

GEO-ENVIRONMENTAL AUDIT

PHASE 1 PRELIMINARY RISK ASSESSMENT

PHASE 2 SITE INVESTIGATIONS

PHASE 3 REMEDIATION STRATEGY

Proposed Residential Development
Church Avenue
Middleton
Manchester

Author: Daniel Slattery
Client: Harrison Construction Ltd
Reference: rep-tjba-harrison-church ave-phs1_2_3env-270824.docx

Revision	Date	Reason
0	September 2024	Original to support planning application.

T J Booth Associates.
20A Eastgate St,
Rochdale,
Lancs,
OL16 1DH.
Tel: 01706 868288.
Email: office@tjba.co.uk

CONTENTS:

1.	Phase 1 Preliminary Risk Assessment.	3
1.1.	Introduction.	3
1.2.	Proposed Development.	3
1.3.	Historic Maps.	4
1.4.	Present Day Maps.	4
1.5.	BGS Geology.	4
1.6.	BGS Boreholes Records.	5
1.7.	Landmark Environmental Data.	5
1.8.	UK Radon.	6
1.9.	Coal Authority.	6
1.10.	Environment Agency Records.	6
1.11.	Planning History.	6
1.12.	Site Reconnaissance.	6
1.13.	Identification of Source-Pathway-Receptor.	7
1.14.	Preliminary Conceptual Model.	8
2.	Phase 2 Site Investigations & Assessment.	10
2.1.	Site Investigation Summary.	10
2.2.	Final Risk Assessment.	10
2.3.	Final Conceptual Model.	12
3.	Phase 3 - Remediation Statement.	14
3.1.	Basic Site Details.	14
3.2.	Conceptual Model (Final), Relevant Pollution Linkages & Remedial Objectives.	14
3.3.	Recommended Remediation:	14
3.4.	Verification (Phase 4 requirements).	14
3.5.	Additional Notes.	15
5.	Appendix A: Figures.	17
5.1.	Location Plan.	17
5.2.	Proposed Development.	18
5.3.	Site Investigation Plan.	19
5.4.	Trial Hole Logs.	20
5.5.	TJBA Soil Analysis.	21
5.6.	EnviroLab Ltd Certificates.	22
5.7.	Ian Farmer Associates Certificates.	30
6.	Appendix B: Photos.	33
7.	Appendix C: Landmark Envirocheck.	35

1. PHASE 1 PRELIMINARY RISK ASSESSMENT.

1.1. Introduction.

T. J. Booth Associates have been appointed by Harrison Construction Ltd to undertake an environmental assessment to a domestic garage site in Middleton.

Planning permission was obtained under planning decision notice: 24/00959/FUL, for the 'Erection of 5 no. dwellinghouses with associated landscaping and car parking following the demolition of existing garages', at Land Adjacent To Rochdale Road At Hillbank Street And Church Avenue, Middleton, M24 2RB.

The permission is a shared permission is shared over two sites, with 3 dwellings to be erected on the Hillbank Street Site, and 2 dwellings on the Church Avenue Site.

Planning conditions were attached as follows:

- 12 Prior to commencement of the development an investigation and risk assessment, in addition to any assessment provided with the planning application, must be completed to assess the nature and extent of any contamination on the site, whether or not it originates on the site. The investigation and risk assessment must be undertaken by competent persons and a written report of the findings must be produced and shall have been first submitted to and approved in writing by the Local Planning Authority before development commences. The report of the findings must include:
- i) a survey of the extent, scale and nature of contamination
 - ii) an assessment of the potential risks to:
 - human health,
 - property (existing or proposed) including buildings, crops, livestock, pets, woodland, and service lines and pipes,
 - adjoining land,
 - groundwaters and surface waters,
 - ecological systems,

Page 4 of 8

- archeological sites and ancient monuments;
- iii) where unacceptable risks are identified, an appraisal of remedial options and proposal of the preferred option(s)

The development shall thereafter be completed in full accordance with the approved recommendations.

This report will be submitted as part of a planning application for the development of 2No. semi-detached dwellings.

Prior to the planning application being submitted, T J Booth Associates were employed to undertake environmental assessment of the Site.

This report provides a desk-based study & intrusive ground investigation based on current UK guidance for environmental investigation within the construction industry. Principal to the assessment is the potential for contamination pollutant linkages via the CLR-11 source-pathway-receptor methodology. Assessment of potential pollution linkages is primarily undertaken in strict accordance with BS 5930:2015, BS 10175:2011+A2:2017, CIRIA C665, and BS 8485:2015+A1:2019 et al.

1.2. Proposed Development.

This application is for the construction of 2No. semi-detached dwellings on a plot of land off Church Street.

The dwellings will comprise a traditional 2-storey construction.

The dwellings will share an access road, with soft landscaped gardens to the immediate rear of the properties, and car parking to the far rear of the Site.

1.3. Historic Maps.

DATE	ON-SITE	OFF-SITE/SURROUNDING AREA
c1848-51	The Site is within agricultural land – part of what appears to be grazing fields.	Generally agricultural. There is a small watercourse/brook approximately 35m east. The only building structures locally are a farmhouse nominally 150m south, and a building to the west Site of Rochdale Road. The Rochdale Canal is nominally 180m west. L&Y Railway 325m west.
c1893	No change.	Further development of residential terraced cottages nominally 150m south along what is now noted as Thornham Lane (previously a private road).
c1910	The Site is part of vacant land.	Terraced dwellings now erected along Rochdale Road. Further minor residential development and local amenities (church/cricket ground etc) in the local area.
c1929	The Site is part of vacant land.	Minor changes in the local area with Church Avenue now shown on plans, leading to a church to the east showing continued residential and amenity development. No overall change in the wider area.
c1939	The Site remains vacant.	Land to the immediate west is now fenced off into either gardens or allotment plots. Further residential development along Rochdale Road.
c1954-56	Domestic garages noted to the west side of the Site.	Further residential development in the local area.
c1979-81	No change.	No overall change.
c1992	The Site is now shown to comprise domestic garages as in the present day.	No overall change.

1.4. Present Day Maps.

Site boundaries, outlines of structures and buildings:	A topographic survey hasn't yet been undertaken, but the Site is relatively level. Domestic garages line the east and west & south boundaries, with access to a central driveway from the north side. The Site is enclosed by boundary fencing to adjacent gardens behind the garages. The Site is surrounded on all sides by private gardens/allotments.
Ground contours, natural drainage features:	The Site is relatively level but there is a slight fall in elevation to the south.
Water courses:	Unnamed brook to the east boundary flowing south approximately 35m distant.
Below ground obstructions:	None noted.

1.5. BGS Geology.

Bedrock geology:	Till, Devensian - Diamicton. Sedimentary superficial deposit formed between 116 and 11.8 thousand years ago during the Quaternary period.
Superficial geology:	Pennine Lower Coal Measures Formation - Mudstone, siltstone and sandstone. Sedimentary bedrock formed between 319 and 318 million years ago during the Carboniferous period.

Coal seams.	One coal seam (Arley) noted approximately 225m northeast.
-------------	---

1.6. BGS Boreholes Records.

There are a number of relevant boreholes locally.

SD80NE3 – 35m northeast off Church Street

0-81m Generally boulder clay with lenses of sand.

81-120.40m Coal Measures.

120.40-122m Arley coal seam.

1.7. Landmark Environmental Data.

1.7.1. Agency & Hydrological.

Groundwater Vulnerability	Secondary Superficial Aquifer - High Vulnerability.
Bedrock aquifer:	Secondary Aquifer – A.
Superficial aquifer:	Secondary Aquifer – A.
Source protection zone:	Not within a Source Protection Zone.

1.7.2. Waste.

BGS recorded landfill sites:	No records within a 250m radius.
Historic landfill sites:	No records within a 250m radius.

1.7.3. Hazardous Substances.

Planning hazardous substance consents:	None noted in the local area.
Planning hazardous substance enforcements:	None noted in the local area.

1.7.4. Geological.

Coal mining affected areas:	In a coal mining affected area.
CBSCB compensation district:	Not within a CBSCB brine district.
Potential for collapsible ground stability hazards:	No Very low risk.
Potential for compressible ground stability hazards:	No hazard.
Potential for ground dissolution stability hazards:	No hazard.
Potential for landslide ground stability hazards:	Very low risk.
Potential for running sand ground stability hazards:	Very low risk.
Potential for shrinking or swelling clay ground stability hazards:	Very low risk.
Radon potential - radon affected areas:	The property is within a Lower probability radon area (<1% of homes estimated to be at or above the action level).

Radon potential - radon protection measures:	No radon protection measures are required.
--	--

1.8. UK Radon.

Not required, superseded by the Landmark Environmental dataset.

1.9. Coal Authority.

Coal Mining Reporting Area:	In a coal mining affected area.
Mine Shafts, Pits, Adits/Entries:	Not known to be a risk.
Past Recorded Underground Mining.	None beneath the Site.
Present/Future Underground Mining.	Not known to be a risk.
Unrecorded Probable/Potential Shallow Underground Workings:	None noted.
Past/Present/Future Mining/Opencast: Surface	Not known to be a risk.
Mining Geology and Subsidence:	Not known to be a risk.
Hazards and Mine Gas:	Not known to be a risk.
Development High Risk Area:	The Site is NOT within a Development High Risk Area.
Abandonment Plan Data:	No data available.

1.10. Environment Agency Records.

Flood zone:	Site is within flood zone 1.
EA Recorded Landfill:	No landfill sites within a 250m radius.
Groundwater source protection zone:	Not in a source protection zone.

1.11. Planning History.

There is no available planning history for the Site.

1.12. Site Reconnaissance.

Details of existing structures:	A site reconnaissance was undertaken in August 2024. The Site was still being used as a garage plot by local residents, and was lined with garages to the east, west, and south sides. Access was from Church Street at the north side of the plot, and comprised a made ground surface with little to no macadam noted. Some of the garages comprised asbestos sheet cladding to the roofs. The Site was generally fenced off from neighbouring gardens/allotments.
Adjacent properties:	The Site was generally fenced off from neighbouring gardens/allotments.
Water levels, directions of flow and rates in rivers:	Watercourse (unnamed) 35m east flows towards the south.

Old mine or quarry workings:	None noted on reconnaissance.
Obvious/immediate hazards to health/safety:	None noted.
Areas of discoloured soil, polluted water, vegetation, and significant odours:	Surface made ground only.

1.13. Identification of Source-Pathway-Receptor.

1.13.1. Potential Contaminant Sources.

CURRENT SOURCE/S	ORIGINAL ASSOCIATED SOURCE	CONTAMINANT/S
Existing made ground.	Historic fill/surfacing.	Metals, PAHs, sulphates, asbestos.
Use as a domestic garage site.	N/A.	Hydrocarbons.

1.13.2. Potential Pathways.

PATHWAY	MEDIA
Soil and dust ingestion	Soil and indoor dust
Consumption of home-grown fruit and vegetables	Produce
Skin contact (indoors)	Indoor dust
Skin contact (outdoors)	Soil
Inhalation of dust (indoors)	Air
Inhalation of dust (outdoors)	Air
Vapours (indoors)	Air
Vapours (outdoors)	Air

1.13.3. Potential Receptors.

Receptors mainly comprise workers in the construction phase, and residents for the proposed end use.

Controlled waters: Adjacent Brook.

1.14. Preliminary Conceptual Model.

POLLUTANT LINKAGE/SOURCE		CONTAMINANT TYPE	PATHWAY	RECEPTOR	POLLUTION LINKAGE	CONSEQUENCE	PROBABILITY	RISK
PL1	Existing site soil/made ground/potential contaminants, and effects on humans/animals /ecology as a receptor	Metals, PAHs, inorganics, asbestos, hydrocarbons.	Direct ingestion, aerial ingestion, dermal contact, drinking water. Crops.	Primarily human - Site construction operatives & future residential Site occupants. Pets. Ecological systems.	There is a potential pollutant linkage as there is the potential for the Site to have been infilled with made ground to comprise a subbase for the car park, and levelled historically. The garages are primarily constructed from timber/concrete panels, but some do have asbestos cladding to the roofs.	Medium.	Likely.	Moderate risk.
PL2	Potential for mortars/plasters and associated effects on concrete.	Sulphates.	Contact with underground structures.	Building structures /concrete.	Potential for constituents in made ground/minor contamination.	Minor.	Likely.	Low risk.
PL3	Potential historic spills/use of hazardous chemicals on Site & and effects on water pipes.	Hydrocarbons, BTEX & MTBE, VOCs/SVOCs, phenols, cresols and chlorinated phenols.	Contact with water pipes/services.	Water pipes/services & human/pet end users.	While there hasn't been any historic industry noted on-site, there is the potential for hydrocarbon contamination associated with the domestic garages/car parking.	Medium.	Likely.	Moderate risk.
PL4	Existing site soil/made ground/potential contaminants, and effects on groundwater or watercourses as a receptor.	Hydrocarbons.	Groundwater via potential leaching and transport of potential contaminants. Pathways is unlikely due to clay subsoil forming an aquiclude.	Underlying aquifer as a receptor.	There is unlikely to be major contamination noted on-site, however, there could be some minor spillage of fuels associated with vehicular storage which is a mobile contaminant and may find its way into the watercourse/groundwater.	Medium.	Low likelihood.	Moderate to low risk.
PL5	Geological ground gas from coal seams/workings.	CH ₄ , CO ₂ , other trace gases.	Diffusion through soil, substructures, aerial inhalation.	Human - future residential Site occupants. Explosion, suffocation.	No shallow coal mines or seams. Source missing, no pollutant linkage.	Mild.	Unlikely.	Very low risk.
PL6	Geological ground gas, radon sources in	Rn.	Diffusion through soil, substructures, aerial inhalation.	Human - future residential Site occupants.	Radon maps suggest the risk is low and no radon protection measures are required.	Mild.	Unlikely.	Low risk.

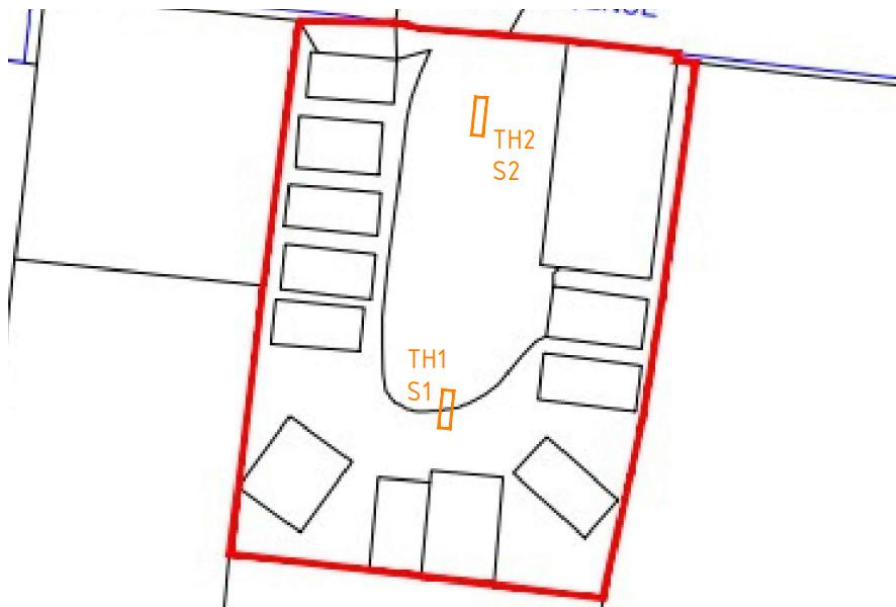


	Namurian deposits.							
PL7	Anthropogenic ground gas from historic/present landfill or made ground.	CH ₄ , CO ₂ , other trace gases.	Diffusion through soil, substructures, aerial inhalation.	Human - future Site residential occupants. Explosion, suffocation.	No landfill sites noted within a 250m radius of the Application Site. Source missing, no pollutant linkage.	Mild.	Unlikely.	Low risk.
PL8	Anthropogenic ground gas sources from alluvium.	CH ₄ , CO ₂ .	Diffusion through soil, substructures, aerial inhalation.	Human - future Site residential occupants. Explosion, suffocation.	No alluvial deposits noted beneath the Site. Source missing, no pollutant linkage.	Mild.	Unlikely.	Low risk.

2. PHASE 2 SITE INVESTIGATIONS & ASSESSMENT.

2.1. Site Investigation Summary.

To date, a single investigation has been undertaken by T J Booth Associates comprising trial holes and soil sampling, refer to Site Investigation Plan excerpt below:



2.1.1. Trial Hole & Soil Sampling Investigations 14.08.2024.

Site Investigations were undertaken by T J Booth Associates and comprised 2No. trial holes (THs 1-2), undertaken with a 3.5t back acting excavator.

2No. soil samples (S1-2) were also taken representative of the upper made ground to assess for potential contamination.

Site investigation revealed the following ground conditions (summarised):

200-400 thick MADE GROUND; sand & gravel. Gravel was sandstone, brick, slate, ash, macadam.

Approx 1m thick Firm to stif occasionally very stiff CLAY.

Refer to full soil logs, Site Investigation Plan & trial hole photographs in the Appendix.

Soil samples were taken of the relatively thin made ground horizon, and were sealed in 1kg white plastic snap top containers & amber jars & vials and sent to Envirolab Ltd to be tested for a range of common contaminants.

Samples were scheduled to be tested for metals, speciated PAH, inorganics & sulphates, SOM, asbestos & hydrocarbon screening in accordance with the conceptual model.

2.2. Final Risk Assessment.

2.2.1. Human Health Risk.

2.2.1.1. Shallow soil contamination.

On return the samples were assessed by TJ Booth Associates to common threshold comparison data in the following order: Defra Category 4 Screening Levels (C4SLs) > LQM/CIEH (S4ULs) > EIC/AGS/CL:AIRE 2010.

Testing of made ground revealed contaminant levels above residential threshold values with elevated levels of the following contaminants of concern, (refer to testing certificates, and full analysis spreadsheets in the Appendix):

Trial Hole/Soil Sample	Made ground horizon	Mitigation/Action
TH1/S1	Lead at threshold, asbestos at threshold, Benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene.	FURTHER ACTION

TH2/S2	No exceedances.	PASS
Due to above elevated levels noted, existing Site soil is considered contaminated above threshold levels allowed for a residential end use, and will not be suitable for reuse with regard to human receptors. 2.2.1.2. Ground Gas. 2.2.1.2.1. Historic landfill Sites. No landfill Sites within a 250m radius of the Site. The risk to the Site is low. 2.2.1.2.2. On-site refuse tips/infilled ponds/infilled land. Only minor made ground has been noted on Site, at an average thickness of approximately 300mm. No onsite refuse tips or substantial areas of made ground noted. The risk to the Site is low. 2.2.1.2.3. Radon. Site designated as low risk – no protection required. 2.2.1.2.4. Alluvium. No alluvial material was noted. The risk to the Site is low. 2.2.1.3. Buildings & Services. 2.2.1.3.1. Water pipes. United Utilities pipeline risk assessment methodology states the following: “The application of the source, pathway, receptor concept will be an integral part of any pipeline risk assessment. For each potential source (the contamination), and each potential receptor (the water pipe), consideration shall be given to whether a potential pathway between source and receptor exists, or may exist in the future, linking the two. There are normally only three pathways by which contamination may come into contact with water pipes. These are direct contact with the soil or backfill, an excessive vapour phase or a contaminated groundwater regime. If none of these conditions exist on site (adopting the source, pathway, receptor concept) then it is likely that extended and/or targeted soil testing will not be required, and a simple risk assessment will suffice.” The site investigations undertaken to date have not noted any fuels in the ground above safety guideline standards PE water pipes. There are no other historic site uses that may have contributed VOC/SVOC contamination in to the ground profile. In addition, maximum made ground depth is 400mm, and average 300mm. Water pipes are generally routed at 750mm deep and thus will be routed through virgin ground. 2.2.1.3.2. Sulphate. Sulphate was recorded below action level (DS1) for all soil samples taken across the Site. No groundwater was noted. The risk from sulphate attack is low.		
2.2.2. Controlled Waters Risk. Where ground/surface water sampling is able to be undertaken, samples are assessed by TJ Booth Associates to common threshold comparison data. Groundwater samples are generally compared against the drinking water standards (UK DWI 2016 & WHO 2022), and Environment Quality Standards for Freshwater (EQS). Surface water samples are primarily compared against the against the EQS. No groundwater was noted on site investigations and no samples taken. Mobile contaminants of concern such as hydrocarbons were not recorded on site. The risk to controlled waters is considered to be low.		

2.3. Final Conceptual Model.

CURRENT SOURCE/S		CONTAMINANT TYPE	PATHWAY	RECEPTOR	POLLUTION LINKAGE	CONSEQUENCE	PROBABILITY	RISK	MITIGATION PROPOSED
PL1	Existing site soil/made ground/potential contaminants, and effects on humans/animals/ecology as a receptor.	Metals, PAHs.	Direct ingestion, aerial ingestion, dermal contact, drinking water. Crops.	Primarily human - Site construction operatives & future residential Site occupants. Pets. Ecological systems.	Metal & PAH contamination has been identified on-site which is a risk to the proposed end user.	Medium.	Likely.	Moderate risk.	REQUIRES REMEDIATION. EITHER REMOVAL & REPLACEMENT OF EXISTING SITE SOIL (REMOVAL OF SOURCE), OR SUITABLE COVER LAYER PROVIDED (REMOVAL OF PATHWAY).
PL3	Potential historic spills/use of hazardous chemicals on Site & and effects on water pipes.	Hydrocarbons, BTEX & MTBE, VOCs/SVOCs, phenols, cresols and chlorinated phenols.	Contact with water pipes/services.	Water pipes/services & human/pet end users.	While there hasn't been any historic industry noted on-site, there was the potential for hydrocarbon contamination associated with the domestic garages/car parking. Subsequent sampling has revealed low levels of hydrocarbons.	Medium.	Unlikely.	Low risk.	NO REMEDIATION REQUIRED.
PL4	Existing site soil/made ground/potential contaminants, and effects on groundwater or watercourses as a receptor.	Hydrocarbons.	Groundwater via potential leaching and transport of potential contaminants. Pathways is unlikely due to clay subsoil forming an aquiclude.	Underlying aquifer as a receptor.	Subsequent sampling has revealed low levels of hydrocarbons.	Medium.	Unlikely.	Low risk.	NO REMEDIATION REQUIRED.

3. PHASE 3 - REMEDIATION STATEMENT.

3.1. Basic Site Details.

Full details included in the Phase 2 Site Investigation Introduction & subsequent sections.

3.2. Conceptual Model (Final), Relevant Pollution Linkages & Remedial Objectives.

Site investigations undertaken as part of the Phase 2, comprised trial pits & soil sampling, with existing upper made ground comprising on average 300mm thick, on top of virgin superficial cover.

1No. pollutant linkage from the Phase 2 site investigation were confirmed:

- PL1: Existing site soil/made ground/potential contaminants, and effects on humans/animals/ecology as a receptor.

The risk is specific to the end use, and required to ensure Site soils are safe for the end user.

3.3. Recommended Remediation:

Made Ground/Soil Risk:

PL1: Existing site soil/made ground/potential contaminants, and effects on humans/animals/ecology as a receptor.

While made ground may remain on site beneath permanent hardstandings such as buildings, roads, pavements & pathways etc; to mitigate the risk to receptors, it is advised that a cover layer of clean inert soil is imported for garden and soft landscaping areas ONLY.

Dependent on the final finished levels, existing made ground within proposed soft landscaping areas, should either be covered with 600mm of imported soil, or excavated to 600mm from finish levels and replaced with a clean imported cover soil to suit finishes. The 600mm cover system is adopted for the following reasons:

Root systems for shrubs are typically up to 600 mm;

Excavations are unlikely to be deeper than 600 mm in typical gardening activities;

Bio-turbation is typically limited to the top 600 mm of the soil profile;

Excavations by children or pets are unlikely to exceed 600 mm.

Imported soil should be clean/inert and free from deleterious materials and should be suitable for use in a residential end use setting. It should be able to pass testing of metals, speciated PAH, inorganics & sulphates, SOM, and asbestos screening to current Defra Category 4 Screening Levels (C4SLs) where available, and then to the LQM/CIEH (S4ULs), for use in a residential end use setting.

3.4. Verification (Phase 4 requirements).

Verification of the imported soil may be required for Planning or Building Control/Building Regulations submission. Should this be required, it will need to be undertaken by suitably qualified consultants and comprise the following:

- Verification of existing made ground removal down to clay.
- Import source material.
- Characterisation & suitability of material.
- Soil sampling should be undertaken as per YALPAG Guidelines as per the following ratios:
 - Virgin quarried materials, 1-2 samples to confirm inert nature.
 - Crushed hardcore, stone, brick, min 1 sample per 500cum.
 - Greenfield/manufactured, generally 1 sample per 250cum (min 3 samples).
 - Brownfield, generally 1 sample per 50cum (min 6 samples).
- Reporting (including photographic evidence).

Samples should be tested for the following contamination suites: metals, inorganics, PAH USEPA16 speciated, and asbestos screening. Defra Category 4 Screening Levels (C4SLs) > LQM/CIEH (S4ULs) > EIC/AGS/CL:AIRE 2010; for use in a residential end use setting.

3.5. Additional Notes

Before any further work is undertaken, this report should be submitted to and agreed by the Local Planning Authority Contaminated Land Department/Building Control Department as necessary.

We trust that the above clear, but should you require further advice please contact the undersigned.

Signed.....



D.S. Slattery BSc (Hons).

T J Booth Associates.

Authorised...



T J Booth BSc (Hons), C. Eng. C. Env. MICE.

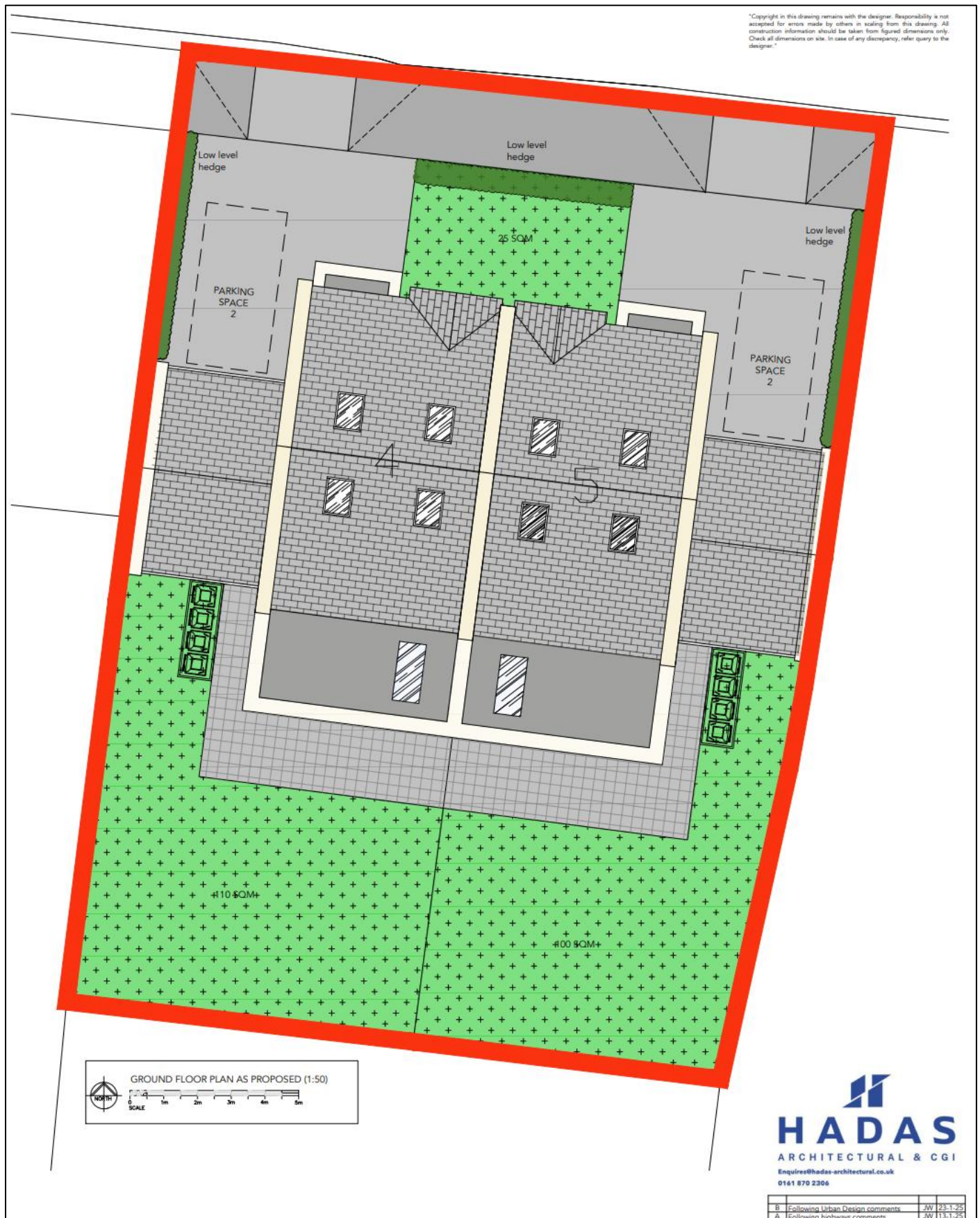
T J Booth Associates.

5. APPENDIX A: FIGURES.

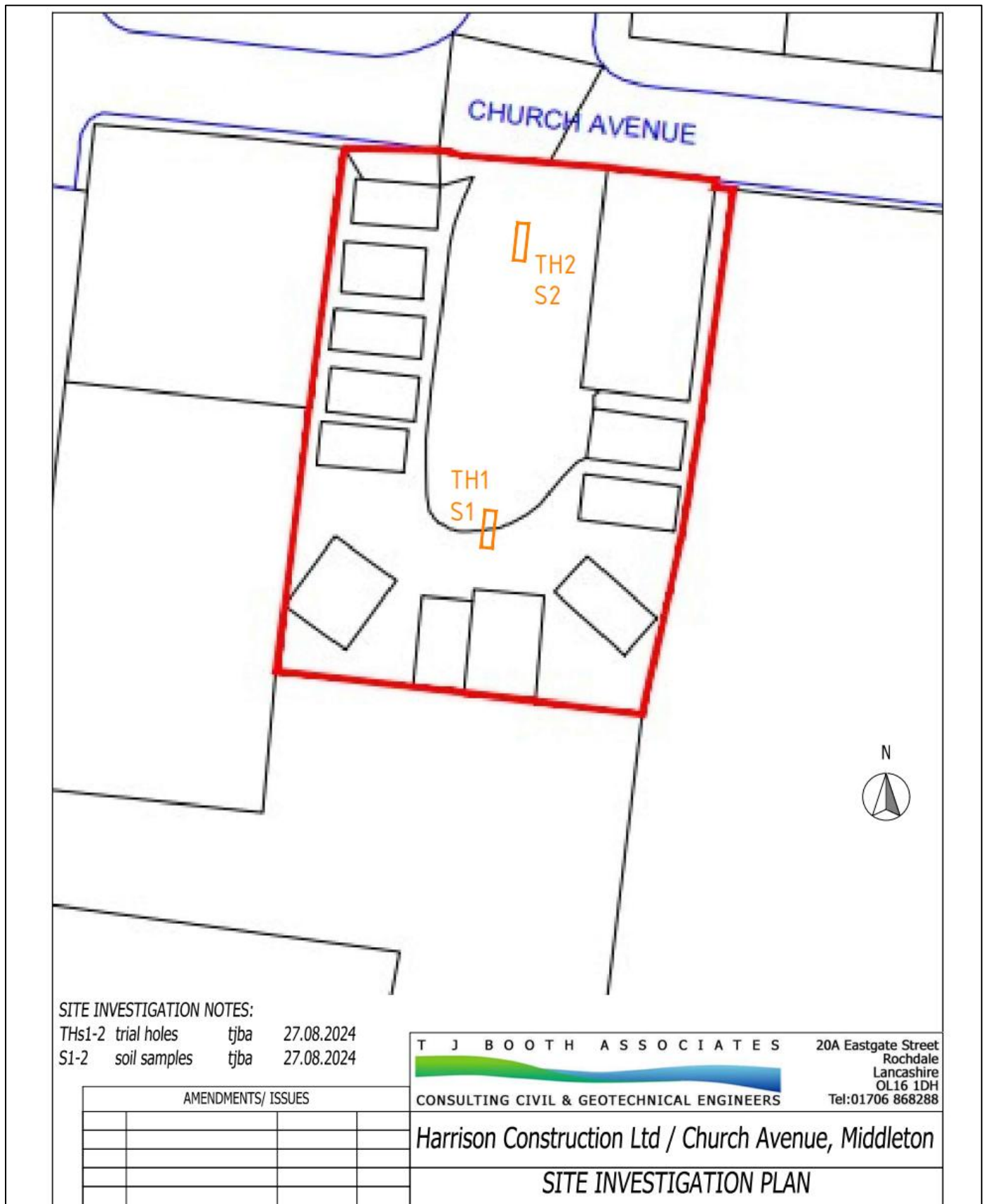
5.1. Location Plan.



5.2. Proposed Development.



5.3. Site Investigation Plan.



5.4. Trial Hole Logs.

TRIAL PIT LOG

Trial pit reference TH1				Sheet 1 of 1
Water	Reduced Level (m)	Legend	Depth (m)	Description
	100.00			
	99.60	X X X X	(0.40) 0.40	MADE GROUND: dark brown-black SAND & GRAVEL. Gravel is ash, brick, stone, slate & macadam. (S1)
	99.40	- - -	0.60	Firm dark brown slightly sandy slightly gravelly CLAY
	99.10	X X X X	(0.30) 0.90	Firm light brown-grey mottled very sandy slightly gravelly CLAY. (CS1)
	98.80	X o X o o X o X	(0.30) 1.20	Very stiff orange-brown/grey mottled slightly gravelly CLAY. Occasional cobbles & fine gravel of reworked coal. (CS2)
				Trial pit ends
Not shown to scale				
Additional notes: No groundwater.				

TRIAL PIT LOG

Trial pit reference TH2				Sheet 1 of 1
Water	Reduced Level (m)	Legend	Depth (m)	Description
	100.00			
	99.80	X X X X	(0.20) 0.20	Made ground: dark brown-black SAND & GRAVEL. Gravel is ash, brick, stone, slate & macadam. (S2)
	99.65	- - -	0.35	Firm to stiff dark brown CLAY
		- - - - - - - - - - - - - - - - - - - -	(0.75)	Stiff light brown slightly sandy CLAY
	98.90	- - - - -	1.10	
				Trial pit ends
Not shown to scale				
Additional notes: No groundwater.				

5.5. TJBA Soil Analysis.

CLIENT/SITE:		Harrison Construction Ltd - Church Avenue, Middleton.						
SAMPLE TYPE:		SOILS						
SAMPLING DATE:		27.08.2024.						
Contaminant		No	Max	Mean	t 95	RESIDENTIAL (with or without plant uptake)		
						Pass/Fail	Comment	
METAL	Arsenic	2	16	15	15.9	37	PASS	
METAL	Boron	2	1	1	1	290	PASS	
METAL	Cadmium	2	1	0.8	0.98	22	PASS	
METAL	Chromium as Cr(III)	2	29	24.50	28.55	910	PASS	
METAL	Chromium as Cr(VI)	2	1	1	1	21	PASS	
METAL	Copper	2	101	68.5	97.75	2400	PASS	
METAL	Lead	2	201	140	194.9	200	comment	S1 =201, t95 ok
METAL	Mercury (inorganic)	2	0.17	0.17	0.17	40	PASS	
METAL	Nickel	2	52	34	50.2	130	PASS	
METAL	Selenium	2	1	1	1	250	PASS	
METAL	Zinc as Zn	2	163	118.5	158.55	3700	PASS	
INORGANIC	Cyanide (Total)	2	1	1	1	34	PASS	
INORGANIC	Sulphate (Total) as SO4	2	0.05	0.048	0.0498	0.24	PASS	
INORGANIC	Sulphide	2	5	5	5	250	PASS	
INORGANIC	pH	2	8.03	7.885	8.0155	6 to 8	ALKALINE	
INORGANIC	Sulphur (Elemental)	2	5	5	5	100	PASS	
INORGANIC	Asbestos Identification	2	1	0.5	0.95	0	FURTHER ACTION	S1
INORGANIC	Asbestos quantification	2	0.002	0.001	0.0019	0.001	FURTHER ACTION	S1=0.002
ORGANIC	SOM	2	21.3	13.65	20.535			
PAH	acenaphthene	2	0.23	0.18	0.225	1100	PASS	
PAH	acenaphthylene	2	0.2	0.11	0.191	920	PASS	
PAH	anthracene	2	1.12	0.665	1.0745	11000	PASS	
PAH	benzo[a]anthracene	2	4.91	2.955	4.7145	13	PASS	
PAH	benzo[a]pyrene (BaP)	2	5.3	3.17	5.087	5	FURTHER ACTION	S1
PAH	benzo[b]fluoranthene	2	6.18	3.685	5.9305	3.7	FURTHER ACTION	S1
PAH	benzo[g,h,i]perylene	2	3.4	2.065	3.2665	350	PASS	
PAH	benzo[k]fluoranthene	2	2.22	1.315	2.1295	100	PASS	
PAH	chrysene	2	5.24	3.25	5.041	27	PASS	
PAH	dibenz[ah]anthracene	2	0.58	0.355	0.5575	0.3	FURTHER ACTION	S1
PAH	fluoranthene	2	11.9	7.24	11.434	890	PASS	
PAH	fluorene	2	0.23	0.145	0.2215	860	PASS	
PAH	indeno[123-cd]pyrene	2	3.13	1.885	3.0055	41	PASS	
PAH	naphthalene	2	0.16	0.095	0.1535	13	PASS	
PAH	phenanthrene	2	5.27	3.23	5.066	440	PASS	
PAH	pyrene	2	10.1	6.255	9.7155	2000	PASS	
FUEL	aliphatic EC 8-10	2	3	2	2.9	150	PASS	
FUEL	aliphatic EC 10-12	2	1	1	1	760	PASS	
FUEL	aliphatic EC 12-16	2	3	2	2.9	4300	PASS	
FUEL	aliphatic EC 16-35	2	70	38.5	66.85	110000	PASS	
FUEL	aromatic EC 8-10	2	6	3.5	5.75	190	PASS	
FUEL	aromatic EC 10-12	2	3	2	2.9	380	PASS	
FUEL	aromatic EC 12-16	2	10	6	9.6	660	PASS	
FUEL	aromatic EC 16-21	2	46	28.5	44.25	930	PASS	
FUEL	aromatic EC 21-35	2	190	115	182.5	1700	PASS	
PHENOLS AND CHLOROPHENOLS (SVOC)	Phenol	2	0.2	0.2	0.2	380	PASS	

Comments Key
 Asbestos: A=amosite (brown), CH=chrysotile (white), CR=crocidolite (blue)

5.6. Envirolab Ltd Certificates.



Hattersley Science & Technology Park
Stockport Road, Hattersley, SK14 3QU

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 24/08369
Issue Number: 1
Date: 10 September, 2024

Client: T J Booth Associates
20a East Gate Street
Rochdale
Rochdale
Greater Manchester
UK
OL16 1DH

Project Manager: Daniel Slattery
Project Name: Harrison - Church Ave, Middleton
Project Ref: Not specified
Order No: N/A
Date Samples Received: 29/08/24
Date Instructions Received: 29/08/24
Date Analysis Completed: 10/09/24

Approved by:

Gemma Berrisford
Deputy Client Services Supervisor





Envirolab Job Number: 24/08369

Client Project Name: Harrison - Church Ave, Middleton

Client Project Ref: Not specified

Lab Sample ID	24/08369/1	24/08369/2	24/08369/3	24/08369/4					
Client Sample No	S1	CS1	CS2	S2					
Client Sample ID	TH1	TH1	TH1	TH2					
Depth to Top	0.00	0.60	0.90	0.00					
Depth To Bottom	0.40	0.90	1.20	0.20					
Date Sampled	27-Aug-24	27-Aug-24	27-Aug-24	27-Aug-24					
Sample Type	SOIL	SOIL	SOIL	SOIL					
Sample Matrix Code	4AE			4ABE					
								Units	Limit of Detection
% Stones >10mm _A	<0.1	-	-	<0.1				% w/w	0.1
pH ₀ ^{MS}	8.03	-	-	7.74				pH	0.01
Sulphate (acid soluble) ₀ ^{MS}	500	-	-	460				mg/kg	200
Cyanide (total) _A ^{MS}	<1	-	-	<1				mg/kg	1
Phenols - Total by HPLC _A	<0.2	-	-	<0.2				mg/kg	0.2
Sulphide _A	<5	-	-	<5				mg/kg	5
Sulphur (elemental) ₀ ^{MS}	<5	-	-	<5				mg/kg	5
Organic Matter ₀ ^{MS}	21.3	-	-	6.0				% w/w	0.1
Arsenic ₀ ^{MS}	14	-	-	16				mg/kg	1
Boron (water soluble) ₀ ^{MS}	<1.0	-	-	<1.0				mg/kg	1
Cadmium ₀ ^{MS}	1.0	-	-	0.6				mg/kg	0.5
Copper ₀ ^{MS}	101	-	-	36				mg/kg	1
Chromium ₀ ^{MS}	29	-	-	20				mg/kg	1
Chromium (hexavalent) ₀	<1	-	-	<1				mg/kg	1
Lead ₀ ^{MS}	201	-	-	79				mg/kg	1
Mercury ₀	<0.17	-	-	<0.17				mg/kg	0.17
Nickel ₀ ^{MS}	52	-	-	16				mg/kg	1
Selenium ₀ ^{MS}	<1	-	-	<1				mg/kg	1
Zinc ₀ ^{MS}	163	-	-	74				mg/kg	5
Ali >C8-C10 _A	3	-	-	<1				mg/kg	1
Ali >C10-C12 _A ^{MS}	1	-	-	<1				mg/kg	1
Ali >C12-C16 _A ^{MS}	3	-	-	<1				mg/kg	1
Ali >C16-C21 _A ^{MS}	6	-	-	<1				mg/kg	1
Ali >C21-C35 _A ^{MS}	64	-	-	6				mg/kg	1
Total Aliphatics _A	-	-	-	-				mg/kg	1
Aro >C8-C10 _A	6	-	-	<1				mg/kg	1
Aro >C10-C12 _A	3	-	-	<1				mg/kg	1
Aro >C12-C16 _A	10	-	-	2				mg/kg	1
Aro >C16-C21 _A ^{MS}	46	-	-	11				mg/kg	1
Aro >C21-C35 _A ^{MS}	190	-	-	40				mg/kg	1
Total Aromatics _A	-	-	-	-				mg/kg	1
TPH (Ali & Aro >C5-C35) _A	-	-	-	-				mg/kg	1
(1.01) Item 1a Moisture Content of Soil (Oven Dried Method) _A ^F	-	Appended	Appended	-					Subcon IFA



Envirolab Job Number: 24/08369

Client Project Name: Harrison - Church Ave, Middleton

Client Project Ref: Not specified

Lab Sample ID	24/08369/1	24/08369/2	24/08369/3	24/08369/4				Units	Limit of Detection	Method ref
Client Sample No	S1	CS1	CS2	S2						
Client Sample ID	TH1	TH1	TH1	TH2						
Depth to Top	0.00	0.60	0.90	0.00						
Depth To Bottom	0.40	0.90	1.20	0.20						
Date Sampled	27-Aug-24	27-Aug-24	27-Aug-24	27-Aug-24						
Sample Type	SOIL	SOIL	SOIL	SOIL						
Sample Matrix Code	4AE			4ABE						
(1.02) Item 2.4.4 Point Liquid & Plastic Limit by Cone Penetrometer ¹	-	Appended	Appended	-						Subcon IFA



Envirolab Job Number: 24/08369

Client Project Name: Harrison - Church Ave, Middleton

Client Project Ref: Not specified

Lab Sample ID	24/08369/1	24/08369/2	24/08369/3	24/08369/4						
Client Sample No	S1	CS1	CS2	S2						
Client Sample ID	TH1	TH1	TH1	TH2						
Depth to Top	0.00	0.60	0.90	0.00						
Depth To Bottom	0.40	0.90	1.20	0.20						
Date Sampled	27-Aug-24	27-Aug-24	27-Aug-24	27-Aug-24						
Sample Type	SOIL	SOIL	SOIL	SOIL						
Sample Matrix Code	4AE			4ABE						
Asbestos in Soil (inc. matrix)										
Asbestos in soil ^o	Chrysotile	-	-	NAD						A-T-045
Asbestos Matrix (visual) ^o	-	-	-	-						A-T-045
Asbestos Matrix (microscope) ^o	Loose Fibres	-	-	-						A-T-045
Asbestos ACM - Suitable for Water Absorption Test? ^o	N/A	-	-	N/A						A-T-045
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing) ^o	0.002	-	-	-				% w/w	0.001	A-T-054



Envirolab Job Number: 24/08369

Client Project Name: Harrison - Church Ave, Middleton

Client Project Ref: Not specified

Lab Sample ID	24/08369/1	24/08369/2	24/08369/3	24/08369/4				Units	Limit of Detection	Method ref
Client Sample No	S1	CS1	CS2	S2						
Client Sample ID	TH1	TH1	TH1	TH2						
Depth to Top	0.00	0.60	0.90	0.00						
Depth To Bottom	0.40	0.90	1.20	0.20						
Date Sampled	27-Aug-24	27-Aug-24	27-Aug-24	27-Aug-24						
Sample Type	SOIL	SOIL	SOIL	SOIL						
Sample Matrix Code	4AE			4ABE						
PAH-16MS										
Acenaphthene _A ^{MS}	0.23	-	-	0.13				mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{MS}	0.20	-	-	0.02				mg/kg	0.01	A-T-019s
Anthracene _A ^{MS}	1.12	-	-	0.21				mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{MS}	4.91	-	-	1.00				mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{MS}	5.30	-	-	1.04				mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{MS}	6.18	-	-	1.19				mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{MS}	3.40	-	-	0.73				mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{MS}	2.22	-	-	0.41				mg/kg	0.07	A-T-019s
Chrysene _A ^{MS}	5.24	-	-	1.26				mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{MS}	0.58	-	-	0.13				mg/kg	0.04	A-T-019s
Fluoranthene _A ^{MS}	11.9	-	-	2.58				mg/kg	0.08	A-T-019s
Fluorene _A ^{MS}	0.23	-	-	0.06				mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{MS}	3.13	-	-	0.64				mg/kg	0.03	A-T-019s
Naphthalene _A ^{MS}	0.16	-	-	<0.03				mg/kg	0.03	A-T-019s
Phenanthrene _A ^{MS}	5.27	-	-	1.19				mg/kg	0.03	A-T-019s
Pyrene _A ^{MS}	10.1	-	-	2.41				mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{MS}	60.2	-	-	13				mg/kg	0.01	A-T-019s



Report Notes

General

- This report shall not be reproduced, except in full, without written approval from Envirolab.
- The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client and can affect the validity of results.
- The results reported herein relate only to the material supplied to the laboratory.
- The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **four weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
- Analytical results reflect the quality of the sample at the time of analysis only.
- Opinions and Interpretations expressed are outside our scope of accreditation.
- A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
- If a sample is outside of the calibration range or affected by interferences then it may need diluting. This will result in the limit of detection (LOD) being raised.
- Subcontracted Analysis: Please see the appended report for any deviations, current LODs and accreditation status of the test.

Key

Superscript "#"	Accredited to ISO 17025
Superscript "M"	Accredited to MCertS
Superscript "U"	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript "A"	Analysis performed on as-received Sample
Subscript "D"	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript "D" on Asbestos	Analysis performed on a dried aliquot of sample provided.
Subscript "A"	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
Trace	Asbestos found not suitable for Gravimetric Quantification – not enough to accurately weigh.
N/A	Not applicable

Asbestos

Identification: Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis

"Trace Asbestos Identified" will be reported if there is not enough present to verify the type.

Quantification: Generally a 2 stage process including visual identification, hand picking and weighing, and fibre counting. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres), "TRACE" will be reported as a quantification result.

PLEASE INFORM THE LABORATORY IF YOU WOULD LIKE THE STAGE 3 SEDIMENTATION PROCESS CARRIED OUT. Note this will be subcontracted.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs

Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.

Soil Chemical Analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present

and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH by method A-T-007:

For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.

Results "with Clean up" indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:

EPH CWG results have humics mathematically subtracted through instrument calculation.

Where these humic substances have been identified in any IDs from "TPH CWG with clean up" please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Please contact your client manager if you require any further information.

**Envirolab Deviating Samples Report**

Hattersley Science & Technology Park, Stockport Road, Hattersley, SK14 3QU
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: T J Booth Associates, 20a East Gate Street, Rochdale, Rochdale, Greater Manchester, UK, OL16 1DH
Project: Harrison - Church Ave, Middleton
Clients Project No:

Project No: 24/08369
Date Received: 29/08/2024 (am)
Cool Box Temperatures (°C): 15.7

NO DEVIATIONS IDENTIFIED with respect to sampling dates or containers received.

Note: If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3 (for water samples $5 \pm 3^{\circ}\text{C}$), ISO 18400-105:2017, then the concentration of any affected analytes may differ from that at the time of sampling.



Envirolab Analysis Dates

Lab Sample ID	24/08369/1	24/08369/2	24/08369/3	24/08369/4
Client Sample No	S1	CS1	CS2	S2
Client Sample ID/Depth	TH1 0.00-0.40m	TH1 0.60-0.90m	TH1 0.90-1.20m	TH2 0.00-0.20m
Date Sampled	27/08/24	27/08/24	27/08/24	27/08/24
A-T-019s	02/09/2024			02/09/2024
A-T-024s	04/09/2024			04/09/2024
A-T-027s	04/09/2024			04/09/2024
A-T-028s	04/09/2024			04/09/2024
A-T-029s	03/09/2024			03/09/2024
A-T-031s	03/09/2024			03/09/2024
A-T-032s	03/09/2024			05/09/2024
A-T-040s	04/09/2024			04/09/2024
A-T-042sTCN	02/09/2024			02/09/2024
A-T-043-s	30/08/2024			30/08/2024
A-T-044	05/09/2024			05/09/2024
A-T-045	02/09/2024			02/09/2024
A-T-050s	02/09/2024			02/09/2024
A-T-054	05/09/2024			
A-T-055s	02/09/2024			02/09/2024
Calc-As Recd	02/09/2024			02/09/2024

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

5.7. Ian Farmer Associates Certificates.



Unit 4, Faraday Close, Pattinson North Industrial Estate, Washington, NE38 8QJ Tel: 0191 482 8500
 washington@ianfarmer.co.uk www.ianfarmer.co.uk

Envirolab
 Housesteads,
 Off Stockport Road,
 Hattersley,
 SK14 3QU

F.A.O.

Final Test Report - 2282173 / 1

Site: Church Avenue, Middleton

Job Number: 2282173

Originating Client: Envirolab

Originating Reference: 24/08369

Date Sampled: Not Given

Date Scheduled: 30/08/2024

Date Testing Started: 02/09/2024

Date Testing Finished: 09/09/2024

Previous Reports	Amendments	Date Issued

Amendments:

Authorised By:

Tim Robinson
 Quality Supervisor

Report Issue Date: 10/09/2024

Page. 1

Laboratory Test
Report

2282173 / 1

Site: Church Avenue, Middleton

Job Number: 2282173

Client: Envirolab

Page: 2

**Determination of Moisture Content, Liquid Limit and Plastic Limit
and Derivation of Plasticity and Liquidity Index**

Borehole / Trial Pit	Depth (m)	Sample	Natural Moisture Content %	Natural - Stones removed by hand Sieved - Washed on 425 µm sieve			Liquid Limit %	Plastic Limit %	Plasticity Index %	Liquidity Index	Class	Description / Remarks
				Natural / Sieved	Percentage Passing %	Moisture Content %						
TH1	0.60	D	19	Sieved	93	20		NP				Brown very sandy CLAY
TH1	0.90	D	15	Natural	99	15	28	15	13	0.01	CL	Brown sandy CLAY

Method of Preparation: BS 1377 : Part 1 : 1990 : Clause 7 Preparation of disturbed samples for testing

BS 1377 : Part 1 : 2016 : Clause 8.4.3 Preparation of samples for plasticity tests

BS 1377 : Part 2 : 1990 : Clause 4.2 Preparation of samples for plastic limit tests

Method of Test: BS 1377 : Part 2 : 1990 : Clause 3.2 Determination of moisture content

BS 1377 : Part 2 : 1990 : Clause 4.3 or 4.4 Determination of the liquid limit

BS 1377 : Part 2 : 1990 : Clause 5.3 Determination of the plastic limit and plasticity index



Results reported relate only to the samples tested.



Final Test Report - 2282173 / 1

Site: Church Avenue, Middleton

Job Number: 2282173

Originating Client: Envirolab

All opinions and interpretations contained within this report are outside of our Scope of Accreditation.

This test report shall not be reproduced, except in full and only with the written permission of Ian Farmer Associates Ltd.

Samples will be retained for 28 days from date of issue of the final test report before being disposed of, unless we receive written instruction to the contrary.

Report End

Report Issue Date: 10/09/2024

Page. 3

6. APPENDIX B: PHOTOS.



Trial Hole 1.



Trial Hole 2.



General site photographs.



General site photographs.

7. APPENDIX C: LANDMARK ENVIROCHECK.

