

OS MasterMap Water Network

Map ID	Details	Distance	Reply or Direction
	Watercourse Type: Underground River	27.4m	E
	Watercourse Type: Primary Flow (un-named)	31.6m	E
	Watercourse Type: Primary Flow (un-named)	39.6m	E
	River Worfe Watercourse Type: Lake or Reservoir	56.6m	NW
	Watercourse Type: Primary Flow (un-named)	56.9m	SW
	Watercourse Type: Primary Flow (un-named)	69.2m	S
	Watercourse Type: Lake or Reservoir	69.2m	S
	Watercourse Type: Primary Flow (un-named)	80.8m	SW
	Watercourse Type: Primary Flow (un-named)	83.8m	S
	River Worfe Watercourse Type: Primary Flow (named)	85.4m	NE
	Watercourse Type: Primary Flow (un-named)	86.3m	SW
	River Worfe Watercourse Type: Primary Flow (named)	92.2m	W
	River Worfe Watercourse Type: Primary Flow (named)	95.5m	N
	Watercourse Type: Primary Flow (un-named)	99.5m	N
	River Worfe Watercourse Type: Primary Flow (named)	100.5m	N
	Watercourse Type: Primary Flow (un-named)	107.5m	SW
	Watercourse Type: Underground River	108.4m	E
	Watercourse Type: Primary Flow (un-named)	108.8m	N
	Watercourse Type: Primary Flow (un-named)	111.4m	NE
	Watercourse Type: Primary Flow (un-named)	115.8m	N
	Watercourse Type: Primary Flow (un-named)	115.8m	N
	Watercourse Type: Primary Flow (un-named)	141.1m	S
	River Worfe Watercourse Type: Lake or Reservoir	152.1m	N
	Watercourse Type: Primary Flow (un-named)	161.5m	S
	River Worfe Watercourse Type: Primary Flow (named)	161.6m	N
	Watercourse Type: Primary Flow (un-named)	161.7m	S
	Watercourse Type: Primary Flow (un-named)	162.6m	SW
	River Worfe Watercourse Type: Primary Flow (named)	164.4m	N
	Watercourse Type: Lake or Reservoir	164.6m	E
	Watercourse Type: Primary Flow (un-named)	169.7m	SE
	Watercourse Type: Primary Flow (un-named)	178.4m	NE
	River Worfe Watercourse Type: Primary Flow (named)	180.0m	NE
	Watercourse Type: Primary Flow (un-named)	180.2m	NE
	River Worfe Watercourse Type: Primary Flow (named)	180.3m	NE
	River Worfe Watercourse Type: Primary Flow (named)	181.1m	N
	Watercourse Type: Secondary Flow	181.7m	N
	Watercourse Type: Underground River	184.6m	SW
	River Worfe Watercourse Type: Lake or Reservoir	185.8m	N
	Watercourse Type: Primary Flow (un-named)	187.2m	SE
	Watercourse Type: Primary Flow (un-named)	187.5m	SW
	Watercourse Type: Primary Flow (un-named)	189.8m	SW
	Watercourse Type: Underground River	191.3m	E
	Watercourse Type: Lake or Reservoir	203.3m	E
	River Worfe Watercourse Type: Underground River	206.8m	N
	River Worfe Watercourse Type: Lake or Reservoir	207.3m	N
	Watercourse Type: Primary Flow (un-named)	218.7m	N

OS MasterMap Water Network

Map ID	Details	Distance	Reply or Direction
	Watercourse Type: Primary Flow (un-named)	219.1m	N
	Watercourse Type: Lake or Reservoir	219.5m	N
	Watercourse Type: Primary Flow (un-named)	220.2m	SE
	Watercourse Type: Primary Flow (un-named)	220.2m	SE
	Watercourse Type: Secondary Flow	222.6m	SE
	Watercourse Type: Primary Flow (un-named)	222.6m	SE
	Watercourse Type: Primary Flow (un-named)	222.8m	E
	Watercourse Type: Lake or Reservoir	223.9m	SE
	Norton Mere Watercourse Type: Lake or Reservoir	232.8m	N
	Watercourse Type: Primary Flow (un-named)	232.8m	S
	Watercourse Type: Secondary Flow	235.9m	S
	Watercourse Type: Primary Flow (un-named)	237.0m	S
	Watercourse Type: Underground River	249.1m	NE
	Watercourse Type: Primary Flow (un-named)	251.9m	NE
	Watercourse Type: Underground River	278.8m	N
	Watercourse Type: Primary Flow (un-named)	279.0m	S
	Watercourse Type: Primary Flow (un-named)	281.4m	W
	Watercourse Type: Primary Flow (un-named)	283.1m	N
	Watercourse Type: Primary Flow (un-named)	293.9m	NW
	Watercourse Type: Secondary Flow	300.6m	S
	Watercourse Type: Secondary Flow	300.6m	S
	River Worfe Watercourse Type: Underground River	302.6m	SW
	River Worfe Watercourse Type: Primary Flow (named)	307.4m	SW
	Watercourse Type: Underground River	316.5m	SE
	Watercourse Type: Primary Flow (un-named)	318.7m	SW
	Watercourse Type: Primary Flow (un-named)	321.7m	SE
	Watercourse Type: Primary Flow (un-named)	326.0m	S
	Watercourse Type: Primary Flow (un-named)	326.0m	SW
	Watercourse Type: Primary Flow (un-named)	326.4m	SW
	Watercourse Type: Primary Flow (un-named)	332.4m	W
	Watercourse Type: Primary Flow (un-named)	333.3m	W
	Watercourse Type: Primary Flow (un-named)	345.9m	NW
	Watercourse Type: Primary Flow (un-named)	345.9m	NW
	Watercourse Type: Primary Flow (un-named)	348.6m	N
	Watercourse Type: Primary Flow (un-named)	348.6m	N
	Watercourse Type: Primary Flow (un-named)	370.5m	N
	Watercourse Type: Lake or Reservoir	374.1m	E
	Watercourse Type: Marsh	374.1m	E
	Watercourse Type: Primary Flow (un-named)	375.2m	E
	Watercourse Type: Primary Flow (un-named)	392.5m	N
	Watercourse Type: Primary Flow (un-named)	395.7m	N
	Norton Mere Watercourse Type: Lake or Reservoir	418.5m	E
	Norton Mere Watercourse Type: Lake or Reservoir	418.5m	E
	Watercourse Type: Secondary Flow	421.8m	E
	Watercourse Type: Primary Flow (un-named)	426.5m	E
	Watercourse Type: Primary Flow (un-named)	490.8m	E

OS MasterMap Water Network

Map ID	Details	Distance	Reply or Direction
	Watercourse Type: Primary Flow (un-named)	491.0m	NW
	Watercourse Type: Primary Flow (un-named)	491.8m	NW



A water feature has been identified at the property. This does not present an immediate risk, however it may require frequent upkeep and maintenance.

OS Data

OS MasterMap Water Network is a three-dimensional digital representation of the watercourses in Great Britain. It includes rivers, streams, lakes, lochs and canals as a series of watercourse network lines. The network lines (links) are attributed to provide a range of information about the section of watercourse they depict. The OS MasterMap Water Network will significantly enhance systems used to manage waterways, river and the flood risk they pose.

Other Information

Height Above Sea Level

Map ID	Details	Distance	Reply or Direction
	Maximum height of the Site above sea level	On Site	149.10m
	Minimum height of the Site above sea level	On Site	67.90m
	Average height of the Site above sea level	On Site	97.99m



The Site is at a relatively high elevation above sea level. However, this is not in itself indicative of the absence of flood risk and reference should be made to other assessments within this report.

Distance to Water Features

Details	Distance	Reply or Direction
Surface water feature	299.8m	S
Surface water feature	308.4m	E
Surface water feature	314.3m	NW
Surface water feature	316.3m	SW
Surface water feature	326.6m	NE
Surface water feature	328.1m	S
Surface water feature	332.2m	S
Surface water feature	346.4m	NE
Surface water feature	354.5m	S
Surface water feature	362.5m	N
Surface water feature	371.0m	S
Surface water feature	379.8m	E
Surface water feature	463.6m	E
Surface water feature	486.2m	E
Surface water feature	489.0m	E
Surface water feature	492.7m	E



There is a water feature shown on the Ordnance Survey maps within the Site. This does not represent a flood risk in itself, but its presence has been taken into account in the overall risk assessment in this Report.

Dam or Reservoir Failure

Details	Distance	Reply or Direction
Is there a risk of the Site being affected by the failure of a nearby dam or reservoir?	On Site	NO



Neither the Site nor areas near to it will be likely to flood if a dam or reservoir in the surrounding area failed.

JBA Risk Management Data

Dam or Reservoir Failure – JBA has modelled approximately 1700 dams and reservoirs across the UK which are considered to pose the greatest risks to people and property. These models are able to predict the areas likely to flood on all sides of a feature, should an element of it fail e.g. a wall, dam or earth bund.

Useful Contacts

Name and Address	Telephone/Fax/Email
Argyll Environmental Limited 1 st Floor 98 – 99 Queens Road Brighton BN1 3XF www.argyllenvironmental.com	Telephone 0845 458 5250 orders@argyllenviro.com
Environment Agency National Customer Contact Centre (NCCC) PO Box 544	Telephone 03708 506 506
Bridgnorth District Council (now part of Shropshire Council) Environmental Health Department Shirehall www.shropshire.gov.uk	Telephone 0345 678 9000 customer.service@shropshire.gov.uk
Shropshire County Council (now part of Shropshire Council) Shropshire Records And Research Centre Shirehall www.shropshire.gov.uk	Telephone 01743 255356 customer.service@shropshire.gov.uk
South Staffordshire District Council Council Offices www.sstaffs.gov.uk	Telephone 01902 696000 Fax: 01902 696403
Landmark Information Group Limited Imperium www.landmarkinfo.co.uk	Telephone 0844 844 9952 Fax: 0844 844 9951 customerservices@landmarkinfo.co.uk
British Geological Survey Enquiry Service British Geological Survey www.bgs.ac.uk	Telephone 0115 936 3143 Fax: 0115 936 3276 enquiries@bgs.ac.uk
Environment Agency Head Office Rio House	Telephone 01454 624400 Fax: 01454 624409
The Coal Authority Property Searches 200 Lichfield Lane	Telephone 0345 762 6848 Fax: 01623 637 338
Defra Nobel House 17 Smith Square London SW1P 3JR	Telephone 08459 335577 defra.helpline@defra.gsi.gov.uk
ALA (Agricultural Law Association)	Telephone 01206 383521 Enquiries@aka.org.uk

Please note that the Environment Agency / SEPA have a charging policy in place for enquiries. When contacting these agencies please mention that this data has been received from the Landmark database, alternatively Argyll Environmental Limited would be pleased to assist with consultation to the above bodies. Please contact us for a quotation.

Contaminated Land Risk Analysis Methodology

The Estate Solutions reports have been designed to assist in making informed decisions during property transactions. The Report is a desktop assessment of direct liabilities (Liabilities) which could affect the owner /occupier of the Site and arise under Part 2A of the Environmental Protection Act 1990 and/or equivalent requirements under the planning regime and/or the Water Resources Act 1991¹⁰. (Relevant Legislation). If a risk is identified, then a number of options for finding out more about the risk, managing it or transferring it are proposed.

The assessment of environmental liability under the Relevant Legislation is based upon the principle of determining the presence of a plausible contaminant-pathway-receptor relationship (a contaminant linkage). A 'contaminant' is a source of contamination, a 'pathway' is a medium through which the contamination can mobilise and 'a receptor' is a person or entity that could be detrimentally affected by the contamination. If all three are identified, then a 'plausible contaminant-pathway-receptor relationship' may be present. By definition, this is one which Argyll believes could result in significant harm, a significant possibility of significant harm or significant pollution or the possibility of significant pollution to Controlled Waters.

In our assessment we use the following test to decide if there is a potential liability affecting the Site. For the purpose of this assessment a site where a potential Liability has been identified is defined as follows:

A Site which, from the information assessed by Argyll, is considered to have the potential of being affected by contaminative substances present in or under the Site (but excluding potential sources of contamination on or above the land) such that, on the basis of its current or proposed use, there is a reasonable likelihood of a UK regulatory authority, acting in accordance with Relevant Legislation, requiring that remedial measures are taken in order to remedy or mitigate the contaminative substances that are present in or under the land that forms all or part of the Site.

The term Liabilities is defined within the scope of this assessment to mean, remedial works under Part 2A of the Environmental Protection Act 1990 (or where appropriate, equivalent requirements under the planning regime) and/or the Water Resources Act 1991 which may result in direct liability for the site owner/occupier.

The assessment within the Report has been produced and quality checked by a team of qualified environmental professionals. The assessment is based upon a manual review of the data contained within the Data Section of this Report and of 1:2500 and 1:1250 (where available) scale historical mapping.

Ecological Risk Assessment

The evaluation of ecological risk is becoming an increasingly important input when making risk management decisions. In the Site Solutions Commercial report, Argyll assesses two different drivers for risks and liabilities driven by ecological receptors;

1. The Contaminated Land Regime; and
2. The Environmental Damage Regulations (EDR) 2009.

The Environment Agency has designed a generic framework for conducting ecological risk assessment (see Assessing Risk to Ecosystems from Land Contamination, R&D Technical Report P299, EA 2002). This recommends a tiered approach in line with best practice for human health and controlled water risk assessment and defines Relevant Ecological Receptors as any of the Relevant Types of Receptor as set out in Table 1 of Defra Statutory Guidance on Contaminated Land dated April 2012.

Argyll assesses Relevant Ecological Receptors as part of its assessment process. To do so it uses the Argyll EcoRisk model which was developed and tested in consultation with leading experts and is based on the Environment Agency framework.

The Environmental Damage (Prevention and Remediation) Regulations 2009 were introduced on 1 March 2009 to implement the provisions of the European Commission's Environmental Liability Directive into law in England¹¹. The aim of EDR is to prevent and remedy damage to protected species or natural habitats or a site of special scientific interest, surface water, groundwater or to land. 'Environmental damage' has a specific meaning in the Regulations, and covers only the most severe cases. Existing legislation with provisions for environmental liability remains in place. The Regulations apply on land in England and on the seabed around the UK up to the limits set out in the Continental Shelf Act 1964, and to waters in the Renewable Energy Zone, which extends approximately 200 miles out to sea.

Argyll does not consider the standard of current operations, but reports the potential for environmental damage based on the location of EDR Receptors around the Site.

¹⁰ Water Environment (Controlled Activities)(Scotland) Regulations 2005 where appropriate.




¹¹ Environmental Damage (Prevention and Remediation) (Wales) Regulations 2009 or Environmental Damage (Prevention and Remediation) (Scotland) Regulations where appropriate.

When conducting either assessment, Argyll will primarily assess information provided in the Data section of the Report. However, in some cases Argyll may choose to supplement this with freely available public information such as that provided by Natural England and/or information provided by the Argyll Europa System.

Liability Assessment

In this section Argyll will report on any potential soil and groundwater liabilities which it considers are associated with the Site. Our assessment of Liability is based upon the proposed and current use of the Site (as supplied by the client) in line with current Government guidance.

There will be one of the following three responses:

Assessment	Liability Statement & explanation	Defra Category*
PASSED 	<p>Within the scope of this assessment no Liabilities have been identified. No further action is required.</p> <p>This statement indicates that within the scope of this assessment, no issues have been identified that are likely to result in significant cost liabilities under Relevant Legislation.</p>	3 or 4
PASSED 	<p>Within the scope of this assessment no Liabilities have been identified. However, your attention is drawn to the prudent enquiries suggested below.</p> <p>This statement indicates that within the scope of this assessment, no issues have been identified that are likely to result in significant cost liabilities under Relevant Legislation. However, a client may wish to obtain further information about other issues disclosed in the Report, which could be material.</p>	3 or 4
FURTHER ACTION 	<p>Potential Liabilities have been identified under Part 2A of the Environmental Protection Act 1990 (or where appropriate, equivalent requirements under the planning regime) and/or the Water Resources Act 1991¹². To quantify these you may decide to undertake a more detailed assessment through the recommendation(s) set out below.</p> <p>This statement indicates that within the scope of this assessment, an issue or a number of issues have been identified that are likely to result in significant cost liabilities under Relevant Legislation. In this event, recommendations are made, in order that additional information is collected so that the liabilities may be more accurately assessed.</p>	Potentially 1 or 2

* According to Defra's updated Statutory Guidance on Contaminated Land, Regulators have a four-stage test to decide when land is and is not contaminated. Category 1 and Category 2 sites would encompass land which is capable of being determined as contaminated land, whereas Category 3 and Category 4 sites would encompass land which is not capable of being determined as contaminated land.

Limitations of the Report

The Estate Solutions reports have been designed to satisfy standard environmental due-diligence enquiries, as recommended by the Law Society's contaminated land warning card. It is a 'remote' investigation and reviews only information provided by the client and from the databases of publicly available information that have been chosen to enable a desk based environmental assessment of the Site. The Report does not include a site investigation, nor does Argyll make specific information requests of the regulatory authorities for any relevant information they may hold. Therefore, Argyll cannot guarantee that all land uses or factors of concern will have been identified by the Report.

The information in the Data Section of the Report is derived from a number of statutory and non-statutory sources. While every effort is made to ensure accuracy, Argyll cannot guarantee the accuracy or completeness of such information or data. Argyll will not accept responsibility for inaccurate data provided by external data providers.

Further information regarding our risk assessment methodology is provided in the Products and Services User Manual which is available free of charge from the client area of our website www.argyllenvironmental.com. For further information regarding the datasets reviewed within our assessment, please contact one of our technical team on 0845 458 5250. This report is provided under The Argyll Environmental Terms and Conditions for Data Reports, a copy of which is available on our website. Flood Risk Screening Methodology

¹²Water Environment (Controlled Activities)(Scotland) Regulations 2005 where appropriate.

The EstateSolutions Farm includes a desktop flood risk assessment designed to enable property professionals to assess the risk of flooding at agricultural sites. It examines the overall risk of flooding at a site (not taking into account any flood defences that may be present). The report considers current Government guidance including the National Planning Policy Framework (NPPF) and the agreement between the Association of British Insurers and Defra known as the Statement of Principles. The report has been produced and quality-checked by a qualified consultant using the data contained in this report.

Flood Risk Rating

Argyll provides an overall flood risk rating based on an assessment of the data provided within this report. It does so by asking one question:

1. What is the overall risk of flooding, assuming flood defence fail or are absent or overtopped?

The answer to this question provides a worst case scenario assuming there are either no defences in the area, that any defences in the area could fail, primarily as a result of river or coastal flooding, or are overtopped by excessive flood volumes.

Questions 1 are answered by one of six standard responses:

Response	Meaning
Negligible	The overall flood risk rating for the Site is assessed to be 'Negligible'. Existing datasets do not indicate any risk at the Site itself, or any feature within the locality of the Site, which would be expected to pose a threat of flooding. It is not considered that any further investigations are necessary in regard to flood risk.
Low	The overall flood risk rating for the Site is assessed to be 'Low'. Although large sites (over 1 ha) would require a Drainage Impact Assessment to accompany any planning application, it is not considered necessary to undertake any other further investigations into the flood risk to the Site.
Low to Moderate	The overall flood risk rating for the Site is assessed to be 'Low to Moderate'. The presence of such features as flood defences, flood storage areas and watercourses within the locality of the Site suggests that there may be a risk of flooding to the Site itself. Further investigations could be undertaken to further assess this risk.
Moderate	The overall flood risk rating for the Site is assessed to be 'Moderate'. Information from existing datasets suggests that there are certain features which may present a risk to the Site and its occupants. Further assessment would normally be suggested as a prudent measure to clarify the risk of flooding at the Site.
Moderate to High	The overall flood risk rating for Site is assessed to be 'Moderate to High'. Information from existing datasets suggests that there are certain features which may present a significant risk to the Site and its occupants. Further assessment is usually recommended in order to clarify the risk of flooding at the Site.
High	The overall flood risk rating for Site is assessed to be 'High', with a consequent risk to life and property. This means that existing datasets reveal significant flood risk issues which need to be addressed. Further assessment is usually recommended in order to clarify the risk of flooding at the Site.

Flood Analysis

The flood risk gauges provide a more detailed analysis of the risk from each of the four main types of flooding – river, coastal, groundwater and surface water. In addition, a fifth gauge provides an analysis of other factors (i.e. historic flood events, geological deposits which are indicative of past flooding, proximity to surface water features and elevation above sea level) that may affect the overall flood risk. For surface water flooding, only the risk rating generated from the 1:200 year rainfall event data is included in the overall risk assessment. The data on 1:75 year and 1:1,000 year rainfall events is provided for information only. The flood analysis within the report is automated taking into account the percentage of identified flood risk from the individual datasets to assess their significance in the context of the wider farm. This includes an assessment of whether the assumed main buildings within the Site boundary fall within an area of flood risk. For further information on each of these types of flooding, please refer to the Argyll FloodSolutions User Guide.

This analysis takes into account any existing flood defences that are intended to protect the Site and assumes that these work as designed. The analysis also takes into account the other information contained in those data sections of the report

which are relevant to that particular type of flooding. The assessment of the risk as shown in the flood gauge should therefore take priority over the information in the individual data sections of the report.

Limitations of the Report

The Renaissance Estate Solutions Farm report has been designed to satisfy basic flood-related environmental due-diligence enquiries for farm and large estates. It is a desktop review of information provided by the client and from selected private and public databases. It does not include a site investigation, nor are specific information requests made of the regulatory authorities for any relevant information (other than local water and sewerage providers). Therefore, Argyll cannot guarantee that all issues of concern will be identified by this report, or that the data and information supplied to it by third parties is accurate and complete.

This report includes an assessment of surface water flooding which examines the risk of the general drainage network overflowing during periods of extreme rainfall. This report does not make a detailed site-specific assessment of the suitability of the existing drainage on the Site. If this is required, then a site survey should be considered. The assessment of pluvial flooding does not take into account particular local or temporary factors that may cause surface water flooding such as the blockage or failure of structures on or within watercourses, drains, foul sewers, water mains, canals and other water infrastructure; and any history of drains flooding at the Site or in the locality. Surface water flooding can occur before surface water reaches the general drainage network, for example on hills and inclines.

Environment Agency data does not include flood risk from very small catchments as models of such small scale catchments are not considered to be reliable for UK-wide flood risk assessments. The potential impact of climate change on flood risk to the Site would require further study.

When answering any questions within this report, current applicable legislation is taken into account.

The data used in this report may have inherent limitations and qualifications. Further details are set out in the FloodSolutions User Guide which is available free of charge from our website www.argyllenvironmental.com, or by calling one of our technical team on 0845 458 5250.

This report is provided under The Argyll Environmental Terms and Conditions for Flood Solutions Reports, a copy of which is available on our website, www.argyllenvironmental.com, or by calling one of our technical team on 0845 458 5250



Important Consumer Protection Information

This search has been produced by Argyll Environmental Ltd, 1st Floor, 98 – 99 Queens Road, Brighton, BN1 3XF. Telephone: 0845 458 5250, e-mail: orders@argyllenviro.com which is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom
- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practice and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.

By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

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- display the Search Code logo prominently on their search reports
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- at all times maintain adequate and appropriate insurance to protect consumers
- conduct business in an honest, fair and professional manner
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If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award up to £5,000 to you if the Ombudsman finds that you have suffered actual financial loss and/or aggravation, distress or inconvenience as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

TPOs Contact Details:

The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Web site: www.tpos.co.uk
Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk

PLEASE ASK YOUR SEARCH PROVIDER IF YOU WOULD LIKE A COPY OF THE SEARCH CODE



Complaints procedure

If you want to make a complaint, we will:

- Acknowledge it within 5 working days of receipt.
- Normally deal with it fully and provide a final response, in writing, within 20 working days of receipt.
- Keep you informed by letter, telephone or e-mail, as you prefer, if we need more time.
- Provide a final response, in writing, at the latest within 40 working days of receipt.
- Liaise, at your request, with anyone acting formally on your behalf.

Complaints should be sent to:

Legal Director
Argyll Environmental Ltd
1st Floor
98 – 99 Queens Road
Brighton
BN1 3XF

Telephone: 0845 458 5250

Email: orders@argyllenviro.com

If you are not satisfied with our final response, or if we exceed the response timescales, you may refer the complaint to The Property Ombudsman scheme (TPOs); Tel: 01722 333306, E-mail: admin@tpos.co.uk

We will co-operate fully with the Ombudsman during an investigation and comply with his final decision.



ANNEX C : CLAVERTON ASSOCIATES REPORT



**Environmental Assessment of Land Adjacent to Gulf Services Filling Station,
Tong Norton, Shropshire, TF11 8PW**

For Bradford Rural Estates Ltd

16th August 2019

Ref: CA181



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APPENDICES

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- Appendix B: Borehole Logs
- Appendix C: Laboratory Analysis
- Appendix D: Strategic Master Plan



EXECUTIVE SUMMARY

Claverton Associates Limited has been appointed by Bradford Rural Estates Ltd (Bradford Estates) to undertake a Phase II environmental site investigation of part of the proposed development site identified as J3. It is understood that Bradford Estates is considering the strategic development of a large area of land just to the north of Junction 3 of the M54. The Site is currently predominantly under arable and pastureland use. A preliminary environmental assessment (environmental screening) was commissioned by Bradford Estates and undertaken by Argyll Environmental Limited (Argyll) in March 2019. The environmental screening exercise identified a number of areas within the J3 site that could potentially be impacted by contaminated land and environmental hazards from historical and current uses.

The sites identified included areas of former gravel extraction pits that had been infilled, a former depot associated with the adjacent Ministry of Defence (MOD) activities to the south, and a current petrol filling station (PFS) located immediately adjacent to the Bradford Estates' land. The infill areas and former depot were subject to site reviews to confirm the assumption based on the review of the summary of historical information in the Argyll report, and a Google Maps historical review, that there was no evidence of impacts in these areas from the inferred previous historical use. Therefore of the areas identified in the Argyll report, only the PFS was selected for further, intrusive investigations as this is a currently operating PFS immediately adjacent to Bradford Estates' land.

Key Findings

The Argyll environmental screening and subsequent Phase II investigations have identified the following:

- The J3 site has a limited history of non-farming activities, with only small areas of infilled land, which are now farmed, and a historical MOD depot. The identified PFS is not located on the Bradford Estates' land but is located immediately adjacent to the J3 site. The infill areas, the depot and the PFS were identified in the Argyll report as potential sources of contamination.*
- The J3 site is considered by Argyll to have a high environmental sensitivity due to the presence of an underlying major aquifer and source protection zone over part of the land. There are also a number of groundwater abstraction wells within the J3 site that are for potable use.*
- As the PFS was identified as the one area with a reasonable potential for contamination of the Bradford Estates' land, it was concluded that the intrusive investigation only needed to focus on the PFS. Given that land immediately to the south and east of the PFS is under private ownership, and the USTs are located on the northwest side of the PFS, the investigation was undertaken through drilling two boreholes immediately to the west and north west of the PFS on land owned by Bradford Estates. There is land further to the south and east is under the ownership of Bradford Estates, but the distances involved (over 50 m) is considered unlikely to be representative of the ground conditions in the vicinity of the PFS.*
- The two boreholes were drilled to depths of 5.5 m and 8 m below ground level, and fitted with installations to permit future groundwater and ground gas monitoring. Soil samples were taken during the site works and underwent headspace testing for volatile gases, and submitted for laboratory analysis to evaluate whether any of a potential range of hydrocarbon contaminants was present.*
- The headspace screening for volatiles in the field indicated the absence of a volatile fraction in the soils. Laboratory test results further confirmed the absence of hydrocarbon contamination in the soil samples. Subsequent gas monitoring of the boreholes indicated the absence of any volatile gases within the boreholes.*
- There is considered to be no plausible source-pathway-receptor scenario associated with the Site due to the absence of hydrocarbon contamination, and no identified risks to current or future uses on the Site. None of the results are considered to trigger the need for further investigations or other actions.*
- Based on the Argyll report, and site visits no further investigation of the infilled areas nor the historical MOD depot is considered to be required.*



1 PROJECT OVERVIEW

1.1 Introduction

Claverton Associates Limited (Claverton) has been appointed by Bradford Rural Estates Limited (Bradford Estates) to undertake a Phase II (intrusive) environmental site investigation of part of the proposed development site identified as J3. It is understood that Bradford Estates is considering the strategic development of a large area of land just to the north of Junction 3 of the M54 (see illustrative master Plan included as *Appendix D* to this report). As part of their due diligence process, a preliminary environmental assessment (environmental screening) was commissioned by Bradford Estates and undertaken by Argyll Environmental Limited (Argyll) in March 2019 (*Ref 1*). The environmental screening exercise identified a number of areas within the J3 site that had the potential to have been impacted by contamination, and/or environmental hazards from current or historical site uses. The sites identified by Argyll included small areas of former gravel extraction pits that had been infilled, a former depot associated with the adjacent Ministry of Defence (MOD) base to the south, and an operational petrol filling station (PFS) that is located on the A41 immediately adjacent to the J3 site.

Of the areas identified in the Argyll report, only the PFS was selected for further, intrusive investigations as this has the potential to be a source of contamination impacting Bradford Estates' land. The infilled areas are located on tenant farm properties and all were under crop, or woodland. The historical former MOD depot now has dense woodland covering the entire footprint of the site, and based on a view from the wood boundary there was no visible evidence of this development.

The intrusive investigation locations for the PFS were situated on the boundary of Bradford Estates' land, and selected based on proximity to the site's underground storage tanks (USTs) and operational area. The intrusive investigation comprised the installation of two boreholes to depths of 5.5 m and 8.0 m below ground level (bgl) to assess ground conditions, the presence of any visible signs of contamination, or volatile vapours associated with hydrocarbons (fuels), and to obtain soil and groundwater samples. Groundwater was not encountered in the boreholes and based on the information from Bradford Estates is understood to be located at significant depth. Piezometers that permit future monitoring of ground gas/vapours and groundwater were installed in the boreholes on completion of the drilling work that was undertaken on 30th July 2019. Gas monitoring was subsequently undertaken on 2nd August 2019.

This report has been produced with due consideration of the current guidance on contaminated land provided by the Environment Agency and the Department of Environment, Food and Rural Affairs (DEFRA) (*Ref 2*).

1.2 Specific Objectives

The objectives of this assignment were as follows:

- undertake a review of the Argyll Report (*Ref 1*) to gain an understanding of the J3 site history and environmental setting and to assess the potential for the presence of environmental issues related to the areas identified as having previous potentially contaminating activities;
- undertake, a site review of the areas identified as those subject to historical infilling and the area formerly occupied by a depot;
- design and undertake a Phase II Site Investigation in the vicinity of the PFS adjacent to the J3 site to determine the physical properties of the underlying soil and the chemical properties of both the soil and groundwater beneath the Site; and
- to develop a conceptual model for the Site and provide a generic qualitative risk assessment based on the site investigation findings to assess the presence and significance of risks with respect to redevelopment for residential use.



Claverton undertook brief visits to the vicinity of the historical infilled areas and depot to confirm the assumptions that these historical areas did not appear to display any indications of environmental issues. Photos from these areas, and selected photographs are included in *Appendix A* along with a figure identifying the photo locations. Based on the age of these historical infill and depot areas, the absence of any notable indications of their presence on the Google Maps historical images, and the underlying geology, the site visits confirmed the view that given the no assessment of these areas was appropriate, and furthermore they will remain under natural vegetation within the current master plan (see *Appendix D*). If there was the potential that one or more of these areas could be developed, a site investigation would be prudent to provide information on any fill material and geotechnical considerations.

1.3 Scope of Works

The scope of works undertaken to meet the objectives is as follows:

- A review of readily available data (e.g. Argyll Report, Google Earth satellite images, Google Maps, British Geological Survey (BGS) website, available groundwater borehole information etc.);
- A visit to the areas of the J3 site identified as potential sources of historical environmental impact;
- Intrusive site investigation in the vicinity of the PFS, logging of soil conditions and measurements of volatile gas;
- Environmental laboratory analysis of soils at the PFS; and
- Data assimilation, generic risk assessment and reporting.

1.4 Report Layout

The remainder of the report is presented as follows:

- *Section 2* describes the current site uses, history and environmental setting;
- *Section 3* provides the site investigation methodology;
- *Section 4* provides the site investigation results;
- *Section 5* provides the qualitative risk assessment;
- *Section 6* provides the conclusions and recommendations;
- *Section 7* provides the references;
- *Section 8* provides the acronyms and abbreviations; and
- *Appendices*: include selected photographs and borehole logs.

1.5 Assumptions and Limitations

This document has been prepared by Claverton Associates Ltd for Bradford Rural Estates Ltd, with all reasonable skill, care and diligence within the terms of the proposal (ref: P205, dated 23rd July 2019) and taking account of the manpower and resources devoted to it by agreement with the client. Claverton disclaims any responsibility to the client and others in respect of any matters outside the scope of the above.

The report may not be relied upon by any other party without the prior and express written agreement of Claverton. Unless otherwise stated, the environmental assessment assumes that the site will continue to be used for its current purpose without significant change, or developed as per the provided master plan (see *Appendix D*) which shows the area around the PFS as being landscaped and wooded. The conclusions and recommendations contained within the report are based solely on observations during the site visit and upon information provided by Bradford Rural Estates and other third parties from whom it has been requested.



2 CURRENT SITE USES, HISTORY AND ENVIRONMENTAL SETTING

The current uses and history of the areas of concern including the areas of infill, the depot and the PFS have been derived from a review of the text of the Argyll report (Ref 1) that provides current and historical environmental data for the J3 site and surrounding area. In additional information derived from the Site visit, and Google Earth images has been used.

The locations of the infill areas, the depot and the PFS are shown on *Figure 1* and photograph locations are identified in *Appendix A* with photos of the infill areas, the depot and PFS.

2.1 Site History and Current Land Uses

The J3 site comprises farmland covering an area of approximately 940 hectares and includes arable and pastureland, small areas of woodland, and farm buildings.

Infill Areas

The three inferred infill areas are located in the southern-central and south-eastern parts of the J3 site and all are on arable land and currently under crop (see *Figure 1*). The Argyll report identifies the infill areas as existing between 1891 and 1954.

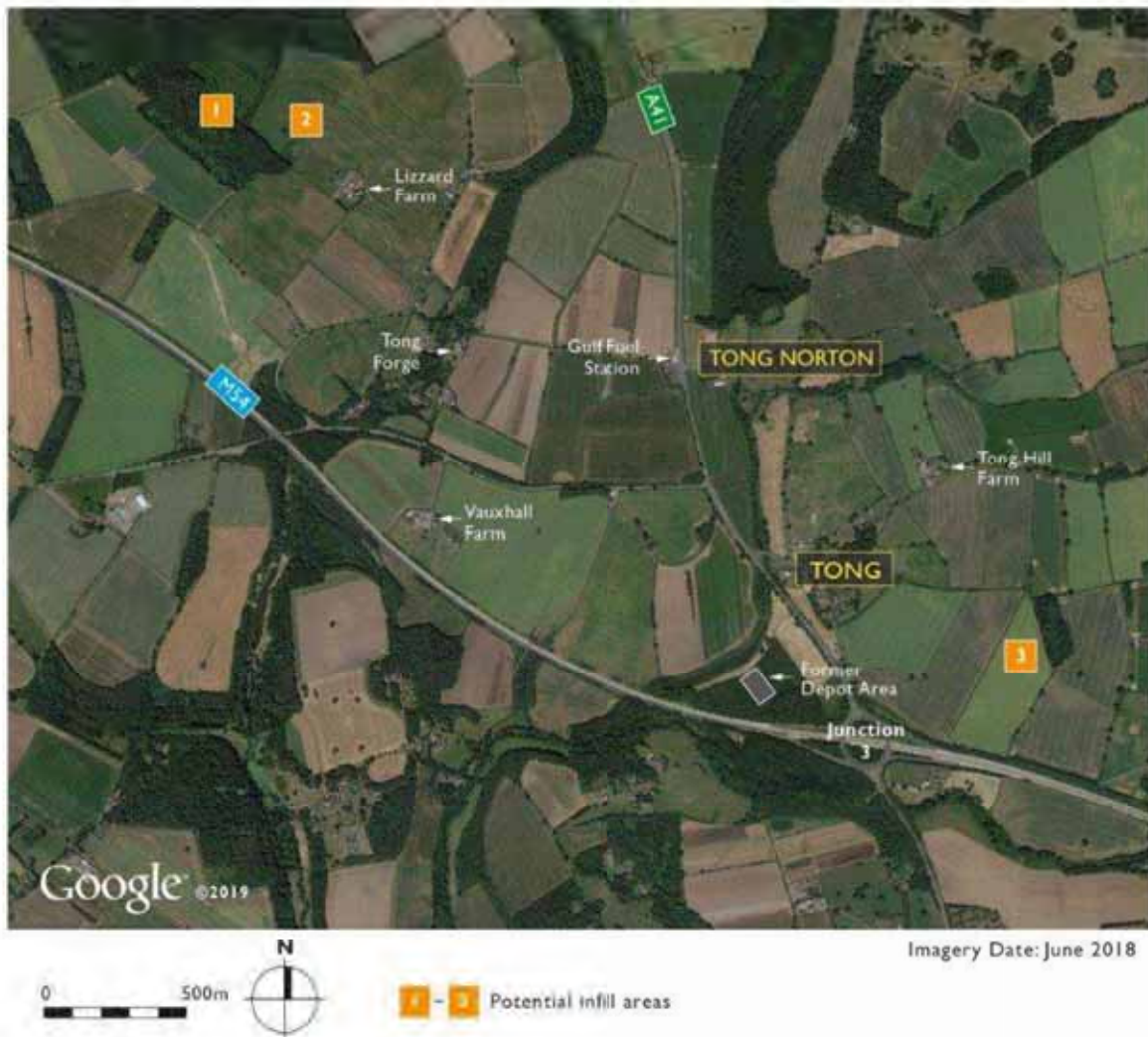


Figure 1: PFS, Infilled Areas and Former Depot Site Setting



Former Depot

The former MOD depot is currently covered by young dense woodland (see *Figure 1*). The former depot is within an amenity area and a private fishing lake identified as Church Pool is located to the north. Surrounding land either under arable use or wooded. The former depot is identified in the Argyll report as existing between 1954 and 1980 and is assumed to have been related to military activities associated with the presence of Cosford military base to the south.

PFS

The PFS is located to the west of the A41 and to the north of Bell Inn and car park area. Surrounding land is in arable use. Historical mapping assessed by Argyll indicates that the PFS was developed at some point between 1965 and 1980. The current PFS comprises a forecourt with eight fuel filling points beneath a canopy. There is an associated shop and separate cashpoint machine. There are seven tanks present at the Site including diesel and unleaded petrol.

The exact installation dates of the USTs were clarified by the PFS owner following discussions during the site investigation, with two diesel tanks installed in 1962, an unleaded petrol and diesel tank installed in 1985, and a further unleaded petrol and diesel tank installed in 1991. The seventh tank was installed in 2003 for additional diesel. The PFS owner also confirmed that the total diesel tank capacity is 73,194 litres in five tanks ranging from 8,819 litres to 29,100 litres, and unleaded petrol is contained in two tanks with capacities of 44,096 and 8,819, totalling 52,915 litres. A photo of the tank details is provided in *Appendix A*. The owner of the PFS stated that the tanks undergo regular integrity testing and that to his knowledge, there had been no issues with petrol or diesel spills or leakage. The PFS has been under the current ownership since 2009.

The immediate environs around the Sites, including the additional area to the north east can be seen in *Figure 1*.

2.2 Environmental Setting

Environmental Setting

All of the areas of concern are located in a predominantly rural area that has been identified as being in a Nitrate Vulnerable Zone which are designated areas of land draining into waters assessed to be polluted by nitrates. The J3 site is located within a Grade 3 classification (good) under the Agricultural Land Classifications.

The sites do not lie in an area in an area of Sensitive Land Use and there are no Sites of Special Scientific Interest (SSSIs), or other areas with special designation for ecology, identified as being located within the vicinity of the sites.

Hydrology

The J3 Site is traversed by the River Worfe and several drains, with numerous small ponds also scattered across the eastern area.

Geology and Hydrogeology

Based on the Environment Agency data provided in the Argyll report, the superficial hydrogeology underlying the area is classified as a Secondary (Undifferentiated) Aquifer (deposits with variable/limited permeability), and a Secondary (A) Aquifer (deposits with moderate permeability). The bedrock hydrogeology is classified as a Secondary (A) Aquifer (deposits with moderate permeability), a Secondary (B) Aquifer (formations with limited permeability), and a Principal Aquifer (highly permeable formations). According to the Environment Agency the J3 Site lies within a Zone I Source Protection Zone (SPZ). An SPZ is a protection zone placed around a well or borehole that supplies groundwater of potable quality. There are numerous abstraction licences located within 500 m. No notable groundwater pollution incidences are reported in the Argyll report.



2.3 Environmental Sensitivity

The findings from the Argyll report identify the J3 site as having a high environmental sensitivity based on the underlying geology and surface water courses.

2.4 Conceptual Site Model

In accordance with current published guidelines and best practise, a conceptual site model (CSM) has been developed for the Sites. This model identifies potential sources of contamination and assesses potential unacceptable risk to identified receptors through the concept of source-pathway-receptor linkage. The analytical results obtained through the site investigation process are assessed in relation to the developed CSM for the Site to identify areas of potential unacceptable risk to Human Health or the Environment.

Prior to the consideration of potential risks posed by contamination at the Sites, potential receptors need to be identified. The three elements of the CSM were assessed during the desk-based study as tabulated below. Following the assessment of the PFS, this element of the CSM was to be refined:

Source	Pathway	Receptors
Hydrocarbons from the USTs associated with the PFS.	Downward and lateral migration of contaminants via leaching through soils, lateral migration of contaminants in groundwater down gradient (inferred to be to east) off-site. On-site inhalation of vapours from soil indoors and outdoors. Migration of contamination via land drains to on or off-site receptors.	Land drains to the east of the A41 that flow to the north east to Norton Mere. Groundwater. River Worfe (400 m to the east of the PFS) Health of PFS staff and visitors (or trespassers).
Infilled areas with unknown material		
Storage and use of various materials and potential hydrocarbons at the former depot.		

A Phase II site investigation was undertaken in the vicinity of the PFS. The Phase II borehole locations were selected as the most proximal to the PFS, and remaining of Bradford Estates land, and most likely to enable the condition of the subsurface around the PFS to be evaluated. This would then provide site-specific information on the potential for the PFS to be a source of ground or groundwater contamination and have impacted Bradford Estates' land.

3 SITE INVESTIGATION METHODOLOGY

3.1 Introduction

The site investigation was undertaken on Tuesday 30th July 2019. A further site visit was made on the Friday 2nd August to undertake ground gas monitoring. Selected photographs from the site work are provided in *Appendix A*, the logs from the borings are provided in *Appendix B*, and the laboratory chemical test results for the soil samples are presented in *Appendix C*.

During the site work the weather was overcast and breezy, with light rainfall later in the day, and not disruptive of the field works. The site investigation team had unrestricted access to the excavation locations which were agreed on the day with a representative from Bradford Estates.



While the borehole drilling was undertaken, the Bradford Estates representative accompanied Claverton's site engineer, to the additional areas of concern (infilled areas and former depot) so as to enable a visual assessment of these sites to be undertaken.

Based on the information from the Argyle report, and the site setting, including the underlying geology it is considered that no further investigation of the infilled areas is required if they remain as amenity/green space land (see *Appendix D*), and investigation would only be required if it was proposed to build directly on top of the depot/pits and geotechnical information was required.

3.2 Site Investigation Strategy

The objectives of the site investigation were to establish soil and groundwater conditions at the site and to undertake soil gas readings.

Given the anticipated geology at the Site and depth to groundwater (circa 15 m bgl based on data from Bradford Estates and searches of geological databases), the most appropriate drilling method was Continuous Flight Auger (CFA). The CFA rig allows relatively undisturbed soil samples to be retrieved for analysis, and creates a sufficiently wide borehole to allow groundwater and gas monitoring piezometers to be installed. The CFA method was also chosen due to the relatively hard geological conditions anticipated (including mudstone).



Imagery Date: June 2018



Figure 2: Tong Services Site Investigation Locations

The locations of the boreholes (as shown on *Figure 2*) were chosen to target the USTs on the PFS as these were the only potential contamination source at the Site. Any release of hydrocarbons from the tanks would likely result in a localised lateral plume at the level of the USTs with a vertical migration component below the tanks. The depth to the base of the tanks, which are of varying capacities, was



inferred to be between 2 m and 3 m bgl. The two boreholes proposed were therefore planned to be excavated to depths of 5 m and 15 m, with the deeper one assessing if there was potential shallower groundwater in the area.

The two boreholes were chosen adjacent to the PFS to the west and north west of the PFS, in close proximity to the fuel USTs on land owned by Bradford Estates. Given that land immediately to the south and east of the PFS is under private ownership, these areas could not be investigated. Land further to the south and east is under the ownership of Bradford Estates, but the distances involved (over 50 m) would not have been representative of the ground conditions in the vicinity of the PFS and therefore boreholes in these directions were discounted.

3.3 Boreholes

Prior to intrusive works, underground services clearance was undertaken by hand digging to a depth of 1.2 m to confirm that the drilling areas were free from underground services.

The borehole excavations were undertaken by Environmental Sampling Ltd under the supervision of a qualified and experienced contaminated land specialist from Claverton who also logged the soil arisings in accordance with BS 5930 (Ref 3). During the soil logging, soil samples underwent headspace screening to identify the presence or otherwise, of volatile compounds, and selected soil samples were collected for laboratory analysis. The two boreholes were completed to depths of 5.0 m and 8.0 m, with the deeper borehole terminating early due to the very hard nature of the geology. To install a deeper borehole in this area would require the use of an air or water flush drilling method which would be very disruptive to the adjacent PFS with noise and airborne spoil, and reduce the opportunity for identifying contamination in the soil.

The 5 m borehole was located just to the west of the PFS where free access was possible. The deeper borehole was excavated in the centre of the access track adjacent to the USTs and tank vent pipes. All boreholes were installed with 1 m of solid standpipe from the ground surface, with the remaining depth installed with slotted uPVC pipe. On completion of drilling and installation, all boreholes were backfilled with clean, inert pea gravel and a bentonite plug capped with a traffic rated cover installed which was set flush with the ground surface.

The detailed logs from the two boreholes are presented in *Appendix C*. Selected photos of the excavations are provided in *Appendix B*.

3.4 Laboratory Analysis

A total of six soil samples were taken from the borehole drilling and sent for laboratory analysis. The samples were sent under a chain of custody system to i2 Laboratories in Watford, Hertfordshire. This is a UKAS and MCERTS accredited laboratory for the required analysis. The analytical suite for the soil samples collected was as follows:

- Total Petroleum Hydrocarbons (TPH);
- Benzene, Toluene, Ethylbenzene and Xylene (BTEX);
- Methyl tert-butyl ether (MTBE);
- Petrol Range Organics (PRO); and
- Diesel Range Organic (DRO).



4 SITE INVESTIGATION RESULTS

4.1 Geology

The general geological sequence encountered during the intrusive investigation is summarised below:

Surface cover:	Depending on the location, comprised a grass cover (BH1) or compacted earth (BH2).
Natural ground:	Comprising a dense, dark red to dark brown sand containing a fine gravel of quartz, flint and granite at depth. The material became increasingly dense with depth with lenses of stiff grey clay and coarse gravel inferred to be mudstone units associated with underlying Coal Measures.

4.2 Hydrogeology

Groundwater was not encountered in either of the boreholes during the site work or during the ground gas monitoring after completion of the site work.

4.3 General Field Observations

The boreholes remained stable during the excavation work.

The observations from the boreholes indicated that the area to the immediate west of the PFS is underlain by natural ground. There were no odours or staining in the material arisings from the boreholes.

4.4 Headspace Screening

A photo-ionisation detector (PID) was used to measure the concentration of the volatile component of gas emitting from the soil samples taken during the site work. Soil samples were stored in a sealed container for up to an hour after sampling and the PID was then used to monitor the gas which accumulated in the sealed container. The results indicated very low (negligible) levels of volatiles of between 0.2 and 1.8 parts per million (ppm).

4.5 Laboratory Test Results

4.5.1 Assessment Criteria

UK Government policy and guidance on the identification, assessment and remediation of contaminated land advocates the use of risk assessment to assess the potential significance of source-pathway-target linkages, which may present an unacceptable level of risk. This ensures that remedial actions (if any) are directed towards such "potentially significant pollutant linkages" so that risks are reduced to acceptable levels.

Guideline values are generally used in the assessment of potentially contaminated sites in the UK with regards to human health. The Contaminated Land Report 11 (CLR) (*Ref 2*) is the overarching document within a series of reports which have been produced by the DEFRA to provide regulators, developers, landowners and other interested parties with relevant, authoritative, appropriate and scientifically-based information on the assessment of risks arising from the contamination from soils. This series of reports replaces the previous guidelines such as those provided by the Inter-Departmental Committee for the Redevelopment of Contaminated Land (ICRCL), and the oft referenced Dutch Intervention Values (DIV) for soils.

The CLR guidelines present a series of Soil Guideline Values (SGVs) to be used in the assessment of chronic risks to human health arising from land contamination in accordance with paragraph B47 of the statutory guidance (*Ref. 4*). The SGVs are also useful in the context of planning applications, where, again, they are not binding standards, but may be used to ensure that a new use of land does not pose any unacceptable risk to the health of intended users. More recently, Category 4 Screening Levels



(C4SLs) have been developed for a limited number of contaminants, and are intended as generic screening values to help show when land is within Category 4 i.e. land where there is "no risk or where the level of risk posed is low". C4SLs have only been developed for six key contaminants to date including Benzo(a)pyrene, Cadmium, Arsenic, Benzene, Hexavalent chromium and Lead.

In addition, the use of generic assessment criteria (GAC) is an integral part of the risk assessment process for land affected by contamination. Forty-seven risk assessors from twenty-six member companies of EIC (Environmental Industries Commission) and AGS (The Association of Geotechnical and Geoenvironmental Specialists) have been working in collaboration with CL:AIRE (Contaminated Land: Applications in Real Environments) to produce a set of industry agreed soil GACs to aid the assessment of risks to human health from 35 substances. These GACs complement the Environment Agency SGV and 2nd edition LQM/CIEH GAC, which together, result in CLEA compliant GACs for a significant number of substances detected in UK soils. The relevant guidance is by the LQM/CIEH entitled 'Suitable for Use Levels' (S4ULs) (Ref 5) that follow on from the previous LQM/CIEH Generic Assessment Criteria. The assessment criteria have been updated recently in line with developments in UK human health risk assessment, in particular the additional land use and exposure assumptions presented in DEFRA's C4SL guidance. The S4ULs are all based on health criteria that represent minimal or tolerable levels of risk to health as described in the Environment Agency's SR2 guidance. The S4ULs have been used in this assessment as they include the full aromatic/aliphatic split of TPH.

4.5.2 Soil Results

A total of six soil samples were submitted for laboratory analysis.

Organic Contamination

All of the soil tests indicated the absence of organic contamination as none of the analytes tested for were above the detection limit of the laboratory.

4.5.3 Gas Monitoring

A return visit was made to the Site three days after the installation of the boreholes to check for the ingress of groundwater and to monitor the volatile component of the ground gas within the piezometer. The boreholes were both found to be dry, with no groundwater present.

Ground gas monitoring indicated concentrations of volatiles were negligible, being between 0.2 and 0.9 ppm.

4.6 Summary of Analytical Results

Soils

The observations of the soils encountered during the site works and the results of the laboratory testing indicate an absence of organic contamination in the vicinity of the PFS.

Ground Gas

The concentrations of volatiles identified from both the headspace screening and the borehole monitoring indicate an absence of volatiles in the soil, and no evidence of contamination from the adjacent PFS.



5 QUANTITATIVE RISK ASSESSMENT

5.1 Introduction

Risk assessment associated with contaminated land can relate both to the issue of environmental liability (of which risks to groundwater and surface water are usually the key issues) and also to Site redevelopment (i.e. making the Site suitable for the proposed use). It generally involves the identification and characterisation of the hazard source (which has the potential to cause harm), the exposure pathway(s) for the hazard and the effect of the exposure on a receptor (the so-called hazard-pathway-target model).

5.2 Plausible Source-Pathway-Receptor Scenarios

Given the absence of any hydrocarbon contamination identified in the soil and absence of significant volatile vapours, there is not considered to be a source of contamination in the vicinity of the PFS. Subsequently, there is considered to be no plausible source-pathway-receptor scenario associated with the Site.

6 CONCLUSIONS

Given the findings of this Phase II site investigation, the following conclusions can be made:

- The J3 site has a limited history of non-farming activities, with only small areas of infilled land, which are now farmed, and a historical MCD depot. The identified PFS is not located on the Bradford Estates' land but is located immediately adjacent to the J3 site. The infill areas, the depot and the PFS were identified in the Argyll report as potential sources of contamination.
- The J3 site is considered by Argyll to have a high environmental sensitivity due to the presence of an underlying major aquifer and source protection zone over part of the land. There are also a number of groundwater abstraction wells within the J3 site that are for potable use.
- As the PFS was identified as the one area with a reasonable potential for contamination of the Bradford Estates' land, it was concluded that the intrusive investigation only needed to focus on the PFS. Given that land immediately to the south and east of the PFS is under private ownership, and the USTs are located on the northwest side of the PFS, the investigation was undertaken through drilling two boreholes immediately to the west and north west of the PFS on land owned by Bradford Estates. There is land further to the south and east is under the ownership of Bradford Estates, but the distances involved (over 50 m) is considered unlikely to be representative of the ground conditions in the vicinity of the PFS.
- The two boreholes were drilled to depths of 5.5 m and 8 m below ground level, and fitted with installations to permit future groundwater and ground gas monitoring. Soil samples were taken during the site works and underwent headspace testing for volatile gases, and submitted for laboratory analysis to evaluate whether any of a potential range of hydrocarbon contaminants was present.
- The headspace screening for volatiles in the field indicated the absence of a volatile fraction in the soils. Laboratory test results further confirmed the absence of hydrocarbon contamination in the soil samples. Subsequent gas monitoring of the boreholes indicated the absence of any volatile gases within the boreholes.
- There is considered to be no plausible source-pathway-receptor scenario associated with the Site due to the absence of hydrocarbon contamination, and no identified risks to current or future uses on the Site. None of the results are considered to trigger the need for further investigations or other actions.
- Based on the Argyll report, and site visits no further investigation of the infilled areas nor the historical MOD depot is considered to be required.



7 REFERENCES

- Ref 1: Argyll Environmental Ltd, Estate Solutions Farm report on Land adjacent to junction 3 of the M54, Shropshire, TF11 8PW, Report Ref AEL-4775-PSF-967436, dated 25th March 2019.
- Ref 2: Model Procedures for the Management of Land Contamination, Contaminated Land Report 11, Environment Agency and DEFRA, 2004.
- Ref 3: Code of Practice for Ground Investigations, British Standards, 2015.
- Ref 4: Environmental Protection Act 1990, Part 2A, Contaminated Land, Sept 2006.
- Ref 5: The LQM/CIEH S4ULs for Human Health Risk Assessment, 2015.



8 ACRONYMS AND ABBREVIATIONS

Argyll	Argyll Environmental Limited
bgl	below ground level
BGS	British Geological Survey
Bradford Estates	Bradford Rural Estates Limited
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
C4SLs	Category 4 Screening Levels
CFA	Continuous Flight Auger
Claverton	Claverton Associates Limited
CLR	Contaminated Land Report 11
CSM	conceptual site model
DEFRA	Department of Environment, Food and Rural Affairs
DIV	Dutch Intervention Values
DRO	Diesel Range Organic
GAC	generic assessment criteria
ICRCL	Redevelopment of Contaminated Land
MOD	Ministry of Defence
MTBE	Methyl tert-butyl ether
PFS	petrol filling station
PID	photo-ionisation detector
ppm	parts per million
PRO	Petrol Range Organics
S4ULs	Suitable for Use Levels
SGVs	Soil Guideline Values
SPZ	Source Protection Zone
SSSIs	Sites of Special Scientific Interest
TPH	Total Petroleum Hydrocarbons
USTs	underground storage tanks



APPENDIX A – PHOTO LOG



Photo 1: BH1 spoil during excavation work



Photo 2: BH2 spoil during excavation work



Photo 3: BH1 completed on site



Photo 4: Location of BH1 in relation to the PFS (the canopy of the PFS can be seen in the background)



Photo 5: BH2 completed on site in the centre of the access track to the north of the PFS



Photo 6: BH2 in relation to the PFS. Vent pipes for the USTs visible approximately 4 m from BH2



Photo 7: Fill point covers of the USTs on site



Photo 8: Redundant storage tank on site. No visible signs of spills or leakage identified during the site visit.

RECORD OF UNDERGROUND & ABOVE-GROUND STORAGE TANKS
INSTALLATION & MAINTENANCE

TANK NO.	CAPACITY (GALLONS)	GRADE	INSTALLATION DATE	PRODUCT STORED	TYPE OF TANK	DATE OF LAST INSPECTION
1	1122.0	DEGR.	1961	W	ST	12/11
2	1122.0	DEGR.	1962	W	ST	12/11
3	1122.0	ALUM.	1985	W	ST	12/11
4	224.0	DEGR.	1985	W	ST	12/11
5	224.0	DEGR.	1981	W	ST	12/11
6	224.0	ALUM.	1991	W	ST	12/11
7	1122.0	DEGR.	1963	W	ST	12/11

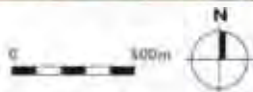
MAINTENANCE & REPAIRS
(Leak Testing / Re-lining / Addition of new section lines)

DATE	DETAILS	COMPETENT PERSON

Photo 9: Information on age, size and contents of fuels at the PFS, Tong Services (provided voluntarily by the owner)



Imagery Date: June 2018



A Photo locations **1 - 2** Potential infill areas

Photo Locations for Photos A - E



Photo A: View looking north west towards Potential Infill Areas 1 and 2.



Photo B: View looking north west towards Potential Infill Areas 1 and 2



Photo C: View looking east across to Potential Infill Area 3



Photo D: View looking east towards former MOD Depot now within the woods



Photo E: View looking directly at location of former MOD Depot within the woods



APPENDIX B: BOREHOLE LOGS

Project: J3 Tong Services, Shropshire	Date: 30 July 2019	BH: 1
Client: Bradford Rural Estates Ltd	Excavation Method: Continuous Flight Auger	Sheet: 1 of 1

Description of strata	Depth bgl (m)	Samples/Tests		Water Strikes (m bgl)
		Type	Depth (m)	
Grass over loose dark brown sandy topsoil (S).	0.0 – 0.2	Soil PID 0.0 ppm	0.0 – 0.2	-
Dense medium to dark brown SAND with a fine gravel of flint (NG).	0.2 – 0.5	Soil PID 0.2 ppm	0.2 – 0.5	-
Very dense dark red to brown SAND and SANDSTONE (NG).	0.5 – 2.8	Soil PID 0.3 ppm	0.8 – 1.5	-
		Soil PID 0.6 ppm	2.5 – 2.8	
Very dense dark red to dark brown SAND and SANDSTONE with much sub-rounded to well-rounded gravel of quartz, flint and gravel (NG).	2.8 – 5.0	Soil PID 0.9 ppm	2.8 – 5.0	-
BH complete at 5.5m				

Comments
Soil samples taken for laboratory analysis: 0.0 – 0.8 m, 4.0 – 5.5 m and composite sample 0.8 – 4.0 m

Notes
MG – Made Ground
NG – Natural Ground
S – Soil



Project: J3 Tong Services, Shropshire	Date: 30 July 2019	BH: 2
Client: Bradford Rural Estates Ltd	Excavation Method: Continuous Flight Auger	Sheet: 1 of 1

Description of strata	Depth bgl (m)	Samples/Tests		Water Strikes (m bgl)
		Type	Depth (m)	
Compacted earth with occasional cobbles and bricks (MG)	0.0 – 0.15	-	-	-
Black tarmacadam (MG)	0.15 – 0.4	-	-	-
Dense medium brown gravelly slightly clayey SAND. Gravel is fine to coarse and well-rounded (NG).	0.4 – 0.9	Soil PID 0.0 ppm	0.4 – 0.9	-
Dense dark red slightly gravelly clayey SAND. Gravel is fine to medium sized well-rounded flint and quartz (NG).	0.9 – 1.5	Soil PID 0.0 ppm	0.9 – 1.5	-
Dense dark red coarse sand and fine GRAVEL with occasional medium gravel of quartz (NG).	1.5 – 3.5	Soil PID 1.8 ppm Soil PID 0.7 ppm	1.5 – 2.8 2.8 – 3.5	-
Very dense grey mudstone and SANDSTONE with coarse sand (Coal Measures) (NG).	3.5 – 8.0	Soil PID 0.5 ppm	3.5 – 8.0	-
BH complete at 8.0 m				

Comments

Soil samples taken for laboratory analysis: 0.4 – 0.9 m, 1.5 – 2.8 m and composite sample 3.5 – 8.0 m

Notes

- MG – Made Ground
- NG – Natural Ground
- S – Soil



APPENDIX C: LABORATORY ANALYSIS



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M CERTS



Environmental Science

Margaret Casey
Claverton Associates
Barn Cottage
Claverton
Bath
BA2 7BG

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7 Woodshots Meadow,
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Business Park,
Watford,
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WD18 8YS

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e: mpcasey789@gmail.com

Analytical Report Number : 19-52476

Project / Site name:	J3	Samples received on:	31/07/2019
Your job number:	J3	Samples instructed on:	31/07/2019
Your order number:	J3	Analysis completed by:	09/08/2019
Report Issue Number:	1	Report issued on:	09/08/2019
Samples Analysed:	6 soil samples		

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Iss No 19-52476-1 J3 J3

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Page 1 of 6



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Environmental Science

Analytical Report Number: 19-52476

Project / Site name: J3

Your Order No: J3

Lab Sample Number	1280832			1280833			1280834			1280835			1280836		
Sample Reference	BH1			BH1			BH1			BH2			BH2		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	0.00-0.80			4.00-5.50			0.80-4.00			0.40-0.90			1.50-2.80		
Date Sampled	Deviating			Deviating			Deviating			Deviating			Deviating		
Time Taken	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status												
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	5.9	5.3	3.9	9.5	6.7							
Total mass of sample received	kg	0.001	NONE	0.53	0.49	0.54	0.50	0.55							

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

Petroleum Range Organics (C6 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
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TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10

TPH (C10 - C25)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
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Environmental Science

Analytical Report Number: 19-52476

Project / Site name: J3

Your Order No: J3

Lab Sample Number				1280837				
Sample Reference				BH2				
Sample Number				None Supplied				
Depth (m)				3.50-8.00				
Date Sampled				Deviating				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	9.5				
Total mass of sample received	kg	0.001	NONE	0.48				

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0				
Toluene	µg/kg	1	MCERTS	< 1.0				
Ethylbenzene	µg/kg	1	MCERTS	< 1.0				
p & m-xylene	µg/kg	1	MCERTS	< 1.0				
o-xylene	µg/kg	1	MCERTS	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0				

Petroleum Hydrocarbons

Petroleum Range Organics (C6 - C10)	mg/kg	0.1	MCERTS	< 0.1				
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TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10				

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10				

TPH (C10 - C25)	mg/kg	10	MCERTS	< 10				
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MCERTS



Environmental Science

Analytical Report Number : 19-52476**Project / Site name: J3**

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1280832	BH1	None Supplied	0.00-0.80	Brown clay and sand with gravel.
1280833	BH1	None Supplied	4.00-5.50	Brown sand.
1280834	BH1	None Supplied	0.80-4.00	Brown sand with gravel.
1280835	BH2	None Supplied	0.40-0.90	Brown sand.
1280836	BH2	None Supplied	1.50-2.80	Brown sand.
1280837	BH2	None Supplied	3.50-8.00	Brown clay and sand.



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MCERTS



Environmental Science

Analytical Report Number : 19-52476

Project / Site name: J3

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
DRO (Soil)	Determination of extractable hydrocarbons in soil by GC-MS/FID.	In-house method with silica gel split/clean up.	L076-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
PRO (Soil)	Determination of hydrocarbons C6-C10 by headspace GC-MS.	In-house method based on USEPA8260	L088-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

Sample Deviation Report

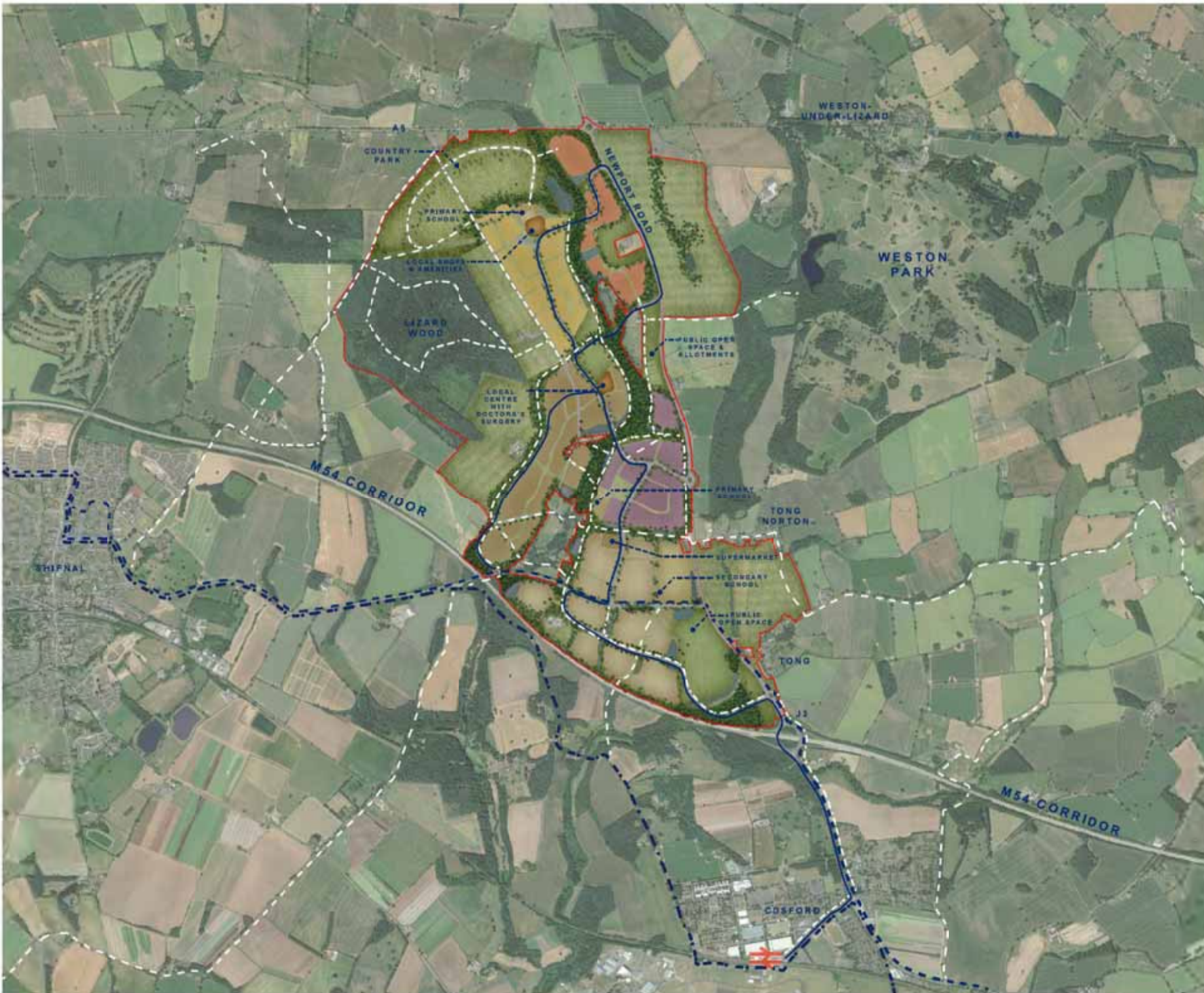


Sample ID	Other ID	Sample Type	Jobs	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
BH1		S	19-52476	1280832	a			
BH1		S	19-52476	1280833	a			
BH1		S	19-52476	1280834	a			
BH2		S	19-52476	1280835	a			
BH2		S	19-52476	1280836	a			
BH2		S	19-52476	1280837	a			

Key: a - No sampling date b - Incorrect container
 c - Holding time d - Headspace e - Temperature



APPENDIX D: ILLUSTRATIVE MASTER PLAN



- KEY**
-  Site Boundary
 -  Retained Agricultural Land Use
 -  Proposed Country Park
 -  Proposed / Reinforced Woodland Belt
 -  Proposed Public Park
 -  Existing + Proposed Water Bodies
 -  Proposed Tree-lined Main Roads
 -  Strategic Employment Area
 -  Neighbourhood 1
 -  Neighbourhood 2
 -  Neighbourhood 3
 -  Neighbourhood 4
 -  Supermarket
 -  School
 -  Local Centre
 -  Cosford Railway Station
 -  Proposed Bus Routes
 -  Existing Bus Routes
 -  National Cycle Route 81
 -  Existing Pedestrian & Cycle Routes
 -  Potential Pedestrian & Cycle Routes

© 22.05.2016 Employment Road Changes

Rev. Date. Detail.

GENERAL
Do not scale from this drawing.
All dimensions to be checked to suit.
This plan is to be read with all accompanying documents.
© Bidwells 2016

DRAFT

Urban Design studio
BIDWELLS Bidwell House, Trumpington Road, Cambridge CB2 3RQ

JUNCTION 3: M54
ILLUSTRATIVE MASTER PLAN

Job Code: 44025
Drawing Number: 100017734
Drawing Date: 02.06.2016
Drawing Title: J3
Drawing Scale: 1:1
Drawing Author: DP
Drawing Number: UDS44025-A1-0201 C