

GEO-ENVIRONMENTAL AUDIT

PHASE 1 Preliminary Risk Assessment

PHASE 2 Site Investigations

PHASE 3 Remediation Statement

Proposed Residential Development
No.2 War Office Road
Bamford
Rochdale
OL11 5HR

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Client: Stevia Investments Ltd
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Revision	Date	Reason
0	July 2022	Phase 1 PRA.
1	March 2024	Phase 2 Site Investigations & Remediation Statement.

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1. PHASE 1 - PRELIMINARY RISK ASSESSMENT.

1.1. Introduction.

T. J. Booth Associates have been appointed by Stevia Investments Ltd to undertake a Phase 1 Preliminary Risk Assessment, Phase 2 Site Investigations, and a Phase 3 Remediation Statement in accordance with UK environmental assessment guidance.

The Site currently comprises a bungalow within its own curtilage, surrounded by garden, paved, permeable areas and driveway.

A Phase 1 Preliminary Risk Assessment version (rev0) of the document was originally authored to accompany a planning application for development.

The planning application, ref: 22/01175/FUL, was submitted for the: "Erection of three dwellings following demolition of existing bungalow - Resubmission of 22/01175/FUL | 2 War Office Road Rochdale OL11 5HR". Draft conditions for the approval have been obtained, and condition No.6 related to environmental assessment of the Site, as follows:

6. No development shall take place until an investigation and risk assessment (in addition to any assessment provided with the planning application) has been submitted to and approved in writing by the Local Planning Authority. The assessment shall investigate the nature and extent of any contamination on the site (whether or not it originates on the site). The assessment shall be undertaken by competent persons and a written report of the findings submitted to and approved in writing by the Local Planning Authority before any development takes place.

The submitted report shall include:

- i) a survey of the extent, scale and nature of contamination
- ii) an assessment of the potential risks to:
 - o human health,
 - o property (existing or proposed) including buildings, crops, livestock, pets, woodland, and service lines and pipes,
 - o adjoining land,
 - o groundwaters and surface waters,
 - o ecological systems,
 - o archaeological sites and ancient monuments;
- iii) where unacceptable risks are identified, an appraisal of remedial options and proposal of the preferred option(s) to form a remediation strategy for the site.

The development shall thereafter be carried out in full accordance with the duly approved remediation strategy and a verification report submitted to and approved in writing by the Local Planning Authority before any of the buildings hereby approved are first occupied.

A subsequent planning application, ref: 23/01347/VRCON, was submitted for: "Section 73 application to vary condition 2 of planning permission 23/00773/FUL (Erection of three dwellings following demolition of existing bungalow - Resubmission of 22/01175/FUL), to replace approved site layout and proposals for plot 1 with amended plans showing alterations to plot 1 to provide accommodation in the roof space, re-planning of internal arrangements, minor alterations to fenestration and small projection added to ground floor to side elevation facing Bury Road. Approved drawings R430-01-C and R430-02-B to be replaced

by:- Revised proposal site plan (Drawing R430-01-D) and Revised proposal plot 1 (Drawing R430-02-C) | 2 War Office Road Rochdale OL11 5HR".

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.

The proposal is for 3No. residential dwellings (1No. detached & 2No semi-detached).

The existing access to the Site from War office Road will be closed and new access point made from the adjacent Arnside Drive to driveways within the property boundary.

There will be private soft landscaped gardens to the rear of each property.

1.3. Historic Maps.

DATE	ON-SITE	OFF-SITE/SURROUNDING AREA
DATE	ON-SITE	OFF-SITE/SURROUNDING AREA
c1851	Site is part of agricultural land. No structures other than a field boundary running through the Site.	War Office Road follows an old route so is not adjacent to the plot. Likewise, Bury Road has not yet been widened and so does not meet the south Site boundary. Only small dwellings, cottages, and farmhouses in the local area. The wider area is rural. No heavy industry.
c1893	No change.	Woollen mill and associated reservoir noted nominally 250-300m northwest.
c1910	No change.	No change.
c1930	Small building central to the Site, possibly a glasshouse from the hatching on the plan.	No change.
c1937	Second glasshouse now shown adjacent to the first. There is also a 3rd glasshouse on the current Site, in what was then a separate plot of land.	No change.
c1957	Just a single glasshouse and another building now remain on Site.	Some buildings in the local area demolished.
c1966-70	Site is now occupied by the current bungalow.	The current estate has been erected, along with the straightening of War Office Road to bound the west side of the development Site, and the widening of Bury Road to bound the south side. Much of the wider area comprises housing estates as per the current day layout but still under construction.
c1977-90	No change.	Some additional housing estate to the south side of Bury Road.
c1992	No change.	Complete urban infill as in the present day.

1.4. Present Day Maps.

Site Boundaries, Outlines of Structures and Buildings:	The Site is enclosed by dwarf walls and timber fencing to the perimeter, with a small retaining wall to the east side with the neighbouring property. The neighbouring property is nominally 1.5m higher.
Ground Contours, Natural Drainage Features:	Locally natural drainage contours fall to the south.
Water Courses:	None noted locally.
Below Ground Obstructions:	None noted.

1.5. Geology.

Bedrock Geology:	Carboniferous Coal Measures cover much of the local area.
Superficial Geology:	Glacial till/boulder clay.
Coal Seams.	Closest seam is the Arley, subcropping nominally 650m northwest, and 350m southeast.

1.6. Boreholes Records.

There are no relevant borehole records within close proximity to the Site.
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1.7. Planning Data.

N/A.

1.8. Landmark Environmental Data.

1.8.1. Agency & Hydrological.

Statutory Authorisations:	No records within a 250m radius.
Contaminated land register entries & notices:	No records within a 250m radius.
Discharge consents:	No records within a 250m radius.
Pollution incidents to controlled waters:	1No. record within a 250m radius, relating to a crude sewage spill to a River Roch tributary 200m northeast.
Substantiated pollution incident register:	No records within a 250m radius.
Water abstractions:	No records within a 250m.
Bedrock aquifer:	Secondary A Aquifer – capable of supporting water supplies at a local rather than strategic scale.
Superficial aquifer:	Secondary Aquifer – undifferentiated.
Source protection zone:	The Site is not within a Source Protection Zone.

1.8.2. Waste.

BGS recorded landfill sites:	None noted within a 250m radius.
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EA Historic landfill sites:	None noted within a 250m radius.
Licenced waste management facilities:	None noted within a 250m radius.
Registered landfill sites:	None noted within a 250m radius.

1.8.3. Hazardous Substances.

Planning hazardous substance consents:	No records within a 250m radius of the Site.
Planning hazardous substance enforcements:	No records within a 250m radius of the Site.

1.8.4. Geological.

Coal mining affected areas:	Within a coal mining area.
CBSCB compensation district:	Not within the CBSCB brine district.
Potential for collapsible ground stability hazards:	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:	No hazard.
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.

1.9. Coal Authority.

Mine Shafts, Pits, Adits/Entries:	No mine entries close to the Site.
Past Recorded Underground Mining.	No recorded workings of coal beneath the Site.
Present/Future Underground Mining.	Not known to be a risk.
Unrecorded Probable/Potential Shallow Underground Workings:	None noted beneath the Site.
Past/Present/Future Surface Mining/Opencast:	None noted locally.
Mining Geology and Subsidence:	Not noted.
Hazards and Mine Gas:	Unknown.
Development High Risk Area:	The Site is not within a Development High Risk Area.
Abandonment Plan Data:	No data available.

1.10. Cheshire Brine Subsidence Compensation Board.

Wells or shafts:	Not in area.
Consultation area:	Not in area.
Notice of damage:	Not in area.
Historical salt mining:	Not in area.
Active salt mining:	Not in area.

1.11. Industry Profiles.

N/A.

1.12. Site Reconnaissance.

Details of Existing Structures & Features:	The Site was accessed via the west driveway entrance off War Office Road. The Site was generally enclosed by timber fencing, dwarf walls and shrubbery around the perimeter, with a higher retaining wall to the east boundary. The existing bungalow is nominally central to the Site, with the surrounding area comprising patio/paths made up of PCC pavements, and other areas generally comprising stone chippings. There were some soft verges around the perimeter in places, and a timber shed in the back garden area. Some small juvenile trees were noted around the Site perimeter such as cherry, copper beech, leylandii amongst others.
Adjacent Properties:	The Site is in a predominantly residential area with a neighbouring residential dwelling to the east side. The Site was bound by Bury Road to the south, War Office Road to the west and Arnside Drive to the north.
Water Levels, Directions of Flow and Rates in Rivers:	None noted.
Old mine or quarry workings:	None noted.
Obvious/immediate hazards to health/safety:	None noted.
Areas of Discoloured Soil, Polluted Water, Vegetation, and Significant Odours:	None noted.
Relevant ground levels, ground water levels, positions of wells and springs:	Site was relatively level with retaining walls to Bury Road and No.2 Arnside Drive (both higher).

1.13. Identification of Source-Pathway-Receptor.

1.13.1. Potential Contaminants.

CURRENT SOURCE/S	ORIGINAL ASSOCIATED SOURCE	CONTAMINANT/S
General made ground/upper soil across the Site.	Past use of the Site, former outbuildings, demolition/construction materials.	Metals, PAHs, sulphates.

1.13.2. Potential Pathways.

The potential pathways to/from the Development Site include (not an exhaustive list but a summary of the main points):

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 residential users for the proposed end use.

Controlled waters: no receptors.

1.14. Preliminary Conceptual Model.

CURRENT SOURCE/S		ORIGINAL ASSOCIATED USAGE / LOCATION	CONTAMINANT TYPE	PATHWAY	RECEPTOR	POLLUTION LINKAGE	CONSEQUENCE	PROBABILITY	RISK
PL1	Existing made ground - surface/subsoil.	Various – see potential contaminants section.	Metals, PAHs, asbestos, sulphates & inorganics.	Direct ingestion, aerial ingestion, dermal contact, drinking water. Contact with potential hazards.	Site construction operatives & future occupants. Site buildings.	POTENTIALLY PRESENT – There is the potential for minor contamination at the Site which may be above threshold values for a residential end use.	Medium.	Likely.	Moderate risk.
PL2	Geological ground gas.	Coal seams & radon sources, peat.	CH ₄ , CO ₂ , Rn, other trace gases.	Diffusion through soil, substructures, aerial inhalation.	Future occupants. Explosion, suffocation.	NOT PRESENT – No coal seams of coal mining legacy features in the local area, and the Envirocheck report has indicated the Site is within a lower radon risk area.	Medium.	Unlikely.	Low risk.
PL3	Anthropogenic ground gas.	Historic landfill Sites within 250m.	CH ₄ , CO ₂ , other trace gases.	Diffusion through soil, substructures, aerial inhalation.	Future occupants. Explosion, suffocation.	NOT PRESENT – There are no landfill sites within a 250m radius of the Development Site boundary.	Medium.	Unlikely.	Low risk.
PL4	Contaminated ground /surface water. Controlled Waters.	Made ground.	Chemical contamination. Hydrocarbons.	Permeation through soil into ground water, local watercourses, or aquatic habitats.	Watercourses, canal, aquatic habitats & associated wildlife.	NOT PRESENT – The Site is not expected to have significant contamination which would pose a risk to ground water.	Minor.	Unlikely.	Very low risk.

2. PHASE 2 – SITE INVESTIGATIONS & ASSESSMENT.

2.1. Site Investigations.

2.1.1. 29.02.2024

Site Investigations were undertaken by T J Booth Associates and comprised 4No. machine excavated trial holes (THs 1-4), undertaken with a 3.5t back acting excavator.

At the time of investigation, the bungalow remained on-site, situated central to the plot, and subsequently the trial holes were taken at equidistant points around the perimeter of the bungalow to gain an understanding of the geology for future geotechnical design, and to obtain an equidistant spacing (10-25m) for contamination analysis.

On-site geology comprised mixed ground, generally with an upper MADE GROUND of fill (brick, stone, occasional ash etc) to between 500mm to 1m depth. Below the MADE GROUND was varying depths of CLAY, SAND, and clayey SAND & GRAVEL to a depth of 2.4m. CLAY generally had mixed strength, with soft, soft to firm, and stiff noted at varying depths over the Site. In trial holes 3 & 4, CLAY was soft-soft to firm, and in trial hole 4 a soft peaty CLAY was noted at between 1500-1700 deep.

4No. soil samples (S1-4) were taken representative of the made ground horizon and in the respective trial holes to assess the potential ground contamination.

Soil samples 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 tested for metals, speciated PAH, inorganics & sulphates, SOM, & asbestos 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, specifically the Defra Category 4 Screening Levels (C4SLs), then to LQM/CIEH (S4ULs).

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	No exceedances.	PASS
TH2/S2	Lead, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, chrysene, dibenz[ah]anthracene.	FURTHER ACTION
TH3/S3	Lead, benzo[b]fluoranthene, dibenz[ah]anthracene.	FURTHER ACTION
TH4/S4	No exceedances.	PASS

Due to above elevated levels noted, existing Site soil is considered contaminated above threshold levels allowed for a residential end use.

The existing soils will not be suitable for reuse with regard to human receptors, and a suitable cover system will need to be employed.

2.2.1.2. *Water pipes.*

No particular contaminative risk included within the source-pathway-receptor methodology has been noted on-site either historically or presently, including industrial or other historic uses which would have introduced organic contaminants which would affect new potable water pipes.

As no sources of the risk chemicals in the PSRAS tables have been identified, there is no pollutant linkage.

Testing for PSRAS contaminants is therefore NOT advised or required in accordance with UK environment risk methodology or UU water supply pipe guidance.

Normal PE pipe will suffice for potable water supplies.

2.2.2. Controlled Waters Risk.

Where ground/surface water sampling is 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.

2.2.2.1. *Groundwater.*

Although groundwater was noted in the trial holes, no groundwater samples were collected due to the low level of risk noted in the Phase 1 Preliminary Risk Assessment. No specific contamination sources were noted in the risk assessment and there was only a relatively thin layer of demolition fill noted on Site which doesn't pose a particular risk of mobile contamination. There was no visual or olfactory evidence of groundwater contamination noted on intrusive investigation.

The underlying aquifers are only moderately productive supporting local supplies, providing minor baseflow to rivers. The Site is not within a Source Protection Zone, and there were no groundwater abstractions noted in the local area.

Clay subsoil was noted beneath the made ground which acts as a barrier to potential minor contamination.

The risk to groundwater is considered mitigated.

2.2.2.2. *Watercourses.*

There are no watercourses in the local area.

No surface water pathways from the Site to offsite sources.

No Site groundwater risk to affect baseflow to rivers via aquifers.

The risk to surface water is considered mitigated.

2.2.3. Ground Gas Risk.

2.2.3.1. *Historic landfill Sites.*

No risk noted in the Phase 1 PRA.

The risk of ground gas attributed to this source is considered mitigated.

2.2.3.2. *On-site refuse tips/infilled ponds/infilled land.*

No risk noted in the Phase 1 PRA.

Made ground was a maximum of 950mm and generally comprised inert building rubble.

The risk of ground gas attributed to this source is considered mitigated.

2.2.3.3. *Radon.*

Site was noted to be in a Class 1 radon zone according to the Phase 1 PRA.

The risk of ground gas attributed to this source is considered mitigated.

2.2.3.4. *Alluvium.*

Site investigations noted clay deposits below the Site, and although there was some minor peaty CLAY noted in TH4, this was discontinuous beneath the Site.

The risk of ground gas attributed to this source is considered mitigated.



2.3. Final Conceptual Model.

CURRENT SOURCE/S		ORIGINAL ASSOCIATED USAGE / LOCATION	CONTAMINANT TYPE	PATHWAY	RECEPTOR	POLLUTION LINKAGE	CONSEQUENCE	PROBABILITY	RISK	MITIGATION PROPOSED
PL1	Existing made ground - surface/subsoil.	Various – see potential contaminants section.	Metals, PAHs, asbestos.	Direct ingestion, aerial ingestion, dermal contact, drinking water.	Primarily human - Site construction operatives & future residential Site occupants. Pets. Ecological systems.	POTENTIALLY PRESENT – There is the potential for minor contamination at the Site which may be above threshold values for a residential end use. No risk to buildings & services.	Medium.	High likelihood.	High risk.	EITHER REMOVAL & REPLACEMENT OF EXISTING SITE SOIL (REMOVAL OF SOURCE), OR SUITABLE COVER LAYER PROVIDED (REMOVAL OF PATHWAY).

3. PHASE 3 - REMEDIATION STATEMENT

3.1. Basic Site Details

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

3.2. Site & Remedial Objectives

Site investigations undertaken as part of the Phase 2, comprised trial holes & soil sampling methods, with historic made ground recorded on-site.

The main remedial objective is to ensure the Site is safe for the proposed end use.

3.3. Conceptual Model (Final) & Relevant Pollution Linkages

Refer to Phase 2 Site Investigation and Assessment section of the report for Final Conceptual Model.

Only 1 pollutant linkage from was confirmed in the ground investigation:

- PL1: Existing made ground - surface/sub-soil & associated risk to human, pets & ecological systems.

To break the pollution linkage, either the source must be removed, or the pathways mitigated. It is not appropriate in this case to modify behaviour of or remove receptors.

3.4. Recommended Remediation:

PL1: Existing made ground - surface/sub-soil & associated risk to human, pets & ecological systems.

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 (or to clean virgin material if shallower than this) and replaced with imported 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;

Bioturbation is typically limited to the top 600 mm of the soil profile;

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

The cover level can be further reduced to 450mm in common or public open space areas.

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.

3.5. 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:

- 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).

- Samples should be tested for the following contamination suites: metals, inorganics, PAH USEPA16 speciated, and asbestos screening. Results will be analysed against Defra Category 4 Screening Levels (C4SLs) where available, and then to the LQM/CIEH (S4ULs), for use in a residential end use setting.
- Verification Depth.
- Reporting (including photographic evidence).

3.6. Additional Notes

Before any further work is undertaken, this report should be submitted to and agreed by the LPA.

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...

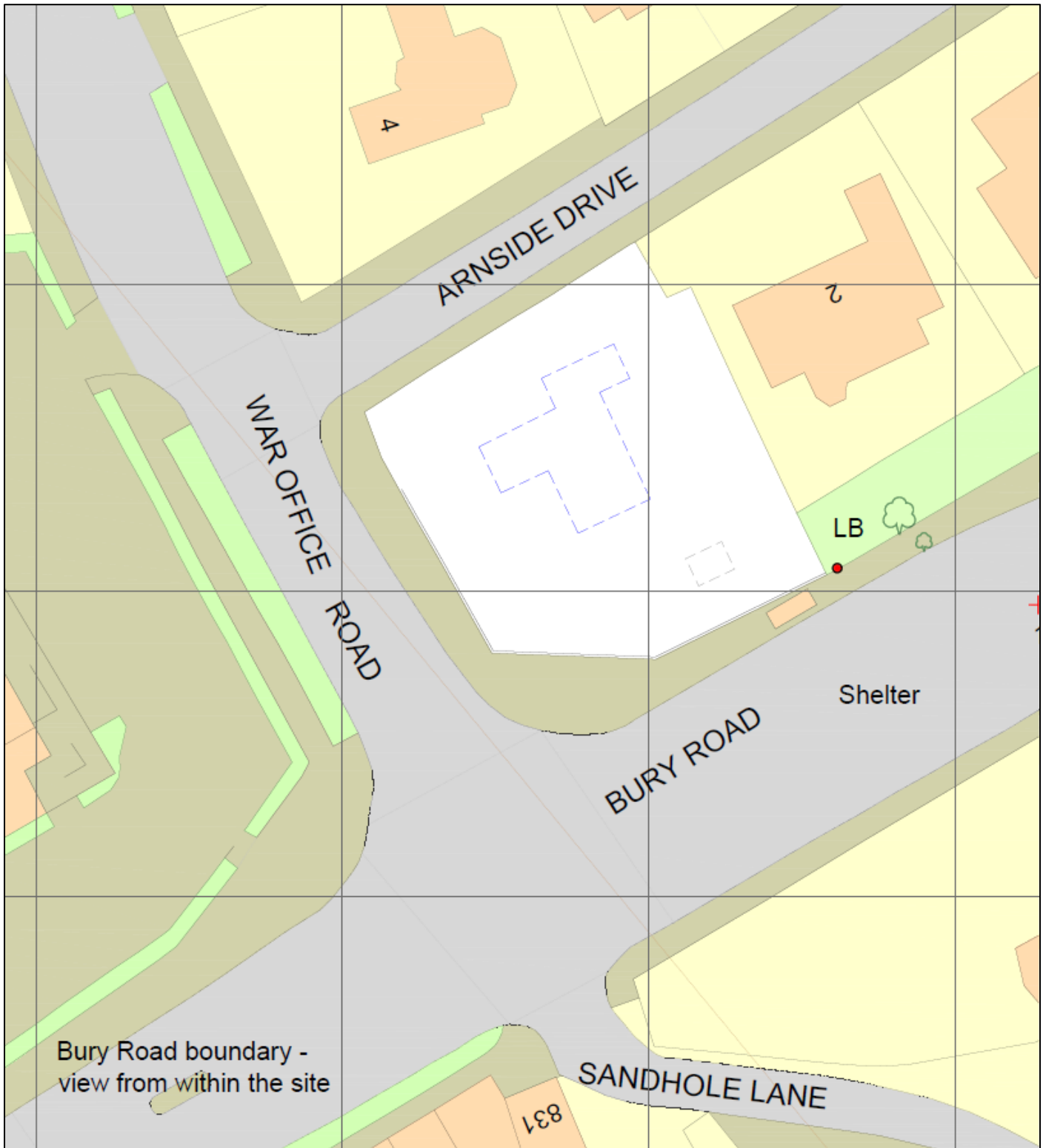


T J Booth BSc (Hons), C. Eng. C. Env. MICE.

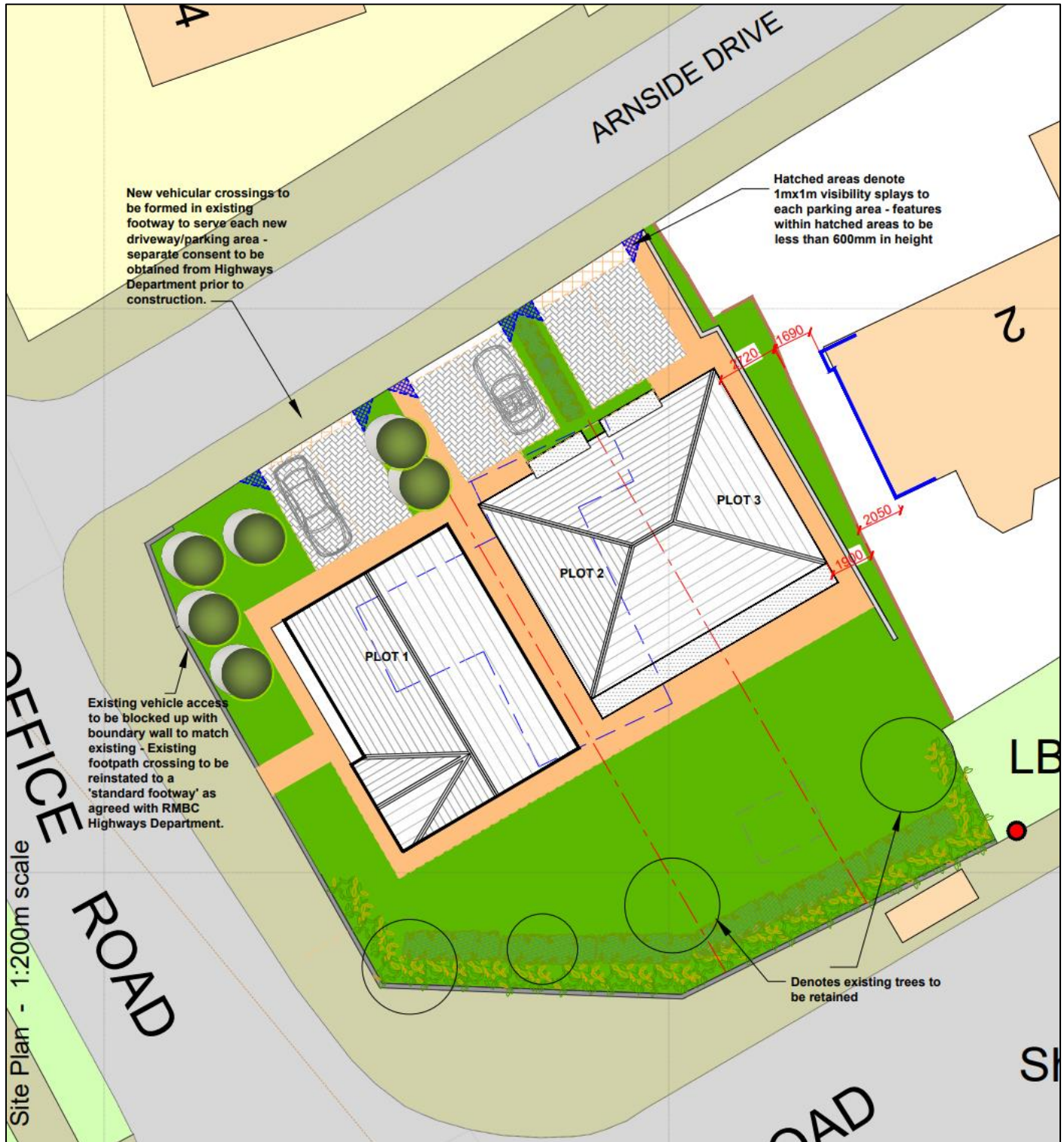
T J Booth Associates.

4. APPENDIX A: FIGURES

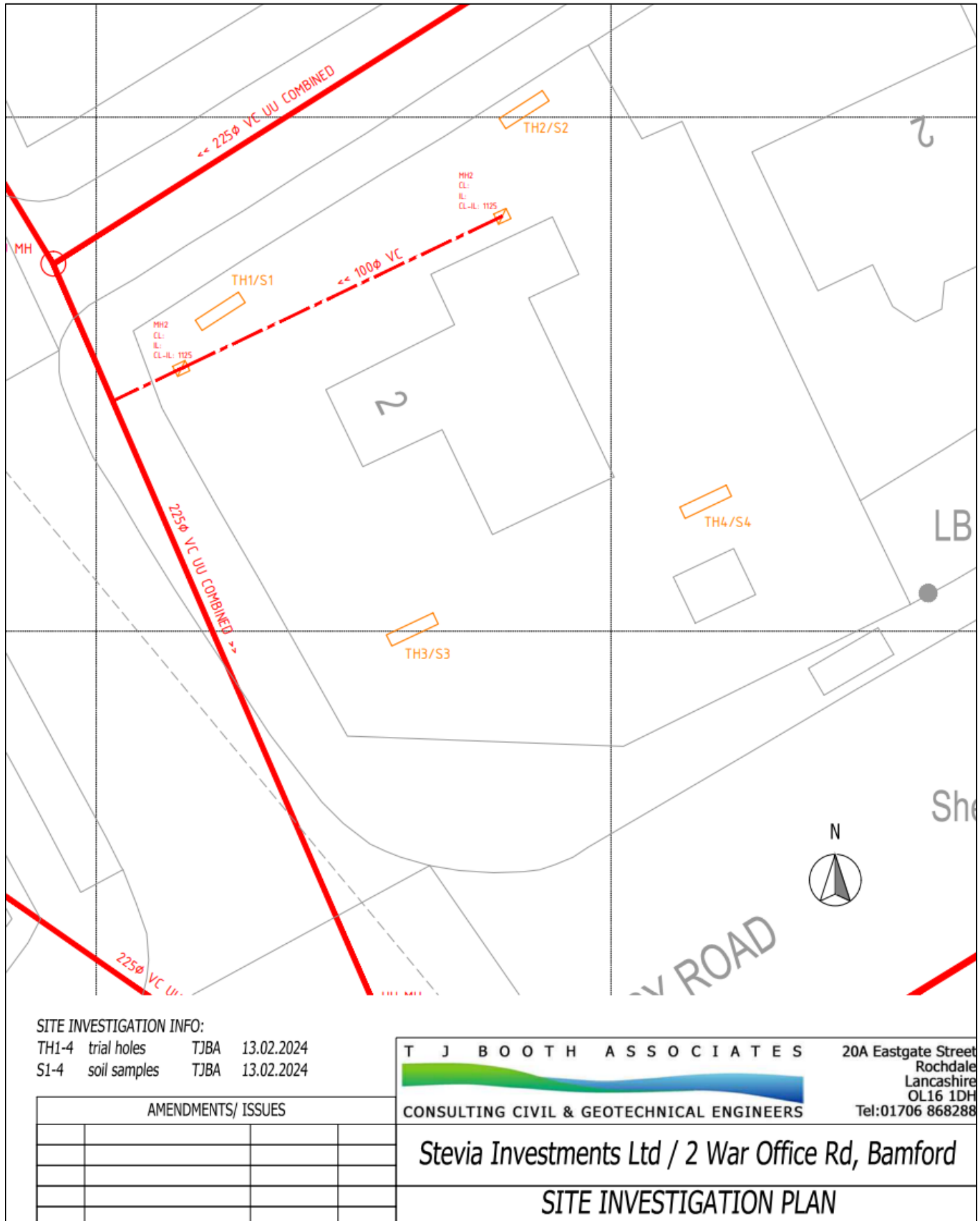
4.1. Location Plan



4.2. Proposed Development



4.3. Site Investigation Plan



4.4. Trial Hole Logs

Trial pit reference TH1					Sheet 1 of 1
Water	Reduced Level (m)	Legend	Depth (m)	Description	
	100.00				
	99.95	X X	0.05	Dark brown silty topsoil MADE GROUND	
	99.55	X X X X	(0.40) 0.45	Dark brown-blue/grey fine sand & gravel MADE GROUND. Sand & gravel is brick, stone, ash, mortar. (S1)	
	99.05	- - - - - - - - - - - - - - -	(0.50) 0.95	Soft to firm brown-dark brown slightly sandy CLAY (suspect MADE GROUND with occasional fine gravel of brick)	
v	97.90	X - X - - X - X - X - X - - X - X -	(1.20)	Medium dense to dense orange-brown/grey mottled very clayey SAND & GRAVEL. Gravel is sandstone & shale.	
	97.85	X - X - - X - X -	2.15		
	97.70	- - - - -	2.30	Firm brown very sandy CLAY	
				Trial pit ends	
Not shown to scale					
Additional notes: GW noted at 2150.					

Trial pit reference TH2					Sheet 1 of 1
Water	Reduced Level (m)	Legend	Depth (m)	Description	
	100.00				
	99.95	X X	0.05	Dark brown silty topsoil MADE GROUND	
	99.50	X X X X X X	(0.45) 0.50	Dark brown/black sandy, very gravelly MADE GROUND. Gravel is brick, stone, ash, slate etc. Occasional cobbles of brick & stone. (S2)	
	99.05	- - - - - - - - - - - - - - -	(0.45) 0.95	Stiff orange-brown/grey mottled sandy CLAY	
v	98.60	- - - - - - - - - -	(0.50)	Medium dense orange/brown fine to medium SAND (occasionally clayey).	
	98.55	- - - - -	1.45		
	98.15	- - - - - - - - - -	(0.40) 1.85	Stiff orange-brown CLAY	
	97.60	- o - o - o - o - o - o - o -	(0.55) 2.40	Medium dense to dense orange-brown SAND AND GRAVEL (sand & gravel is sandstone & shale).	
				Trial pit ends	
Not shown to scale					
Additional notes: GW noted at 1450.					

Trial pit reference TH3

Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	100.00			
	99.50	X X X X	(0.50) 0.50	Dark brown occasionally clayey gravel & cobbles MADE GROUND. Gravel is quartz with rare sandstone. Abundant rootlets. (S3)
<u>v</u>	99.35 99.05	X X X X	(0.45) 0.95	Loose occasionally clayey coarse gravel & cobbles MADE GROUND. Gravel/cobbles are stone, brick & ash. NOTE DEPTH IS ONLY AN ESTIMATE DUE TO GROUND WATER IN TRIAL HOLE.
	98.40	X o X o o X o X X o X o o X o X	(0.65) 1.60	Soft-soft to firm black slightly gravelly CLAY. NOTE DEPTH IS JUST AN ESTIMATE DUE TO GROUNDWATER IN TRIAL HOLE.
	98.20	X o X o o X o X	(0.20) 1.80	Very soft-soft orange-brown/grey mottled gravelly CLAY. NOTE DEPTH IS JUST AN ESTIMATE DUE TO GROUNDWATER IN TRIAL HOLE.
				Trial pit ends

Not shown to scale

Additional notes: Heavy influx of GW at 650 deep. Hole was filled with water throughout excavation.

Trial pit reference TH4

Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	100.00			
	99.40	X X X X	(0.60) 0.60	Firm orange-brown gravelly clay MADE GROUND. (S4)
<u>v</u>	99.15 99.10	: o : o : o : o : o	(0.30) 0.90	Loose to medium dense light brown slightly clayey SAND AND GRAVEL Gravel is sandstone & shale.
	98.50	- o - o - o - o - o - o - o -	(0.60) 1.50	Soft black/grey slightly gravelly CLAY
	98.30	- - - -	1.70	Soft brown peaty CLAY
	97.70	- : - : - : : - : - : - - : - : - :	(0.60) 2.30	Soft to firm grey very sandy CLAY becoming firm at approx 2000.
				Trial pit ends

Not shown to scale

Additional notes: GW noted seeping at 900.

4.5. TJBA Soil Analysis

CLIENT/SITE: SAMPLE TYPE: SAMPLING DATE:		Stevia Investments Ltd - 2 War Office Rd, Bamford.						
		SOILS.						
		13.02.2024.						
Contaminant		No	Max	Mean	t 95	RESIDENTIAL (with or without plant uptake)		
							Pass/Fail	Comment
METAL	Arsenic	4	35	13.5	30.95	37	PASS	
METAL	Boron	4	1	1	1	290	PASS	
METAL	Cadmium	4	22.4	11.775	20.66	22	comment	S2 FAIL
METAL	Chromium as Cr(III)	4	17	14.75	16.70	910	PASS	
METAL	Chromium as Cr(VI)	4	1	1	1	21	PASS	
METAL	Copper	4	190	75.5	169.15	2400	PASS	
METAL	Lead	4	537	214	491.4	200	FURTHER ACTION	S2, S3
METAL	Mercury (inorganic)	4	4.38	1.3325	3.8145	40	PASS	
METAL	Nickel	4	76	35	69.1	130	PASS	
METAL	Selenium	4	1	1	1	250	PASS	
METAL	Zinc as Zn	4	128	86.25	125.75	3700	PASS	
INORGANIC	Cyanide (Total)	4	1	1	1	34	PASS	
INORGANIC	Sulphate (Total) as SO4	4	0.056	0.04125	0.05375	0.24	PASS	
INORGANIC	Sulphide	4	5	5	5	250	PASS	
INORGANIC	pH	4	7.34	6.6475	7.3235	6 to 8	NORMAL	
INORGANIC	Sulphur (Elemental)	4	210	57.25	179.85	100	comment	S2 FAIL
INORGANIC	Asbestos Identification	4	0	0	0	0	PASS	
ORGANIC	SOM	4	6	5.125	6			
	PAH acenaphthene	4	1.04	0.3075	0.9005	1100	PASS	
	PAH acenaphthylene	4	6.31	1.61	5.374	920	PASS	
	PAH anthracene	4	4.82	1.56	4.2935	11000	PASS	
	PAH benzo[a]anthracene	4	21.8	6.695	19.187	13	FURTHER ACTION	S2
	PAH benzo[a]pyrene (BaP)	4	12.9	4.53	11.637	5	FURTHER ACTION	S2
	PAH benzo[b]fluoranthene	4	14.6	5.02	13.124	3.7	FURTHER ACTION	S2, S3
	PAH benzo[g,h,i]perylene	4	4.95	1.9725	4.5855	350	PASS	
	PAH benzo[k]fluoranthene	4	6.99	2.2375	6.192	100	PASS	
	PAH chrysene	4	27.8	8.2075	24.278	27	comment	S2 FAIL
	PAH dibenz[ah]anthracene	4	1.3	0.4675	1.174	0.3	FURTHER ACTION	S2, S3
	PAH fluoranthene	4	44.1	13.7975	38.9835	890	PASS	
	PAH fluorene	4	0.79	0.39	0.781	860	PASS	
	PAH indeno[123-cd]pyrene	4	6.15	2.3625	5.6445	41	PASS	
	PAH naphthalene	4	1.59	0.445	1.371	13	PASS	
	PAH phenanthrene	4	6.26	2.825	6.0005	440	PASS	
	PAH pyrene	4	56.9	16.655	49.6505	2000	PASS	
SVOC	phenol	4	0.2	0.2	0.2	380	PASS	

Comments Key

Asbestos: A=amosite (brown), CH=chrysotile (white), CR=crocidolite (blue). S1, S2 etc - samples noted above relevant thresholds.

4.6. Envirolab Ltd Certificates



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

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 24/01556
Issue Number: 1
Date: 29 February, 2024

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

Project Manager: Daniel Slattery
Project Name: Stevia Investments Ltd - 2 War office Road, Bamford,
Rochdale
Project Ref: Not specified
Order No: N/A
Date Samples Received: 15/02/24
Date Instructions Received: 15/02/24
Date Analysis Completed: 29/02/24

Approved by:

Richard Wong
Client Manager





Envirolab Job Number: 24/01556

Client Project Name: Stevia Investments Ltd - 2 War office
Road, Bamford, Rochdale

Client Project Ref: Not specified

Lab Sample ID	24/01556/1	24/01556/2	24/01556/3	24/01556/4				Units	Limit of Detection	Method ref
Client Sample No	S1	S2	S3	S4						
Client Sample ID	TH1	TH2	TH3	TH4						
Depth to Top	0.00	0.00	0.00	0.00						
Depth To Bottom	0.45	0.50	0.50	0.60						
Date Sampled	13-Feb-24	13-Feb-24	13-Feb-24	13-Feb-24						
Sample Type	SOIL	SOIL	SOIL	SOIL						
Sample Matrix Code	6A	6A	6AE	6A						
% Stones >10mm _A	6.9	6.2	15.0	7.0				% w/w	0.1	A-T-044
pH _D ^{MF}	7.23	6.50	7.34	5.52				pH	0.01	A-T-031s
Sulphate (acid soluble) _D ^{MF}	<400	560	410	280				mg/kg	200	A-T-028s
Cyanide (total) _A ^{MF}	<1	<1	<1	<1				mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2	<0.2	<0.2				mg/kg	0.2	A-T-050s
Sulphide _A	<5	<5	<5	<5				mg/kg	5	A-T-043-s
Sulphur (elemental) _D ^{MF}	9	210	<5	<5				mg/kg	5	A-T-029s
Organic Matter _D ^{MF}	8.3	28.2	6.4	3.3				% w/w	0.1	A-T-032s
Arsenic _D ^{MF}	5	35	8	6				mg/kg	1	A-T-024s
Boron (water soluble) _D ^{MF}	<1.0	<1.0	<1.0	<1.0				mg/kg	1	A-T-027s
Cadmium _D ^{MF}	10.8	22.4	6.8	7.1				mg/kg	0.5	A-T-024s
Copper _D ^{MF}	38	190	51	23				mg/kg	1	A-T-024s
Chromium _D ^{MF}	12	15	15	17				mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1				mg/kg	1	A-T-040s
Lead _D ^{MF}	56	537	233	30				mg/kg	1	A-T-024s
Mercury _D	<0.17	4.38	0.61	<0.17				mg/kg	0.17	A-T-024s
Nickel _D ^{MF}	30	76	18	16				mg/kg	1	A-T-024s
Selenium _D ^{MF}	<1	<1	<1	<1				mg/kg	1	A-T-024s
Zinc _D ^{MF}	52	113	128	52				mg/kg	5	A-T-024s



Envirolab Job Number: 24/01556

Client Project Name: Stevia Investments Ltd - 2 War office
Road, Bamford, Rochdale

Client Project Ref: Not specified

Lab Sample ID	24/01556/1	24/01556/2	24/01556/3	24/01556/4				Units	Limit of Detection	Method ref
Client Sample No	S1	S2	S3	S4						
Client Sample ID	TH1	TH2	TH3	TH4						
Depth to Top	0.00	0.00	0.00	0.00						
Depth To Bottom	0.45	0.50	0.50	0.60						
Date Sampled	13-Feb-24	13-Feb-24	13-Feb-24	13-Feb-24						
Sample Type	SOIL	SOIL	SOIL	SOIL						
Sample Matrix Code	6A	6A	6AE	6A						
Asbestos in Soil (inc. matrix)										
Asbestos in soil ₀ ⁹	NAD	NAD	NAD	NAD						A-T-045
Asbestos Matrix (visual) ₀	-	-	-	-						A-T-045
Asbestos Matrix (microscope) ₀	-	-	-	-						A-T-045
Asbestos ACM - Suitable for Water Absorption Test? ₀	N/A	N/A	N/A	N/A						A-T-045



Envirolab Job Number: 24/01556

Client Project Name: Stevia Investments Ltd - 2 War office
Road, Bamford, Rochdale

Client Project Ref: Not specified

Lab Sample ID	24/01556/1	24/01556/2	24/01556/3	24/01556/4				Units	Limit of Detection	Method ref
Client Sample No	S1	S2	S3	S4						
Client Sample ID	TH1	TH2	TH3	TH4						
Depth to Top	0.00	0.00	0.00	0.00						
Depth To Bottom	0.45	0.50	0.50	0.60						
Date Sampled	13-Feb-24	13-Feb-24	13-Feb-24	13-Feb-24						
Sample Type	SOIL	SOIL	SOIL	SOIL						
Sample Matrix Code	6A	6A	6AE	6A						
PAH-16MS										
Acenaphthene _A ^{MS}	0.07	0.11	1.04	<0.01				mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{MS}	0.07	6.31	0.05	<0.01				mg/kg	0.01	A-T-019s
Anthracene _A ^{MS}	0.09	4.82	1.31	<0.02				mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{MS}	0.56	21.8	4.38	<0.04				mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{MS}	0.69	12.9	4.48	0.05				mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{MS}	0.67	14.6	4.76	0.05				mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{MS}	0.37	4.95	2.52	<0.05				mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{MS}	0.22	6.99	1.67	<0.07				mg/kg	0.07	A-T-019s
Chrysene _A ^{MS}	0.65	27.8	4.32	<0.06				mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A	0.07	1.30	0.46	<0.04				mg/kg	0.04	A-T-019s
Fluoranthene _A ^{MS}	1.02	44.1	9.99	<0.08				mg/kg	0.08	A-T-019s
Fluorene _A ^{MS}	0.03	0.79	0.73	<0.01				mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{MS}	0.48	6.15	2.78	0.04				mg/kg	0.03	A-T-019s
Naphthalene _A ^{MS}	<0.03	0.13	1.59	<0.03				mg/kg	0.03	A-T-019s
Phenanthrene _A ^{MS}	0.48	4.53	6.26	<0.03				mg/kg	0.03	A-T-019s
Pyrene _A ^{MS}	1.08	56.9	8.57	<0.07				mg/kg	0.07	A-T-019s
Total PAH-16MS _A	6.55	214	54.9	0.14				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 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.

The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client.

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.

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 "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
N/A	Not applicable

Asbestos

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

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing, and fibre counting by sedimentation/phase contrast optical microscopy if required. 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) quantification by sedimentation is performed. 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.

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 accreditation 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@envirolab.co.uk

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

Project No: 24/01556
Date Received: 15/02/2024 (am)
Cool Box Temperatures (°C): 13.2

Project: Stevia Investments Ltd - 2 War office Road, Bamford, Rochdale
Clients Project No:

Lab Sample ID	24/01556/1	24/01556/2	24/01556/3	24/01556/4
Client Sample No	S1	S2	S3	S4
Client Sample ID/Depth	TH1 0.00-0.45m	TH2 0.00-0.50m	TH3 0.00-0.50m	TH4 0.00-0.60m
Date Sampled	13/02/24	13/02/24	13/02/24	13/02/24
Deviation Code	F			

Key

F Maximum holding time exceeded between sampling date and analysis for analytes listed below

HOLDING TIME EXCEEDANCES

Lab Sample ID	24/01556/1	24/01556/2	24/01556/3	24/01556/4
Client Sample No	S1	S2	S3	S4
Client Sample ID/Depth	TH1 0.00-0.45m	TH2 0.00-0.50m	TH3 0.00-0.50m	TH4 0.00-0.60m
Date Sampled	13/02/24	13/02/24	13/02/24	13/02/24
Sulphide	✓	✓	✓	✓

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.

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Envirolab Analysis Dates

Lab Sample ID	24/01556/1	24/01556/2	24/01556/3	24/01556/4
Client Sample No	S1	S2	S3	S4
Client Sample ID/Depth	TH1 0.00-0.45m	TH2 0.00-0.50m	TH3 0.00-0.50m	TH4 0.00-0.60m
Date Sampled	13/02/24	13/02/24	13/02/24	13/02/24
A-T-019s	22/02/2024	23/02/2024	22/02/2024	22/02/2024
A-T-024s	28/02/2024	28/02/2024	28/02/2024	28/02/2024
A-T-027s	29/02/2024	29/02/2024	29/02/2024	29/02/2024
A-T-028s	28/02/2024	28/02/2024	28/02/2024	28/02/2024
A-T-029s	28/02/2024	29/02/2024	28/02/2024	28/02/2024
A-T-031s	28/02/2024	28/02/2024	28/02/2024	28/02/2024
A-T-032s	28/02/2024	28/02/2024	28/02/2024	28/02/2024
A-T-040s	28/02/2024	28/02/2024	28/02/2024	28/02/2024
A-T-042sTCN	22/02/2024	22/02/2024	22/02/2024	22/02/2024
A-T-043-s	29/02/2024	29/02/2024	29/02/2024	29/02/2024
A-T-044	22/02/2024	22/02/2024	22/02/2024	22/02/2024
A-T-045	19/02/2024	19/02/2024	19/02/2024	19/02/2024
A-T-050s	26/02/2024	26/02/2024	26/02/2024	26/02/2024

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

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5. APPENDIX B: PHOTOS



Reconnaissance photos July 2022.



Reconnaissance photos July 2022.



Site investigation photos February 2024 - Trial Hole TH1.



Site investigation photos February 2024 - Trial Hole TH2.

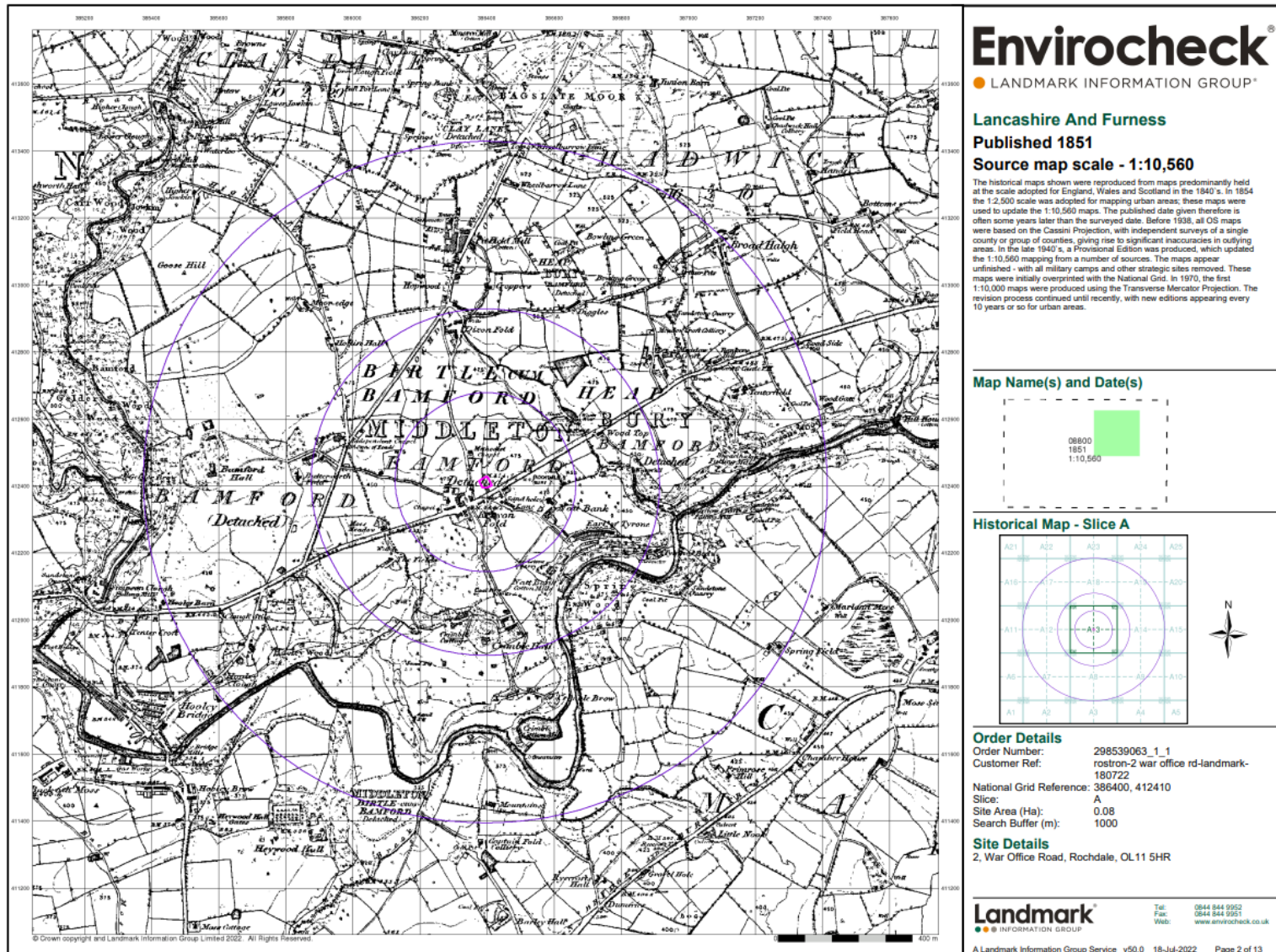


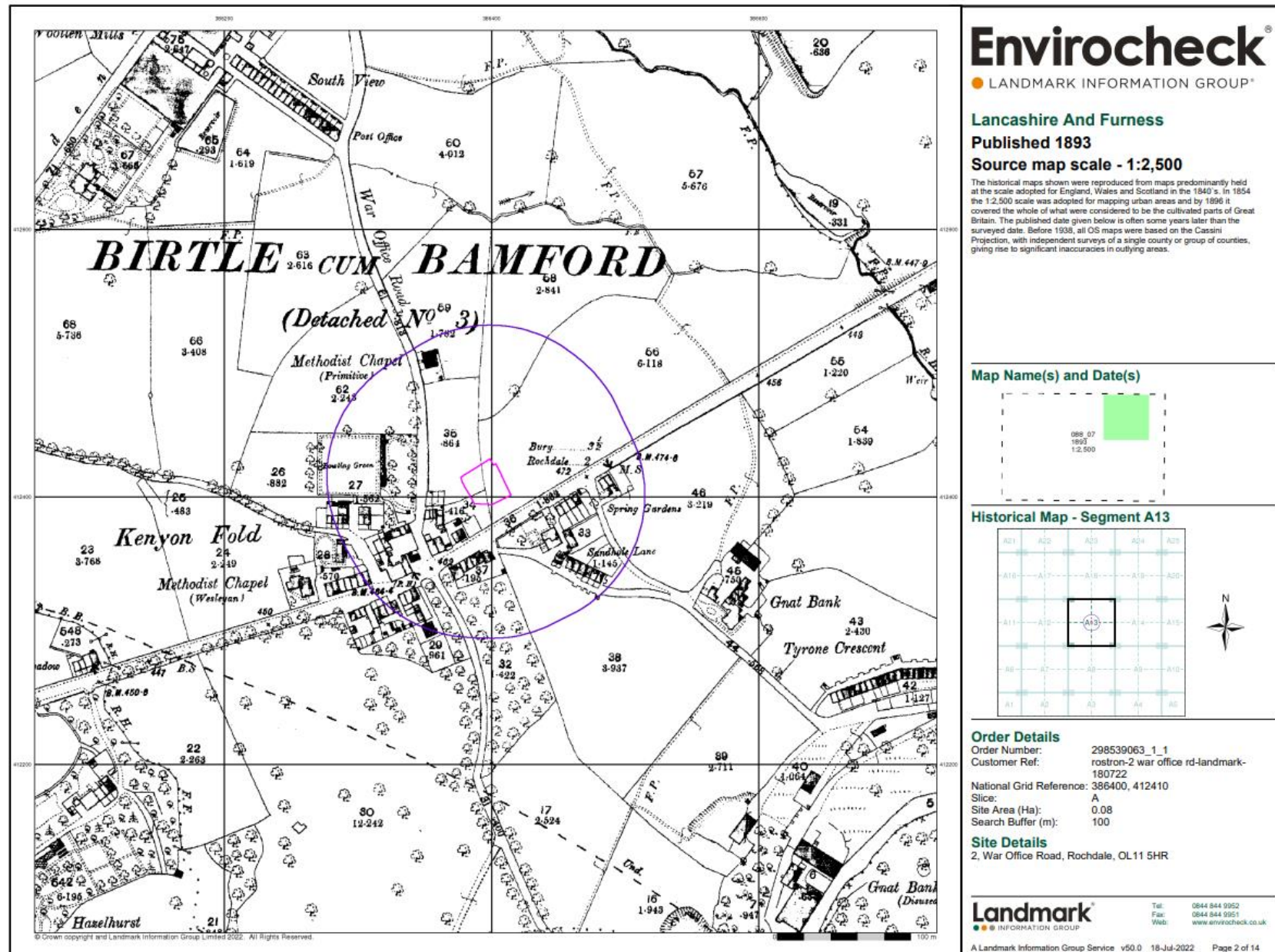
Site investigation photos February 2024 - Trial Hole TH3.

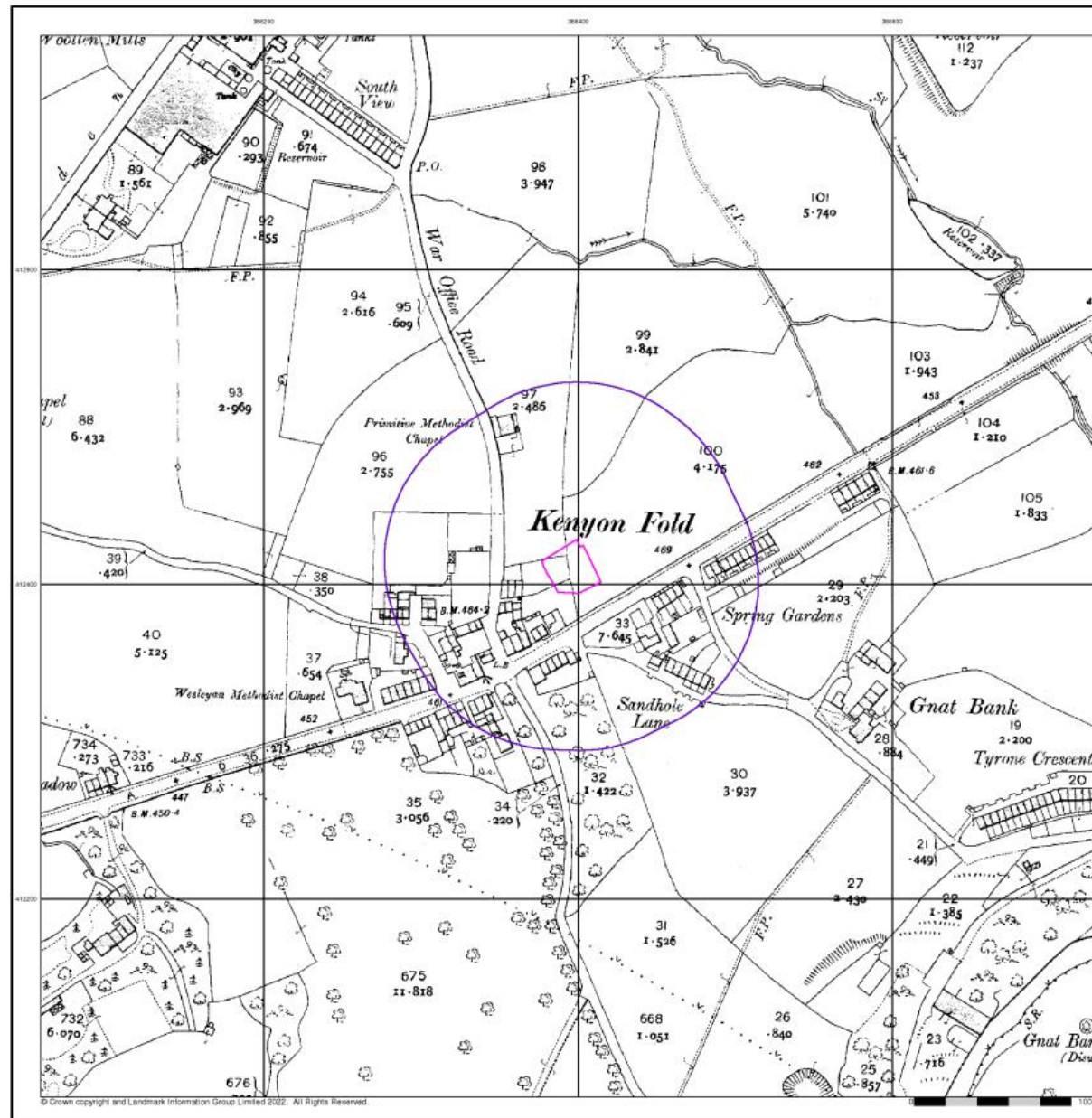


Site investigation photos February 2024 - Trial Hole TH3.

6. APPENDIX C: LANDMARK ENVIROCHECK







Envirocheck®

LANDMARK INFORMATION GROUP®

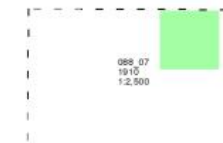
Lancashire And Furness

Published 1910

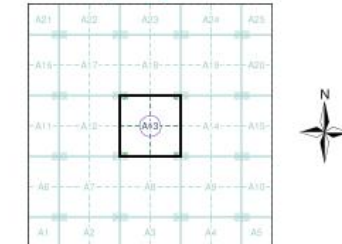
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number: 298539063_1_1
 Customer Ref: rostron-2 war office rd-landmark-180722
 National Grid Reference: 386400, 412410
 Slice: A
 Site Area (Ha): 0.08
 Search Buffer (m): 100

Site Details

2, War Office Road, Rochdale, OL11 5HR

Landmark®
 LANDMARK INFORMATION GROUP

Tel: 0844 844 0952
 Fax: 0844 844 0951
 Web: www.envirocheck.co.uk

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