< 1.0	< 1.0	< 1.0	3	2000	S4UL	0
Aliphatic C10-C12	< 1.0	< 1.0	< 1.0	3	9700	S4UL	0
Aliphatic C12-C16	< 1.0	< 1.0	8.05	3	59000	S4UL	0
Aliphatic C16-EC35	7.3	1600	811.77	3	1600000	S4UL	0
Aliphatic C35-C40	4.4	591	324.13	3	1600000	S4UL	0
Aromatic C5-C7	< 0.01	< 0.01	< 0.01	3	26000	S4UL	0
Aromatic C7-C8	< 0.01	< 0.01	< 0.01	3	56000	S4UL	0
Aromatic C8-C10	< 1.0	< 1.0	< 1.0	3	3500	S4UL	0
Aromatic C10-C12	< 1.0	< 1.0	< 1.0	3	16000	S4UL	0
Aromatic C12-C16	< 1.0	5.7	4.05	3	36000	S4UL	0
Aromatic >C16-C21	< 1.0	41	29.5	3	28000	S4UL	0
Aromatic >C21-C35	4.6	1610	750.53	3	28000	S4UL	0
Aromatic >C35-EC40	2.9	557	274.3	3	28000	S4UL	0

The speciated Total Petroleum Hydrocarbons (TPH) results have shown the majority below the relevant detection limits, however material from TP01 at 0.30m bgl and TP02 at 0.15m has total concentrations <1000mg/kg. The concentrations fall below GACs and therefore are not likely to represent a significant increased risk to long term human health and give no cause for concern.

Bituminous fragments were noted as present within this material, and as such the elevated PAHs are likely the result of these fragments.

Asbestos

Asbestos can be present in soil as fragments of bulk Asbestos Containing Materials (ACMs) (e.g., asbestos cement sheeting) and also as discrete asbestos fibres within the soil matrix. This investigation has carried out assessments to determine whether both bulk fragments of asbestos and discrete fibres are present in the soil at the site. The asbestos

assessment commenced on site with inspection of the Made Ground by our site staff for the presence of bulk ACMs. During the fieldwork no suspected ACMs were identified.

Laboratory assessments were carried out in order to confirm the site assessment that ACMs were absent, and no asbestos was detected in any of the samples retrieved from site.

7.3 Assessment for the Protection of Controlled Waters

The total concentrations detected within soil samples are predominantly relatively marginal in human health terms and do not indicate particularly high concentrations which would be indicative of a significant source of groundwater contamination. Whilst only encountered within exploratory hole TP01 it is likely there is a significant layer of low permeability Glacial Till between the made ground and underlying aquifer. Overall, it is assessed that there is a low possibility of a contaminant linkage between the potential source and the underlying principle aquifer because:

- No potable extractions are within 1000m
- Closest potable extraction is located 1202m W
- The site lies outside of a source protection zone
- There is likely a significant amount of clay between potentially impacted material and the principal bedrock aquifer.

7.4 Permanent Ground Gases

The risks from permanent ground gases are considered low as no active or recent landfills are recorded within 500m of the site, with deep made ground only associated with filled basements from historical onsite structures, of which no elevated volatiles have been identified in such materials. Despite higher concentrations of TPHs, vapor risk is considered low as these elevated concentrations are likely derived from bituminous fragments being present within the samples taken for analysis, therefore classifying these largely as mobile and not likely to cause a vapor risk.

7.5 Risks to Human Health (Construction Phase)

Whilst overall contaminant levels are low during the construction works there will be a risk from dust to on-site workers and people occupying adjacent properties. Appropriate risk assessments should be carried out by the contractor to allow appropriate controls for the mitigation of risk to health of construction workers to be put in place. This risk can be controlled to within acceptable limits by:

- Method statement for site activities including control of dust generation;
- Having adequate site hygiene facilities allowing staff to keep a good level of personal hygiene;
- The method statement shall have a contingency plan which should be implemented if the presence of significantly elevated levels of lead is suspected in groundworks; and
- Only permitting smoking or eating on site in appropriate pre-designated areas.

As a minimum it is anticipated the works will be undertaken in accordance with BRE best practise guidance, and that the following measures will be introduced to assist with control of dust generation during the groundworks phase of the works:

- Access roads and any stockpiles created during groundworks should be regularly damped down with water;
- Vehicles used to transport materials/wastes and aggregates should be enclosed or tarpaulined;
- Vehicle movements and speed should be kept to a minimum within the site ;
- Dust generating equipment (e.g., mobile crushing and screening equipment) should be located to minimise potential nuisance impacts to receptors as far as practicable; and
- Minimising drop heights of all loading and unloading activities that involve the transfer of soils and demolition materials.

7.6 Conceptual Site Model

The proposed development comprises of an extension of the existing Shamrock Pub with the addition of extra floor space, consisting of 2 storeys, in the footprint of the existing service yard.

The conceptual site model has been updated since the Phase 1 Preliminary Risk Assessment, as the findings of the Phase 2 site investigation revealed the following general downward succession:

- Site surface: Asphalt hardstanding;
 - Deep Made Ground (across the site): Predominantly comprising of loose red brick cobbles underlying loose grey slightly silty sandy gravel of limestone, red brick and bituminous material
 - Devensian Till: Encountered in TP01 beyond 1.65m, comprising of stiff grey sandy clay
-

The results of site investigation and laboratory analysis generally record negligible to zero concentrations of potential contaminants, however there are elevated concentrations of Dibenzo(a,h)anthracene within TP01 at a depth of 0.30m

bgl and high TPHs concentrations in TP01 at a depth of 0.30m and TP02 at a depth of 0.15m bgl, which as previously discussed are likely resultant from bituminous material being present within the samples.

GroundSolve conclude that the risk from elevated Dibenzo(a,h)anthracene concentrations to the proposed development is considered low as the area with impacted material is within the footprint of the proposed extension, and therefore will be under hard standing, as such it will likely not require any additional remediation due to the following factors:

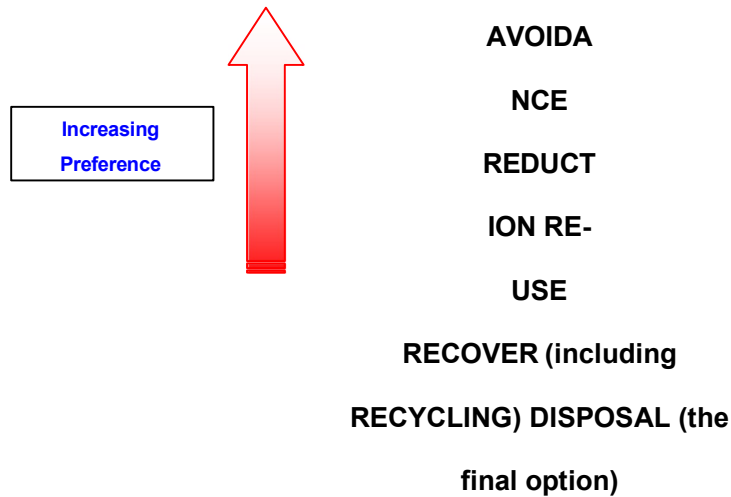
- The elevated concentrations are located within the area of the proposed extension therefore not in an area of soft landscaping;
- The shallower materials are likely to be removed from site during site clearance and preparation for the proposed development.
- Material which recorded high concentrations of TPHs are those of which contained bituminous fragments, as noted within field logs found in **Appendix C**.

Whilst unexpected contamination is not anticipated, the proposed development could encounter previously unrecorded hotspots of contaminants. These will be assessed and mitigated in accordance with current good practice.

8 WASTE ASSESSMENT

8.1 Waste Hierarchy

In accordance with government guidance, it is required that the production and disposal of waste is managed in accordance with the following hierarchy of preference:



8.2 Waste Characterisation and Classification

If there is a portion of excess soil this will then have to be sent to a suitable landfill site. A two-phase approach is required comprising:

- Waste Characterisation; and
- Waste Classification (Waste Acceptance Criteria).

Waste Characterisation

The results of the total concentrations from the chemical testing on soil samples have been assessed to determine whether or not they are hazardous in terms of waste characterisation. The results of this assessment indicate that the materials encountered during the investigation should be classified as hazardous, due to high concentrations of TPHs found within 2 No. shallow samples.

Waste Classification

In order to determine whether soils can be sent to a licensed landfill for disposal further testing is required comprising landfill Waste Acceptance Criteria (WAC) analysis for both total concentrations for certain chemicals and for leachate analysis. No WAC testing was carried out as part of this investigation. WAC testing will have to be carried out to confirm the landfill waste classification and if any pre-treatment is required. This is best carried out once all material to be disposed of is stockpiled, and volumes can be accurately assessed. It should be noted that natural clay can likely be classified as Inert Waste 17 05 04: Soil and stones only (excluding topsoil, peat, soil and stones).

Testing Frequency

There are also set requirements for the required sampling and testing frequencies for materials being sent for disposal at landfills. The required testing frequencies for each different waste type are summarised in **Table 8.1** below.

Table 8.1: Laboratory Sampling Testing Frequencies

Testing Level	Quantity of Waste	Number of Samples	
		Homogeneous	Heterogeneous & New Wastes
Level 1 Characterisation (Description, Total Concentrations & Leaching)	<100T	2	5
	<500T	3	8
	<1000T	5	14
	10,000 T	11	22
	Per additional 10,000T	+5 pro rata	+10 pro rata
Level 2 Compliance For Regularly Generated Wastes (Total Concentrations & Leaching)		1 per defined waste sub-population per year	3 per defined waste sub-population per year
Level 3 Verification Delivery document & visual check Chemical testing as per Level 2 suite		Visual – Each Load	Visual – Each Load
		1 per year per waste stream	3 per year per waste stream

9 GEOTECHNICAL ASSESSMENT AND RECOMMENDATIONS

9.1 Fieldwork and Laboratory Data Review

The proposed development includes the construction of a 2-storey extension to the existing Shamrock Pub, on Bengal Street Manchester.

No loading information has been provided for this report.

The shallow ground conditions predominantly comprise loose grey silty sandy gravel of bituminous fragments, limestone and red brick varying in thickness from 0.35m to 0.85m. This material typically overlies loose red brick cobbles which extend to a maximum proven depth of 2.20m bgl and 2.10m bgl in TP02 and TP03 respectively, where excavations encountered concrete obstructions anticipated to be basement floor slabs.

The underlying drift deposits have been confirmed to comprise stiff grey sandy clay encountered at a depth of 1.00m in TP01 and proven to 2.25m bgl.

Classification testing was undertaken on disturbed samples of the natural clay strata and are summarised in **Table 9.1**

below:

Table 9.1 Summary of Classification Testing

Hole	Depth (m)	Moisture Content (%)	% passing 425um sieve	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Modified Plasticity Index	Plasticity	Volume Change Potential
TP01	2	32	98	54	26	28	27	High	Medium
TP01	1.3	28	99	44	20	24	24	Intermediate	Medium
Minimum		28	98	44	20	24	23.76	28	98
Average		30.0	98.5	49.0	23.0	26.0	25.6	30.0	98.5
Maximum		32	99	54	26	28	27.44	32	99

Testing indicates that the clays show evidence of desiccation with moisture contents higher than the plastic limits, and medium volume change potential.

Pocket penetrometer tests were carried out on the recovered clay to estimate the shear strength, with results recording values of 100kN/m².

Test results are recorded on the exploratory hole records and are summarised in **Table 9.2** below:

Table 9.2: Summary of In-Situ Hand Shear Vane Tests

Locati on	Depth (m bgl)	Estimated Undrained Shear strength (kPa) *
TP01	1.20	100
	2.00	100

9.2 Trees

No trees or vegetation are on or bounding the site and therefore a comprehensive tree survey is not likely required.

9.3 Foundation Recommendations

For the purpose of this assessment, it is assumed the site will not be subject to extensive reprofiling.

The previous building's basement has been shown to be at a depth of 2.10m below existing ground level and underlie the majority of the proposed development see **Figure 2**,

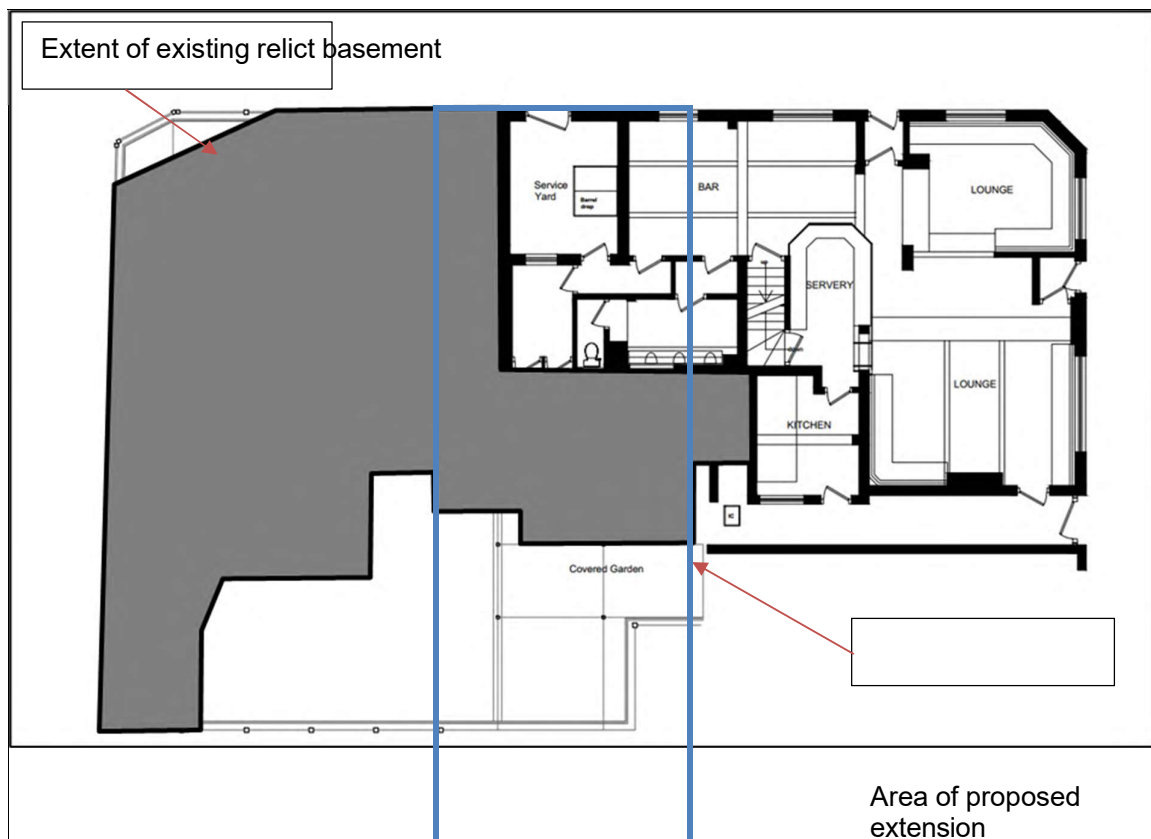


Figure 2 - Approximate Extent of Existing Relict Basement

Given the absence of any details as to the age, composition and strength of the relict basement slabs it is recommended these are removed prior to the construction of the new development, likewise any, relict walls and foundations. These materials could then be screened, crushed and reused as a suitably engineered backfill. The development could then be constructed on a conventional reinforced concrete raft designed based on an allowable bearing capacity of 50kN/m²

Whilst conventional strip foundations may be possible to the southern portion of the extension where the natural clay deposits lie at shallow depth this would significantly increase the risk of differential settlement between the two foundation types and as such is not recommended.

9.4 Reuse of Materials

As part of the site preparation all relict foundations, floor slabs and walls underlying the proposed development will need to be grubbed out and replaced with a suitably compacted granular material. It should be feasible to screen, crush and reuse the majority of excavated made ground and relict foundations as engineered backfill. This material could be placed and compacted in accordance with a suitable earthworks specification to allow the utilisation of a conventional reinforced raft foundation. Due to exceedances of PAH and TPHs within made ground material, it is recommended that this material is not reused under any areas of soft landscaping. The glacial till materials encountered in TP01 should be suitable for reuse under any proposed soft landscaping areas.

9.5 Groundwater & Excavations

It is not expected that shallow excavations (<2.50m) within the glacial till or made ground will encounter significant groundwater entries. Some perched water contained within the relict basements and made ground should be anticipated however it is predicted that these should be controllable via conventional pumping from sumps. If inflows are relatively localised, this may cause softening of the ground and require localised excavation support in order to prevent instability of the sides of excavations.

Excavations through the made ground are liable to encounter extensive obstructions associated with relict foundations and basements which will require mechanical or hydraulic breaking. The presence of numerous obstructions and former developments mean significant amounts of overbreak during excavation should be expected. Fill materials predominantly comprised loose granular material and whole bricks and as such excavations will require temporary support. Any temporary works design will also need to consider support of the existing structure foundations.

Whilst excavation depths should generally be readily achieved using conventional hydraulic plant, with breaker attachments careful consideration should be given to plant and breaker sizes following difficulty observed during the site investigation works.

All excavations should be carried out in accordance with CIRIA Report 97 "Trenching Practice" and BS6031: 2009: Code of Practice for Earthworks. Further guidance on this aspect of site works is given in the British Standards for "Workmanship on Building Sites", BS 8000, Part 1, and in the Construction Industry Training Board's Site Safety Note 10.

9.6 Buried Concrete and Pipework

The results of laboratory pH and sulphate content indicate that ACEC Class AC-1 conditions prevail in accordance with BRE Special Digest 1, 2005 (the Design Concrete Class). Therefore, special precautions are not required at the site for the design of concrete in terms of the durability and structural performance.

GroundSolve Ltd		Machine Dug Trial Pit Record				TP01	
Project Name: The Shamrock Pub, Bengal Street		Client: John Dixon & Associates Ltd		Date: 03/07/2024			
Location: Bengal Street, Manchester		Contractor: GroundSolve		Co-ords: E384994,98 N398821,75			
Project No.: 3127		Crew Name: Hurt Plant Hire		Equipment: 8T			
Location Number TP01	Location Type TP	Level	Logged By AR	Scale 1:25	Page Number Sheet 1 of 1		
Backfill/ Instn	Water Strikes	Sample and In Situ Testing		Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type				
		0,20 - 0,80	B	100,0kPa	0,05		Bituminous slab (MADE GROUND)
		0,30	ES		Loose grey slightly silty sandy subangular to angular fine to coarse GRAVEL of bituminous material, limestone and red brick (MADE GROUND)		
					From 0,20m to 1,20m bgl Vertical extent of brick wall		
		1,20	ES	100,0kPa	0,80		Stiff brown mottled grey slightly sandy CLAY with occasional charcoal fragments (MADE GROUND)
1,20	PP	1,00	Stiff grey sandy CLAY (GLACIAL TILL)				
1,30	D	From 0,30m to 1,00m whole red bricks					
		1,80 - 2,20	B	100,0kPa			
2,10	D						
2,20	PP	2,25	End of Trial Pit at 2,250m				
Dimensions Pit Length: 2,20 Pit Width: 0,60							
Trench Support and Comment Pit Stability: Stable Shoring Used: Remarks: Date: Rate: Remarks:							
Remarks							



TRIAL PIT PHOTOGRAPHS

Report No : 3127
Report Title Shamrock Inn, Bengal Street
Engineer: GroundSolve
Date: 16/08/2024



TP01



TP01 Arisings

GroundSolve Ltd				Machine Dug Trial Pit Record						TP02	
Project Name: The Shamrock Pub, Bengal Street				Client: John Dixon & Associates Ltd				Date: 03/07/2024			
Location: Bengal Street, Manchester				Contractor: GroundSolve				Co-ords: E385006,70 N398807,38			
Project No.: 3127				Crew Name: Hurt Plant Hire				Equipment: 8T			
Location Number TP02		Location Type TP		Level		Logged By AR		Scale 1:25		Page Number Sheet 1 of 1	
Backfill/ Instal'n	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0,20 - 0,30 0,25	B ES		0,05			Bituminous slab (MADE GROUND)			
					0,35			Loose grey slightly silty sandy subangular to angular fine to coarse GRAVEL of bituminous material, limestone and red brick (MADE GROUND)			
								Loose angular red brick COBBLES (MADE GROUND)			
					2,20 2,25			Concrete slab (MADE GROUND) End of Trial Pit at 2,250m			

1

2

3

4

5



TRIAL PIT PHOTOGRAPHS

Report No : 3127
Report Title Shamrock Inn, Bengal Street
Engineer: GroundSolve
Date: 16/08/2024



TP02



TP02 - Arisings



TRIAL PIT PHOTOGRAPHS

Report No : 3127
Report Title : Shamrock Inn, Bengal Street
Engineer : GroundSolve
Date : 16/08/2024



TP02 – Concrete Slab

GroundSolve Ltd		Machine Dug Trial Pit Record				TP03	
Project Name: The Shamrock Pub, Bengal Street		Client: John Dixon & Associates Ltd		Date: 03/07/2024			
Location: Bengal Street, Manchester		Contractor: GroundSolve		Co-ords: E385005,03 N398809,59			
Project No.: 3127		Crew Name: Hurt Plant Hire		Equipment: 8T			
Location Number TP03	Location Type TP	Level	Logged By AR	Scale 1:25	Page Number Sheet 1 of 1		
Backfill/ Instaln	Water Strikes	Sample and In Situ Testing		Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type				
		0,40 0,40 - 0,70	ES B	0,05			Bituminous slab (MADE GROUND) Loose grey slightly silty sandy subangular to angular fine to coarse GRAVEL of bituminous material, limestone and red brick (MADE GROUND)
				0,85			Loose angular red brick COBBLES (MADE GROUND)
				2,10 2,15			Concrete slab (MADE GROUND) End of Trial Pit at 2,150m
Dimensions		Trench Support and Comment		Pumping Data			
Pit Length 3,10	Pit Width 0,60	Pit Stability Unstable	Shoring Used	Remarks		Date	Rate
Remarks							
Encountered concrete slab, Difficulty progressing beyond 2,30m bgl							



TRIAL PIT PHOTOGRAPHS

Report No : 3127
Report Title : Shamrock Inn, Bengal Street
Engineer : GroundSolve
Date : 16/08/2024



TP03



TP03 – Concrete Slab



TRIAL PIT PHOTOGRAPHS

Report No : 3127
Report Title : Shamrock Inn, Bengal Street
Engineer : GroundSolve
Date : 16/08/2024



TP03 - Arisings

Appendix B

Crawford & Co Ltd Drawings

REV	AUTHOR/REV	DATE
A	ISSUED FOR INFORMATION	07.11.24
B	SW ATTENTION TANK/ HYDRO BRACE ADDED	12.11.24
C	UPDATED WITH LATEST JDA PLAN DRAINAGE UPDATED, GRID REF ADDED	06.02.25

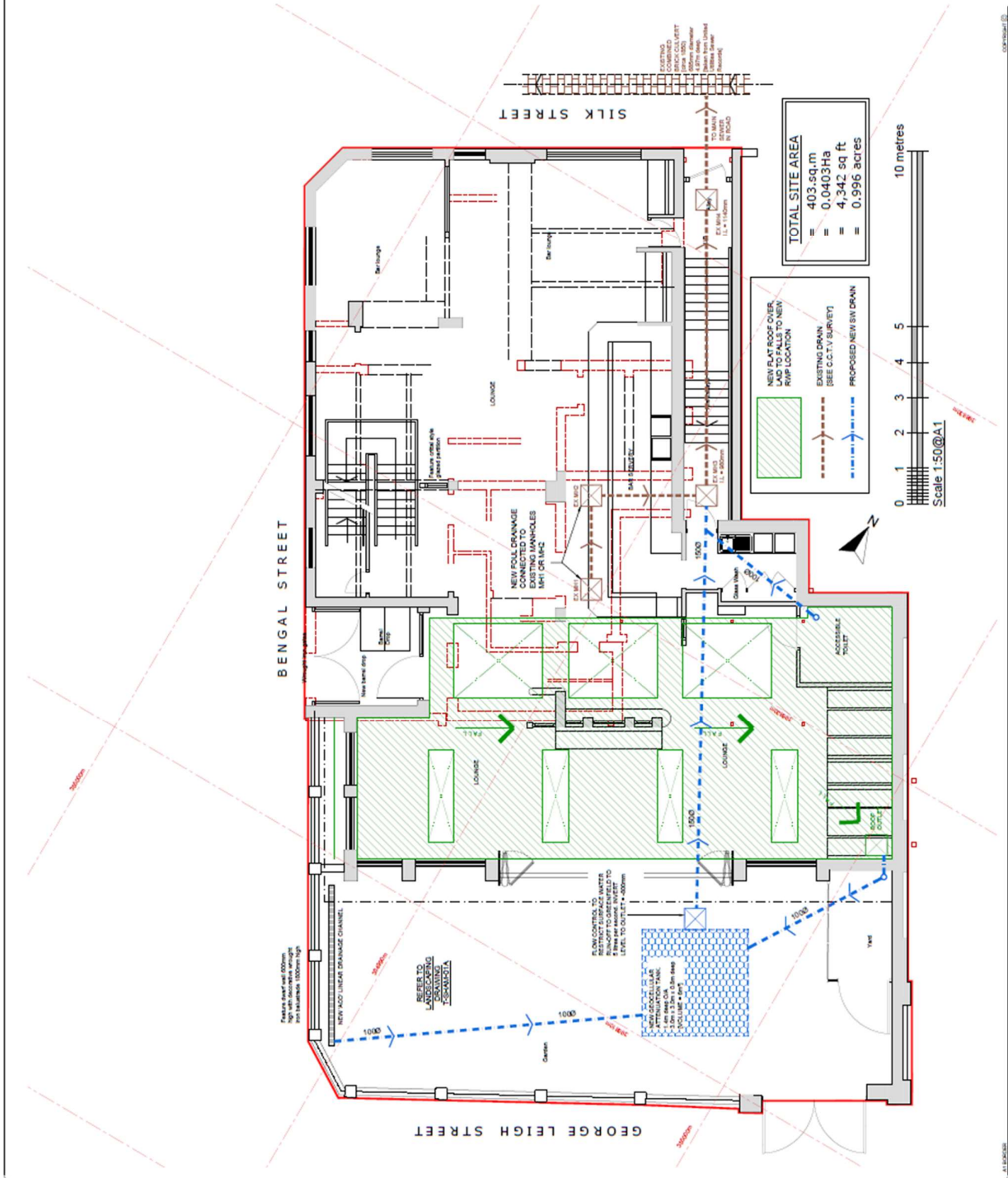
Crawford & Co
Consulting Engineers

JOSEPH HOLT

PROJECT
THE SHAMROCK, BENGAL STREET
MANCHESTER

PROPOSED GROUND FLOOR PLAN
DRAINAGE STRATEGY

DRAWN BY SMI	DRAWING NO B/JH14 05	ISSUE NO C
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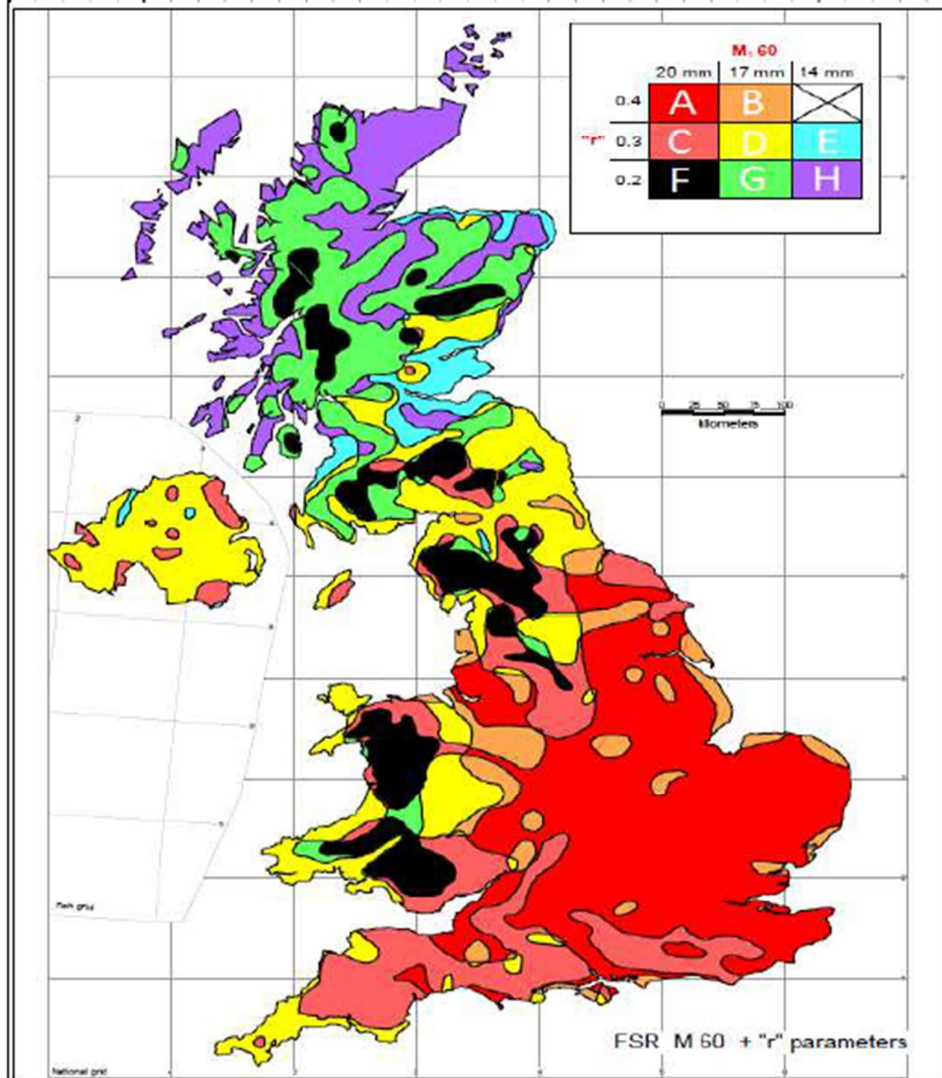
Appendix C

Attenuation Design

Colebrook-White CalculationRegistered User: **Single User License**

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CRAWFORD & CO LTD	Project:	THE SHAMROCK, MANCHESTER		By: JC
	Calculation:	New Roof SW Attenuation MH Design		Approved:
	Sheet Number:	BJH14 SW1	12-Nov-24	BC
Catchment Details				
Catchment Area		200	m ²	
Runoff Coefficient		0.95		
Location Code		A		
Return Period		1000	years	
Climate Change Factor		40	%	
<u>UK Rainfall Map</u>				



Colebrook-White Calculation

Your Logo / Company Details Here	Project:	THE SHAMROCK, MANCHESTER		JC
	Calculation:	New Roof SW Attenuation MH Design		Approved:
	Sheet Number:	BJH14 SW2	12-Nov-24	BC

Attenuation Tank Outflow	5	l/s	Acceptable
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Results Table

Storm Duration (Mins)	Inflow (l)	Outflow (l)	Storage Required (m³)
5	5,717	1,500	4
10	8,822	3,000	6
15	10,806	4,500	6
30	14,417	9,000	5
45	16,618	13,500	3
60	18,194	18,000	0
120	21,918	36,000	0
240	25,323	72,000	0
480	29,792	144,000	0
600	31,920	180,000	0
1440	38,304	432,000	0

Attenuation Tank Design		Tank Cross Section	Tank Plan
Tank Shape	Rectangular		
Number of Tanks	1		
Length	3 m		
Width	3 m		
Effective Depth	0.8 m		
Void Percentage	90 %		

Storage Area Required	6 m³	Acceptable
Storage Area Provided	6.48 m³	

Time for Emptying 50%	0.2 hours	Acceptable
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Appendix D

Rota-Rod Ltd Drain Report

ROTA-ROD LTD
DRAIN SEWER & PIPE CLEANING SERVICES
81 JAMES STREET, LITTLEBOROUGH, ROCHDALE. OL15 8NF
TEL: (01706) 372111
EMAIL: rota-rod@sky.com

The Shamrock
Manchester

10/10/2024

Drain Report

The engineers attended site to carry out a CCTV survey of all accessible drains.
It was noted that manhole 4 had a blockage in the interceptor.

The cover over this manhole was also found to be degraded and dangerous to walk on.

The drains between manholes 2,3 and 4 are 150mm diameter salt glazed clay pipes.
Other drains including the connections into the manholes are 100mm diameter salt glazed clay pipes.

Below is the report for each drain:

MH1 Branch A

There has been a resin reline installed for the first 0.5m

The camera reaches a rest bend at 1.5m

No faults

MH1 Branch B

The camera reaches a rest bend at 0.3m

No faults

MH1 to MH2

The drain holds water from 1.3m to 2.3m. There are 2 small displaced joints and a connection in this section where there is a dip in the pipe.

The camera reaches the manhole at 2.4m

MH2 Branch A

There has been a resin reline installed for the first 0.5m

The camera reaches a rest bend at 0.5m

No faults

MH2 to MH3

There has been a resin reline installed for the first 2m

There are 2 small displaced joints at 2.3m and 2.7m where the short section of pipe has dropped.

The camera reaches the manhole at 2.7m

MH3 to MH4

The first 1.5m is a newer ~~superslave~~ clay pipe. Where the ~~superslave~~ pipe connects to the salt glazed pipe there is a displaced joint.

There are further displaced joints at 1.7m, 2.3m and 3m. Within this section with displaced joints there is a junction that has a break.

There is cement/scale on joints at 3.7m and 5m.

There are displaced joints at 5.6m and 6.2m

The camera reaches the manhole at 8.4m

Manhole 4 has an interceptor on the outfall. These cause regular blockages.

MH4 Branch A

The camera reaches a rest bend at 0.2m

No faults

MH4 to Submain

The camera reaches the drop to the submain at 3m

No faults

Recommendations and Quotations

Replace the degraded manhole cover for MH4 with new 600mm by 450mm cast iron cover £110+vat

Break out the interceptor within MH4 and fit a straight section of 150mm pipe, sealing into place with a resin reline £450+vat

MH1 to MH2

Excavate approx. 1.5m by 0.5m to a depth of up to 0.75m.

Replace the section of pipework with a dip, including the junction, with new plastic pipes and fittings.

Back fill and make good to ground with concrete £520+vat

MH2 to MH3

Resin reline 1m of 150mm diameter pipe as it enters MH3 to smooth out the displaced joints £120+vat

MH3 to MH4

Excavate approx. 1.5m by 0.5m to a depth of up to 1m.

Replace the section of 150mm pipe with displaced joints and the broken junction.

Back fill and make good to ground with concrete £650+vat

Remove the cement/scale using CCTV and chain flail tool £90+vat

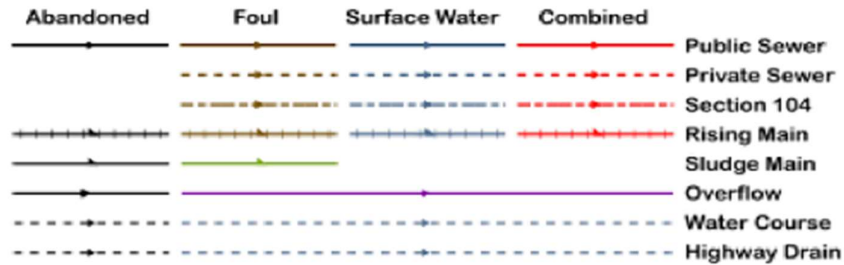
Resin reline 1m of 150mm diameter pipe between 5.6m and 6.2m to smooth out the displaced joints £120+vat

Appendix E

United Utilities Records



Wastewater Symbolology



All point assets follow the standard colour convention: **red** – combined **brown** - foul
blue – surface water **purple** - overflow

- | | |
|------------------------|------------------------------------|
| ● Manhole | ◆ Side Entry Manhole |
| HS ● Head of System | ⌋ Outfall |
| ES ● Extent of Survey | ▢ Screen Chamber |
| RE ● Rodding Eye | IC ● Inspection Chamber |
| IN ● Inlet | BC ● Bifurcation Chamber |
| DP ● Discharge Point | LH ● Lamp Hole |
| VX ● Vortex | TJ ● T Junction / Saddle |
| PE ● Penstock | CP ● Catchpit |
| WC ● Washout Chamber | VC ● Valve Chamber |
| VA ● Valve | VN ● Vent Column |
| AV ● Air Valve | VC ● Vortex Chamber |
| NRV ● Non Return Valve | PC ● Penstock Chamber |
| SO ● Soakaway | NST ● Network Storage Tank |
| GU ● Gully | SO ● Sewer Overflow |
| CA ● Cascade | WWT ● Ww Treatment Works |
| FM ● Flow Meter | WPS ● Ww Pumping Station |
| HA ● Hatch Box | ST ● Septic Tank |
| OI ● Oil Interceptor | CK ● Control Kiosk |
| SH ● Summit | DNM ● DNM Network Monitoring Point |
| DS ● Drop Shaft | CC ● Change of Characteristic |
| OP ● Orifice Plate | |

