T J BOOTH ASSOCIATES

CONSULTING CIVIL & GEOTECHNICAL ENGINEERS

PHASE I & II ENVIRONMENTAL AUDIT.
Land adjacent 662 Bury Rd, Rochdale, OL11 4AY.

Client:	Miss Riley.
Date:	November 2018.
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1. INTRODUCTION.

T. J. Booth Associates have been appointed by Miss Riley to undertake a Phase I Environmental Audit to the above Development Site and surrounding area. This report will support a planning application to address Town & Country Planning requirements for development.

The Development Site is located in the former garden area and to the east side of 662 Bury Road, Rochdale; E: 386659, N: 412567. The Site is currently vacant, comprising a greenfield plot of land surrounded by public open space to the N & E sides. The local area is generally made up of residential housing estates with local amenities.

The Site was granted planning permission in July 2018, ref No. 17/00922/FUL; for the erection of 1No. detached residential dwelling.

Condition No. 4 of the planning permission related to an environmental assessment of the Site, and stated specifically:

> 4 No development shall take place until an investigation and risk assessment, in addition to any assessment provided with the planning application, to assess the nature and extent of any contamination on the site, whether or not it originates on the site, has been submitted to and approved in writing by the local planning authority. 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:
>
> 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 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 provides a desk based environmental study local to the site on the potential for contamination via the source-pathway-receptor methodology using current environmental databases. A Site walkover is also undertaken, in line with current guidance. Recommendations in line with current best practice shall be put forward at the end of the report.

2. PROPOSED DEVELOPMENT.

The proposed development is for the erection of 1No. traditional 2 storey residential dwelling with room in the roof, and an underfloor void space.

The Site will be accessed direct from Bury Road, to a driveway at the front of the property. Excluding pathways and a patio around the property, the remainder of the Site will comprise soft landscaping.

3. MAP REVIEW.

3.1. Historic Maps.

Historic maps were obtained from Landmark at nominally 1:2500 and 1:10560 scale of the Site and the surrounding area. Google Maps historic view is also included from c2000. They were reviewed, tabulated below & appended.

DATE	ON-SITE	OFF-SITE/SURROUNDING AREA
c1851	The Site is part of agricultural land.	There is a minor watercourse/stream flanking the NE & NW boundaries of the Site. A small reservoir/pond is located off-site to the N, and another reservoir approx. 100m N; both have artificial earth banks. Bury Road is noted to the SE boundary of the Site.
c1890-93	No change.	Further reservoirs down-stream to the S approx 100-200m distant.
c1910	No change.	Some residential development in the local area around Bury Rd.
c1930	No change.	Bury RDC Sewage Works noted approx 50m SE across Bury Road. Sand pit expanded to within 250m of the development.
c1937	No change.	No overall change.
c1957	662 now erected. Site partly within the garden area to 662, and partly within agricultural or open land the NW side.	Pylon now noted to the NE side off-site. The reservoir to the N side has been removed, and the reservoir 100m N noted as old. Around the SE boundary to Bury Road, and to the SW adjacent 662, land is noted to fall towards the Site nominally as in present day layout. Some construction of the housing estate across Bury Rd to the S.
c1966-70	No change.	Much of the housing estates to both the N & S of Bury Rd now erected. Sewage Works to the SW now disused.
c1992	Site now shaped as in present day.	Watercourse to the NW/NE of the Site now completely culverted. Total urbanisation of the local area.
c1992	No change.	No change.

3.2. Present Day Maps.

Present day maps comprise both paper & digital/online resources such as google maps, topographic surveys, OS etc.

PRESENT DAY MAPPING DATA SUMMARY	
Site Boundaries, Outlines of Structures and Buildings:	The Site is currently part of 662 Bury Road, occupying the E/NE side of the garden which currently wraps around the property. Other than vegetation, no other structures or buildings are noted within the Proposed Site boundaries.
Water Courses:	Manholes are noted on the topographic survey of the Site, indicating the line of the culverted watercourse.
Ground Contours, Natural Drainage	The Site is in a natural hollow. Historically the Site would have formed part of the valley formed by the adjacent

Features:	stream but this has since had the Bury Road embankment run through it creating the hollow. The Front S side of the Site is level with Bury Road, and the adjacent No.662, however, the level drops off with the largest difference noted in the N corner of the Site at approx 4.5m.
Below Ground Obstructions:	None noted beneath the Site.

3.3. BGS Geological Map Review.

The local geology was accessed via the BGS digital online mapping data service, and paper copies of Manchester Sheet 85, 1:50000 Series (solid & superficial), refer to appendix for Geological Maps.

GEOLOGY DATA SUMMARY	
Bedrock Geology:	The site is general underlain by undifferentiated Carboniferous Westphalian Coal Measures. The local stratigraphic dip is approx 5 degrees NW.
Superficial Geology:	Glacial clay till underlies the Site and area local to Site with some deposits of glaciofluvial sand & gravel in the wider area.
Coal Seams/Faults.	The Arley Mine Seam is the closest to outcrop approximately 375m SE of the Site. Geological mapping data suggests the seam to be 40-45m below the Site.

4. ENVIRONMENTAL DATA SEARCH.

4.1. Landmark Envirocheck Report.

The Landmark Envirocheck Report comprises a detailed environmental dataset for the site and the surrounding local area.

The summary assessment tables give an account of the environmental issues on site, within 0-250, and between 250-500m of the site (refer to appendix for summary tables). For this location an area up to 250m of the site boundary is critical for environmental purposes and each section of the summary tables is commented on below.

4.1.1. Agency & Hydrological

Contaminated Land Register Entries & Notices – 0 records within a 250m radius of the Site.

Discharge Consents - 0 records within a 250m radius of the Site.

Pollution Incidents To Controlled Waters - 2 records within a 250m radius of the Site relating to illegal foul water connections to surface water network 58mSE, and 137m W.

Groundwater Vulnerability – Classified soils as high leaching potential.

Bedrock Aquifer Designation – Secondary A Aquifer.

Superficial Aquifer Designation – Secondary Undifferentiated.

Source Protection Zones – Not within a Source Protection Zone.

Flooding from Rivers & Sea – Not within a flood zone.

4.1.2. Waste.

Historic Landfill Sites – 1 record within a 251-500m radius of the Site: named as Meadowcroft Mill 404m SE.

4.1.3. Hazardous Substances.

No records noted within a 250m radius of the Site.

4.1.4. Geological.

BGS Recorded Mineral Sites – No records within a 250m radius of the Site.

Coal Mining Area – in an area that may be affected by coal mining.

Potential for Collapsible Ground Stability Hazards – very low.

Potential for Compressible Ground Stability Hazards – no hazard.

Potential for Ground Dissolution Stability Hazards – no hazard.

Potential for Landslide Ground Stability Hazards – very low.

Potential for Running Sand Ground Stability Hazards – very low.

Potential for Shrinking or Swelling Clay Ground Stability Hazards – very low.

Radon Potential/Radon Affected Areas – the property is in a Lower Probability Radon Area where <1% of homes are estimated to be at or above the action level.

Radon Potential/Radon Protection Measures – no radon protection measures are necessary in the construction of new dwellings or extensions.

4.2. BGS Boreholes Records.

No boreholes were noted within a relevant and close proximity to the Site.

4.3. Coal Authority.

Information was obtained from the Coal Authority interactive digital online mapping service. Data tabulated below.

COAL AUTHORITY DATA SUMMARY	
Mine Shafts, Pits, Adits/Entries:	Closest pit to the Site is approximately 80m NE of the Site boundary.
Past/Present Recorded Underground Mining.	No recorded underground workings have been noted beneath the Site.
Probable/Potential Shallow Underground Workings & Outcrops:	No recorded probable or potential shallow mining has been noted beneath the Site, although it has potentially occurred locally.
Outcrops:	Closest is the Arley Mine approx 375m SE.
Development High Risk Area:	Site is not in a Development High Risk Area.

5. FIELDWORK.

5.1. Site Reconnaissance.

A Site reconnaissance was undertaken in August 2018. The weather was sunny and dry.

SITE RECONNAISSANCE SUMMARY	
Details of Existing Structures:	The Site comprises a vacant plot of land accessed from Bury Road, and comprised the E garden area to No.662 Bury Road. There was a gravel driveway to the front S side, and was bound by a timber fence to the NE & NW perimeter, and comprised hedging to the SE/S side. The Site had been vegetated with mature tree species that had recently been felled. There was a fall away from Bury Road, and No 662 to the N/NE corner of the Site of approx 4m.
Adjacent Properties:	Bury Rd to the S; No.662 to the W. An area of public open space surrounded the N & E perimeter. The culverted watercourse is located in this piece of land, and associated manholes were noted. There was also a pylon close by to the E
Water Levels, Directions of Flow and Rates in Rivers:	Stream is culverted but flows to the S under Bury Road.
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:	The Site is within a hollow, and is approx. (up to) 4m below ground level at Bury Rd.

5.2. Site Investigations.

Site investigations were undertaken in September 2018, and comprised hand excavated soil sampling of the upper topsoil across the Site. Four No. samples were taken (S1-4), refer to appendix for Site investigation Plan.

Soil sampling was taken across the Site and generally comprised the upper 0.5m of topsoil. No visual or olfactory contamination of the Soil was noted on sampling. Samples S1, S3, & S4 were noted as brown sandy silty topsoil. S2 was brown/orange & more silty suggesting it comprised more of the subsoil beneath.

Soil samples were sealed in 1kg white plastic snap top containers, amber jars & vials where appropriate and sent to Concept Life Sciences Ltd, to be tested for a range of common contaminants. Samples were tested for metals, speciated PAH, inorganics & sulphates, SOM, and asbestos screening.

On return the results were assessed by TJ Booth Associates to common threshold comparison data, firstly to the Defra Category 4 Screening Levels (C4SL) where available, and then to EA/DEFRA SGV (2009) data and LQM/CIEH GAC 2nd edition (2009) & erratum (2011) thereafter. The soil results were compared to residential threshold levels.

Results indicated Site soil was not contaminated when compared to a residential end use scenario.

6. DISCUSSION FROM THE DESK STUDY AND FIELDWORK.

6.1. Conceptual Model.

6.1.1. Summary.

The Site was originally part of agricultural land, from c1850s until c1950s when it became the garden area to the 662 Bury Road. It has remained as such up until the present day.

The area around Bury Road has been infilled to some extent to level and widen the highway so there is the potential for Site soil to have been contaminated.

Soil sampling was undertaken on the topsoil to ensure its suitability for reuse, and has tested below threshold levels for common contaminants when compared to a residential end use setting. Thus existing topsoil on Site can be reused for the proposed end use.

Locally, the area has mostly been agricultural up until the local area was developed for housing c1960-70. There was a reservoir close to the NE of the Site boundary but this is shown on historic maps to have been formed by a bund to the S side which was later removed, and so no infilling is thought to have occurred locally as a result of the reservoir removal.

The Landmark data indicated no historic landfill sites within a 250m radius of the Application Site. The Site is not within a radon protection zone, and is not within Development High Risk Area for coal mining issues.

6.1.2. Potential Contaminants.

The desk study/site reconnaissance has revealed the following sources (not an exhaustive list but a summary of the main points):

SOURCE/S	CONTAMINANT/S
Top soils	Metals, PAH, sulphates, inorganics, asbestos.

6.1.3. Potential Pathways.

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

PATHWAY	MEDIA	PRESENT
Soil and dust ingestion	Soil and indoor dust	YES
Consumption of home grown fruit and vegetables	Produce	YES
Skin contact (indoors)	Indoor dust	NO
Skin contact (outdoors)	Soil	YES
Inhalation of dust (indoors)	Air	YES
Inhalation of dust (outdoors)	Air	YES
Vapours (indoors)	Air	NO
Vapours (outdoors)	Air	NO

6.1.4. Potential Receptors.

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

6.1.5. Potential Pollutant Linkages.

Below is a tabulated form of the conceptual model:

	SOURCE	PATHWAY	RECEPTOR	RISK
1	On site surface soils.	Direct ingestion, aerial ingestion, dermal contact, drinking water.	Site construction operatives & future occupants.	LOW RISK
2	Subsoils.	Contact with potential hazards.	Site buildings.	LOW RISK
3	Ground gas from geological strata.	Diffusion through soil, aerial inhalation.	Future occupants. Explosion, suffocation.	LOW RISK
4	Ground gas from waste, landfill or other sources in made ground.	Diffusion through soil, aerial inhalation.	Future occupants. Explosion, suffocation.	LOW RISK
5	Contaminated ground and surface water. Controlled Waters.	Permeation through soils into excavations / basements, dermal contact & ingestion.	Site construction operatives & future occupants.	LOW RISK
6	Aerial contaminants.	Dermal contact & aerial inhalation.	All site users / occupants.	LOW RISK

7. CONCLUSIONS.

7.1. Preliminary Contaminant Risk Assessment.

Regarding potential pollutant linkage 1, testing of the upper soil profile has proven low levels of contaminants in Site soils when compared to a residential end use. Thus the source-pathway-receptor pollutant linkage is considered broken and little risk remains to potential receptors.

Regarding potential pollutant linkage 2, no risk is noted. Site soil comprised no elevated levels of sulphates and no hydrocarbon or other organics capable of penetrating water pipes etc is evident.

Regarding potential pollutant linkage 3, contaminant sources from local geology are thought to pose a low risk. The local area is not within a radon protection zone (BGS/HPA Class 1 Area), and coal mining is not a risk beneath the Site.

Ground gas sources such as waste & landfill sites or made ground in potential pollutant linkage 4 comprise a low risk. No landfill sites have been noted within a 250m radius of the Development Site.

Regarding potential pollutant linkage 5, potential impact on ground/surface water is considered low. There is a watercourse by the Site but it has been culverted and there is no

risk. Bedrock & superficial aquifers are secondary, and the Site is not within a Source Protection Zone.

Potential pollutant linkage 6 is considered to pose a low risk. Present legislation regarding the release of aerial contaminants is regulated although past contamination which was unregulated would now be recorded in potential pollutant linkage 1 as shallow ground contamination.

8. RECOMMENDATIONS/SITE INVESTIGATION STRATEGY.

8.1. Shallow Soil Contamination:

Soil test results have confirmed that the existing upper soil profile is free from elevated contaminants when compared against a residential end use setting.

Upper Site soil/topsoil may therefore be retained and put aside where necessary for later reuse.

Due to the above, existing Site soil does not warrant retesting/validation. However, should further soil be imported to the Site, it should be clean/inert, and free from deleterious materials; and should be suitable for use in a residential end use setting. Imported soil will need to be validated & will be tested for contamination suites: metals, inorganics, PAH USEPA16 speciated, and asbestos screening. Results will be analysed against Defra Category 4 Screening Levels (C4SL) where available, and to EA/DEFRA SGV (2009) data; and to LQM/CIEH GAC 2nd edition (2009) & erratum (2011) thereafter, for use in a residential end use setting.

8.2. Gas Risk:

No gas risk has been noted at the development and thus gas protection measures are not required.

8.3. Additional Notes:

Should any suspected unidentified contamination be encountered throughout the groundworks or construction phase of the development, the suspect area/s should be isolated, advice sought from a suitable qualified environmental professional, and the LPA informed.

A final Site Validation Report may be required to confirm the status of remedial works when completed. The report should be submitted to the LPA to obtain full discharge of the environmental planning condition.

Before any further work is undertaken, this report should be submitted to and agreed by the RMBC Contaminated Land Team.

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.

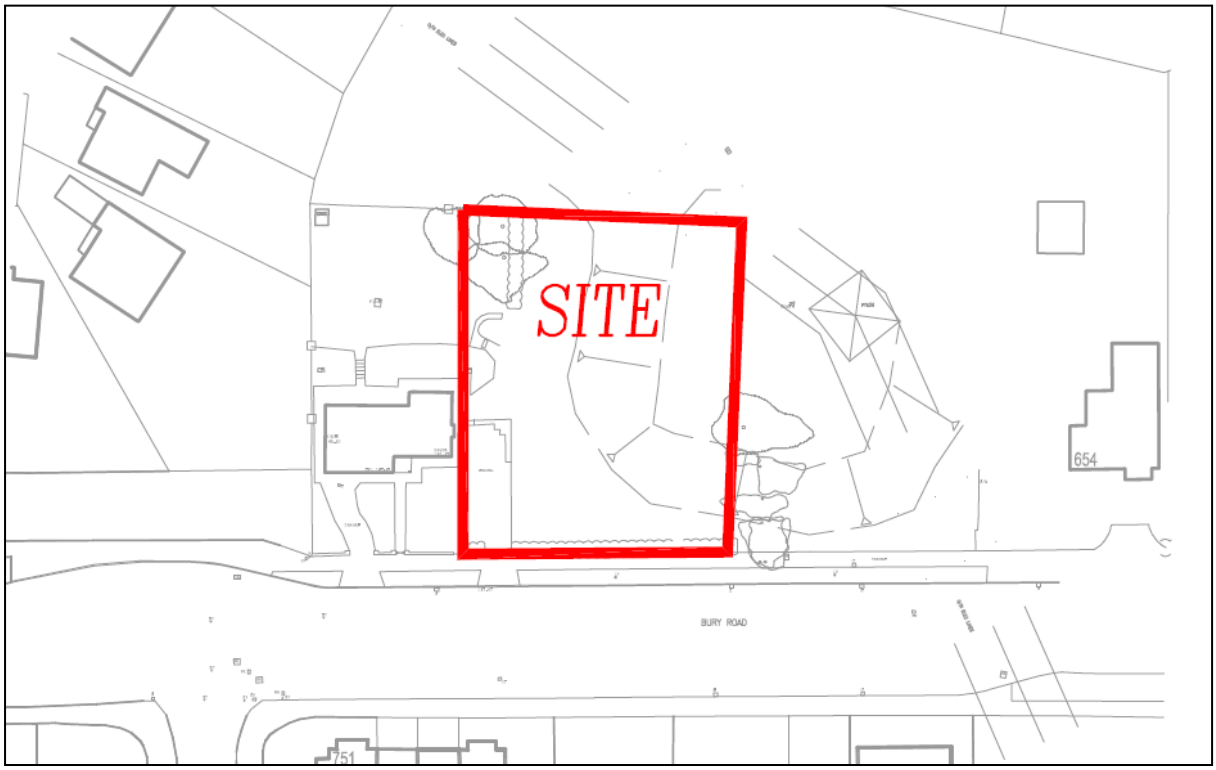
T J Booth Associates.

9. REFERENCES.

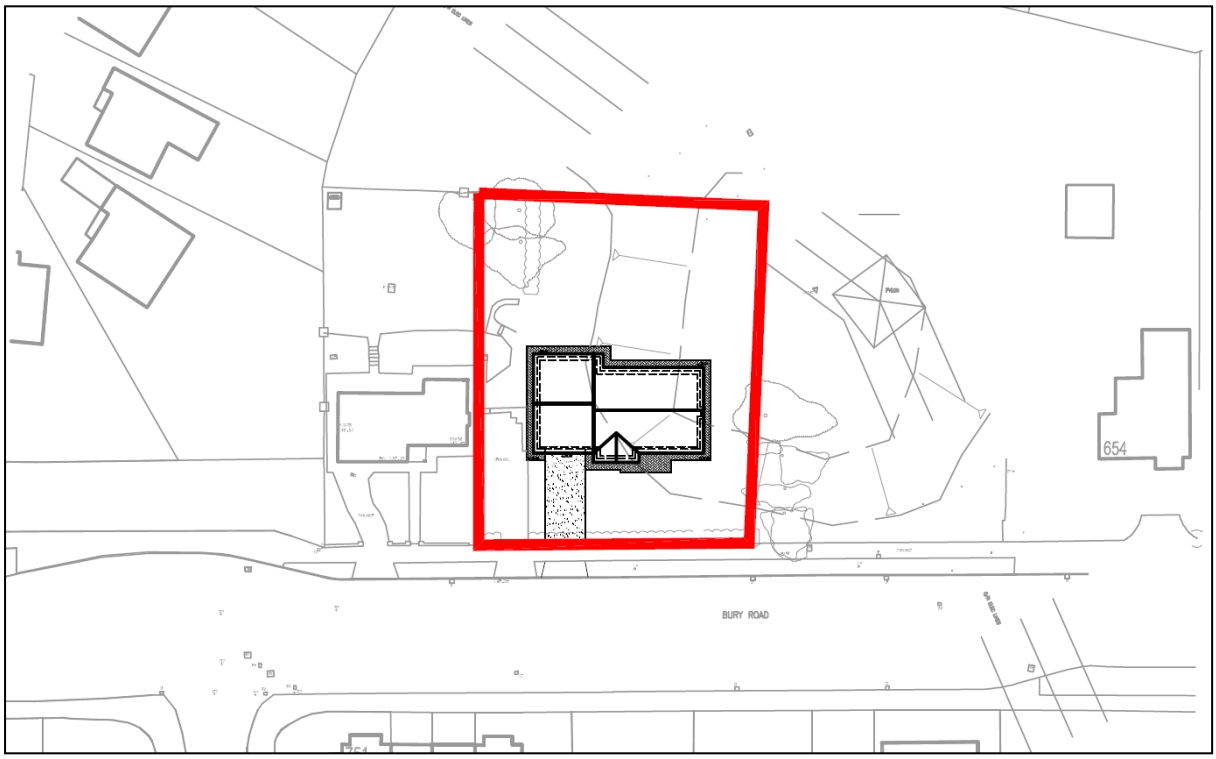
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- BRE 414. 2001. Protective Measures for Housing on Gas Contaminated Land.
- ICE Manual of Geotechnical Engineering Volume I. 2012.

10. APPENDIX A: FIGURES.

10.1. Location Plan.



10.2. Proposed Development.



10.3. Site Investigation Plan.



10.4. TJBA Soil Contamination Analysis.

Client / Site	***Riley - 662 Bury Rd, Rochdale.***
Sampling Date	***27th Sept 2018***

Comparison of Contamination Test Results with Thresholds (mg/kg)

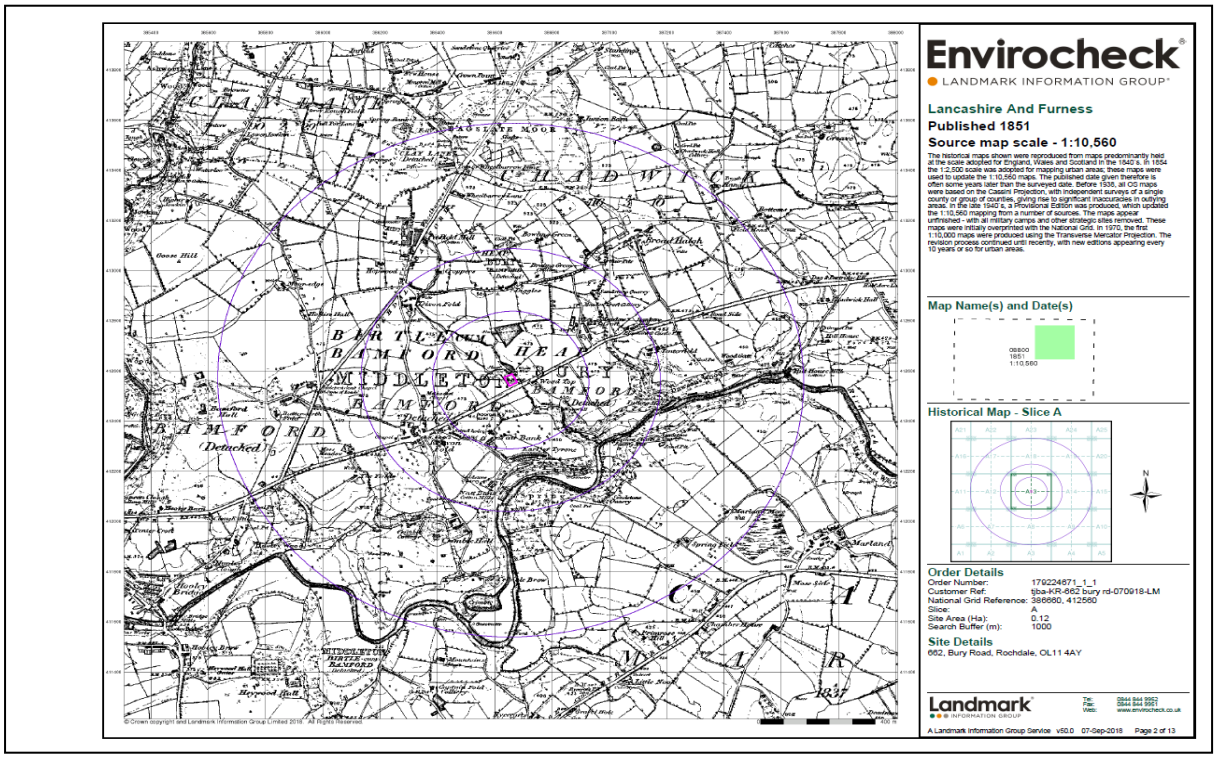
Contaminant		No	Max	Mean	t 95	RESIDENTIAL (with or without plant uptake)		
							Pass/Fail	Comment
METALS	Arsenic as As, dry weight	4	26	16	24.5	37	PASS	
	Boron as B, hot water sol dw	4	2	1.25	1.85	291	PASS	
	Cadmium as Cd, dry weight	4	1	1	1	22	PASS	
	chromium as Cr(III) dry weight	4	24.00	18.75	23.10	627	PASS	
	Chromium as Cr(VI), dry weight	4	1	1	1	21	PASS	
	Copper, as Dry Weight	4	62	40.75	58.55	2330	PASS	
	Lead, as Dry Weight	4	140	84.5	130.7	200	PASS	
	Mercury as Hg, dry weight	4	1	1	1	1	PASS	
	Nickel as Ni, dry weight	4	22	17	21.25	130	PASS	
	Selenium as Se, dry weight	4	3	3	3	350	PASS	
	Zinc as Zn, dry weight	4	98	67.75	92.75	3750	PASS	
INORGANIC	Cyanide (Total)	4	1	1	1	2.5	PASS	
	Sulphate (Total) as SO4	4	0.11	0.078	0.104	0.24	PASS	
	Sulphide	4	10	10	10	250	PASS	
	pH	4	5.3	4.875	5.255	6 to 8	ACIDIC	
	Sulphur (Elemental)	4	500	500	500	100	comment	
	Asbestos Identification	4	0	0	0	0	PASS	
ORGANIC	SOM	4	6	5.125	6			
PAH	acenaphthene	4	0.05	0.03	0.049	1000	PASS	
PAH	acenaphthylene	4	0.03	0.015	0.027	850	PASS	
PAH	anthracene	4	0.13	0.055	0.118	9200	PASS	
PAH	benz[a]anthracene	4	0.79	0.32	0.709	5.9	PASS	
PAH	benzo[a]pyrene	4	0.9	0.328	0.792	5	PASS	
PAH	benzo[b]flouranthene	4	0.93	0.328	0.815	7	PASS	
PAH	benzo[g,h,i]perylene	4	0.78	0.268	0.681	47	PASS	
PAH	benzo[k]flouranthene	4	0.69	0.253	0.609	10	PASS	
PAH	chrysene	4	0.86	0.328	0.763	9.3	PASS	
PAH	dibenz[ah]anthracene	4	0.21	0.075	0.185	0.9	PASS	
PAH	flouranthene	4	1.5	0.578	1.329	670	PASS	
PAH	flourene	4	0.04	0.023	0.039	780	PASS	
PAH	indeno[123-cd]pyrene	4	0.59	0.208	0.517	4.2	PASS	
PAH	napthalene	4	0.11	0.048	0.1	8.7	PASS	
PAH	phenanthrene	4	0.67	0.293	0.61	380	PASS	
PAH	pyrene	4	1.3	0.508	1.155	1600	PASS	
PAH	PAH (Total - SUM EPA16)	4	9.5	3.613	8.42	1	comment	
SVOC	phenol	4	1	1	1	420	PASS	

GAC =LQM residential plant uptake & commercial 2009, BRE = Building Research Establishment, S = typ SNIFFER values, SOM=soil organic material, IC-ICRCL 87(withdrawn), LOD = limit of detection

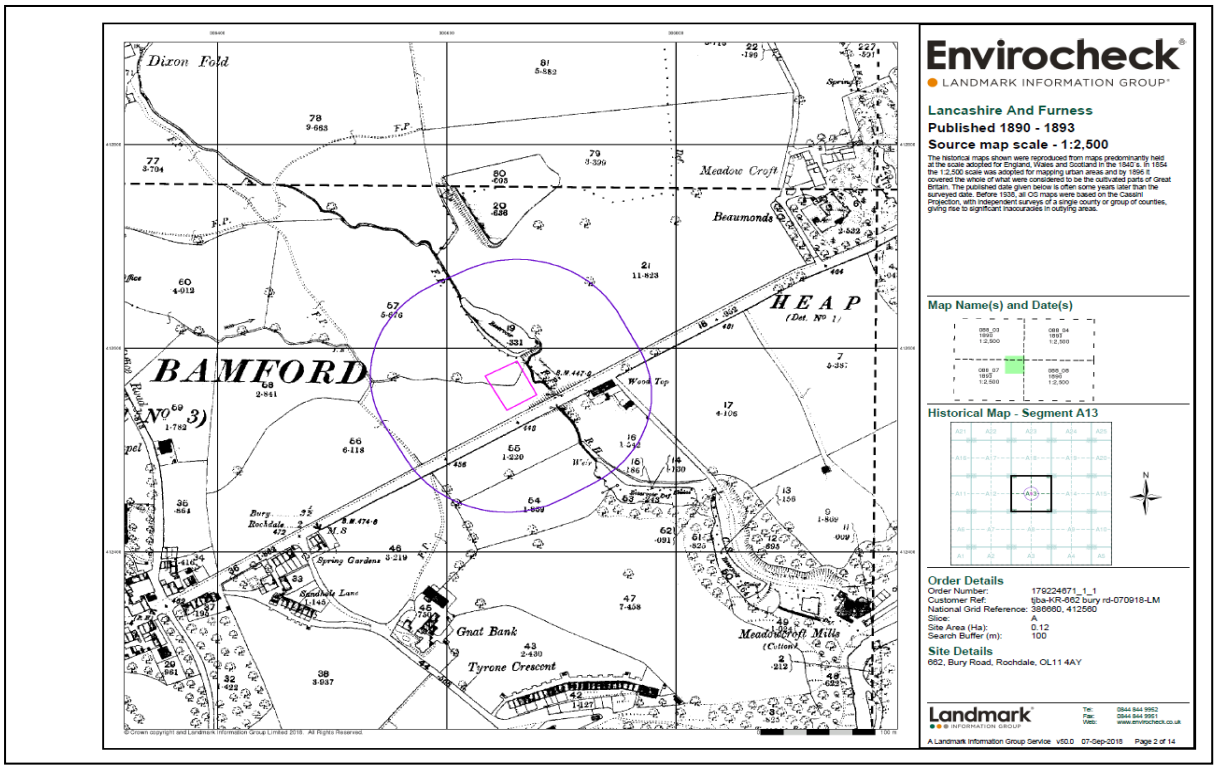
11. APPENDIX B: MAPS.

11.1. Historic Maps.

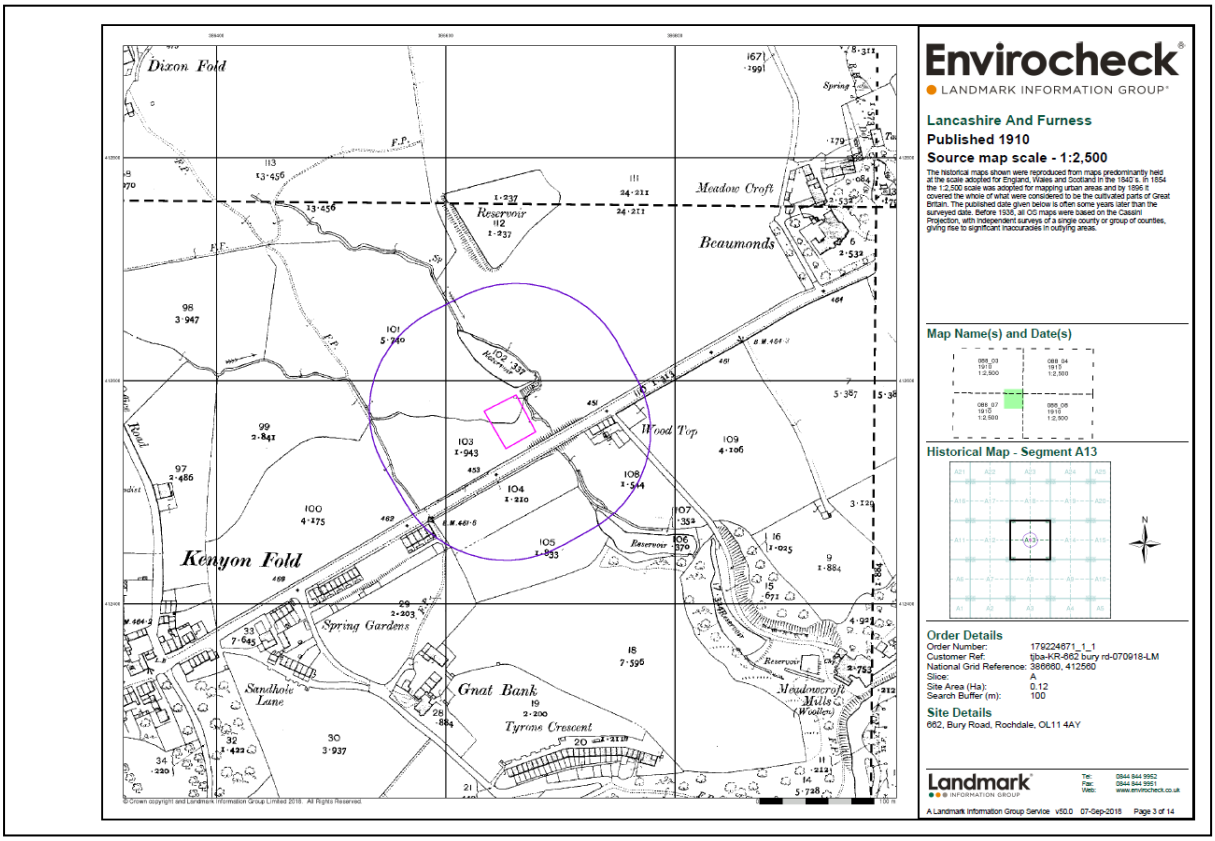
11.1.1. Ordnance Survey c1851



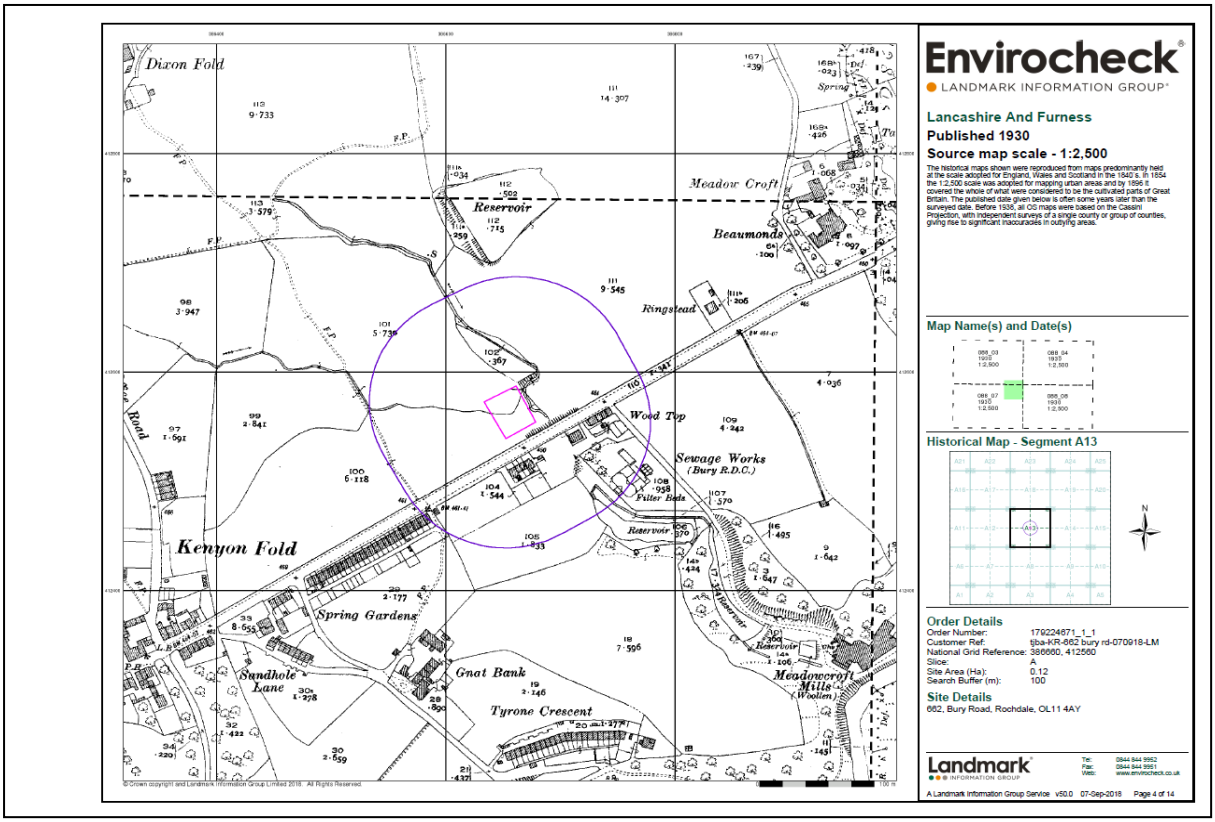
11.1.2. Ordnance Survey c1890-93



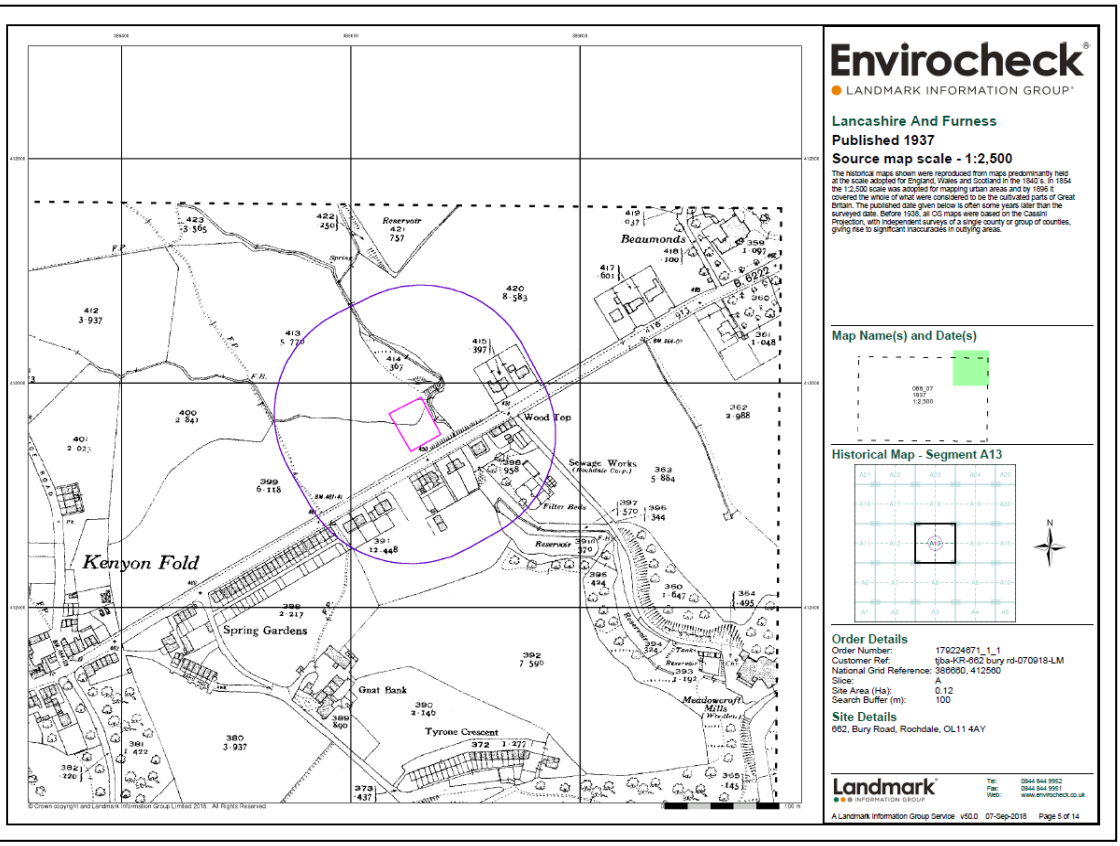
11.1.3. Ordnance Survey c1910



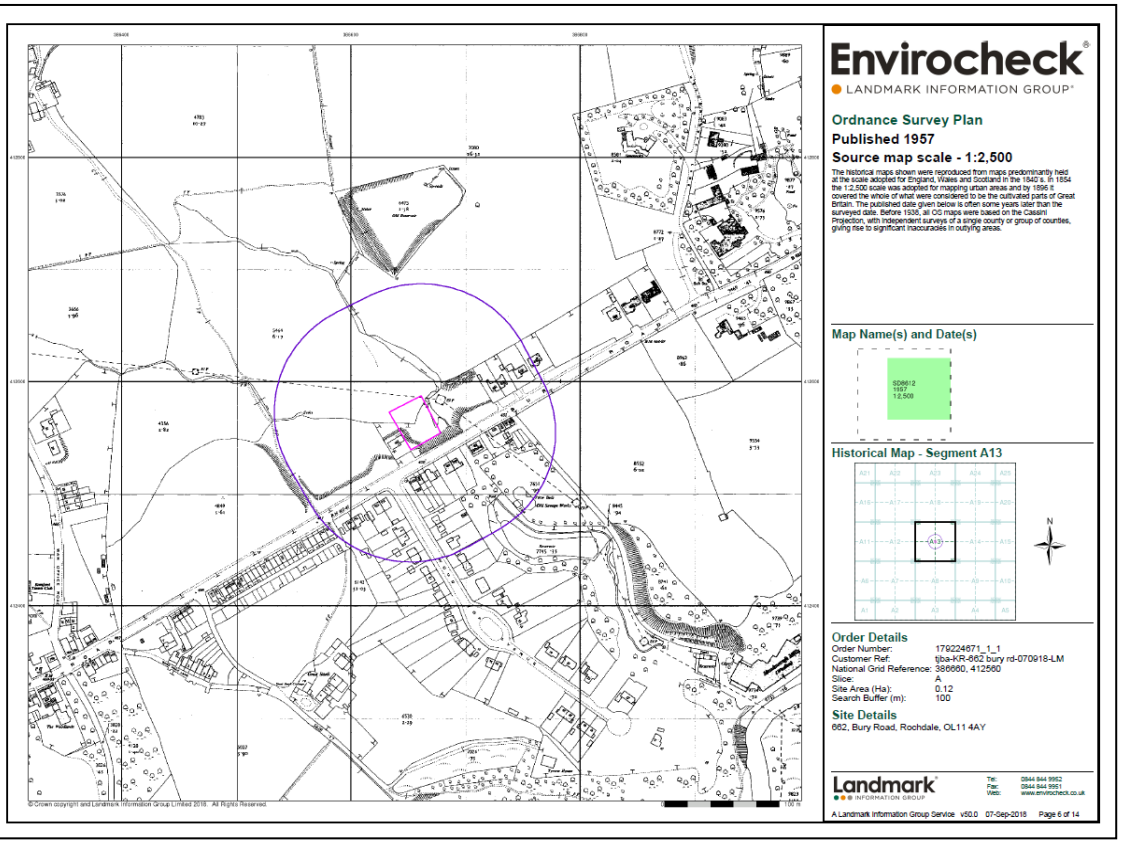
11.1.4. Ordnance Survey c1930



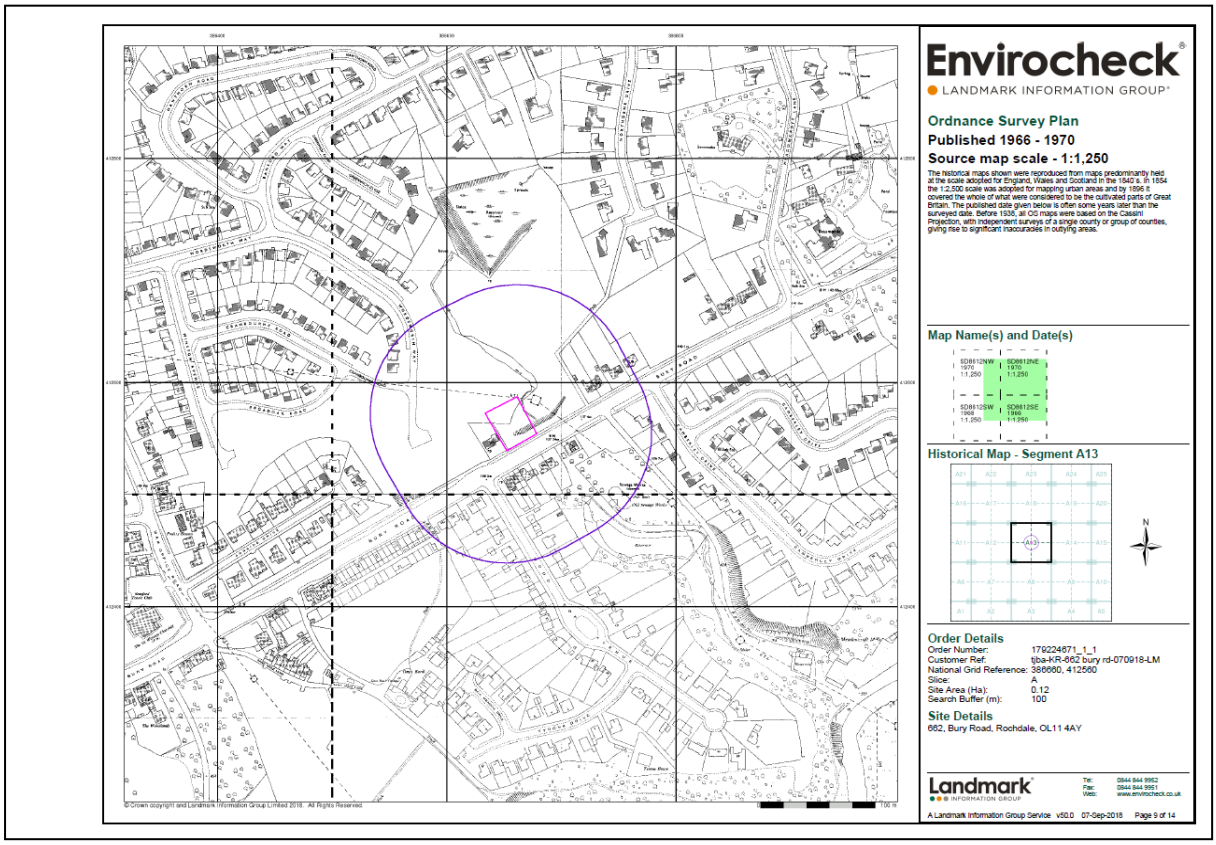
11.1.5. Ordnance Survey c1937



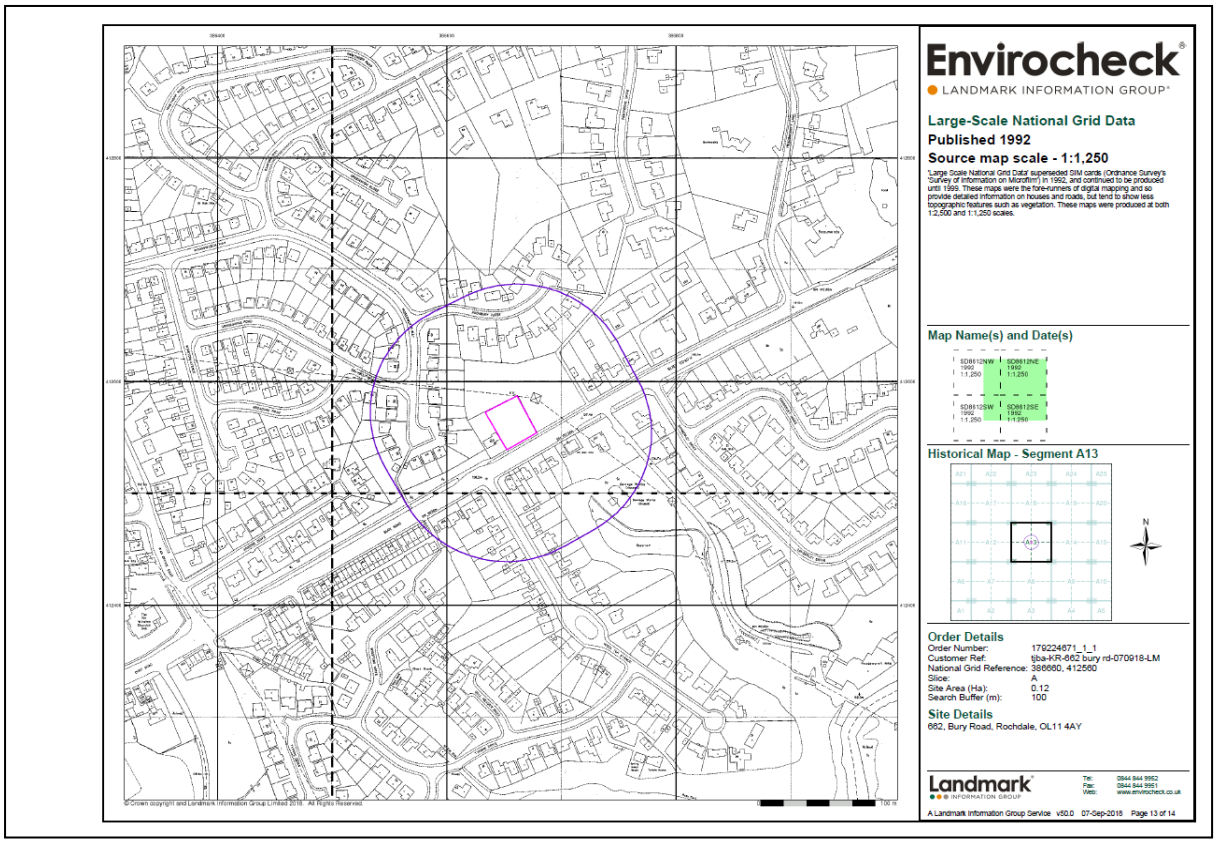
11.1.6. Ordnance Survey c1957



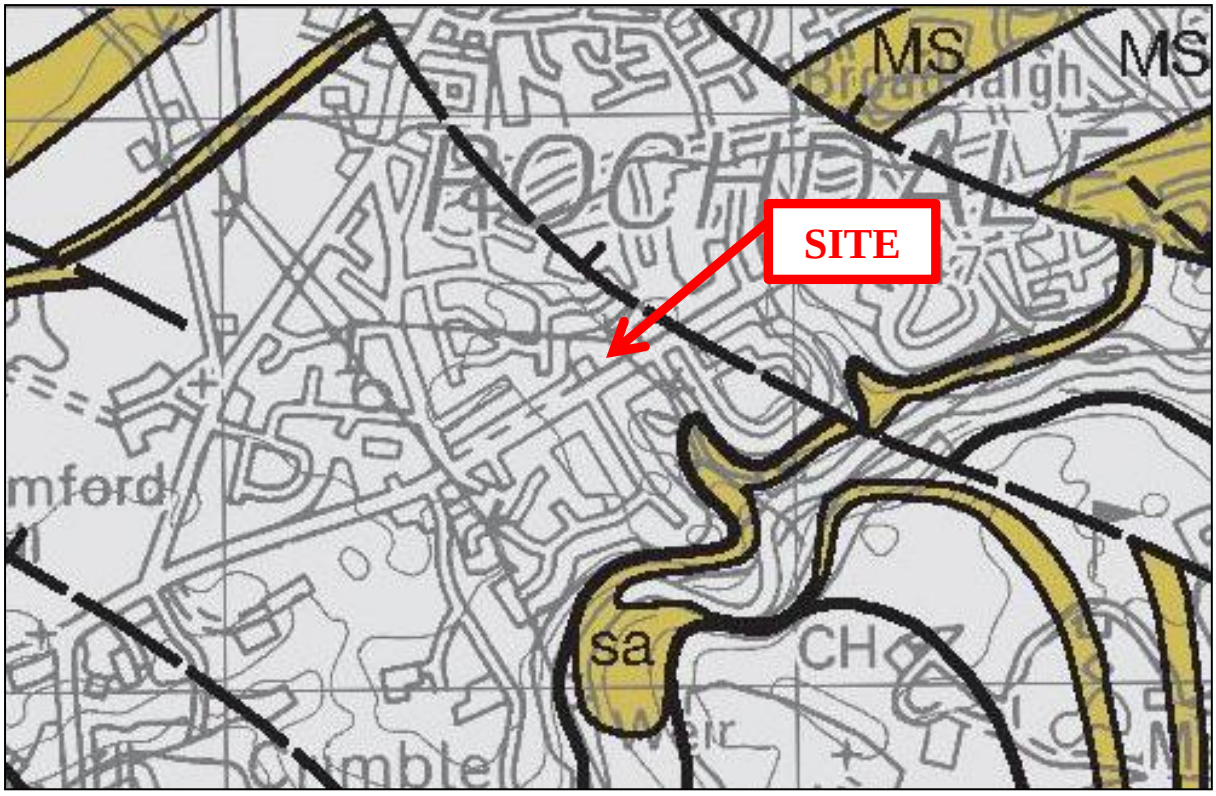
11.1.7. Ordnance Survey c1966-70



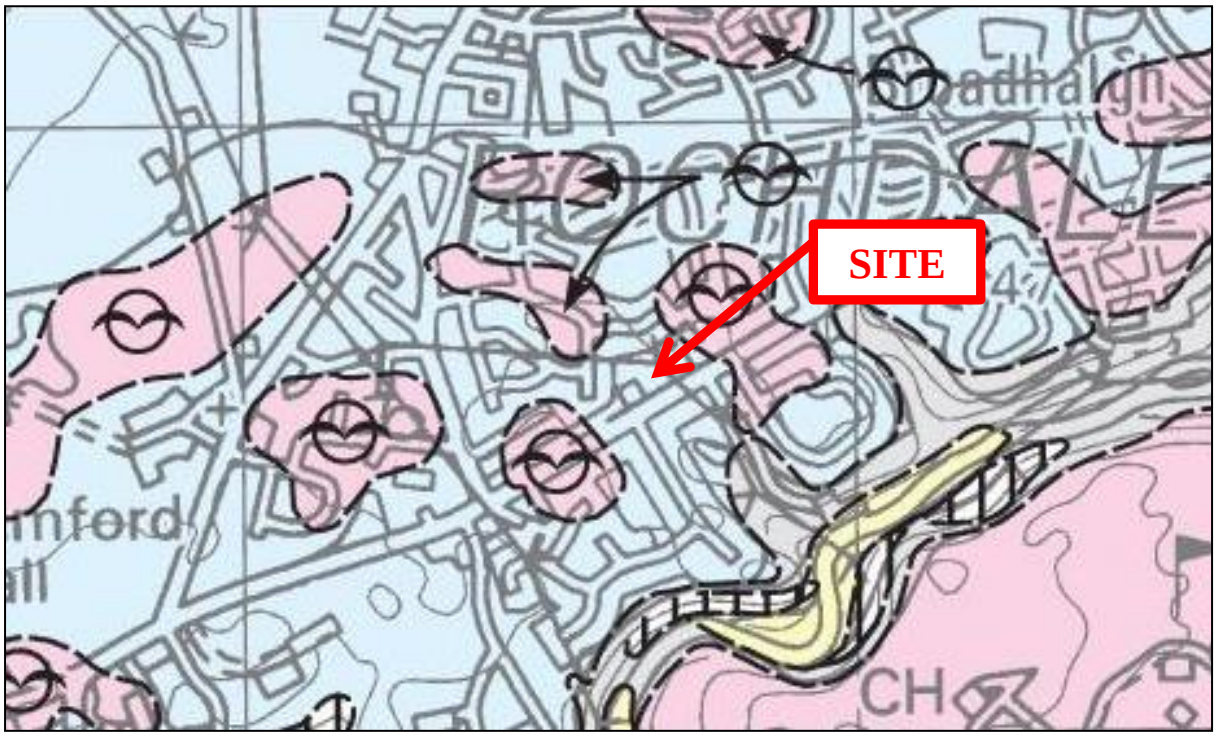
11.1.8. Ordnance Survey c1992



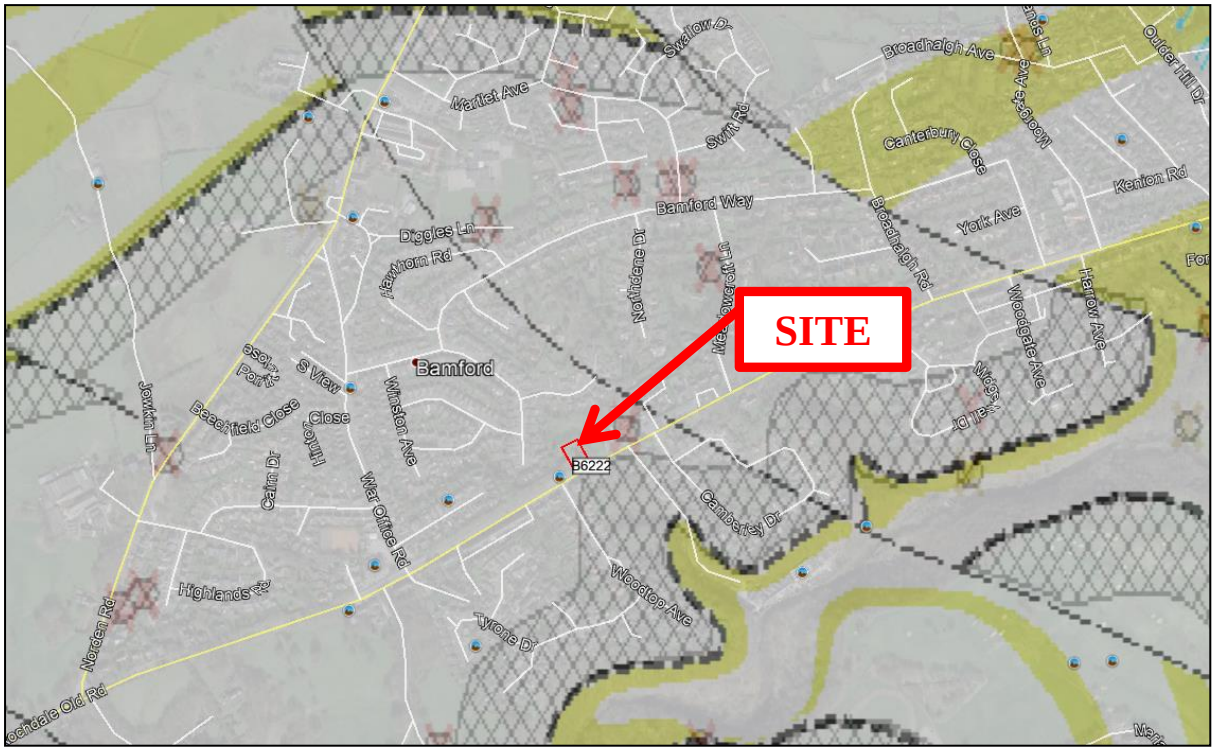
11.2. BGS Geological Map (Solid).



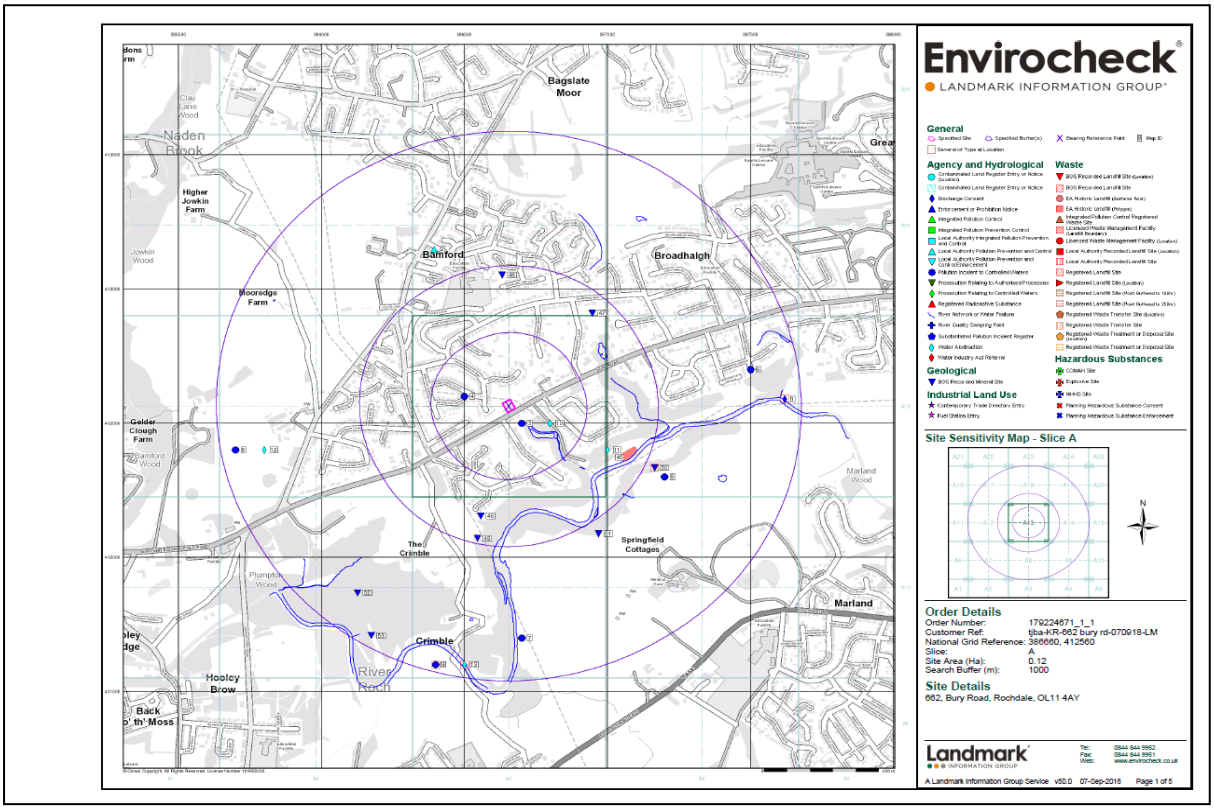
11.3. BGS Geological Map (Superficial).



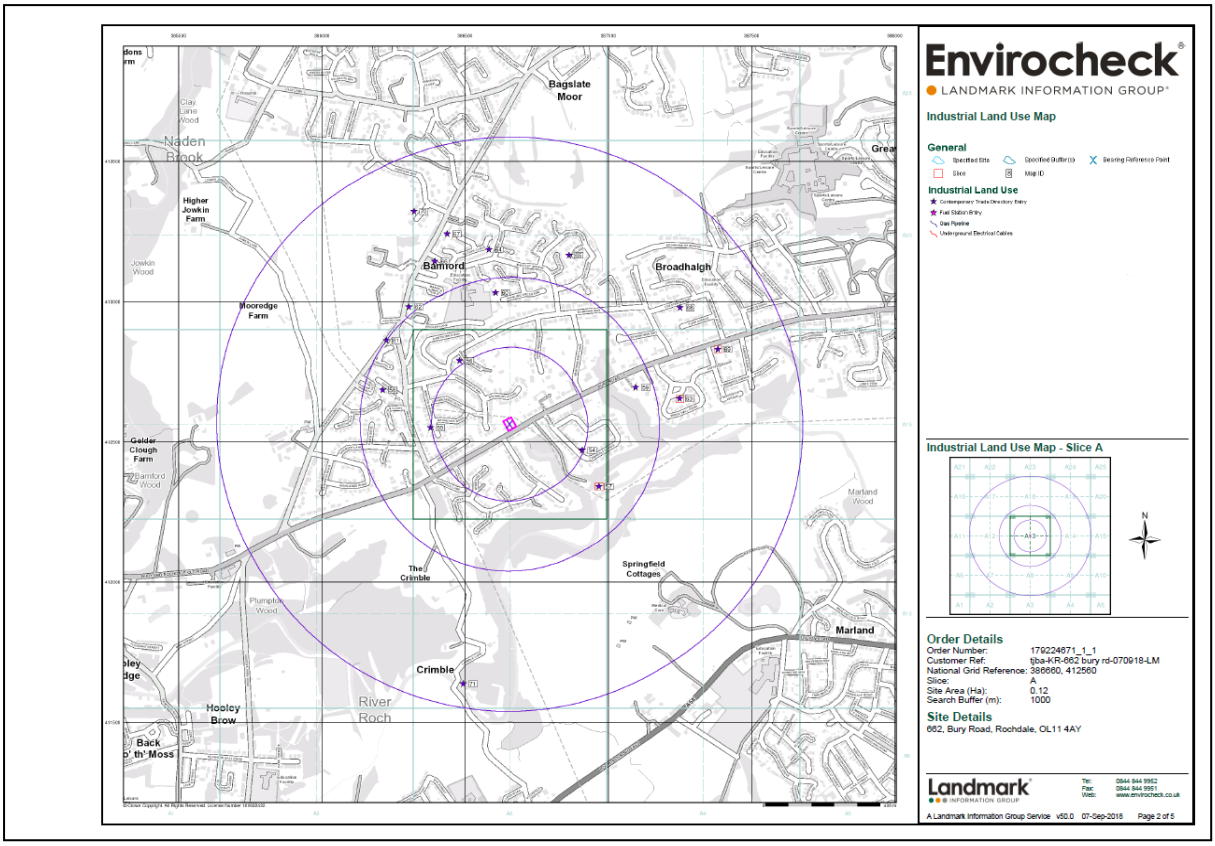
11.4. Google Earth Map - Coal Authority Overlay.



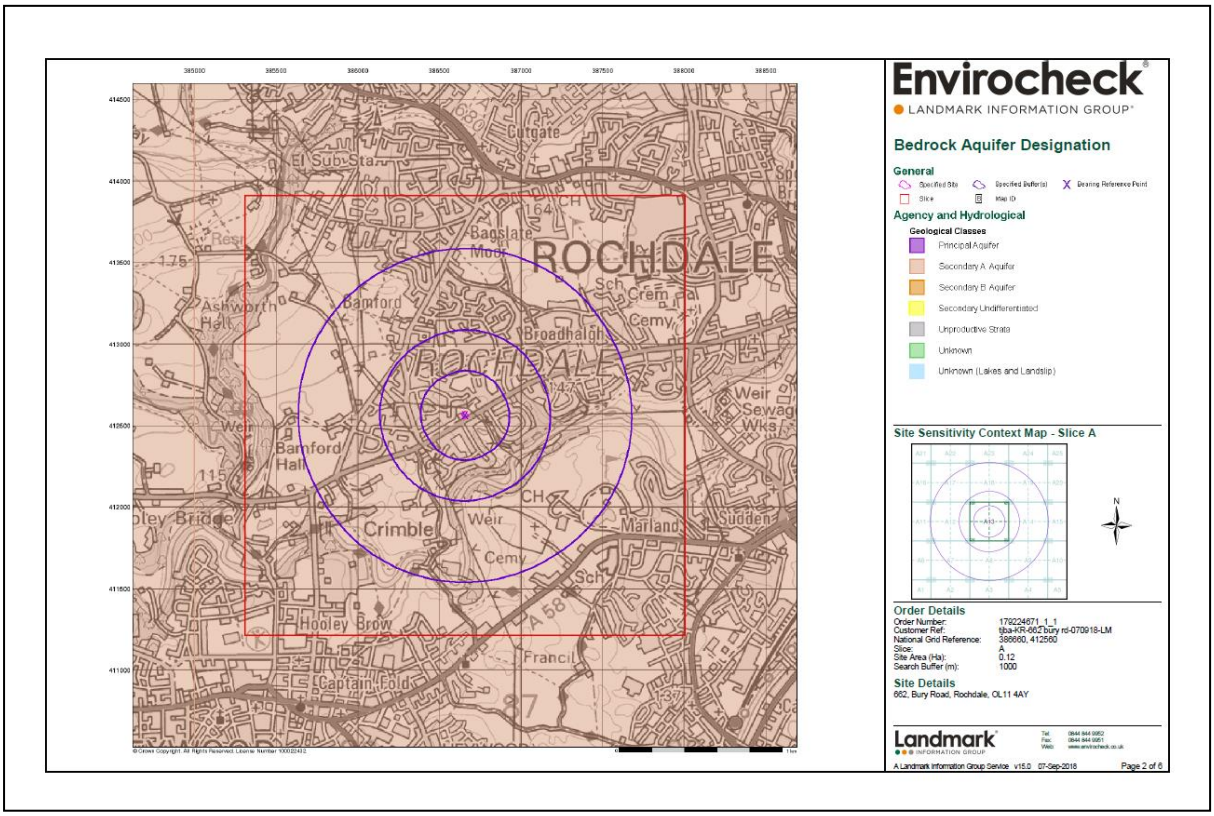
11.5. Agency, Hydrological & Waste Land Use Map.



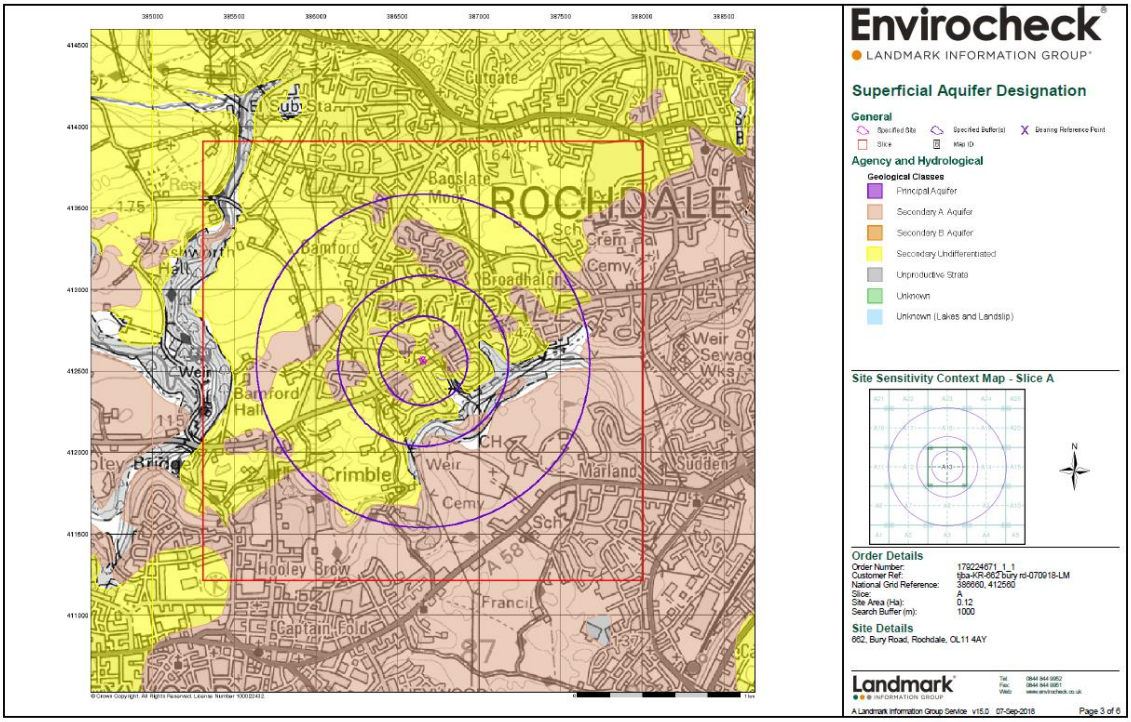
11.6. Landmark Industrial Land Use Map.



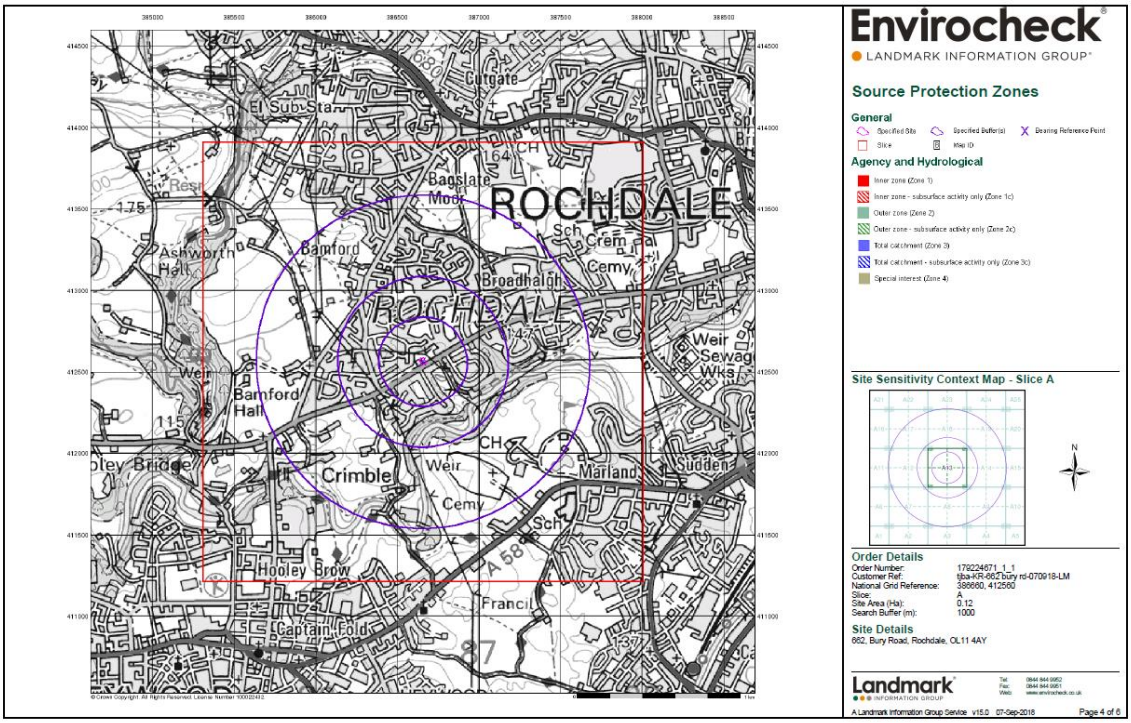
11.7. Landmark Bedrock Aquifer Map.



11.8. Landmark Superficial Aquifer Map.



11.9. Landmark Source Protection Zone Map.



12. APPENDIX C: REPORTS.

12.1. Landmark Envirocheck.

Envirocheck®
LANDMARK INFORMATION GROUP®

Envirocheck® Report:

Datasheet

Order Details:

Order Number:
179224671_1_1

Customer Reference:
tjba-KR-662 bury rd-070918-LM

National Grid Reference:
386660, 412560

Slice:
A

Site Area (Ha):
0.12

Search Buffer (m):
1000

Site Details:
662, Bury Road
Rochdale
OL11 4AY

Client Details:
Mr T Booth
TJ Booth Associates
20a Eastgate Street
Rochdale
Lancashire
OL16 1DH

Landmark
INFORMATION GROUP

Order Number: 179224671_1_1 Date: 07-Sep-2018 rpr_ec_datasheet v53.0 A Landmark Information Group Service

12.2. Concept Life Sciences Ltd – Soil Test Certification.

CONCEPT LIFE SCIENCES

Concept Life Sciences is a trading name of Concept Life Sciences Analytical & Development Services Limited registered in England and Wales (No 2514788)

Concept Life Sciences
Certificate of Analysis

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

Report Number: 771117-1

Date of Report: 12-Oct-2018

Customer: T J Booth Associates
20A Eastgate
Rochdale
OL16 1DH

Customer Contact: Mr Daniel Slattery

Customer Job Reference:
Customer Purchase Order: CLS-riley-662 bury rd-270918
Customer Site Reference: Riley - 662 Bury Road, Rochdale
Date Job Received at Concept: 01-Oct-2018
Date Analysis Started: 02-Oct-2018
Date Analysis Completed: 12-Oct-2018

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual

UKAS TESTING
1549

Report checked and authorised by :
Toni Morris
Customer Service Advisor

Issued by :
Aleksandra Pacula
Senior Customer Service Advisor

Concept Reference: 771117
Project Site: Riley - 662 Bury Road, Rochdale
Customer Reference:

Soil Analysed as Soil
ICRCL (Maxi)

				Concept Reference	771117 001	771117 002	771117 003	771117 004
				Customer Sample Reference	S1	S2	S3	S4
				Date Sampled	27-SEP-2018	27-SEP-2018	27-SEP-2018	27-SEP-2018
Determinand	Method	Test Sample	LOD	Units				
Chromium VI	T6	A40	1	mg/kg	<1	<1	<1	<1
Arsenic	T6	A40	1	mg/kg	26	9	16	13
Boron (water-soluble)	T6	A40	1	mg/kg	2	<1	<1	<1
Cadmium	T6	A40	1	mg/kg	<1	<1	<1	<1
Chromium	T6	A40	1	mg/kg	24	18	18	15
Copper	T6	A40	1	mg/kg	62	27	39	35
Cyanide(Total)	T4	AR	1	mg/kg	<1	<1	<1	<1
Cyanide(free)	T4	AR	1	mg/kg	<1	<1	<1	<1
Lead	T6	A40	1	mg/kg	140	46	78	74
Mercury	T6	A40	1	mg/kg	<1	<1	<1	<1
Nickel	T6	A40	1	mg/kg	22	14	17	15
pH	T7	A40			4.8	4.4	5.0	5.3
Phenols(Mono)	T4	AR	1	mg/kg	<1	<1	<1	<1
Selenium	T6	A40	3	mg/kg	<3	<3	<3	<3
SO4(Total)	T6	A40	0.01	%	0.11	0.06	0.07	0.07
Sulphide	T4	A40	10	mg/kg	<10	<10	<10	<10
Sulphur(Free)	T2	AR	500	mg/kg	<500	<500	<500	<500
Thiocyanate	T4	A40	10	mg/kg	<10	<10	<10	<10
Zinc	T6	A40	1	mg/kg	98	48	62	63

Concept Reference: 771117
Project Site: Riley - 662 Bury Road, Rochdale
Customer Reference:

Soil Analysed as Soil
Total and Speciated USEPA16 PAH

				Concept Reference	771117 001	771117 002	771117 003	771117 004
				Customer Sample Reference	S1	S2	S3	S4
				Date Sampled	27-SEP-2018	27-SEP-2018	27-SEP-2018	27-SEP-2018
Determinand	Method	Test Sample	LOD	Units				
Naphthalene	T149	AR	0.01	mg/kg	0.11	0.02	0.04	0.02
Acenaphthylene	T149	AR	0.01	mg/kg	0.03	0.01	0.01	0.01
Acenaphthene	T149	AR	0.01	mg/kg	0.05	0.01	0.04	0.02
Fluorene	T149	AR	0.01	mg/kg	0.04	0.01	0.03	0.01
Phenanthrene	T149	AR	0.01	mg/kg	0.67	0.08	0.27	0.15
Anthracene	T149	AR	0.01	mg/kg	0.13	0.01	0.05	0.03
Fluoranthene	T149	AR	0.01	mg/kg	1.5	0.16	0.36	0.29
Pyrene	T149	AR	0.01	mg/kg	1.3	0.14	0.33	0.26
Benzo(a)Anthracene	T149	AR	0.01	mg/kg	0.79	0.08	0.25	0.16
Chrysene	T149	AR	0.01	mg/kg	0.86	0.08	0.21	0.16
Benzo(b/k)Fluoranthene	T149	AR	0.01	mg/kg	1.7	0.14	0.32	0.26
Benzo(a)Pyrene	T149	AR	0.01	mg/kg	0.90	0.08	0.18	0.15
Indeno(123-cd)Pyrene	T149	AR	0.01	mg/kg	0.59	0.05	0.10	0.09
Dibenzo(ah)Anthracene	T149	AR	0.01	mg/kg	0.21	0.02	0.04	0.03
Benzo(ghi)Perylene	T149	AR	0.01	mg/kg	0.78	0.06	0.12	0.11
PAH(total)	T149	AR	0.01	mg/kg	9.5	0.95	2.3	1.7

Concept Reference: 771117
Project Site: Riley - 662 Bury Road, Rochdale
Customer Reference:

Soil Analysed as Soil
Miscellaneous

					Concept Reference	771117 001	771117 002	771117 003	771117 004
					Customer Sample Reference	S1	S2	S3	S4
					Date Sampled	27-SEP-2018	27-SEP-2018	27-SEP-2018	27-SEP-2018
Determinand	Method	Test Sample	LOD	Units					
Asbestos ID	T27	A40				Asbestos not detected	Asbestos not detected	Asbestos not detected	Asbestos not detected
Soil Organic Matter	T287	A40	0.1	%		12	3.8	7.5	7.5
Benzo(b)fluoranthene	T149	AR	0.01	mg/kg		0.93	0.07	0.16	0.15
Benzo(k)fluoranthene	T149	AR	0.01	mg/kg		0.69	0.07	0.15	0.10

Index to symbols used in 771117-1

Value	Description
AR	As Received
A40	Assisted dried < 40C
S	Analysis was subcontracted
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Asbestos testing was subcontracted

Method Index

Value	Description
T287	Calc TOC/0.58
T6	ICP/OES
T149	GC/MS (SIR)
T7	Probe
T4	Colorimetry
T2	Grav
T27	PLM

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Chromium VI	T6	A40	1	mg/kg	N	001-004
Arsenic	T6	A40	1	mg/kg	U	001-004
Boron (water-soluble)	T6	A40	1	mg/kg	N	001-004
Cadmium	T6	A40	1	mg/kg	U	001-004
Chromium	T6	A40	1	mg/kg	U	001-004
Copper	T6	A40	1	mg/kg	U	001-004
Cyanide(Total)	T4	AR	1	mg/kg	U	001-004
Cyanide(free)	T4	AR	1	mg/kg	U	001-004
Lead	T6	A40	1	mg/kg	U	001-004
Mercury	T6	A40	1	mg/kg	U	001-004
Nickel	T6	A40	1	mg/kg	U	001-004
pH	T7	A40			U	001-004
Phenols(Mono)	T4	AR	1	mg/kg	U	001-004
Selenium	T6	A40	3	mg/kg	U	001-004
SO4(Total)	T6	A40	0.01	%	N	001-004
Sulphide	T4	A40	10	mg/kg	N	001-004
Sulphur(Free)	T2	AR	500	mg/kg	N	001-004
Thiocyanate	T4	A40	10	mg/kg	N	001-004
Zinc	T6	A40	1	mg/kg	U	001-004
Naphthalene	T149	AR	0.01	mg/kg	U	001-004
Acenaphthylene	T149	AR	0.01	mg/kg	U	001-004
Acenaphthene	T149	AR	0.01	mg/kg	U	001-004
Fluorene	T149	AR	0.01	mg/kg	U	001-004

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Phenanthrene	T149	AR	0.01	mg/kg	U	001-004
Anthracene	T149	AR	0.01	mg/kg	U	001-004
Fluoranthene	T149	AR	0.01	mg/kg	U	001-004
Pyrene	T149	AR	0.01	mg/kg	U	001-004
Benzo(a)Anthracene	T149	AR	0.01	mg/kg	U	001-004
Chrysene	T149	AR	0.01	mg/kg	U	001-004
Benzo(b/k)Fluoranthene	T149	AR	0.01	mg/kg	U	001-004
Benzo(a)Pyrene	T149	AR	0.01	mg/kg	U	001-004
Indeno(123-cd)Pyrene	T149	AR	0.01	mg/kg	U	001-004
Dibenzo(ah)Anthracene	T149	AR	0.01	mg/kg	U	001-004
Benzo(ghi)Perylene	T149	AR	0.01	mg/kg	U	001-004
PAH(total)	T149	AR	0.01	mg/kg	U	001-004
Asbestos ID	T27	A40			SU	001-004
Soil Organic Matter	T287	A40	0.1	%	N	001-004
Benzo(b)fluoranthene	T149	AR	0.01	mg/kg	U	001-004
Benzo(k)fluoranthene	T149	AR	0.01	mg/kg	U	001-004