

**Land East of Penistone Road, Fenay Bridge,
Huddersfield**

Summary Report on Previous Site Investigation

ENGIE Regeneration Ltd

Report prepared by:
Ecus Ltd.
Brook Holt
3 Blackburn Road
Sheffield
S61 2DW
0114 266 9292

January 2019

This page has been intentionally left blank.

Ecus Ltd

Report to: **Engie Regeneration Ltd
Callflex Business Park
Golden Smithies Lane
Wath upon Dearne
Rotherham
S63 7ER**

Report Title: **Land east of Penistone Road, Fenay Bridge, Huddersfield
Summary Report on Previous Site Investigation**

Revision: **FINAL**
Issue Date: **January 2019**
Report Ref: **MM/12358/190107/P1**
REDACTED

Originated By:

M A McDowell BSc (Hons) CGeol EurGeol FGS
Principal Geoscience Consultant Date: 19 December 2018

REDACTED

Reviewed and
Approved By:

K Hawkins BSc (Hons) MSc DIC CBiol
CSci FRSB MIoD
Regional Director

Date: 3 January 2019

Prepared by:
Ecus Ltd.
Brook Holt
3 Blackburn Road
Sheffield
S61 2DW

The report and the site assessments carried out by Ecus on behalf of the client in accordance with the agreed terms of contract and/or written agreement form the agreed Services. The Services were performed by Ecus with the skill and care ordinarily exercised by a reasonable Environmental Consultant at the time the Services were performed. Further, and in particular, the Services were performed by Ecus taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between Ecus and the client.

Other than that expressly contained in the paragraph above, Ecus provides no other representation or warranty whether express or implied, in relation to the services.

This report is produced exclusively for the purposes of the client. Ecus is not aware of any interest of or reliance by any party other than the client in or on the services. Unless expressly provided in writing, Ecus does not authorise, consent or condone any party other than the client relying upon the services provided. Any reliance on the services or any part of the services by any party other than the client is made wholly at that party's own and sole risk and Ecus disclaims any liability to such parties.

This report is based on site conditions, regulatory or other legal provisions, technology or economic conditions at the time of the service provision. These conditions can change with time and reliance on the findings of the Services under changing conditions should be reviewed. Ecus accepts no responsibility for the accuracy of third party data used in this report.

This report may express opinions on the possible conditions of strata, contaminants, groundwater and gases between or beyond exploratory hole locations. Ground conditions are inherently variable and the opinions expressed are for guidance only. No liability can be accepted for their accuracy.

This page has been intentionally left blank.

CONTENTS

Executive Summary	viii
1 Introduction	1
1.1 Terms of Reference	1
1.2 Objectives	1
1.3 Future Site Use	1
1.4 Sources of Information	1
1.5 Limitations	2
2 The Site	3
2.1 Location	3
2.2 Site Description	3
2.3 Topography	3
2.4 Access	3
2.5 Underground Structures and Services	3
2.6 Surrounding Land Use	3
3 Historical Setting	4
3.1 Historical Land Use	4
3.2 Summary of Historical Land Use	5
4 Environmental Searches	6
4.1 Pollution Incidents	6
4.2 Discharge Consents	6
4.3 Landfill Sites and Waste Management Licences	6
4.4 Potentially Infilled Land	6
4.5 Part A and B Authorised Activities	6
4.6 Dangerous Substances	6
4.7 Industrial Land Uses	6
4.8 Environmentally Sensitive Land Uses	7
4.9 Radon	7
4.10 Flood Risk	7
5 Geology and Mining	8
5.1 Artificial Deposits and Superficial	8
5.2 Solid Geology	8
5.3 Hydrogeology	8
5.4 Hydrology	8
6 Phase 2 Ground Investigation Summary	9
6.1 Introduction	9
6.2 Intrusive Investigation Works	9
6.3 Geo-environmental Laboratory Testing	9
6.4 Geotechnical Laboratory Testing	9
6.5 Ground Conditions	9
7 Geotechnical Considerations	11
7.1 General	11
7.2 Foundations	11
7.3 Floor Slabs	11

7.4	Excavations & Earthworks	11
7.5	Highways and Hard Standing	11
7.6	Concrete Protection	12
7.7	Soakaways and Site Drainage	12
8	Coal Mining Risk Assessment	13
8.1	General	13
8.2	Published Geology	13
8.3	Historical Mapping	13
8.4	Coal Authority Data	13
8.5	Ground Investigation	14
8.6	Potential Coal Mining Risks	14
8.7	Conclusions	15
9	Revised Conceptual Model and Risk Assessment	16
9.1	General	16
9.2	Risks to Site End Users – Selection of Human Health Risk Screening Criteria	16
9.3	Risks to Human Health – Conceptual Exposure Model	17
9.4	Human Health – Generic Quantitative Risk Assessment (GQRA)	18
9.5	Controlled Waters	19
9.6	Ground Gases	19
9.7	Invasive Plants	19
9.8	Revised Conceptual Site Model	20
10	Conclusions	22
10.1	Geo-environmental Assessment	22
10.2	Geotechnical Analysis	22

Figures

Appendix 1: Site Walkover Photographs

Appendix 2: WSP Combined Phase 1 & 2 Ground Risk Appraisal

Appendix 3: Chemical Analyses

This page has been left intentionally blank.

Executive Summary

Site Location	The Site is situated on land east of Penistone Road, Fenay Bridge, Huddersfield and is approximately 2.3 hectares in area. The National Grid Reference for the Site is E: 418600, N: 414820.
Current Site Use	The Site comprises a single undeveloped parcel of agricultural land (presumed to be open pasture land).
Proposed Site Use	The Site is anticipated to be developed with residential housing and associated private gardens.
Previous Site Uses	The Site has remained undeveloped throughout its history.
Geological Setting	No superficial drift deposits or artificial made ground are recorded across the Site or immediate vicinity. The Site is recorded to be underlain by the Grenoside Sandstone, part of the Lower Pennine Coal Measures, dating to the Carboniferous period. No geological faults are shown to affect the Site.
Environmental Considerations	No pollution incidents have been highlighted within 250 m that could affect the Site. The Site is not located within a groundwater Source Protection Zone and the underlying bedrock is recorded to be a Secondary (A) aquifer. No recorded landfill sites have been identified within 250 m of the Site. The Better Bed coal seam could present a ground gas risk. No radon protection measures are required for the new buildings.
Preliminary Contamination Assessment	No historical or potential sources of contamination have been identified on site. Soil testing indicated elevated arsenic with subsequent statistical analysis confirming a UCL below the screening value. An exceedance of mercury is considered to be an outlier and not representative of the wider site environment. The risk to human health is overall considered to be low. The risk of pollution to controlled waters is very low. The risk from hazardous ground gases is considered to be low.
Geotechnical Considerations	The Site is not deemed to be at risk from unrecorded shallow mine workings or quarrying. Based on the anticipated ground conditions consideration could be given to founding the new dwelling on strip footings seated into stiff / residual soils or weathered bedrock. At this stage full construction thickness should be assumed for a stratum with 2.5% CBR for any highway or pavement areas. Concrete design conditions of DS-1 and AC-2z for slightly acidic ground have been determined. Soakaways are not recommended.
Recommendations	Remediation measures for contaminated land are not considered necessary. An Earthworks Method Statement is recommended to address re-profiling of the Site. This may require additional geotechnical testing to obtain design data (e.g. compaction tests).

This page has been left intentionally blank.

1 Introduction

1.1 Terms of Reference

- 1.1.1 Ecus Ltd (hereafter Ecus) was commissioned by ENGIE Regeneration Ltd (the 'Client') to undertake a desk-based review of existing site investigation data for land at Fenay Bridge, Huddersfield (hereafter referred to as 'the Site') The Site location is shown on Figure 1.
- 1.1.2 The report follows the general format of a Phase 1 geo-environmental desk study but uses existing WSP report 'Land At Fenay Bridge: Combined Phase I and Phase II Ground Risk Appraisal' (Report Reference. 70035780-001, dated October 2017) as the primary source of information. The WSP report, while containing a significant amount of useful data, was found to be lacking in its conclusions on some issues; Ecus were asked to review and update WSP's findings and to provide firmer conclusions where possible, or to identify limitations and further work requirements where necessary.

1.2 Objectives

- 1.2.1 The assessment has been carried out in general accordance with the requirements of British Standards BS5930 (2015) – *Code of Practice for Ground Investigations* and BS10175 (2011+A2:2017) – *Investigation of Potentially Contaminated Sites. Code of Practice*.
- 1.2.2 The general objectives of the assessment are as follows:
- Review existing site investigation data covering both geo-environmental and geotechnical issues;
 - Review the geological, hydrogeological and hydrological conditions identified under the Site;
 - Confirm that the Conceptual Site Model (CSM) of potential linkages between potential sources of contamination and receptors through likely pathways is still valid and update where appropriate;
 - Review potential geotechnical constraints or hazards from the ground conditions and confirm geotechnical recommendations for foundations, pavements and drainage where appropriate;
 - Confirm the status of any coal mining risk to the Site; and
 - Provide any recommendation for further investigations or remedial actions as may be necessary.

1.3 Future Site Use

- 1.3.1 It is proposed to develop the site with approximately eighty residential properties with private gardens as shown on Figure 2.
- 1.3.2 This report has been written in relation to this site end-use; should the proposed Site use change then the conclusions and recommendations of the report will require reassessment.
- 1.3.3 Any changes in the development layout within the red-line boundary are not considered likely to be significant in terms of the findings of this report.

1.4 Sources of Information

- 1.4.1 Table 1 presents sources of information that have been consulted during this assessment.

Table 1: Sources of Information

Source	Details
Client	The Client provided information in relation to the proposed future use of the Site.
Site Walkover	Information about the Site was gained from visual inspection during a site walkover.
Previous Site Investigation Reports	WSP report 'Land At Fenay Bridge: Combined Phase I and Phase II Ground Risk Appraisal' (Report Reference. 70035780-001, dated October 2017) is included as Appendix B. The report looks at three sites in the Fenay Bridge area. The information for 'Plot D' is relevant to this review.
British Geological Survey (BGS)	The BGS Geoindex website ¹ was consulted for geological information relating to the site and surrounding area.

1.5 Limitations

- 1.5.1 The recommendations presented in this report are based on the findings of the available information reviewed when compiling the report. Published information has been rechecked using publically available online resources where possible.
- 1.5.2 Ecus cannot be held responsible for any recommendations or conclusions based on the published information if it is later proven to be inaccurate.
- 1.5.3 It should also be noted that there may be other conditions prevailing on the site which are not disclosed by the available information and therefore could not be taken into account when writing this report. Ecus cannot be responsible for unrecorded information.
- 1.5.4 The conclusions and recommendations of this report cannot be guaranteed to gain regulatory approval. This report should be passed to the relevant regulatory authorities for their comment and approval prior to undertaking any works on site if it is required as part of a Planning Application.

¹ <http://www.bgs.ac.uk/geoindex/>. Accessed 14th November 2018.

2 The Site

2.1 Location

- 2.1.1 The Site is approximately 2.3 hectares in area, and is situated on land east of Penistone Road, Fenay Bridge, Huddersfield. Figure 1 shows the location of the Site which centres on National Grid Reference E: 418600, N: 414820.
- 2.1.2 A Site walkover survey was carried out by Ecus on 19th December 2018. Figure 2 shows the proposed layout of the Site. Photographs of the Site are presented in Appendix 1.

2.2 Site Description

- 2.2.1 At the time of the walkover survey the Site comprised an undeveloped agricultural field (open pasture land), as shown in photo 1.
- 2.2.2 The western site boundary was formed by Penistone Road. The eastern site boundary was formed by a disused railway embankment. Whitegates grove bounded the Site to the north, and the southern boundary was marked by existing residential development to the south.
- 2.2.3 Mature trees were located at the northern end of the Site, with a single oak tree standing alone in the middle of the Site. Further mature trees were present along the eastern boundary. Sparsely planted young trees were present along the western roadside boundary.
- 2.2.4 No obvious visual or olfactory signs of potential contamination were identified on the Site during the walkover survey. Limited littering was observed by the site entrance, and also included some discarded scaffold boards and organic garden waste (photos 2 and 3).

2.3 Topography

- 2.3.1 The Site slopes from east to west, the south-east corner is the highest point at c. 97.4 m Above Ordnance Datum (AOD), and the north-west corner is the lowest point at 85.7 m AOD.

2.4 Access

- 2.4.1 Access to the Site is via Whitegates Grove in the north-west corner of the Site.

2.5 Underground Structures and Services

- 2.5.1 A formal underground services search has not been undertaken at this stage.

2.6 Surrounding Land Use

- 2.6.1 The Site is situated at the western side of the village of Fenay Bridge, and is surrounded by residential property to the north, east and south. The land to the west comprises of undeveloped fields.

3 Historical Setting

3.1 Historical Land Use

- 3.1.1 Historical Ordnance Survey mapping was included in the WSP report (Appendix 2), and has also been verified using online resources such as Old Maps².
- 3.1.2 A description of the historical use of the Site is presented in Table 2, along with a summary of surrounding land uses considered to have the potential to influence the contamination potential of the Site.

Table 2: Summary of Historical Land Use (all distances are approximate)

Map Date	Land Use within the Site Boundary	Potentially Significant Surrounding Land Use
1854	The Site comprised undeveloped agricultural land.	Rowley Bottom is approximately 400 m south-east of the Site. Rowley Mill (Woollen) is approximately 450 m south of the Site. A small gravel pit is located 250 m south. A sandstone quarry lies 200 m east.
1894	No changes shown.	There is a railway embankment (Kirkburton Ranch) that runs along the eastern boundary of the Site in a north-south orientation. The gravel pit is no longer depicted and has potentially been infilled. A fireworks manufactory is shown 300 m east.
1908	No changes shown.	No significant changes shown.
1933	No changes shown.	Railway sidings are shown 50 m south of the Site. Victoria Colliery is shown 200 m south-east of the Site, with Woodsome Colliery located 300 m south-east. Several shafts are also depicted, the closest being an old shaft 200 m north-east. Woodsome Brick Works is located 400 m south-east of the Site.
1938-1948	No changes shown.	No significant changes shown.
1955-1956	No changes shown.	Woodsome Colliery has reduced in size and there are no longer any railway sidings shown.
1965-1968	No changes shown.	Circular structures, potentially brick kilns, are shown to the north and east of the brick works. Several buildings labelled 'Works' are shown in the village of Rowley Hill, 200 m to the east of the Site.
1976-1979	No changes shown.	The railway to the east of the Site is no longer shown. The colliery is no longer shown.
1984	No changes shown.	The potential brick kilns have been cleared.

² www.old-maps.co.uk. Accessed 14th November 2018.

Map Date	Land Use within the Site Boundary	Potentially Significant Surrounding Land Use
1992-2017	No changes shown.	No significant changes shown.

3.2 Summary of Historical Land Use

- 3.2.1 The Site is shown to have remained undeveloped since the earliest available map, dated to 1854. No significant potential sources of contamination on Site identified.
- 3.2.2 The surrounding area has remained largely rural to the west and residential to the east, with a few industrial works in the vicinity including a brick works and a colliery, which have now become disused.

4 Environmental Searches

4.1 Pollution Incidents

- 4.1.1 There is one recorded pollution incident within 500 m of the Site. The incident was recorded 30 m north-west of the Site, it occurred as a result of sewage released to an unnamed freshwater stream, dated January 1994. The incident was classified by the Environment Agency (EA) as being Category 2 – Significant.
- 4.1.2 There are no recorded Part 2(a) sites within 500 m of the Site.

4.2 Discharge Consents

- 4.2.1 One licensed discharge consents to surface water or groundwater has been identified within 500 m of the Site.
- 4.2.2 The Consent is held by Woodsome Hall Golf Club for the discharge of treated sewage to Springwood Beck approximately 400 m south-west of the Site. The consent was issued in June 2004.
- 4.2.3 Within 250 m of the Site, no records for any Water Industry Referrals (potential harmful discharges to the public sewer) have been highlighted.

4.3 Landfill Sites and Waste Management Licences

- 4.3.1 There are no recorded active or historical landfill Sites, or other waste management facilities located within 250 m of the Site.
- 4.3.2 There are no recorded licensed waste management facilities within 250 m of the Site.

4.4 Potentially Infilled Land

- 4.4.1 Ten entries for potentially infilled land relating to three locations are highlighted within 500 m of the Site. The nearest location is shown 125 m south-east of the Site and relates to an unknown filled ground (pit, quarry etc.) dating to 1992.

4.5 Part A and B Authorised Activities

- 4.5.1 No Part A(1), Part A(2), Part B or Historic IPC Authorisations have been identified within 500 m of the Site.

4.6 Dangerous Substances

- 4.6.1 Within the Groundsure report, there are no records of any List 1 or List 2 Dangerous Substances within 500 m of the Site.
- 4.6.2 No records for registered Category 3 or 4 Radioactive substances sites have been identified within 500 m of the Site.
- 4.6.3 The Groundsure report does not recorded any Control of Major Accident Hazards (COMAH) or Notification of Installations Handling Hazardous Substances (NIHHS) sites within 500 m of the Site.

4.7 Industrial Land Uses

- 4.7.1 There are six records for industrial land uses relating to three locations within 500 m of the Site. The closest are 360 m south of the Site and cover manufacturing and light engineering services.
- 4.7.2 No active petrol stations / fuel sites are recorded within 500 m of the Site.
- 4.7.3 There are no recorded high voltage underground electricity cables or high pressure gas pipelines within 500 m of the Site.

4.8 Environmentally Sensitive Land Uses

- 4.8.1 The Site is not located within a groundwater Source Protection Zone (SPZ), as set by the EA for the protection of potable groundwater resources.
- 4.8.2 There are seven records for two registered groundwater abstractions located within a 500 m radius of the Site. The closest lies 400 m south of the Site and is for textile and leather processes at Reliance Gear Co Ltd. The abstractions appear to be live.
- 4.8.3 No other potential environmentally sensitive receptors have been recorded across the surrounding area in the Enviro Insight report.

4.9 Radon

- 4.9.1 The Site is located within an intermediate probability radon area (1 to 3 % of homes are estimated to be at or above the Action Level). Protection measures are not normally required in the construction of new dwellings or extensions at this probability level.

4.10 Flood Risk

- 4.10.1 The Site is not shown to lie within an area deemed to be at risk of flooding from rivers or seas.
- 4.10.2 According to the British Geological Survey (BGS), the Site is indicated to be at limited risk potential for groundwater flooding at the site.

5 Geology and Mining

5.1 Artificial Deposits and Superficial

- 5.1.1 The geological map for the area, 1:50,000 scale BGS Sheet 77 (Huddersfield), and BGS sheet SE12SE, scale 1:10,000, have been studied to infer the likely geology of the Site and surrounding area.
- 5.1.2 No superficial deposits are shown to overlie the solid geological unit in proximity to the Site.
- 5.1.3 No artificial made ground deposits are recorded to underlie the Site or within the surrounding area.
- 5.1.4 Shallow soils would therefore be anticipated in the form of residual soils, weathered down from the parent bedrock.

5.2 Solid Geology

- 5.2.1 The solid strata shown underlying the Site is the Grenoside Sandstone as part of the Pennine Lower Coal Measures Formation, dating to the Carboniferous period. This formation comprises interbedded mudstone, siltstone and sandstone, with more numerous and thicker coal seams in its upper horizon.
- 5.2.2 The geological maps indicates the Better Bed coal seam is present, trending north to south along the eastern boundary of the Site. The seam is indicated on the 1:10,000 scale geological map to be dipping 2 degrees to the east. The thickness of the Better Bed coal seam is recorded as 0.10m to 0.90 m.
- 5.2.3 No geological faults are shown to affect the Site.

5.3 Hydrogeology

- 5.3.1 The bedrock geology (Pennine Lower Coal Measures Formation and the Grenoside Sandstone) is classified by the EA as Secondary A aquifers. These are described as permeable layers capable of supporting water supplies at a local rather than strategic scale.
- 5.3.2 The Site is not located within a SPZ.

5.4 Hydrology

- 5.4.1 The Site is located within the EA's defined Humber River Basin District and the Aire and Calder Catchment area.
- 5.4.2 The nearest named surface watercourse is Fenay Beck, located approximately 80 m west of the Site, which runs in a westerly direction.
- 5.4.3 Fenay Beck is classified by the EA as having moderate ecological potential and a good chemical water quality.

6 Phase 2 Ground Investigation Summary

6.1 Introduction

- 6.1.1 The WSP report included the findings of a site specific Phase 2 ground investigation. The investigation appears to have been undertaken broadly in accordance with British Standards BS5930:2015 – *Code of Practice for Ground Investigations* and BS10175:2011+A1:2013 – *Investigation of Potentially Contaminated Sites. Code of Practice*.

6.2 Intrusive Investigation Works

- 6.2.1 Fieldwork was undertaken at the Site between 15th and 23rd August 2017.
- 6.2.2 Three rotary boreholes, designated BHD01 to BHD03, were formed by open-hole techniques using a Commachio Geo 205 rig to depths of between 21 m and 24 m below ground level (bgl). The boreholes were positioned along the eastern edge of the Site where the Better Bed coal seam was projected to outcrop to assess the potential for shallow abandoned mine workings.
- 6.2.3 50 mm diameter ground gas and groundwater monitoring standpipes were installed in the boreholes on completion. Subsequent ground gas and groundwater monitoring was undertaken on two occasions in September 2017. Groundwater samples were also taken for laboratory testing.
- 6.2.4 Six mechanically excavated trial pits, designated TPD01 to TPD06, were formed using a JCB 3CX to inform the general ground profile across the Site. The pits reached maximum depths of 2.40 m bgl and were sampled to assess background contaminant concentrations and to determine the geotechnical properties of the ground.
- 6.2.5 Standard penetration testing (SPT) was undertaken in the boreholes in the near surface strata.
- 6.2.6 A photo-ionisation detector (PID) was used to screen samples for volatile organic compounds during sampling. Results are reported to have been limited to 1 ppm or less.

6.3 Geo-environmental Laboratory Testing

- 6.3.1 Samples were sent to ALS Laboratories for testing. Determinands included heavy metals, polycyclic aromatic hydrocarbons (PAH) and asbestos.

6.4 Geotechnical Laboratory Testing

- 6.4.1 Four samples were tested by Geotechnical Engineering Ltd (via ALS) for moisture content and Atterberg Limits (plasticity) testing. The WSP report states that testing for particle size distribution and compaction was undertaken, however no results are included or discussed within the report.

6.5 Ground Conditions

Made Ground

- 6.5.1 Made Ground was not reported to have been encountered during the ground investigation.

Superficial Deposits

- 6.5.2 Topsoil was recorded in all trial pit locations as a sandy clay. The topsoil thickness varied between 0.15 m and 0.35 m and the soil was generally described as having a soft consistency.
- 6.5.3 No superficial deposits other than topsoil were recorded.

Solid Geology

- 6.5.4 Solid geology consistent with the Pennine Lower Coal Measures Formation was encountered in all locations.
- 6.5.5 The main detail is provided within the trial pit logs due to the boreholes using an open-hole method that resulted in limited recovery.
- 6.5.6 The logs indicate the underlying bedrock to have been weathered to a stiff to very stiff (locally firm, locally hard) clay. The clay is frequently slightly sandy or sandy, often containing gravel of mudstone or sandstone lithorelics. The depth of weathered strata was up to 2.00 m bgl.
- 6.5.7 The underlying bedrock was encountered as a mudstone, typically recovered as gravel indicated a highly fractured or 'non intact' state.
- 6.5.8 In the boreholes, the bedrock was predominantly recorded as mudstone. Occasional bands of siltstone, 2.40 m to 5.00 m thick, and sandstone, 0.10 m to 1.00 m thick, were recorded at depth.

Groundwater

- 6.5.9 Groundwater was not encountered during the drilling of boreholes or excavation of trial pits.
- 6.5.10 Post-fieldwork monitoring indicates two groundwater horizons may exist. The shallowest groundwater was recorded in borehole BHD01 between 7.30 m and 7.41 m bgl.
- 6.5.11 The deeper groundwater was recorded in boreholes BHD02 and BHD03 between 15.89 m and 16.75 m bgl and appears likely to correspond to sandstone and siltstone bands generally encountered between 10 m and 20 m depth.

7 Geotechnical Considerations

7.1 General

- 7.1.1 The recommendations given below are based on the available geological information and the anticipated ground conditions at the Site as demonstrated by the existing WSP Phase 2 ground investigation.
- 7.1.2 These recommendations are based on the proposed development for residential properties. If there are changes to these proposals then modification to the recommendations provided may be required.

7.2 Foundations

- 7.2.1 It is anticipated that conventional strip footings will be suitable based on the reported stiff to very clays across the Site. These should provide an allowable bearing capacity of up to 125 kN/m² based on a 1 m wide strip footing at 1 m depth, more than sufficient for low-rise housing development.
- 7.2.2 Settlements are anticipated to be less than 25 mm.
- 7.2.3 Soil volume change potential is indicated to be medium to high based on the available plasticity results. This is not unexpected since the shallow soils are derived from shallow mudstone bedrock which typically has a high plasticity and a minimum foundation depth of 1 m should be sufficient to accommodate this.

7.3 Floor Slabs

- 7.3.1 The information available is relatively limited but the residual soils have some potential for volume change and suspended floor slabs in line with NHBC guidance for potentially high volume change material are recommended.
- 7.3.2 If the formation level is on the mudstone bedrock, ground bearing floor slabs may be used.

7.4 Excavations & Earthworks

- 7.4.1 Based on the desk study information and ground investigation results, significant made ground and granular soils are not currently anticipated.
- 7.4.2 Temporary support is not anticipated to be necessary for excavations in the clay soils or mudstone bedrock.
- 7.4.3 Care should be taken where excavations remain open for an extended period since instability can develop over time.
- 7.4.4 Excavations should be avoided in periods of inclement weather to avoid softening of the clay formation level. Soft spots should be excavated and replaced with a material of similar properties to the surrounding soils.
- 7.4.5 It is anticipated that some earthwork cut and fill construction will be necessary to achieve the desired construction levels due to the slope of the Site. Compaction testing is understood to have been done as part of the WSP Phase 2 ground investigation but was not included within the information provided. If this can be made available for review, it should be used to prepare an Earthworks Method Statement (EMS) detailing the construction methodology for the cut and fill works. Where the compaction testing is not available, further ground investigation for this purpose would be necessary prior to preparation of the EMS.

7.5 Highways and Hard Standing

- 7.5.1 Highways Agency Interim Advice Note 73/06 (2009): 'Design Guidance For Road Pavement Foundations' provides a method for estimating the California Bearing Ratio (CBR) of soils based on soil type and plasticity. Based on the results of the WSP Phase 2 ground investigation, a CBR value of 2.5 % should be achievable

across the Site. Based on this, a sub base thickness of 450 mm would be appropriate based on restricted design methodology. It may be possible to reduce this thickness through site specific CBR testing (advisable where materials are to be reworked as fill) or sub grade reinforcement.

7.6 Concrete Protection

- 7.6.1 A limited number of water soluble sulphate and pH tests were undertaken as part of the chemical testing on samples obtained from the WSP ground investigation. The results indicated water soluble sulphate concentrations of <4.0 mg/l and 49 mg/l, with corresponding pH levels between 5.47 and 7.32.
- 7.6.2 The results have been assessed in line with BRE Special Digest 1 (2005): 'Concrete in Aggressive Ground' to determine the risk to buried concrete such as foundations. The sulphate results indicate a Design Sulphate Class of DS-1 is appropriate for the Site. It is noted that the pH levels are slightly acidic and the corresponding ACEC classification is therefore proposed as AC-2z, primarily to provide some protection against acidic conditions.

7.7 Soakaways and Site Drainage

- 7.7.1 The ground investigation results have demonstrated clay soils and shallow mudstone bedrock across the Site. The materials have a low permeability and would not be expected to accommodate rapid soil infiltration of surface waters. On this basis, soakaway drainage is not recommended for the Site.
- 7.7.2 It is noted that the Site levels vary by as much as 12.00 m, representing a significant fall in ground level that will naturally direct surface water flows to the west towards Penistone Road. Surface water run-off entering the highway drainage system on Penistone Road may not be allowed depending on the local authority drainage strategy, and it may therefore be necessary to incorporate a surface water attenuation pond or similar feature.

8 Coal Mining Risk Assessment

8.1 General

- 8.1.1 The Site is understood to lie within a Coal Mining Report Area, and partially lies within a Development High Risk Area. This means that the Coal Authority is likely to be a statutory consultee for any planning applications associated with the Site.
- 8.1.2 The WSP report included a Preliminary Coal Mining Risk Assessment (see Appendix 2). The findings of that assessment are reappraised here alongside a further review of available information to present a more definitive conclusion of the mining risks to the Site.

8.2 Published Geology

- 8.2.1 The solid strata shown underlying the Site is the Grenoside Sandstone as part of the Pennine Lower Coal Measures Formation, dating to the Carboniferous period. This formation comprises interbedded mudstone, siltstone and sandstone, with more numerous and thicker coal seams in its upper horizon.
- 8.2.2 The geological maps indicates the Better Bed coal seam is present, trending north to south along the eastern boundary of the Site. The seam is indicated on the 1:10,000 scale geological map to be dipping 2 degrees to the east. The thickness of the Better Bed coal seam is recorded as 0.10m to 0.90 m.
- 8.2.3 No geological faults are shown to affect the Site.

8.3 Historical Mapping

- 8.3.1 The closest mapped mining features comprise an old mine shaft approximately 200 m north-west of the Site, and Victoria Colliery located approximately 200 m to the south-east.
- 8.3.2 The position of the old shaft does not correspond with the Better Bed coal seam and may have been used to target much deeper coal seams, possibly acting as an air shaft. The Victoria Colliery does lie in proximity to the Better Bed coal seam.
- 8.3.3 Mining appears to have ceased by the 1960s.

8.4 Coal Authority Data

- 8.4.1 A Coal Authority report was obtained for the Site, but is only summarised within the WSP report. The details summarised are as follows:
- The Site is in a surface area that could be affected by underground mining in three seams of coal at shallow to 230 m depth, last worked in 1931.
 - The Site is not within a surface area that could be affected by present underground mining.
 - The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 m since 31 October 1994. There is no current Stop Notice delaying the start of remedial works or repairs to the property.
- 8.4.2 The Coal Authority's online Interactive Map Viewer³ shows that the eastern edge of the Site is located within a Development High Risk Area, with the remainder of the Site being within a Coal Mining Reporting Area.
- 8.4.3 The Development High Risk Area along the eastern edge of the Site coincides with the mapped outcrop of the Better Bed coal seam. The line of the outcrop is recorded as having probable shallow coal mine workings, while an area approximately 30 m to

³ <http://mapapps2.bgs.ac.uk/coalauthority/home.html>. Accessed 16th November 2018.

the east (beyond the former railway line) is shown as having past shallow coal mine workings.

- 8.4.4 A mine abandonment plan obtained from the Coal Authority was included in the WSP report. The plan was for Woodsome Outcrop, Huddersfield Collieries Ltd and covers workings in the 'Better Bed Clay' which underlies the Better Bed coal seam. The Better Bed Clay is not highlighted specifically on the geological maps but its position beneath the coal seam indicates it probably represents a thick fireclay that would have been used in local brick manufacture.

8.5 Ground Investigation

- 8.5.1 Three rotary boreholes were formed using open-hole techniques to depths of up to 24 m bgl. The boreholes were located along the eastern edge of the Site to determine whether the Better Bed coal seam was present and whether there was any evidence of abandoned mine workings.
- 8.5.2 None of the boreholes encountered coal, and trial pits across the Site similarly did not record any coal within the shallow strata. This does not mean the Better Bed coal seam is absent in the area, but more likely means that it lies along the eastern boundary of the Site, probably beneath the railway embankment.
- 8.5.3 It is possible that the Better Bed Clay could have been worked but the main mining activity in the area commenced after the railway was constructed. It would therefore not have been possible to extract clay (or coal) such close proximity to the railway without risking the removal of ground support to the railway. Based on this, and the absence of mining features within the boreholes, it is unlikely that clay workings are present beneath the Site.

8.6 Potential Coal Mining Risks

- 8.6.1 The Coal Authority present several questions that are to be addressed as part of any Coal Mining Risk Assessment. These are presented in Table 3.

Table 3: Coal Mining Risks

Potential Coal Mining Risk	Relevant to Site?	Comments
Underground coal mining (recorded at shallow depths)?	No	Coal Authority data does not identify any known shallow mine workings at shallow depth beneath the Site, the closest being some 30 m to the east.
Underground coal mining (probable at shallow depths)?	No	Coal Authority data identifies probable shallow coal mine workings based on Better Bed outcrop position. This only encroaches on the eastern edge of the Site however, and boreholes have demonstrated the coal to be absent indicating the outcrop is likely to be further east and therefore off site.
Mine entries (shafts and adits)?	No	None identified on site from Coal Authority, BGS and historical OS data. Presence of former railway makes it highly unlikely mine entries such as adits have been driven into the sloping ground.

Potential Coal Mining Risk	Relevant to Site?	Comments
Coal mining geology (fissures)?	No	None identified from Coal Authority or BGS data.
Record of past mine gas emissions or potential?	No	None identified from Coal Authority data.
Recorded coal mining surface hazard?	No	None identified from Coal Authority data.
Surface mining (opencast workings)?	No	None identified from Coal Authority data.

8.7 Conclusions

- 8.7.1 The Coal Authority data indicates a potential risk of shallow coal mine workings relating to the Better Bed coal seam which outcrops along the eastern edge of the Site. Boreholes and trial pits have not identified the presence of any coal seams and it is therefore considered likely that the coal seam outcrops immediately east of the Site beneath the former railway embankment. On this basis, the risk posed to the Site by shallow abandoned mine workings and mine entries is considered to be low and no further assessments are considered necessary at this time.

9 Revised Conceptual Model and Risk Assessment

9.1 General

- 9.1.1 The following geo-environmental assessment uses the WSP Phase 2 ground investigation results but comprises an independent analysis of the data by Ecus.
- 9.1.2 The development proposals provide the potential for future residents to come into contact with any contaminated soils that may be present on site in proposed private garden and soft landscaped areas.
- 9.1.3 Made Ground was not proved in any of the exploratory holes at the Site, and chemical testing was therefore undertaken on the shallow natural soils to verify that the Site was otherwise uncontaminated.
- 9.1.4 In light of the development proposals for residential houses with private garden areas, chemical levels recorded in the laboratory test results have been compared against available published human health guideline values for an end-use scenario of “residential with homegrown produce”.

9.2 Risks to Site End Users – Selection of Human Health Risk Screening Criteria

Category 4 Screening Levels

- 9.2.1 The Department for Environment, Food and Rural Affairs (Defra) published Category 4 Screening Levels^{4,5} (C4SLs) in 2014. These were developed to be used in the inspection of potentially contaminated land under Part 2A of the Environmental Protection Act (1990) (hereafter referred to as ‘Part 2A’) to define land that is suitable for use and definitely not contaminated land.
- 9.2.2 Defra has explicitly stated that the C4SL values are suitable for use for soil contamination assessments within the development planning regime; the Policy Companion Document published by Defra to be read alongside the main document states that:

“The Part 2A regime and the planning regime are inter-linked such that the National Planning Policy Framework states that “after development, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990” and that “Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.” The Part 2A Statutory Guidance and accompanying Impact Assessment were developed on the basis that Category 4 Screening Levels could be used under the planning regime, as they would be in Part 2A investigations directly”.
- 9.2.3 Hence a site where all shallow soils contain concentrations of contaminants that are equal to or less than the applicable C4SLs is suitable for use, as defined within the National Planning Policy Framework (NPPF). Therefore, the C4SLs are appropriate for use as a human health risk screening tool in this assessment. However, where the concentration of a contaminant is greater than the C4SL value, this is not necessarily indicative that there is an unacceptable risk or that remediation is required; other lines of evidence should also be taken into consideration.
- 9.2.4 The land use assumptions for the residential, allotments and commercial land use scenarios within the C4SL assessment system are based on the EA’s Contaminated

⁴ CL:AIRE, 2014. *Development of Category 4 Screening Levels for Assessment of Land affected by Contamination. Final Project Report (Revision 2)*. Defra, London.

⁵ Defra, 2014. *Development of Category 4 Screening Levels for Assessment of Land affected by Contamination – Policy Companion Document*. Defra, London.

Land Exposure Assessment (CLEA) model^{6,7,8}, with amendments to the exposure assumptions within the standard land use models and exchanging the health criteria values (HCVs) used to calculate the previously published soil guideline values (SGVs) for updated low levels of toxicological concern (LLTC).

- 9.2.5 At the time of writing, C4SL values have been published for arsenic, benzene, benzo(a)pyrene, cadmium, hexavalent chromium and lead.

Suitable 4 Use Levels

- 9.2.6 Land Quality Management Ltd (LQM) and the Chartered Institute of Environmental Health (CIEH) published Suitable 4 Use Levels (S4ULs) in 2015⁹. These were calculated based on the same assumptions on exposure as those used to calculate the C4SL values, and LLTC values that are of an equivalent level of protection as the C4SLs.
- 9.2.7 Accordingly, the S4UL have been used as human health risk screening criteria in this assessment for those heavy metals, PAH compounds and petroleum hydrocarbon fractions not covered by the C4SLs.

Asbestos

- 9.2.8 For the assessment of the risk from asbestos in soils, guidance contained within CIRIA Report C733¹⁰ has been taken into consideration, although it should be noted that this document does not include any UK-based SGVs for the assessment of risk from asbestos in soils.

9.3 Risks to Human Health – Conceptual Exposure Model

- 9.3.1 C4SLs and S4ULs have been produced for the following standardised land use scenarios:
- Residential (with and without home-grown produce);
 - Allotments;
 - Commercial;
 - Public open space near to housing; and
 - Public open space distant from housing.
- 9.3.2 In the CLEA model, the residential land use with home-grown produce scenario is assumed to consist of a small two-storey house built on a ground-bearing floor slab with access to a private garden. The standard critical receptor is assumed to be a young female child (aged zero to six years old) with a duration of exposure of six years.
- 9.3.3 It is understood that the site is proposed for redevelopment with residential houses, with private gardens and public amenity areas. Therefore, C4SL and S4UL values for the 'residential with home-grown produce' land use scenario have been chosen

⁶ Environment Agency, 2009. Science Report SC050021/SR2: *Human health toxicological assessment of contaminants in soil*.

⁷ Environment Agency, 2009. Science Report SC050021/SR4: *CLEA Software (Version 1.05) Handbook*.

⁸ Environment Agency, 2009. Science Report SC050021/SR3: *Updated technical background to the CLEA model*.

⁹ Nathanail, C.P., et al., 2015. *The LQM/CIEH S4ULs for Human Health Risk Assessment*. Land Quality Press, Nottingham.

Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3222. All rights reserved.

¹⁰ Nathanail, P., et al., 2014. CIRIA Report C733. *Asbestos in Soil and Made Ground: A Guide to Understanding and Managing Risks*. CIRIA, London.

as the initial risk screening criteria for the site for the potential redevelopment of the site for residential use.

Soil Organic Matter

- 9.3.4 The soil organic matter (SOM) from made ground soil samples analysed varies between 1.11 % and 7.05 %. S4UL values based on an assumed 1 % SOM have been used in this assessment. The C4SL values are calculated assuming a SOM concentration of 6 %.

9.4 Human Health – Generic Quantitative Risk Assessment (GQRA)

Initial Screening

- 9.4.1 The results of the WSP Phase 2 ground investigation do not record any evidence of Made Ground on the Site. No visual or olfactory evidence of contamination was recorded.
- 9.4.2 The original chemical testing data (including WSP's previous assessment) is included in Appendix 2. Appendix 3, Tables A and B present the chemical data in a summary format showing the minimum and maximum values achieved, and highlighting any exceedances against the human health screening values for a residential with home-grown produce end-use.
- 9.4.3 Appendix 3, Table A shows the results summary for heavy metals and asbestos. No asbestos was detected in any of the samples. Two samples showed exceedances for arsenic (TPD04 at 0.10 m bgl, and BHD03 at 0.30 m bgl). A third sample showed an exceedance for mercury (TPD05 at 0.20 m bgl). Each exceedance was clearly above its respective screening value and a further statistical analysis is therefore required.
- 9.4.4 Appendix 3, Table B shows the results summary for PAH. No exceedances are evident and further analysis is not required for PAH.

Statistical Analysis Summary

- 9.4.5 The statistical analysis for arsenic and mercury is presented in Appendix 3. The results indicate that the upper confidence limit (UCL) for arsenic is 31.1 mg/kg at an evidence level of 99 %. When compared against the original screening value of 37 mg/kg, this means that the risk posed by elevated arsenic at the Site is not considered to be statistically significant no further actions are required.
- 9.4.6 The statistical analysis for mercury indicated that the single exceedance – TPD05 at 0.20 m bgl, located in the south-west corner of the Site – was an outlier that resulted in a UCL value that exceeded the original screening value of 1.2 mg/kg. Identification and subsequent separation of said outlier demonstrated that the UCL for the remaining results is 1.0 mg/kg and an evidence level of 98 %.
- 9.4.7 It is noted that the outlier was not identified in the WSP Phase 2 appraisal, and a review of the screening criteria in that assessment indicates a much higher value for inorganic mercury was used, rather than the lower elemental mercury screening value used by Ecus.
- 9.4.8 Given the local geology with a recorded presence of a coal seam on the edge of the Site, the otherwise 'greenfield' condition of the Site, and the absence of other heavy metal exceedances, it seems probable that the outlier for mercury reflects a localised feature that is probably natural in origin. The result is not therefore considered representative of the wider site environment.

Asbestos

- 9.4.9 No evidence of asbestos was reported in any of the samples tested. This does not preclude the possibility that asbestos may be present in some form given its prevalence in the modern urban environment, however the lack of previous site development the risk is considered to be very low.

9.5 Controlled Waters

- 9.5.1 No significantly potentially mobile contamination was identified during the site investigation and no shallow groundwater was identified. The Site is also underlain by several metres of low permeability mudstone. The resultant risk to groundwater or any adjacent controlled waters is considered to be low.

9.6 Ground Gases

- 9.6.1 Guidance within BS8485:2015¹¹ advocates a risk assessment approach based on calculated Hazardous Gas Borehole Flow Rates (Qhg) using the maximum recorded flow rate and concentrations of methane (CH₄) and carbon dioxide (CO₂) from all monitoring locations on each individual monitoring visit.
- 9.6.2 Where no flow is recorded BS8485:2015 stipulates using a nominal flow rate based on the limit of detection of the monitoring equipment used; taken as 0.1 l/h.
- 9.6.3 Where gas concentrations have been detected, the Qhg values are calculated for both methane (CH₄) and carbon dioxide (CO₂).
- 9.6.4 A design Gas Screening Value (GSV) is then used for risk assessment purposes, typically taken from the highest calculated Qhg, but a site wide GSV can also be calculated using the highest recorded gas concentration and peak flow rate from all the monitoring locations, as a worst-case scenario.
- 9.6.5 Monitoring for ground gas emissions was undertaken as part of the WSP ground investigation on two occasions in September 2017. The first visit was carried out under rising pressure conditions, and the second under falling pressure conditions.
- 9.6.6 Table 4 presents the maximum recorded methane and carbon dioxide concentrations and borehole flow rate results for each monitoring location, and, where applicable, summarises the maximum Qhg for the borehole during the monitoring programme.

Table 4: Calculation of Borehole Hazardous Gas Flow Rates (Qhg)

Reference	Max. CH ₄ (%)	Max. CO ₂ (%)	Max. Flow (l/hr)	Max. CH ₄ Qhg (l/h)	Max. CO ₂ Qhg (l/h)
BHD01	0.0	2.5	0.2	0.0	0.005
BHD02	0.0	0.5	0.0	0.0	0.0
BHD03	0.0	2.1	0.0	0.0	0.0
SITE	0.0	2.5	0.2	0.0	0.005

- 9.6.7 From Table 3 it can be seen that methane was not recorded in any of the boreholes, but low levels of carbon dioxide were recorded in all three locations.
- 9.6.8 Based on the monitoring data, a site-wide design GSV of 0.0 l/h for methane and 0.005 l/h for carbon dioxide have been derived. Both GSVs are within the prescribed range for Characteristic Situation CS1 indicating a very low hazard potential.
- 9.6.9 The ground gas risk at the Site is therefore considered to be low.

9.7 Invasive Plants

- 9.7.1 No evidence of any invasive plant species was identified during the site walkover. However, the visual absence of invasive plants on site cannot be a guarantee that they are not present.

¹¹ British Standard 8485:2015, Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.

- 9.7.2 If any areas of potential invasive plants are suspected during construction works an ecological consultant should be contacted for identification of any invasive plants and further advice.

9.8 Revised Conceptual Site Model

- 9.8.1 A CSM was presented as part of the WSP Phase 2 site investigation report. The CSM has been replicated and reassessed here. The original risk ratings have been reassessed by Ecus and additional risks added where considered relevant.
- 9.8.2 The proposed development includes houses with private gardens and public amenity spaces. The following assessment is based upon this end-use.
- 9.8.3 Definitions of each element of the Source-Pathway-Receptor model are outlined in Table 5 for ease of reference. Where all three elements are deemed to be present, the risk is a function of the probability of the event occurring and the potential consequence, should the event occur.

Table 5: Source-Pathway-Receptor Definitions

Source	A substance that is above, on or under land and could pose potential harm or adversely affect an identified receptor, or cause pollution to controlled waters.
Pathway	The physical means by which the potential contaminants may reach the receptor.
Receptor	The identified element (either animate or inanimate) that could be adversely affected by the contaminant.

- 9.8.4 The risk classifications assigned to the CSM are based on the terminology for consequence and probability outlined in CIRIA C552, with a summary of the resultant risk classifications summarised in Table 6.

Table 6: Summary of risk classification

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High likelihood	Very High risk	High risk	Moderate risk	Moderate/low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

- 9.8.5 In accordance with best practise guidance the CSM should be treated as a live document and updated as necessary throughout the development process. The revised CSM is provided in Table 7.
- 9.8.6 If any unrecorded conditions are encountered throughout the development works the CSM should be reviewed and, where necessary, the potential risks to the identified receptors reassessed and updated accordingly.

Table 7: Revised Conceptual Site Model

Source	Hazard	Critical Pathway	Most Sensitive Receptor	Comments	Current Anticipated Risk
Contaminated soils	Asbestos	Inhalation of fibres	Future site users and construction Workers	No asbestos fibres reported, Site has remained undeveloped.	Very low
	Metals, TPH and PAH	Direct contact and ingestion of soil, inhalation of soil derived dust.	Future site users and construction Workers	Some elevated heavy metals detected but are not considered statistically significant.	Low
		Ingestion of home-grown produce	Future site users	Some elevated heavy metals detected but are not considered statistically significant.	Low
	Leachable metals, TPH and PAH	Leaching from soil and migration through porous strata or overland flow.	Fenay Brook and Secondary (A) bedrock aquifer	No potentially mobile contaminants observed and soil contaminant concentrations are generally low. Porous strata in the bedrock aquifer protected by overlying mudstone acting as an aquitard.	Very low
Coal seams & mine workings	Ground gases & VOCs	Upward migration of ground gas and accumulation within confined spaces	Future site users and buildings	No mine workings have been proven at the Site. Ground gas monitoring to date has demonstrated CS1 conditions.	Low

9.8.7 The overall risks to human health and the local environment appear to be very low to low, and the Site is considered to be suitable for its intended residential use.

10 Conclusions

10.1 Geo-environmental Assessment

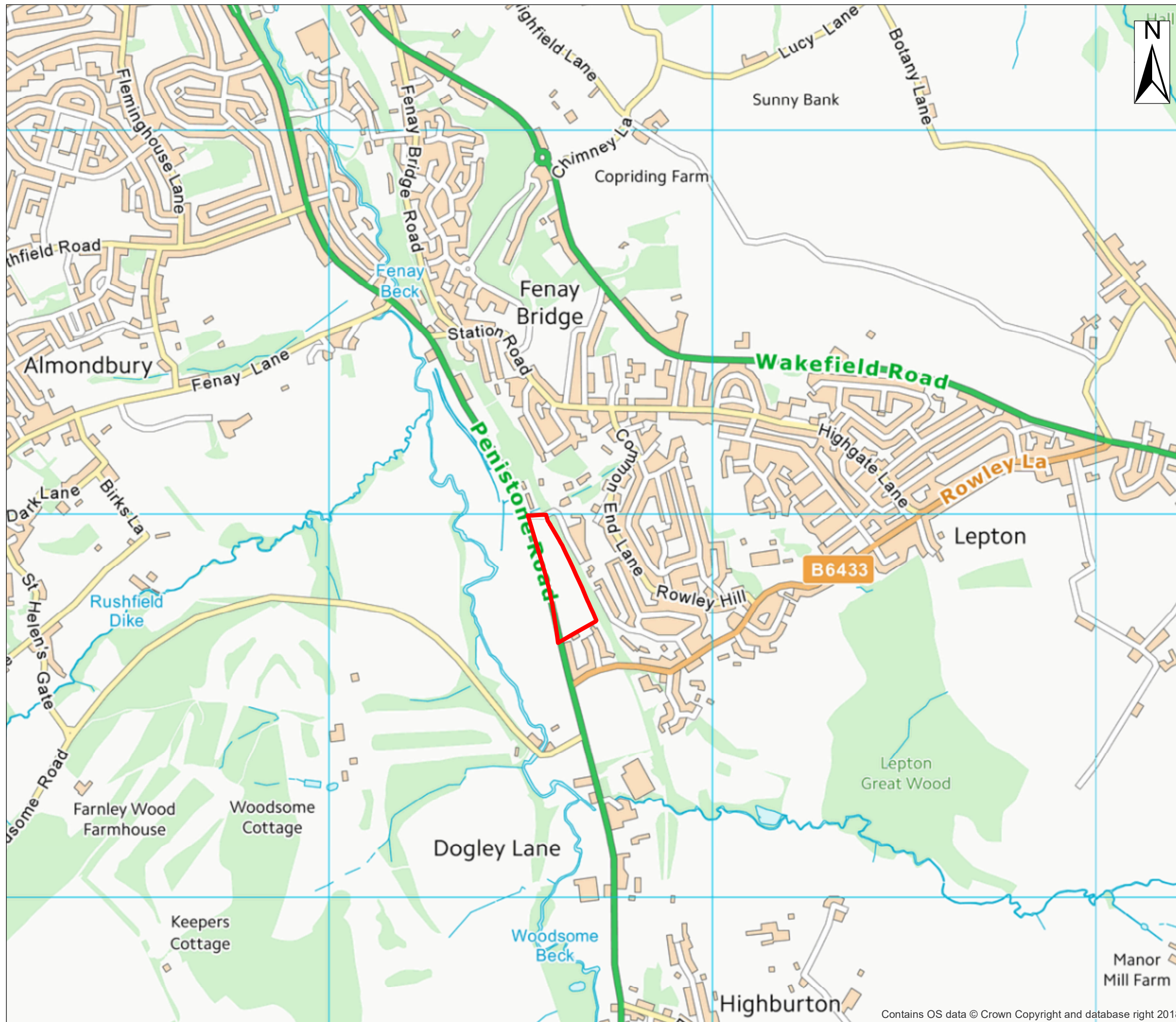
- 10.1.1 The Site is shown to have remained undeveloped and no visual or olfactory signs of potential contamination were highlighted during the walkover survey.
- 10.1.2 The risk to human health from soil contamination is considered to be generally low. Elevated arsenic concentrations in two locations were statistically analysed and the overall site UCL determined to be below the human health screening value. A single elevated mercury result appears to be an outlier and is thought to be a natural occurrence given the presence of coal bearing strata in the area. No further soil testing or remediation measures are proposed at this time.
- 10.1.1 The potential for unforeseen ground conditions is always a risk during construction. Should any potential contamination hotspots be encountered during construction works a suitably qualified geo-environmental consultant should be informed and an appropriate environmental assessment carried out to determine the presence and extent of any contamination.
- 10.1.2 If off-site disposal of soils is likely to be required, chemical testing of the soils should be undertaken to assess the likely waste classification of the soils. However based on the likely requirement for reprofiling of the Site, it is anticipated that off-site disposal of soil will be minimal.
- 10.1.3 No risks to controlled waters have been identified in relation to Site or the proposed development.
- 10.1.4 Coal bearing strata present a risk of mine gas generation, however no properties will be built directly over shallow coal seams and ground gas monitoring has not indicated any significant concern. The Site is deemed to fit Characteristic Situation CS1 and no gas protection measures are necessary.
- 10.1.5 Radon protection measures are not required to be installed in the proposed new properties.

10.2 Geotechnical Analysis

- 10.2.1 Geotechnical testing has been limited to date but the boreholes and trials indicate suitable founding conditions for development, with allowable bearing capacities of 125 kN/m² and settlements below 25 mm calculated.
- 10.2.2 Highway pavements based on a CBR of 2.5 % will require 450 mm of sub base, but this may be refined through further testing or reduced through the incorporation of sub grade reinforcement.
- 10.2.3 Compaction testing is understood to have been carried out but was not provided for review. An Earthworks Method Statement should be prepared to cover the anticipated site re-profiling. If existing compaction data remains unavailable, further site testing will be required in order to obtain additional design data.
- 10.2.4 Concrete design should be based on DS-1 and AC-2z conditions.
- 10.2.5 The Site is not considered suitable for soakaways.
- 10.2.6 The Site has been shown to have no shallow coal seams or mine workings beneath it. While a coal outcrop is anticipated along the eastern edge of the Site, this is assumed to lie beneath the adjacent former railway embankment. The risks from abandoned mine workings is considered to be low.

This page has been left intentionally blank.

Figures



Legend

— Site Boundary

0 250 500
Meters

ENGIE Regeneration Ltd
Penistone Road, Fenay Bridge,
Huddersfield

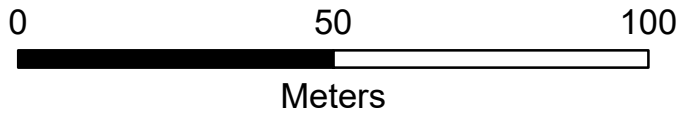
Figure 1
Location Map

Brook Holt 3 Blackburn Road Sheffield S61 2DW
T: 0114 2669292 www.ecusltd.co.uk



Legend

- Site Boundary
- ⊕ Borehole - WSP (2017)
- ⊞ Trial Pit - WSP (2017)



ENGIE Regeneration Ltd
 Penistone Road, Fenay Bridge,
 Huddersfield

**Figure 2
 Site Plan**

Brook Holt 3 Blackburn Road Sheffield S61 2DW
 T: 0114 2669292 www.ecusltd.co.uk

This page has been left intentionally blank.

Appendix 1: Site Walkover Photographs



Job: Summary Report on Previous Site Investigation
Site: Land East of Penistone Road, Fenay Bridge
Ref: 12358

P1: View of Site from north-west corner access point.



Job: Summary Report on Previous Site Investigation
Site: Land East of Penistone Road, Fenay Bridge
Ref: 12358

P2: Discarded rubbish by access point in north-west corner of Site, including garden waste.

Ecus Ltd
3 Blackburn Rd
Sheffield
S61 2DW

Tel : 0114 266 9292
www.ecusltd.co.uk





Job: Summary Report on Previous Site Investigation
Site: Land East of Penistone Road, Fenay Bridge
Ref: 12358

P3: Discarded rubbish by access point in north-west corner of Site, including scaffold boards.

Ecus Ltd
3 Blackburn Rd
Sheffield
S61 2DW

Tel : 0114 266 9292
www.ecusltd.co.uk



This page has been left intentionally blank.

Appendix 2: WSP Combined Phase 1 & 2 Ground Risk Appraisal



Farnley Estates Ltd & John Radcliffe and Sons (Holdings) Ltd

LAND AT FENAY BRIDGE &
Combined Phase I and Phase II Ground Risk
Appraisal





Farnley Estates Ltd

LAND AT FENAY BRIDGE

Combined Phase I and Phase II Ground Risk Appraisal

TYPE OF DOCUMENT (VERSION) PUBLIC

PROJECT NO. 70035780

OUR REF. NO. 70035780-01

DATE: OCTOBER 2017

WSP
Three White Rose Office Park
Millshaw Park Lane
Leeds
LS11 0DL
Phone: +44 113 395 6200
Fax: +44 113 395 6201
WSP.com



QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	Version 1			
Date	October 2017			
Prepared by	C. Wainwright / R Jacobs			
Signature				
Checked by	G. Meynell / A Hallas			
Signature				
Authorised by	A McCusker			
Signature				
Project number	70035780			
Report number	70035780-001			

CONTENTS

1	INTRODUCTION 1	1
1.1	AUTHORISATION	1
1.2	PROJECT CONTEXT	1
1.3	AIM & OBJECTIVES	1
1.4	LIMITATIONS	1
1.5	RELIANCE	2
2	SITE INFORMATION	3
2.1	SITE DETAILS	3
2.2	SITE HISTORY	4
2.3	HISTORICAL SOURCES OF CONTAMINATION SUMMARY	5
2.4	REGULATORY INFORMATION	6
2.5	SITE SETTING	6
3	PRELIMINARY COAL MINING RISK ASSESSMENT	8
3.1	MINING RELATED GEOLOGY	8
3.2	HISTORICAL OS MAPS	8
3.3	COAL AUTHORITY INFORMATION	8
3.4	MINE ABANDONMENT PLANS	9
4	PRELIMINARY CONCEPTUAL SITE MODEL	13
4.1	CONCEPTUAL SITE MODEL	13
4.2	POTENTIAL SOURCES OF CONTAMINATION	13
4.3	POTENTIAL RECEPTORS	13
4.4	EXPOSURE PATHWAYS	13
4.5	SUMMARY OF PLAUSIBLE POLLUTION LINKAGES	14
5	INTRUSIVE GROUND INVESTIGATION	15

5.1	RATIONALE	15
5.2	EXPLORATORY HOLES AND INSTALLATIONS	15
5.3	IN-SITU AND FIELD TESTING	16
5.4	GROUNDWATER AND GROUND GAS MONITORING	16
5.5	LABORATORY ANALYSIS AND TESTING	16
6	GROUND CONDITIONS	18
6.1	SUMMARY OF ENCOUNTERED GROUND CONDITIONS	18
6.2	EVIDENCE OF CONTAMINATION	19
6.3	GROUNDWATER CONDITIONS	19
7	GENERIC QUANTITATIVE RISK ASSESSMENT	21
7.1	METHODOLOGY	21
7.2	HUMAN HEALTH GQRA	21
7.3	CONTROLLED WATERS ASSESSMENT	21
8	GROUND GAS ASSESSMENT	23
8.1	POTENTIAL GROUND GAS SOURCES	23
8.2	GROUND GAS MONITORING RESULTS	23
9	REVISED CONCEPTUAL SITE MODEL	25
9.1	PLOT A	25
9.2	PLOT D	25 26
9.3	PLOT E	26
10	GEOTECHNICAL ASSESSMENT	28
10.1	GROUND MODEL	28
10.2	FOUNDATIONS AND FLOOR SLABS	28
10.3	EARTHWORKS	28
10.4	EXCAVATIONS / OBSTRUCTIONS	28
10.5	GROUNDWATER	29
10.6	COAL MINING	29
10.7	CONCRETE CLASSIFICATION	29

11	CONCLUSIONS	30
11.1	GROUND INVESTIGATION	30
11.2	LAND QUALITY ASSESSMENT	30
11.3	GEOTECHNICAL ASSESSMENT	30

TABLES

Table 1 - Summary of Site Details	3
Table 2 - Site History	4
Table 3 - Regulatory Information Summary	6
Table 4 - Plot A - Identification and assessment of site specific coal mining risks	9
Table 5 - Plot D- Identification and assessment of site specific coal mining risks	10
Table 6 - Plot E – Identification and assessment of site specific coal mining risks	11
Table 7 - Potential pollutant linkages	14
Table 8 - Summary of monitoring well installations	16
Table 9 - Summary of encountered coal seams	18
Table 10 - Summary of Strata Encountered	19
Table 11 - Summary of groundwater levels recorded post site investigation	19
Table 12 - Groundwater Exceedances	22
Table 13 - Summary of ground gas monitoring results (steady concentrations)	23
Table 14 - Contaminant linkage summary Plot A	25
Table 15 - Contaminant linkage summary Plot D	26
Table 16 - Contaminant linkage summary Plot E	27

FIGURES

Figure 1 – Site Location Plan
Figure 2 – Site Layout Plan
Figure 3a – Drift Geology Plan, Plot A
Figure 3b – Drift Geology Plan, Plot D
Figure 3c – Drift Geology Plan, Plot E
Figure 4a – Solid Geology Plan, Plot A
Figure 4b – Solid Geology Plan, Plot D

Figure 4c – Solid Geology Plan, Plot E

Figure 5a – Coal Mining Plan, Plot A

Figure 5b – Coal Mining Plan, Plot D

Figure 5c – Coal Mining Plan, Plot E

Figure 6 – Exploratory Hole Plan

APPENDICES

Appendix A - Envirocheck

Appendix B - General Limitations

Appendix C - Exploratory Hole Logs

Appendix D - Chemical Laboratory Results and Screening

Appendix E - Geotechnical Laboratory Results

Appendix F - Field Records

Appendix G - GAC Methodology

Appendix H - Topographical Survey Drawings

Appendix I - Coal Authority Plans



EXECUTIVE SUMMARY

GVA, supporting John Radcliffe and Sons (Holdings) Ltd and Farnley Estates Ltd (the 'Client'), commissioned WSP to undertake a Preliminary Ground Risk Appraisal at Fenay Bridge in Huddersfield, West Yorkshire (the 'site'). The site comprises three individual parcels of land referred to as Plot A, D and E all of which have been allocated for residential development as part of the local authority's latest Local Plan.

Given the land's designation the Client now wishes to sell the land for residential development and requires information to understand potential ground related development constraints. The primary aim of the appraisal was therefore to identify potential land quality and ground engineering constraints to outline potential development issues/risks and opportunities in the context of a residential development.

The appraisal included a Phase 1 desk based element collating information on the environmental site setting, history and potential sources of contamination. The desk based element identified that the wider site area had been subject to shallow mining activities which may be present at shallow depth beneath all three plots of land and also that a large brick works and small refuse tip were located on Plot A historically. A Phase 2 ground investigation was subsequently scoped to target potential areas of shallow mine workings and potential source areas of contamination associated with the former brick works.

The ground investigation was completed in August 2017, and included ten boreholes across the three plots of land, advanced to depths of between 21 and 24mbgl, and 23 trial pits advanced to depths up to 3.4mbgl. The intrusive investigation confirmed a ground model sequence comprising topsoil predominantly underlain by Pennine Lower Coal Measures within Plots D & E and topsoil underlain by Made Ground and Pennine Lower Coal Measures within Plot A.

Groundwater was encountered within all but one borehole (BHE1) installed within the Pennine Lower Coal Measures at depths varying between 4.02mbgl in BHA2 and 17.9mbgl in BHE3. Soil sampling and subsequent laboratory analysis observed concentrations unlikely to pose an unacceptable risk to human health assuming a residential redevelopment on plots D and E. Trace asbestos fibres were recorded in Made Ground on plot A; given the potential associated risks a capping layer is likely to be required over contaminated soils to mitigate the risks.

Ground gas monitored was undertaken on two occasions during September 2017. A preliminary ground gas risk assessment concluded a classification of Characteristic Situation 1, which indicates that no specialist gas protection measures would be required in new buildings.

No worked or unworked coal seams were encountered in Plot D and E. Coal Authority records identified localised mine workings in the east and west of the plot associated with clay extraction for the brick works. Where identified shafts, adits and mine workings have been identified they may require treatment if development is to be undertaken above / in the vicinity of them.

The uncertainties in the variation, depth and geotechnical characteristics of the Made Ground within Plot A indicates that the ground conditions may not be suitable to support a traditional foundation option generally across the site, however, this would be subject to review following confirmation of the layout and plot loadings. The weathered and unweathered Pennine Lower Coal Measures encountered across Plot D and E is likely to be suitable for traditional spread foundations and ground bearing floor slabs. The majority of the earthworks are likely to be achievable with standard earth moving plant.

Contact name Gareth Meynell

Contact details 01133956463 | gareth.meynell@wsp.com

1 INTRODUCTION 1

1.1 AUTHORISATION

GVA, supporting John Radcliffe and Sons (Holdings) Ltd and Farnley Estates Ltd (henceforth referred to as the 'Client'), commissioned WSP to undertake a combined Phase 1 and Phase 2 Preliminary Ground Risk Appraisal for three parcels of undeveloped land in Fenay Bridge, Huddersfield, West Yorkshire henceforth referred to as the 'site'. A site location plan is included as **Figure 1**.

These works have been instructed and delivered in accord with our proposal and associated terms, reference 70035780-P01 dated 16 June 2017.

1.2 PROJECT CONTEXT

The site has been allocated for housing as part of Kirklees Council's Local Plan. Given this status the client is seeking to sell the land for residential development. Although the site is currently undeveloped it is located in an area which has been extensively mined, which can potentially pose ground stability issues, and parts of the site have been occupied by industrial premises which may have impacted the ground. Given these potential ground risk related issues WSP was commissioned to undertake a combined Phase 1 and 2 Preliminary Ground Risk Appraisal to assess potential contaminated land and ground engineering development constraints and opportunities to support the sale of the land.

The site is split into three separate parcels of land referred to as:

- Plot A (4.8 ha);
- Plot D (2.3 ha); and,
- Plot E (3.6 ha).

A site layout plan showing each individual plot is included as **Figure 2**.

1.3 AIM & OBJECTIVES

The aim of this appraisal is to obtain information to allow potential ground related development constraints to be better understood by both the client and prospective purchasers.

The specific objectives of the appraisal were to:

- Review the history and publically available information regarding the environmental setting of the site, to inform potential historical sources of contamination/ground type;
- Review publically available documentation, and site specific Envirocheck Report (Appendix A) to set out the environmental sensitivity of the site;
- Present an initial understanding of ground conditions including the depth to natural ground / thickness of fill materials;
- Investigate for the presence of potential contamination associated with the site;
- Identify (where possible) the probability of shallow mining, approximate seam depth (where present) and whether they may have been worked;
- Assess the presence of a shallow groundwater table;
- Provide an initial assessment of ground gas concentrations to inform the likelihood of potential ground gas protection measures; and,
- Provide commentary on the potential ground engineering related issues.

1.4 LIMITATIONS

This investigation has been undertaken with due consideration to the guidance in '*Model Procedures for the Management of Land Contamination*', Contaminated Land Report 11(CLR 11), (Environment Agency, 2004), and in general accordance with the British Standard '*Investigation of potentially contaminated sites - Code of practice*' BS EN 10175 2011, in the context of a preliminary investigation only.

Given the size of the site, further ground investigation works will be required to satisfy future planning.

The location of a number of suspected mine shafts have been provided by the Coal Authority only. Their location and integrity are yet to be proven by intrusive investigation.

Furthermore, not all areas of the site were accessible during our ground investigation for example due to:

- Dense tree growth with Plot A and badger set restrictions; and
- Health and safety concerns around areas of steep slope in Plots D and E.

A copy of our general limitations are included in **Appendix B**.

1.5 RELIANCE

This report is addressed to and may be relied upon by the following parties:

- John Radcliffe and Sons (Holdings) Ltd: and
- Farnley Estates Ltd.

This assessment has been prepared for the sole use of the above named parties. This report shall not be relied upon or transferred to any other parties without the express written authorisation of WSP. No responsibility will be accepted where this report is used either in its entirety or in part, by any other party. This report has been prepared to support the sale of Land at Fenay Bridge (the site) and not for planning or detailed geotechnical design purposes.

2 SITE INFORMATION

2.1 SITE DETAILS

A summary of pertinent site information is provided in **Table 1**.

Table 1 - Summary of Site Details

ASPECT	DESCRIPTION
Site address	Land at Fenay Bridge, Fenay Bridge, Huddersfield, HD8 0JS.
National Grid Reference	418870, 414330 (approximate site centre).
Site location	The site is located approximately 750m south-west of the centre of Fenay Bridge and 5km south-east of Huddersfield. A site location plan is included as Figure 1. A site layout plan showing the current site boundary is included as Figure 2.
Approximate surface area	Total site area is approximately 10.7ha, broken down into the following three separate plots of land: - Plot A (4.8ha); - Plot D (2.3ha); and, - Plot E (3.6ha).
Topography	Plot A – the central area of the site comprises a relatively flat plateau (102.6mAOD to 99.4mAOD). There is a steep decline in plot levels in the west towards the western and southern boundary (c.93m AOD) and also an incline in the north of north-east (c.110m AOD), which follows the natural surrounding topography. Plot D – the plot is located on a slope which generally falls from east to west, the most elevated point is in the south-east corner (97.4mAOD) with the lowest point being on the western boundary (85.7m AOD). Plot E – the plot generally slopes from east to west, the most elevated point is in the south-east corner (98.8mAOD) with the lowest point being on the western boundary (88.8m AOD). Topographical survey plans are included in Appendix H.
Current site use	Plot A - is currently rough grassland, there are wooded areas around the majority of the boundaries of the plot as well as a dense area within the centre of the area. In the north-west are some overhead power lines. Access to the plot is from a gate in the north-west, through Woodsome Park. Plot D - is undeveloped arable farmland. Access to the plot is via Whitegates Grove to the north-west. Plot E - is undeveloped arable farmland. Access to the plot is off Rowley Lane to the north-west.
Proposed end use	All three plots are anticipated residential end use with gardens.
Surrounding land uses	Plot A – undeveloped to the south and east, residential buildings to the north and Reliance Precision Limited (engineering) to the west. A large disused viaduct is located to the west of the plot and a pond is located to the southeast. Plot D – residential to the north, south and east and undeveloped to the west. Plot E – residential to north, commercial and residential to the east, Reliance Precision Limited to the south and undeveloped to west.
Radon	All three plots are located within an intermediate probability radon area (1 to 3% of homes are estimated to be at or above the Action Level). Reportedly there is not a necessity for protection measures in the construction of new dwellings or extensions.

2.2 SITE HISTORY

Historical Ordnance Survey (OS) maps have been obtained (**Appendix A**) and reviewed to provide a summary of historical activities at each plot. **Table 2** summarises pertinent historical information for each plot.

Table 2 - Site History

MAP DATE	PLOT A	PLOT D	PLOT E	SURROUNDINGS
1854	The plot is shown to be undeveloped agricultural land.	The plot is shown to be undeveloped agricultural land.	The plot is shown to be undeveloped agricultural land. A small gravel pit is shown on the western boundary.	Rowley Bottom is approximately 150m east of Plot E and 100m north of Plot A. Rowley Mill (Woollen) is 100m south of Plot E.
1894	No significant changes noted.	No significant changes noted in the plot.	The gravel pit is no longer depicted on-site and has potentially been infilled.	There is a railway embankment (Kirkburton Ranch) that runs along the eastern boundary of Plot D and Plot E and on the western boundary of Plot A in a north / south orientation.
1908				No significant changes noted within the vicinity.
1933	The centre of the plot is occupied by Woodsome Brick Works. Railway sidings are shown in the north of the plot and extend off-site to the Kirkburton Branch.			Woodsome Colliery is adjacent to the north of Plot A, several shafts are depicted.
1938	No significant changes noted.			No significant changes noted within the vicinity.
1948				
1955-1956	The railway sidings are no longer shown.			Woodsome Colliery has reduced in size and there are no longer railway sidings extending off-site to the north-west of Plot A.
1965-1968	Circular structures (potentially brick kilns) relating to the brick works are shown in the north and east of the plot. The north, east and south-east of the site have been profiled with mounds depicted in the south and west.			Immediately north of Plot A a refuse heap is shown.
1976-1979	Many of structures are no longer depicted in the east of the plot, and are assumed to have been demolished. A thin strip of land in the south east is shown to be a refuse tip.		No significant changes noted.	The railway to the east of Plot D and E and to the west of Plot A is no longer shown. The colliery to the north of Plot A is no longer shown.
1984	All structures have been cleared from the site with the exception of a			No significant changes noted in the vicinity.

MAP DATE	PLOT A	PLOT D	PLOT E	SURROUNDINGS
	rectangular building in the north-west of the plot. The refuse tip is no longer shown.			
1992	The plot has been cleared of all structures.			
2000	No significant changes noted in the plot.			
2006				
2017				

2.3 HISTORICAL SOURCES OF CONTAMINATION SUMMARY

2.3.1 PLOT A

Between 1930s and 1980s the plot was developed with a clay and brick works. Potential contamination associated with the former industrial land use could include ash from on-site furnaces, process waste as well as asbestos and heavy metals associated with demolished buildings.

A refuse tip was shown in the south of the plot between 1976 and 1984, it is likely that this refuse tip was associated with the clay and brick works and therefore potential contaminants are likely to be a similar to that associated with the works.

2.3.2 PLOT D

No significant potential sources of contamination identified.

2.3.3 PLOT E

A small gravel pit on the western boundary was present between 1854 and 1894, the pit is presumed to have been backfilled with material of unknown origin, therefore potential contaminants would be dependent on the nature of the fill, and contaminant concentrations are likely to have diminished with time.

2.3.4 OFF-SITE

Adjacent to all three plots (east of Plots D & E and west of Plot A) was a former railway line and embankment, potential contaminants associated with the railway include metals, pesticides, hydrocarbons, including PAHs and asbestos.

Woodsome Colliery was located adjacent to the north of Plot A, present in 1933 with a refuse heap depicted in 1965, it was no longer present by 1976. Potential contaminants from the colliery may include metals, hydrocarbons (including PAHs) and asbestos. However, hazardous mine gas could be present beneath the site, subject to geology and the presence of workings.

2.4 REGULATORY INFORMATION

Table 3 - Regulatory Information Summary

ASPECT	ON-SITE	WITHIN 500M	DETAILS
Discharge Consents	0	2	The Consent is held by Reliance Precision Limited for the trade discharge of cooling water to Beldon Brook via Old Mill Pond approximately 20m south-east of Plot A. The consent was issued in July 2006. The second discharge is held by Woodsome Hall Golf Club for the discharge of treated sewage to Springwood Beck approximately 380m west of Plot E, the consent was issued in June 2004.
Pollution Incidents to controlled waters	0	13	The nearest pollution incident recorded was a result of released sewage to an unnamed freshwater stream approximately 30m north-west of Plot D, the incident occurred in January 1994 and was classified by the Environment Agency as being Category 2 – Significant. 50m south of Plot E, an incident occurred in August 1995, relating to the release of sewage to the Calder tributaries, the incident was classified by the EA as Category 2 – Significant.
Landfills/infilled land	0	1	One historical landfill is recorded approximately 90m south-east of Plot A, referred to as Netheroyd Hill Tip. There are no further records regarding the landfill. Historical plan show a refuse tip in the southeast of the site.

2.5 SITE SETTING

2.5.1 GEOLOGY

British Geological Survey (BGS) Sheet 77, Huddersfield scale 1:50,000, Solid and Drift edition, dated 2003 and BGS Sheet SE12SE, scale 1:10,000, Solid and Drift edition, dated 1999 indicate the solid geology beneath the site to be of the Pennine Lower Coal Measures. This comprises interbedded mudstone, siltstone and sandstone, with more numerous and thicker coal seams in its upper horizons.

Plot A is shown to have superficial deposits comprising alluvial on the southern boundary of the plot, the underlying solid geology comprises Pennine Lower Coal Measures in the north-eastern 70% of the site and the Grenoside Sandstone outcrop in the south-western 30% of the site.

Plot D is underlain by Grenoside Sandstone. No superficial deposits are recorded.

Plot E is shown to have superficial alluvial deposits present in the northwest corner of the plot only. The underlying bedrock comprises Grenoside Sandstone covering circa 80% of the west of the plot, with the remainder of the east of the plot underlain by Pennine Lower Coal Measures.

The geological maps indicates two coal seams, the Better Bed, and the Black Bed Coal seam, outcrop on and in the vicinity of the site, trending approximately northwest-southeast. Further details relating to the underlying coal seams are discussed in Section 3 below.

Figures 3A to 3C and 4A to 4C show the drift and solid geology of the site.

2.5.2 HYDROGEOLOGY

The bedrock geology (Pennine Lower Coal Measures Formation & Grenoside Sandstone) is classified by the Environment Agency (EA) as Secondary A aquifers. These are described as permeable layers capable of supporting water supplies at a local rather than strategic scale.

The site is not located within a Source Protection Zone (SPZ). Two publically registered groundwater abstractions are located within a 500m radius of the site boundary. The nearest are located approximately 40m and 70m to the southwest of Plot A, abstracted groundwater is recorded as being used for general use in textiles and leather, including process water and non-evaporative cooling water for Reliance Gear Co Ltd. There is no information regarding daily abstraction rates.

2.5.3 HYDROLOGY

The site is located within the Environment Agency (EA) defined Humber River Basin District and the Aire and Calder Catchment area. The nearest named surface watercourse is Beldon Brook, which runs in a westerly direction along the southern boundary of Plot A. the Brook joins with Fenay Beck, located approximately 80m west of Plots D & E. Fenay Beck is classified by the EA as having a moderate ecological potential and a good chemical water quality.

3 PRELIMINARY COAL MINING RISK ASSESSMENT

3.1 MINING RELATED GEOLOGY

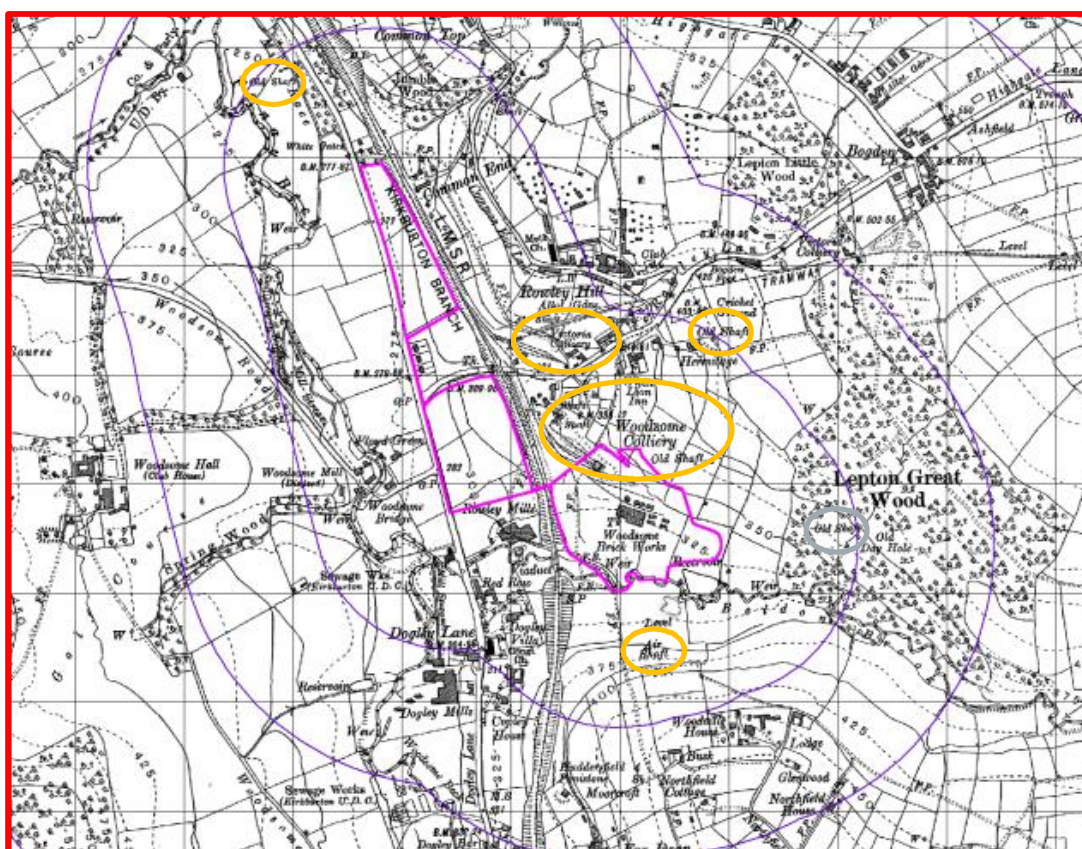
The BGS mapping indicates all three plots are underlain by bedrock comprising the Pennine Lower Coal Measures.

The Better Bed coal seam is indicated to outcrop in an approximately south east to north west direction across the centre of Plot A and in a broadly north to south direction along the eastern boundary of Plots D and E. The seam is indicated on the 1:10,000 geological map to be dipping 2° to the east.

3.2 HISTORICAL OS MAPS

The 1933 OS maps (Drawing. 1) shows Woodsome Colliery located approximately 95m to the east of Plot D and 80m northwest of Plot A. Two shafts are shown at the centre of the colliery, as are railway sidings which encroach onto the north-eastern boundary of Plot A. Victoria Colliery is shown immediately to the north of Woodsome Colliery, located approximately 180m to the northeast of Plot D and 200m southeast of Plot D. An 'Old Shaft' and an 'Air Shaft' are also shown approximately 150m and 200m east and south of Plot A respectively. By the mid-1960s the collieries are no longer shown, and the sites were developed with housing by the 1990s.

DRAWING 1. 1933 OS map, with coal mining related features highlighted.



3.3 COAL AUTHORITY INFORMATION

A Coal Authority report was obtained for the site. Pertinent details are summarised below:

- The site is in a surface area that could be affected by underground mining in three seams of coal at shallow to 230m depth, last worked in 1931.
- The site is not within a surface area that could be affected by present underground mining.

- The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres, since 31 October 1994. There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority Interactive Viewer and GIS data indicates that:

- The easternmost parts of Plots D and E are located within a Development High Risk Area, relating to the outcrop of the Better Bed coal seam and are associated with areas of 'probable shallow coal mine workings'. No recorded shallow workings are recorded within Plots D and E.
- The north-eastern part of Plot A is located within a Development High Risk Area, linked to the outcrop of the Better Bed coal seam and associated with areas of 'probable shallow coal workings' and two areas of 'past shallow coal mine workings'.

Extracts from the Coal Authority GIS data is presented on figures **5A**, **5B** and **5C**.

A series of Coal Authority Shaft Plan and Data Sheets (referenced 51001620532001) were obtained (**Appendix I**), which provide limited information on the shafts present on site. No treatment details were provided for any of the shafts/adits.

3.4 MINE ABANDONMENT PLANS

A mine abandonment plan (referenced 11127, entitled 'Woodsome Outcrop, Huddersfield Collieries Limited, Better Bed Clay Workings', dated 1933) was obtained from the Coal Authority. This indicates two areas of shallow workings within Plot A.

The abandonment plan indicates that the Better Bed coal seam was encountered at a depth of approximately 1.2m bgl and approximately 0.45m thick. However, the plan indicates that rather than the coal being worked, a 0.9m thick clay seam was worked using pillar and stall techniques at a depth of 3.0m bgl. It is considered likely that the clay workings were associated with the Woodsome Brick Works which is shown to be located on site on the 1933 historical map.

The plan indicates the strata beneath Plot A is dipping at approximately 2° to the northeast.

3.4.1 IDENTIFICATION AND ASSESSMENT OF SITE SPECIFIC COAL MINING RISKS

Based on the information reviewed in the above sections, site specific coal mining risks have been identified and assessed for each plot, and these are presented in Table 4 to 6.

Table 4 - Plot A - Identification and assessment of site specific coal mining risks

COAL MINING ISSUE	APPLICABLE TO SITE	RISK ASSESSMENT / COMMENTS
Is the proposed development in the likely zone of influence of past underground coal mining?	Yes	The site is in an area that could be affected by past underground mining within three seams (shallow to 230 m depth).
Is the proposed development in the likely zone of influence of any present underground coal workings?	No	-
Is the proposed development within the likely zone of influence of underground coal workings at shallow depth (depths of less than 30m)?	Yes	Areas of recorded and probable shallow workings are identified.
Is there a possibility of unrecorded shallow mine workings and/or mine entries?	Yes	A coal seams outcrops on site and the potential exists for unrecorded workings associated with this seam. In addition, there are recorded workings within a seam of clay beneath the coal seams and further unrecorded workings associated with this clay may be present.

COAL MINING ISSUE	APPLICABLE TO SITE	RISK ASSESSMENT / COMMENTS
		clay may be present.
Is there a record of mine gas emissions within the site boundary?	No	The potential for shallow mine workings within the vicinity of the site suggests that ground gas monitoring would be warranted.
Is the proposed development in an area for which the Coal Authority is determining or has granted a license to remove coal by underground methods?	No	-
Are there recorded coal mine entries within the site or within 20m of the site boundary?	Yes	The Coal Authority indicates that there are ten mine entries on site, or within 20 m of the site boundary. There is no record of what steps, if any, have been taken to treat the eight adits and two shafts recorded.
Has the site been subject to remedial works by, or on behalf of, the Coal Authority under its surface hazard call out procedures?	No	-
Is the proposed development within the boundary of a surface mining/opencast site from which coal has been removed by surface mining/opencast methods?	No	-
Is the proposed development within 200 metres of a surface mining/opencast site from which coal is being removed?	No	-

Table 5 - Plot D- Identification and assessment of site specific coal mining risks

COAL MINING ISSUE	APPLICABLE TO SITE	RISK ASSESSMENT / COMMENTS
Is the proposed development in the likely zone of influence of past underground coal mining?	Yes	The plot is in an area that could be affected by past underground mining within three seams (shallow to 230 m depth).
Is the proposed development in the likely zone of influence of any present underground coal workings?	No	-
Is the proposed development within the likely zone of influence of underground coal workings at shallow depth (depths of less than 30m)?	Yes	The outcrop of the Better Bed Coal seam is shown on or close to the plot's eastern boundary.
Is there a possibility of unrecorded shallow mine workings and/or mine entries?	Yes	The Better Bed Coal Seam outcrops on or close to the plot's eastern boundary and could be associated with shallow workings and/or mine entries.
Is there a record of mine gas emissions within the site boundary?	No	The potential for shallow mine workings within the vicinity of the site suggests that ground gas monitoring would be warranted.
Is the proposed development in an area for which the Coal Authority is determining or has granted a license to remove coal by	No	-

COAL MINING ISSUE	APPLICABLE TO SITE	RISK ASSESSMENT / COMMENTS
underground methods?		
Are there recorded coal mine entries within the site or within 20m of the site boundary?	No	
Has the site been subject to remedial works by, or on behalf of, the Coal Authority under its surface hazard call out procedures?	No	-
Is the proposed development within the boundary of a surface mining/opencast site from which coal has been removed by surface mining/opencast methods?	No	-
Is the proposed development within 200 metres of a surface mining/opencast site from which coal is being removed?	No	-

Table 6 - Plot E – Identification and assessment of site specific coal mining risks

COAL MINING ISSUE	APPLICABLE TO SITE	RISK ASSESSMENT / COMMENTS
Is the proposed development in the likely zone of influence of past underground coal mining?	Yes	The plot is in an area that could be affected by past underground mining within three seams (shallow to 230 m depth).
Is the proposed development in the likely zone of influence of any present underground coal workings?	No	-
Is the proposed development within the likely zone of influence of underground coal workings at shallow depth (depths of less than 30m)?	Yes	The outcrop of the Better Bed Coal seam is shown on or close to the plot's eastern boundary.
Is there a possibility of unrecorded shallow mine workings and/or mine entries?	Yes	The Better Bed Coal Seam outcrops on or close to the plot's eastern boundary and could be associated with shallow workings and/or mine entries.
Is there a record of mine gas emissions within the site boundary?	No	The potential for shallow mine workings within the vicinity of the site suggests that ground gas monitoring would be warranted.
Is the proposed development in an area for which the Coal Authority is determining or has granted a license to remove coal by underground methods?	No	-
Are there recorded coal mine entries within the site or within 20m of the site boundary?	No	
Has the site been subject to remedial works by, or on behalf of, the Coal Authority under its surface hazard call out procedures?	No	-
Is the proposed development within the boundary of a surface mining/opencast site from which coal has been removed by	No	-

COAL MINING ISSUE	APPLICABLE TO SITE	RISK ASSESSMENT / COMMENTS
surface mining/opencast methods?		
Is the proposed development within 200 metres of a surface mining/opencast site from which coal is being removed?	No	-

4 PRELIMINARY CONCEPTUAL SITE MODEL

4.1 CONCEPTUAL SITE MODEL

A preliminary conceptual site model (CSM) was initially formulated utilising the available information to determine the potential for plausible contaminant linkages and to assist in targeting this preliminary site investigation. For a significant or identifiable risk to exist an exposure pathway must be present which requires each of the following to be identified:

- The presence of substances that may cause harm (source);
- The presence of a receptor which may be harmed at an exposure point (receptor); and
- The existence of means of exposing a receptor to the source (the exposure pathway).

4.2 POTENTIAL SOURCES OF CONTAMINATION

Based on the sites historical use together with site walkover, potential sources of contamination identified have included:

Plot A

- Made Ground associated with demolished buildings from the brick works (which could include asbestos containing materials (ACM), heavy metals, total petroleum hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAHs));
- Made Ground/waste associated with infilling of the ground associated with a former refuse heap; and
- The potential for ground gases associated with shallow and deeper mine workings (hazardous ground gases).

Plot D

- The potential for ground gases associated with shallow and deeper mine workings as well as from backfill within the former opencast areas (permanent ground gases).

Plot E

- Known infilled land associated with a former sandstone extraction pit. Potential contamination would be dependent on the nature of the fill material used but could be a source of contaminated leachate as well as ground gas.
- The potential for ground gases associated with shallow and deeper mine workings as well as from backfill within the former opencast areas (hazardous ground gases).

Potential off-site sources of contamination furthermore include a former landfill located ~90m to the south-east presenting a potential for the generation and migration of landfill leachate and ground gases towards the site.

4.3 POTENTIAL RECEPTORS

Based on the sites proposed future residential redevelopment and potential receiving environment, potential receptors are considered to include the following:

- Future on-site residents;
- Construction/maintenance workers conducting subsurface works;
- Controlled waters: underlying Secondary A Aquifer, Beldon Brook and Fenay Beck.
- Build Environment - subsurface concrete, susceptible to sulphate erosion and water supply pipes.

4.4 EXPOSURE PATHWAYS

Transport mechanisms and exposure routes could include the following:

- Direct contact with impacted soils (dermal contact and incidental ingestion);
- Dermal contact, incidental ingestion and inhalation of soil particulates (dust);
- Direct ingestion of contaminants via home grown produce;
- Volatilisation of vapours from impacted soil and/or groundwater and subsequent vapour intrusion into buildings leading to vapour inhalation;
- Accumulation of gases resulting in potentially explosive / asphyxiating atmosphere;
- Leaching of contamination into groundwater followed by migration of groundwater to the wider groundwater environment and down gradient surface waters; and

- Direct contact of buried concrete with aggressive (acidic) ground.

4.5 SUMMARY OF PLAUSIBLE POLLUTION LINKAGES

Pre investigation plausible pollutant linkages are summarised in Table 7. Potentially active linkages are to be assessed herein by way of preliminary assessment.

Table 7 - Potential pollutant linkages

		PLOT A	PLOT D	PLOT E
EXPOSURE LINKAGE	POTENTIALLY ACTIVE (✓)			
	INACTIVE (✖)			
HUMAN HEALTH				
Exposure to contaminated soils via ingestion/dermal contact/inhalation (site users, maintenance and construction workers)	✓	✓	✓	
Vapour inhalation (outdoor and indoor)	✓	✖	✖	
BUILT ENVIRONMENT				
Migration of ground gas & potentially vapours into buildings	✓	✓	✓	
Permeation of contaminants through water pipework leading to contamination of drinking water supply	✓	✖	✖	
Direct contact of aggressive ground with buried concrete	✓	✓	✓	
CONTROLLED WATERS				
Contamination of groundwater and surface waters	✓	✖	✖	
Contamination of abstraction wells	✓	✖	✖	

5 INTRUSIVE GROUND INVESTIGATION

5.1 RATIONALE

The desk based assessment identified a number of potential ground risk related issues which can broadly summarised as follows:

Land Quality

- Potential for contaminated ground associated with former brick works and from a former refuse tip (Plot A) and small infilled pit (Plot E) presenting potential risks sensitive environmental receptors;
- Potential for hazardous ground gas to migrate to the surface and impact future buildings (site wide) presenting unacceptable risks to future site users and buildings.

Geotechnical

- Potential for shallow mine (coal and clay) workings presenting ground stability risks;
- Potential for Made Ground across Plot A and associated with an infilled pit (Plot D), potential for differential settlement.
- Potential for below ground obstructions, which may impact ground engineering works.
- Potential for shallow groundwater which could impact excavations and other below ground infrastructure.
- Potential for aggressive ground conditions that could impact below ground concrete.

Given the desk based issues this investigation was subsequently undertaken to assess potential land quality issues and also to gain a preliminary understanding of geotechnical related issues.

5.2 EXPLORATORY HOLES AND INSTALLATIONS

The intrusive investigation was overseen by WSP staff between 14 and 22 August 2017. Prior to breaking ground underground utility plans were studied prior to a specialist underground utility avoidance engineer assessing all proposed exploratory locations, this was delivered on 10 August 2017.

5.2.1 PLOT A

Four boreholes (BHA01 to BHA04) were advanced using rotary open hole drilling techniques to depths of between 21mbgl (BHA01 & BHA03) and 22.5 (BHA04). Boreholes were located to target coal seams / potential historical shallow workings in the north of the plot. Eleven trial pits (TPA01 to TPA11) excavated to a maximum depth of 3.4mbgl were located on-site for general coverage as well as investigating the former on-site brick works and the area depicted as being a refuse heap.

5.2.2 PLOT D

Three boreholes (BHD01 to BHD03) were advanced using rotary open hole drilling techniques to depths of between 21mbgl (BHD01 & BHD02) and 24mbgl (BHD03). Boreholes were located to target coal seams / potential historical shallow workings in the east of the plot. Six trial pits (TPD01 to TPD06) were excavated to a maximum depth of 2.4mbgl across the plot for general coverage as well as investigating shallow contamination.

5.2.3 PLOT E

Three boreholes (BHE01 to BHE03) were advanced using rotary open hole drilling techniques to a depths of 21mbgl. Boreholes were located to target coal seams / potential historical shallow workings in the east of the plot. Seven trial pits (TPE01 to TPE07) were excavated to a maximum depth of 1.6mbgl across the plot for general coverage as well as investigating shallow contamination.

On completion of drilling, groundwater / ground gas monitoring wells were installed in all of the boreholes.

A borehole location plan is included as **Figure 6**. Exploratory hole logs are included in **Appendix C**.

Table 8 - Summary of monitoring well installations

BOREHOLE ID	GROUND ELEVATION (MAOD)	PIEZOMETER DIAMETER (MM)	SCREEN TOP AND BASE DEPTH (MBGL)	SCREEN TOP AND BASE ELEVATION (MAOD)	STRATA TARGETED
Plot A					
BHA1	102.318	50	10.00 to 15.00	92.32 to 87.32	Pennine Lower Coal Measures
BHA2	100.732	50	2.50 to 5.00	98.23 to 95.73	Pennine Lower Coal Measures
BHA3	99.990	50	4.00 to 9.00	95.99 to 90.99	Pennine Lower Coal Measures
BHA4	101.298	50	6.00 to 11.00	95.30 to 90.30	Pennine Lower Coal Measures
Plot D					
BHD1	92.983	50	1.00 to 10.00	91.98 to 82.98	Pennine Lower Coal Measures
BHD2	94.974	50	16.00 to 21.00	78.97 to 73.97	Pennine Lower Coal Measures
BHD3	95.251	50	18.00 to 24.00	77.25 to 71.25	Pennine Lower Coal Measures
Plot E					
BHE1	96.823	50	1.00 to 6.00	95.82 to 90.82	Pennine Lower Coal Measures
BHE2	96.351	50	11.00 to 21.00	85.35 to 75.35	Pennine Lower Coal Measures
BHE3	96.876	50	15.00 to 21.00	81.88 to 75.88	Pennine Lower Coal Measures

5.3 IN-SITU AND FIELD TESTING

A hand held Photo-Ionisation Detector (PID) (fitted with a 10.6eV lamp) was used to provide an indication of the presence of volatile compounds within the soil profile. The PID readings are presented on the borehole logs (**Appendix C**), there were no reading above 1ppm recorded across any of the three plots.

5.4 GROUNDWATER AND GROUND GAS MONITORING

Groundwater level monitoring (using an interface probe) and ground gas monitoring meter was undertaken on two occasions (05 & 25 September 2017).

Ground gas monitoring included the measurement of methane, carbon dioxide, hydrogen sulphide, carbon monoxide and oxygen along with peak and steady gas flows plus barometric pressures.

Groundwater was sampled from BHA02, BHA03 and BHA04 using low-flow techniques, comprising a YSi Pro Plus and peristaltic pump.

5.5 LABORATORY ANALYSIS AND TESTING

Selected soil samples were submitted for analysis to ALS Laboratories which uses United Kingdom Accreditation Service (UKAS) and Environment Agency of England & Wales (EA) Monitoring Certification Scheme (MCERTS) accredited methods, where applicable. A total of 33 samples were analysed for the identified contaminants of concern, including:

- Asbestos screen;
- Metals suite (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Total petroleum hydrocarbons Criteria Working Group (TPH CWG);
- Benzene, toluene, ethylbenzene, xylenes (BTEX) compounds;
- Methyl tertiary butyl ether (MTBE) and tert-amyl methyl ether (TAME); and,

A selection of samples were also analysed for moisture content and % Soil Organic Matter (SOM).

Laboratory analytical reports are included in **Appendix D**.

The three groundwater samples were analysed for the following contaminants:

- Metals suite (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Total petroleum hydrocarbons Criteria Working Group (TPH CWG);
- Benzene, toluene, ethylbenzene, xylenes (BTEX) compounds; and
- Methyl tertiary butyl ether (MTBE) and tert-amyl methyl ether (TAME)



Bulk and disturbed samples were sent for geotechnical testing (Plasticity Index, moisture content, particle size distribution and compaction) at Geo Site & Testing Services Ltd (GSTL) laboratory. Results are included within **Appendix E**.

6 GROUND CONDITIONS

6.1 SUMMARY OF ENCOUNTERED GROUND CONDITIONS

6.1.1 PLOT A

All intrusive locations identified grass and topsoil (of between 0.1m and 0.3m thick) within their uppermost horizons.

Made Ground was encountered in all trial pits and boreholes beneath the topsoil with the exception of TPA10 located in the south-west of the plot, where topsoil was underlain by weathered bedrock. The thickness of the Made Ground is variable across the plot and its thickness was not proven (>3m depth) in the south of the plot (TPA07 and TPA08) where a historical refuse tip had been recorded. The Made Ground encountered generally comprised clayey gravel or gravelly clay compiled of mudstone, burnt shale, crushed brick, ash and crushed clay pipes. The edge of the refuse area was identified in TPA09 where a layer (2.95m thick) of Made Ground was identified and underlain by weathered bedrock. In the centre and east of the plot Made Ground was identified to between 1mbgl and 1.8mbgl. In the west of the site, trial pits were not able to be extended to beyond 0.8m bgl due to underground obstructions in the form of concrete or brick foundations; however the boreholes identified Made Ground to a maximum depth of 1.8mbgl in the area.

Underlying the Made Ground in all instances was weathered bedrock comprising clay and then interbedded mudstone, siltstone, sandstone and coal of the Pennine Lower Coal Measures, encountered between 0.8m and 3.1m bgl.

Coal was encountered in a number of the exploratory holes carried out within Plot A. Table 9 below summarises the coal seam encountered during the ground investigation

Table 9 - Summary of encountered coal seams

BOREHOLE	ELEVATION M AOD	DEPTH M BGL	SEAM THICKNESS	INTERPRETED COAL SEAM
BHA1	96.22	6.10	0.9	Better Bed Coal
BHA2	96.83	3.90	0.7	Better Bed Coal
BHA3	97.79	2.60	0.6	Better Bed Coal
TPA05	97.03	2.70	0.1	Better Bed Coal
TPA10	99.26	0.70	0.5	Better Bed Coal

The available data indicates that the strata dips at an angle of circa 2° towards the north. No evidence of mining was recorded within Plot A during the ground investigation.

6.1.2 PLOT D

All intrusive locations identified topsoil (of between 0.15m and 0.35m thickness) within their uppermost regions.

Made Ground was not encountered within any of the exploratory locations.

Topsoil was underlain by weathered rock comprising clay and then interbedded mudstone, siltstone, sandstone and coal of the Pennine Lower Coal Measures. The depth of the bedrock was not proven in any of the exploratory locations. Coal was not recorded in any of the exploratory locations.

6.1.3 PLOT E

All intrusive locations identified topsoil (of between 0.2m and 0.35m thickness) within their uppermost regions.

Made Ground was not encountered within any of the exploratory locations.

Topsoil was underlain by weathered rock comprising clay in the south-east (BHE04 & BHE04) and sand in the remainder of the plot. The underlying bedrock was a sandstone outcrop (Grenoside), part of the Pennine Lower Coal Measures comprising interbedded mudstone, siltstone, sandstone and coal. The depth of the bedrock was not proven in any of the exploratory locations

A summary of the strata encountered during our investigation is presented in **Table 10**. Exploratory hole logs are provided within **Appendix C**.

Table 10 - Summary of Strata Encountered

STRATUM NAME	DEPTH TO BASE OF STRATA (MGBL)	ELEVATION OF BASE OF STRATA (MAOD)	THICKNESS (M)
Plot A			
Topsoil	0.10 to 0.20	102.37 to 99.68	0.10 to 0.20
Made Ground Granular	0.40 to 3.10	102.17 to 96.49	0.20 to 2.45
Made Ground Cohesive	0.80 to 3.10	100.52 to 97.89	0.60 to 2.90
Pennine Lower Coal Measures Formation	Not proven (22.50)	Not proven (78.80)	Not proven (22.50)
Plot D			
Topsoil	0.15 to 0.35	97.07 to 85.47	0.15 to 0.35
Pennine Lower Coal Measures Formation	Not proven (24.00)	73.97 to 71.25	Not proven (24.00)
Plot E			
Topsoil	0.2 to 0.35	98.45 to 88.51	0.2 to 0.35
Pennine Lower Coal Measures Formation	Not proven (21.50)	75.82 to 75.38	Not proven (21.50)

6.2 EVIDENCE OF CONTAMINATION

The PID screening of soil samples collected during the advancement of the boreholes, trial pits and hand dug pits all reported readings below 1ppm. Furthermore no visual or olfactory evidence of contamination was reported during the advancement of the exploratory holes.

6.3 GROUNDWATER CONDITIONS

Groundwater strikes were recorded in multiple boreholes; depths of the strikes are recorded within borehole logs within **Appendix C**.

Groundwater levels were subsequently recorded during the groundwater and ground gas monitoring rounds. A summary of the groundwater depths and elevations recorded post site investigation is provided **Table 11**. Field records are provided in **Appendix F**.

Table 11 - Summary of groundwater levels recorded post site investigation

BOREHOLE ID	GROUND ELEVATION (MAOD)	GROUNDWATER DEPTH (MBGL)		GROUNDWATER ELEVATION (MAOD)	
		Min	Max	Min	Max
Plot A					
BHA1	102.32	9.45	9.88	92.44	92.87
BHA2	100.73	4.02	4.14	96.59	96.71
BHA3	99.99	5.92	6.36	93.63	94.07
BHA4	101.30	8.68	8.94	92.36	92.62
Plot D					
BHD1	92.98	7.30	7.41	85.57	85.68
BHD2	94.97	15.89	16.11	78.86	79.08
BHD3	95.25	16.11	16.75	78.50	79.14
Plot E					
BHE1	96.82	Dry	Dry	N/A	N/A
BHE2	96.35	17.23	17.61	78.74	79.12
BHE3	96.88	17.89	17.90	78.98	78.99

Groundwater was identified at elevations between 78.50 mAOD (BHD3) and 96.71 mAOD (BHA2) within the Pennine Lower Coal Measures.

Plot A – Groundwater depths were recorded to be variable across the plot, likely a result of purchased water associated with low permeability stratum and potentially disruption of groundwater flow from relict below ground infrastructure.

Plot D - Groundwater depths are in keeping with the local topography with the exception of BHD1, where there is a more elevated response zone compared to BHD2 & BHD3. This has resulted in a higher groundwater elevation, indicating that there is likely to be a perched water body in the shallow subsurface.

Plot E – Groundwater depths are broadly in keeping with the local topography.

7 GENERIC QUANTITATIVE RISK ASSESSMENT

7.1 METHODOLOGY

Legislation and guidance on the assessment of contaminated sites acknowledges the need for a proportionate and consequently tiered risk based approach. Our assessment herein represents a Generic Quantitative Risk Assessment (GQRA), being a comparison of site contaminant levels against generic assessment criteria, including a qualitative assessment of risk using the source-pathway-receptor model. These criteria may be considered as delivering a conservative assessment of the available data. Our Generic Assessment Criteria (GAC) have been calculated using the Environment Agency's Contaminated Land Exposure Assessment (CLEA) Workbook v1.071 to assess potential health risks associated with contaminants in soil. Our methodology for the derivation of GAC is presented in **Appendix G**.

7.2 HUMAN HEALTH GQRA

Based on the sites' proposed residential end use with the potential for home grown produce in gardens, the soil chemical data has been compared against GACs derived for residential end use. Site specific Soil Organic Matter (SOM) content was obtained from 12 out of 32 soil samples, with values ranging between 1.11% (TPD05 at 0.7-0.8mbgl) and 37.1% (TPA06 at 0.5-0.6mbgl). Given the variability of organic content across the site, GACs for 1% SOM were adopted as the selection of the percentage of SOM can have an influence upon the screening criteria, use of 1% may be considered as conservative. Screened results are included as a table in **Appendix D**.

7.2.1 PLOT A

A total of 13 soil samples were analysed, comprising 12 samples taken from Made Ground and one topsoil sample.

A trace of chrysotile (white) asbestos was identified within TPA01 at between 0.3m and 0.4m bgl, it is currently being quantified and results are awaited.

When compared to appropriate GACs it was determined that there was one exceedance of the GAC threshold. This was for arsenic, which was identified as having a concentration of 52.6mg/kg in TPA10 at 0.1-0.2m bgl, exceeding the GAC of 32.0mg/kg.

7.2.2 PLOT B

A total of nine soil samples were analysed, comprising five samples taken from the topsoil and four from the underlying natural strata (Pennine Lower Coal Measures).

When compared to appropriate GACs it was determined that there were two exceedances of the GAC threshold. These were both for arsenic, which were identified as having concentrations of 42.4mg/kg (BHD3 at 0.3m bgl) and 41.9mg/kg (TPD04 at 0.1-0.2m bgl) both exceeding the GAC of 32.0mg/kg.

7.2.3 PLOT E

A total of ten soil samples were analysed, comprising three samples taken from topsoil and seven from the Pennine Lower Coal Measures. There were no exceedances recorded on this plot.

7.3 CONTROLLED WATERS ASSESSMENT

Three groundwater samples (BHA2 – BHA4) were collected on 25 September 2017. Legislation and guidance on the assessment of contaminated sites acknowledges the need for a tiered risk based approach. This assessment represents a GQRA: a comparison of site contaminant levels against GAC, including a qualitative assessment of risk using the source-pathway-receptor model.

Based on the preliminary conceptual site model and the identified receptors, the following water quality standards (WQS) have been adopted primarily in consideration of the underlying Secondary A Aquifer, and the nearby surface water (Beldon Brook).

- UK Drinking Water Standards
- WHO Drinking Water Guidelines 2008 & 2011
- EC Drinking Water Directive 1998
- Scotland Private Water Supply Regulations 2006

■ Environmental Quality Standards 2015

The following exceedances were identified from groundwater testing in Table 13 below:

Table 13 – Groundwater Exceedances

DETERMINAND	NUMBER OF SAMPLES ANALYSED	ENVIRONMENTAL QUALITY STANDARDS (EQS) INLAND SURFACE WATER RECEPTOR	MIN	MAX	LOCATION OF EXCEEDANCE
PAHs					
Benzo(a)pyrene	3	0.0002	0.00275	0.0196	BHA2, BHA3, BHA4

Benzo(a)pyrene was also identified as exceeding the UK DWS (0.01 µg/l) in BHA3 and BHA4.

All exceedances are noted to be marginal.

WSP has also derived a set of groundwater GACs to evaluate the potential indoor inhalation health risks associated with vapours derived from volatile contaminants within groundwater. When compared to thresholds for a residential end use, there were no exceedances.

Groundwater results and screening are included within **Appendix D**.

8 GROUND GAS ASSESSMENT

8.1 POTENTIAL GROUND GAS SOURCES

The site is located in an areas which is understood to have been extensively mined for coal therefore former coal mining activities are considered to represent a moderate generation potential of ground gas source at the site.

Plot A and E have also been subject to historical infilling (refuse tip and gravel pit). However, the investigation backfill was noted to be of brick and burnt shale as well as clay and not degradable material were recorded. The infilled areas are therefore considered to present a low risk of gas generation.

8.2 GROUND GAS MONITORING RESULTS

Two ground gas monitoring visits have been undertaken on 05 and 25 September 2017. These have been delivered as an initial assessment of gas risk only and not for compliance against CIRA 665 and planning regulations. Barometric pressure was recorded to be relatively stable during the first visit and a slight increase during the second sampling visit. This is constant with regional barometric pressure data measured at Linton-On-Ouse Air Base (65km north-west). Monitoring results are summarised in **Table 12** below.

Table 12 - Summary of ground gas monitoring results (steady concentrations)

MONITORING POINT	METHANE (% v/v)		CARBON DIOXIDE (% v/v)		OXYGEN (% v/v)		FLOW (l/hr)	
	Min	Max	Min	Max	Min	Max	Min	Max
Plot A								
BHA1	0.00	0.00	1.20	3.00	12.70	17.80	0.00	0.00
BHA2	0.00	0.00	1.40	2.70	17.10	17.80	0.00	0.00
BHA3	0.00	0.00	3.50	3.90	9.40	11.30	0.00	0.00
BHA4	0.00	0.00	0.40	0.80	18.60	19.60	0.00	0.00
Plot D								
BHD1	0.00	0.00	2.50	2.90	15.70	17.60	0.00	0.20
BHD2	0.00	0.00	0.00	0.50	20.00	20.70	0.00	0.00
BHD3	0.00	0.00	1.90	2.10	17.20	18.00	0.00	0.00
Plot E								
BHE1	0.00	0.00	0.40	1.90	18.70	19.80	0.00	0.00
BHE2	0.00	2.50	0.00	2.30	1.00	20.50	0.00	0.00
BHE3	0.00	0.00	2.20	4.20	14.40	16.00	0.00	0.00

Steady methane levels were all 0% with the exception of BHE2 where a maximum concentration of 2.5% was recorded during the first monitoring round, it was not recorded during the second round.

The maximum initial carbon dioxide concentration of 4.2%v/v was recorded in BHE3, a concentration that remained at this steady level. Carbon dioxide levels were also generally low and below 5% v/v in all instances.

Flow was recorded at <0.1l/hr in all boreholes with the exception of BHD1 which recorded an initial flow rate of 0.2l/hr which reduced to 0l/hr steady flow.

The ground gas data is presented in **Appendix F**.

A preliminary ground gas risk assessment has been carried out as part of this investigation in line with CIRIA Report C665, "Assessing risk posed by hazardous ground gases to buildings" (CIRIA, 2007). This publication details the methods for assessing the ground gas regime at a site; it is reliant on the calculation of a Gas Screening Value (GSV) calculated as shown below:

- $GSV = \text{Maximum steady carbon dioxide or methane concentration (\%)} / 100 \times \text{maximum steady flow rate (l/hr)}$

Based on the maximum carbon dioxide concentration and flow rate recorded during the limited monitoring in 2017, the GSV for the site is 0.0084 l/hr. On this basis, the site classification corresponds to Characteristic Situation 1 with no need for ground gas protection measures to be installed in buildings.

9 REVISED CONCEPTUAL SITE MODEL

9.1 PLOT A

The ground investigation data generally indicates that the majority of the plot comprises grass and topsoil over Made Ground. The Made Ground encountered is described as clayey gravel and gravelly clay, comprising mudstone, ash, burnt shale, crushed brick and crushed terracotta pipe. No gross contamination was identified associated with the Made Ground. This was further supported by the volatile field screening where no samples recorded above the PID's level of detection (1ppm). However, one sample recorded trace asbestos fibres, likely to be associated with demolition rubble.

Risks to controlled waters are considered to be minimal from a plot wide risk assessment perspective. However, it is noted that localised areas of leachable contamination cannot be discounted based on the available information. Groundwater testing has been undertaken and the results indicate the plot is not impacting the underlying groundwater. The ground investigation data also suggests there are limited to no sources of vapours; again further investigation would be required to confirm this across the site.

Based on the preliminary CSM developed for the site, the ground investigation field observations and the outcome of the GQRA, an initial assessment of the potential contaminant linkages identified are summarised in **Table 14** below.

Table 14 - Contaminant linkage summary Plot A

SOURCE	PATHWAYS	RECEPTOR	PROBABILITY OF EXPOSURE	POTENTIAL CONSEQUENCE	RISK RATING
Made Ground associated with demolished buildings (inc. trace asbestos fibres) as well as the infilling of ground associated with a former refuse heap	- Ingestion of soil; - Dermal contact with soil; and, - Inhalation of soil-derived dust.	Construction workers	Low likelihood	Medium	Moderate
	Associated with any proposed garden/landscaped areas where fill is present at the surface.	Future site residents	Low likelihood	Medium	Moderate
	Ingestion of contaminants via uptake from homegrown vegetables	Future site residents	Low likelihood	Mild	Low
	Inhalation of vapours in confined spaces.	Future site residents	Unlikely	Mild	Very Low
	Associated with future buildings areas of Made Ground				
Underlying mine workings – Ground gas generation	Controlled waters	Surface water / aquifers and groundwater abstraction wells.	Unlikely	Mild	Very low
	Upward migration and accumulation of ground gases	Buildings & future site residents	Unlikely	Severe	Moderate / low
	Associated with upward migration of ground gas and accumulation within enclosed spaces				

9.2 PLOT D

The ground investigation has generally indicates that the plot comprises topsoil over weathered bedrock (clay) of the Pennine Lower Coal Measures Formation. The topsoil and weathered bedrock did not exhibit any

notable sources of contamination. This was further supported by the volatile field screening where no samples recorded above the PID's level of detection (1ppm).

Risks to controlled waters are considered be minimal from a plot wide risk assessment perspective. The ground investigation data also suggests there are limited to no sources of vapours; again further investigation would be required to confirm this across the site.

Based on the preliminary CSM developed for the site, the ground investigation field observations and the outcome of the GQRA, an initial assessment of the potential contaminant linkages identified are summarised in **Table 15** below.

Table 15 - Contaminant linkage summary Plot D

SOURCE	PATHWAYS	RECEPTOR	PROBABILITY OF EXPOSURE	POTENTIAL CONSEQUENCE	RISK RATING
Made Ground associated with demolished buildings as well as the infilling of ground associated with a former refuse heap	- Ingestion of soil; - Dermal contact with soil; and, - Inhalation of soil-derived dust.	Construction workers	Low likelihood	Mild	Low
	Associated with any proposed landscaped/garden areas where fill is present at the surface.	Future site residents	Low likelihood	Mild	Low
	Ingestion of contaminants via uptake from homegrown vegetables	Future site residents	Low likelihood	Mild	Low
	Inhalation of vapours in confined spaces.	Future site residents	Unlikely	Mild	Very Low
	Associated with future buildings areas of Made Ground				
Underlying mine workings – Ground gas generation	Controlled waters	Surface water / aquifers and groundwater abstraction wells.	Unlikely	Mild	Very low
	Upward migration and accumulation of ground gases	Buildings & future site residents	Unlikely	Severe	Moderate / low
	Associated with upward migration of ground gas and accumulation within enclosed spaces				

9.3 PLOT E

The ground investigation has generally indicates that the plot comprises topsoil over weathered bedrock (Clay and Sand) of a sandstone outcrop (Grenoside) of the Pennine Lower Coal Measures Formation. The topsoil and weathered bedrock did not exhibit any notable sources of contamination. This was further supported by the volatile field screening where no samples recorded above the PID's level of detection (1ppm).

Risks to controlled waters are considered be minimal from a plot wide risk assessment perspective. The ground investigation data also suggests there are limited to no sources of vapours; again further investigation would be required to confirm this across the site.

Based on the preliminary CSM developed for the site, the ground investigation field observations and the outcome of the GQRA, an initial assessment of the potential contaminant linkages identified are summarised in **Table 16** below.

Table 16 - Contaminant linkage summary Plot E

SOURCE	PATHWAYS	RECEPTOR	PROBABILITY OF EXPOSURE	POTENTIAL CONSEQUENCE	RISK RATING
Made Ground associated with demolished buildings as well as the infilling of ground associated with a former refuse heap	- Ingestion of soil; - Dermal contact with soil; and, - Inhalation of soil-derived dust.	Construction workers	Low likelihood	Mild	Low
	Associated with any proposed landscaped/garden areas where fill is present at the surface.	Future site residents	Low likelihood	Mild	Low
	Ingestion of contaminants via uptake from homegrown vegetables	Future site residents	Low likelihood	Mild	Low
	Inhalation of vapours in confined spaces. Associated with future buildings areas of Made Ground	Future site residents	Unlikely	Mild	Very Low
	Controlled waters	Surface water / aquifers and groundwater abstraction wells.	Unlikely	Mild	Very low
Underlying mine workings – Ground gas generation	Upward migration and accumulation of ground gases Associated with upward migration of ground gas and accumulation within enclosed spaces	Buildings & future site residents	Unlikely	Severe	Moderate / low

10 GEOTECHNICAL ASSESSMENT

10.1 GROUND MODEL

PLOT A

The ground conditions encountered beneath Plot A (with the exception of TPA10) can be summarised as topsoil over Made Ground, which is in turn underlain by weathered Pennine Lower Coal Measures comprising clay, sandstone, mudstone, siltstone and coal.

The recorded Made Ground generally increases in thickness to the south and southwest and comprised reworked natural material, with the addition of burnt shale, crushed brick, ash and crushed terracotta pipes.

Coal seams were recorded in a number of the exploratory holes within Plot A. The coal was encountered at depths of between 0.7 and 6.1 m BGL (99.26 and 96.22 m AOD), with the thickness of coal encountered ranging between 0.1 and 0.9 m. The recorded elevations show the coal seam to have an easterly dip.

No voids or broken ground were recorded as part of the ground investigation, although no boreholes were located within the two areas of known shallow mine workings. Voids and/or broken ground are anticipated within the two areas of known shallow mine workings.

TPA10 in the south west of the plot did not encounter Made Ground.

PLOTS D AND E

The ground conditions encountered beneath Plots D and E can be summarised as topsoil over weathered Pennine Lower Coal Measures comprising clay, sandstone, mudstone and siltstone. No coal, voids or broken ground were recorded during the ground investigation.

10.2 FOUNDATIONS AND FLOOR SLABS

PLOT A

The ground investigation recorded a variable thickness of Made Ground across the site, typically increasing in depth to the south. The depth of Made Ground may prohibit the use of traditional shallow spread foundations and ground bearing floor slabs and alternative foundation solutions are likely to be required.

PLOTS D AND E

Based on the ground conditions encountered, it is anticipated that shallow spread foundations bearing within the weathered Pennine Lower Coal Measures would likely be suitable for traditional low rise housing. Likewise, ground bearing floor slabs are also anticipated to be suitable.

At present it is unclear whether site levels will be altered significantly to create development platforms. In areas of up-fill, the type of foundation and floor slab will be dependent on the quality and performance of the placed fill.

10.3 EARTHWORKS

No development masterplans are currently available and the nature and extent of earthworks required to establish development platforms for the plots are unknown.

If significant earthworks are required, an earthworks specification should be prepared to manage excavations and the placement of fill. This should detail the compaction or performance requirements for each fill type.

10.4 EXCAVATIONS / OBSTRUCTIONS

It is anticipated that the majority of excavations should be achievable with standard earth moving plant. However, excavations within the Pennine Lower Coal Measures may require ripping or hydraulic breakers if hard strata are encountered.

Man-made obstructions were encountered in the Made Ground on Plot A during the ground investigation.

Trial pits across the site were generally stable. However, instability was recorded within two trial pits in Plot A.

10.5 GROUNDWATER

The results from the preliminary groundwater monitoring suggest that the main groundwater table is present at depth within the Pennine Lower Coal Measures strata.

Groundwater strikes closer to the ground surface were recorded during the investigation in exploratory holes BHA2 (2.7m bgl) and TPD01 (2.4m bgl).

10.6 COAL MINING

PLOT A

No evidence of shallow mining (coal or clay) was encountered within any of the exploratory holes formed, with intact coal being encountered within four exploratory holes. Given the geology it is highly unlikely that coal workings exist to the south of the coal seam.

Abandonment plans obtained from the Coal Authority show recorded shallow underground workings in two isolated locations within the site. No evidence that the extent of the workings is greater than that recorded was encountered, although it should be noted that the number of exploratory holes is limited.

Where present, the underground workings and the identified shafts and adits may require treatment if built development is to be undertaken above / in the vicinity of them.

PLOTS D AND E

The eastern extents of Plots D and E are recorded as being within a Coal Authority *Development High Risk Area*, relating to *probable shallow coal mine workings* associated with the Better Bed coal seam outcrop.

No coal or evidence of mining was recorded on these plots during the ground investigation.

10.7 CONCRETE CLASSIFICATION

Results from the limited laboratory testing conducted indicates a Design Sulphate Class of DS-1 for the three Plots and Aggressive Chemical Environment for Concrete (ACEC) classes as follows:

- Plot A: between AC-1 and AC-2z;
- Plot D: between AC-1 and AC-3z; and,
- Plot A: between AC-1 and AC-2z.

11 CONCLUSIONS

11.1 GROUND INVESTIGATION

A preliminary ground investigation has been carried out at Fenay Bridge in Huddersfield to support the delivery of initial site due diligence. Plots D & E comprised primarily 'Greenfield' land. Plot A has historically been a brick / clay works and has been subject to infilling and reprofiling activities. Plots D & E are currently undeveloped farm land used for pasture and Plot A is undeveloped grassland.

This preliminary ground investigation has confirmed a ground model sequence in Plot A comprising topsoil, underlain by Made Ground associated with the former brick and clay works including the on-site refuse heap, underlain by Pennine Lower Coal Measures. In Plots D & E, the ground model comprised topsoil over weathered bedrock of the Pennine Middle Coal Measures Formation. Groundwater has been identified in all but one of the boreholes across the site, in Plots D & E groundwater depths follow the general trend of the topography, whereas in Plot A the depth is variable and therefore likely influenced by the variable thickness of Made Ground and potential below ground infrastructure.

11.2 LAND QUALITY ASSESSMENT

Soil characterisation has been undertaken for potential contaminants of concern. A conservative and generic risk assessment has been undertaken to assess potential health risks to site users, based on its proposed residential end use. The GQRA has identified soil concentrations predominantly below their respective GACs and an absence of asbestos in the majority of soil samples retained. Marginally elevated concentrations of arsenic was identified in three of the 32 samples analysed. A maximum concentration encountered was 52.6mg/kg within Plot A against a GAC of 32mg/kg. As the three exceedances are marginal, they are not generally considered to pose a significant risk to construction workers and future site users. However, further ground investigation would be required to confirm this. In particular the presence of made ground materials is indicative of the potential presence of asbestos (even though only one sample has to date contained asbestos). Consequently, appropriate health and safety measures (including PPE/RPE) should be planned to assist in mitigating the risks associated with the made ground materials encountered.

Of the three groundwater samples there were several marginal exceedances of PAHs, however these are considered to not be significant due to their low concentrations. Impacts from groundwater receptors from all three plots are considered to be minimal based on the ground investigation data obtained to date.

A preliminary ground gas risk assessment limited to two monitoring rounds suggests the site classification corresponds to Characteristic Situation 1 with no need to incorporate basic gas protection measures within new buildings. However, a full gas assessment is recommended in the consideration of development proposals and it is noted that grouting works may alter the ground gas regime.

11.3 GEOTECHNICAL ASSESSMENT

The following geotechnical related constraints and opportunities have been identified from the investigation:

- The weathered and unweathered Pennine Lower Coal Measures should be suitable for the support of spread foundations and ground bearing floor slabs for traditional low rise residential properties across plot D and E.
- The depth of Made Ground within Plot A may prohibit the use of shallow spread foundations and ground bearing floor slabs.
- Changes in site levels are likely to be achievable with standard earth moving plant. However, excavations within the Pennine Lower Coal Measures may require ripping or hydraulic breakers if hard strata are encountered.
- Shallow groundwater may be present locally, particularly within the Made Ground on Plot A.
- Areas of Plot A have been identified to be at risk of potential shallow underground workings and a number of mine entries are present on the plot. Pre-development mitigation measures are therefore likely to be required in plot A. No coal seams or potential workings were recorded on Plots D and E.
- Testing indicates a Design Sulphate Class DS-1 and Aggressive Chemical Environment for Concrete (ACEC) class between AC-1 and AC-3z for below ground concrete.





File: \\uk.wspgroup.com\Central_Data\Projects\700173xx\70017314 - Bassingthorpe Farm\E Models and Drawings\Drawings\PDF Date Modified: 29/4/17 Drawn By: UKRH048



Legend

Site Boundary

Alluvium - Clay, Silt, Sand and Gravel

Indicative Made Ground from BGS - Artificial Deposit



Contains Ordnance Survey data © Crown copyright and database right 2017.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

TITLE:
Land at Fenay Bridge
Drift Geology Plan Plot A

FIGURE No:
Figure 3A

File: \\uk.wspgroup.com\Central_Data\Projects\700173xx\70017314 - Bassingthorpe Farm\E Models and Drawings\Drawings\PDF Date Modified: 29/4/17 Drawn By: UKRH0048



Legend

Site Boundary

Made_Ground

Alluvium - Clay, Silt, Sand and Gravel

Made Ground - Artificial Deposit

TITLE:

Land at Fenay Bridge
Drift Geology Plan Plot E

FIGURE No:

Figure 3B

Contains Ordnance Survey data © Crown copyright and database right 2017.

00.0125025 0.05 0.075 0.1 Kilometres

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS.



Legend

Site Boundary

Alluvium - Clay, Silt, Sand and Gravel

Made Ground - Artificial Deposit



TITLE:
Land at Fenay Bridge
Drift Geology Plan Plot D

FIGURE No:
Figure 3C

Contains Ordnance Survey data © Crown copyright and database right 2017.

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

File: \\uk.wspgroup.com\Central_Data\Projects\700173xx\70017314 - Bassingthorpe Farm\E Models and Drawings\Drawings\PDF Date Modified: 29/4/17 Drawn By: UKRHD048



Legend

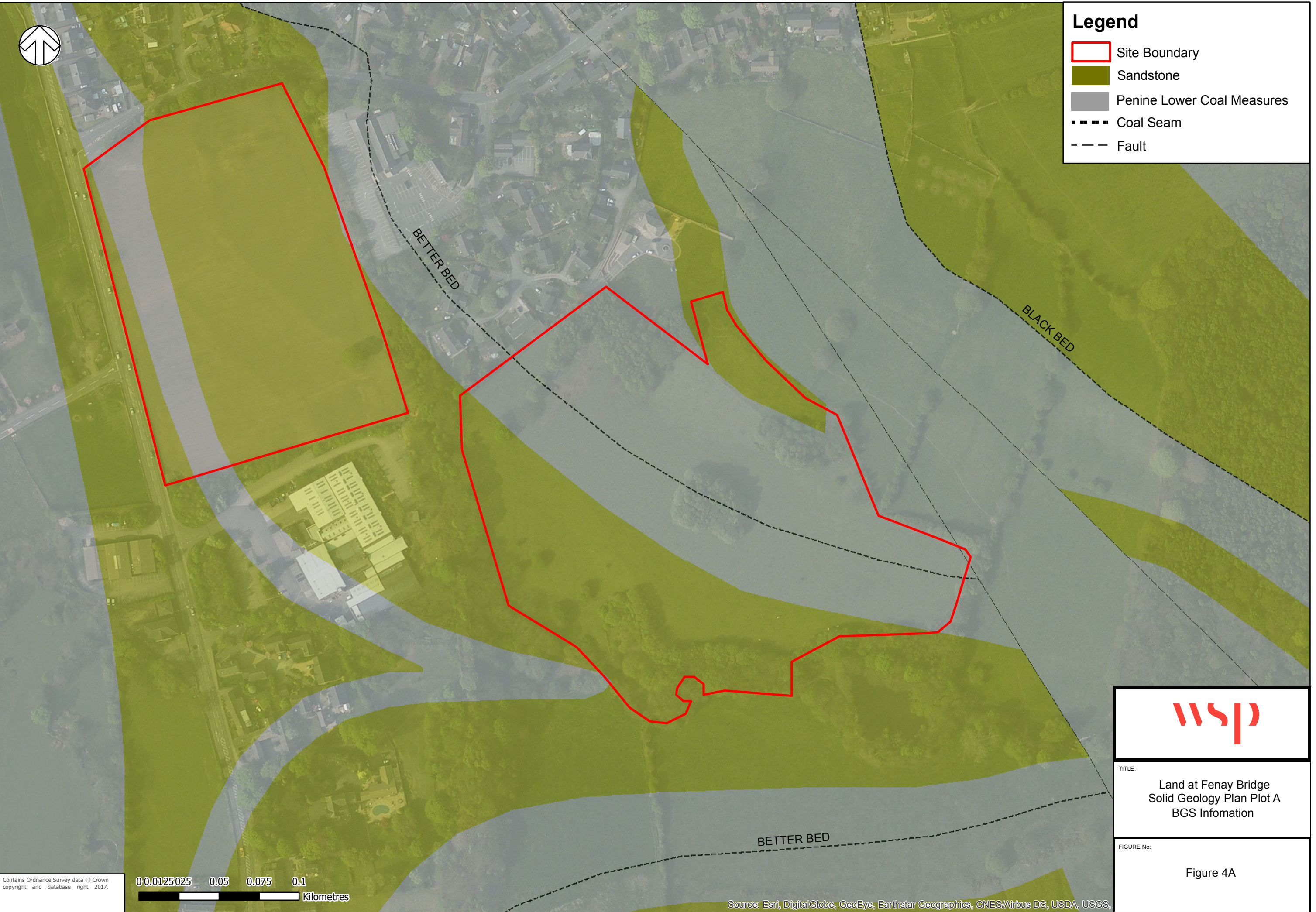
Site Boundary

Sandstone

Penine Lower Coal Measures

Coal Seam

Fault



Contains Ordnance Survey data © Crown copyright and database right 2017.

00.0125025 0.05 0.075 0.1

Kilometres

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

TITLE:
Land at Fenay Bridge
Solid Geology Plan Plot A
BGS Infomation

FIGURE No:

Figure 4A

File: \\uk.wspgroup.com\Central_Data\Projects\700173xx\70017314 - Bassingthorpe Farm\E Models and Drawings\Drawings\PDF Date Modified: 29/4/17 Drawn By: UKRH048



Legend

- Site Boundary
- Sandstone
- Penine Lower Coal Measures
- Coal Seam
- Fault



TITLE:
Land at Fenay Bridge
Solid Geology Plan Plot E
BGS Infomation

FIGURE No:
Figure 4B

Contains Ordnance Survey data © Crown copyright and database right 2017.

0 0.0125025 0.05 0.075 0.1
Kilometres

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,



Legend

Site Boundary

Sandstone

Penine Lower Coal Measures

Coal Seam

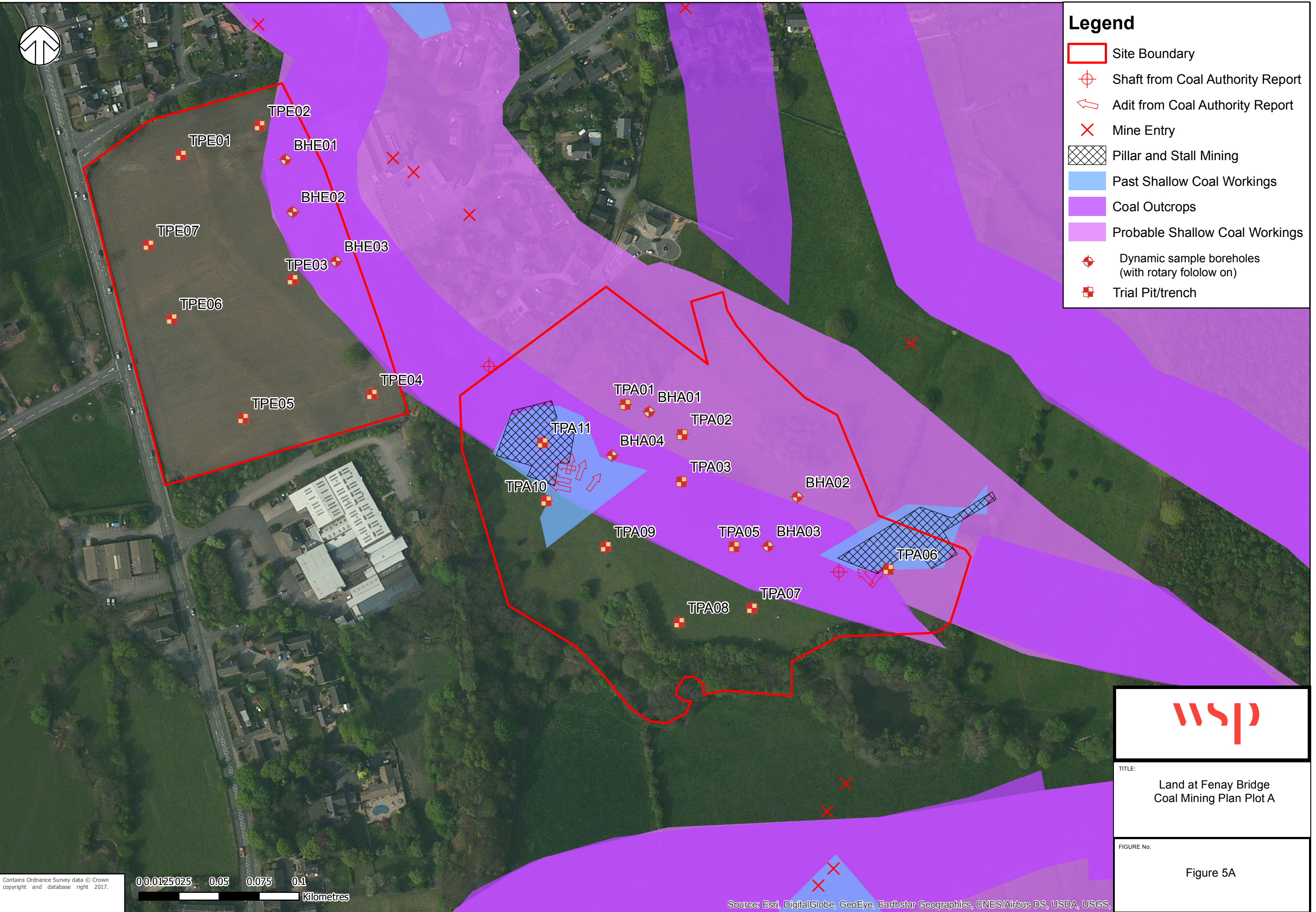
Fault



TITLE:
Land at Fenay Bridge
Solid Geology Plan Plot D
BGS Infomation

FIGURE No:
Figure 4C

File: \\uk.wspgroup.com\Central_Data\Projects\700173xx\70017314 - Bassingthorpe Farm\E Models and Drawings\Drawings\PDF Date Modified: 29/4/17 Drawn By: UKRHD048



Legend

Site Boundary

Shaft from Coal Authority Report

Adit from Coal Authority Report

Mine Entry

Pillar and Stall Mining

Past Shallow Coal Workings

Coal Outcrops

Probable Shallow Coal Workings

Dynamic sample boreholes
(with rotary folow on)

Trial Pit/trench



TITLE:
Land at Fenay Bridge
Coal Mining Plan Plot A

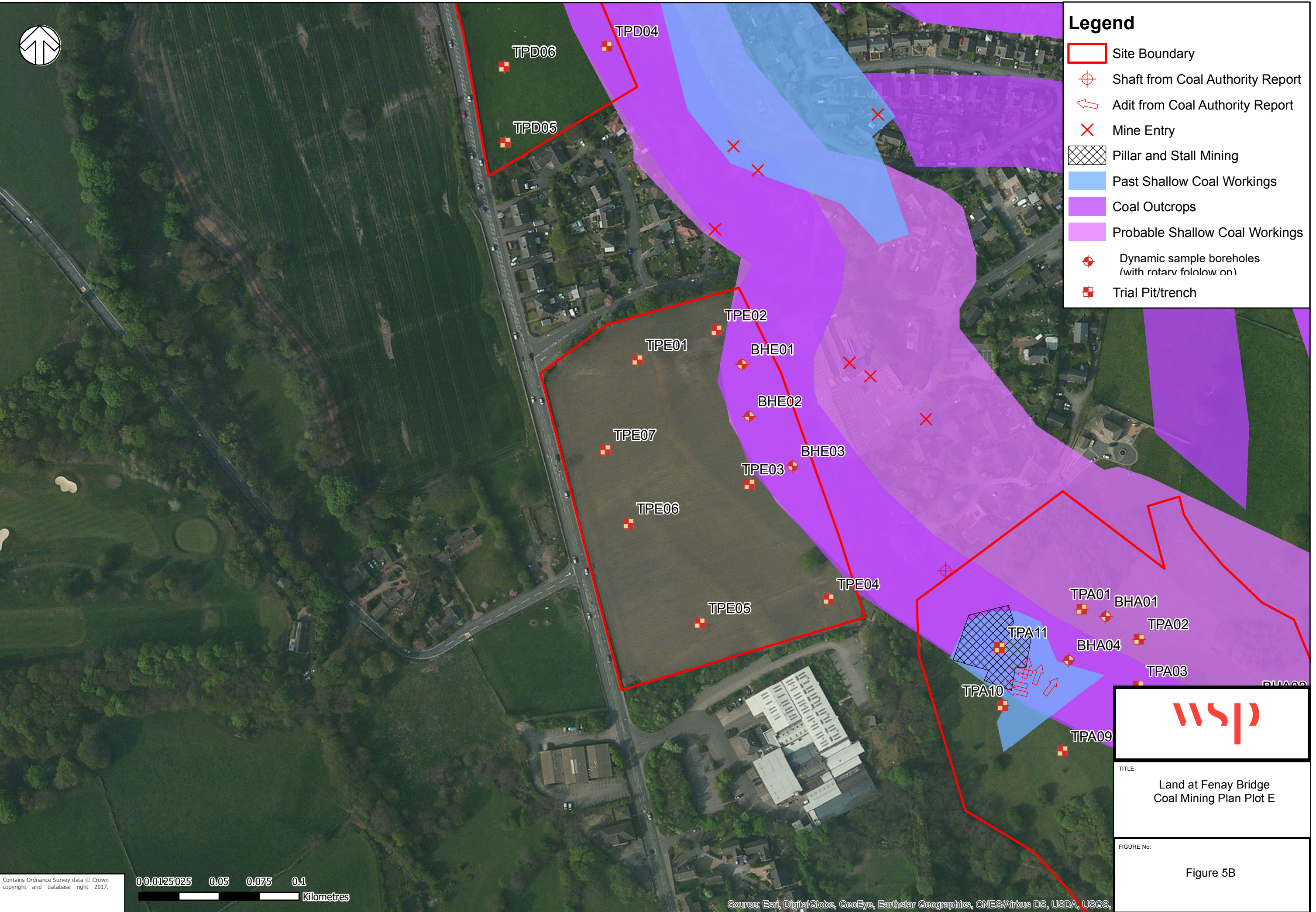
FIGURE No:
Figure 5A

Contains Ordnance Survey data © Crown
copyright and database right 2017.

0 0.0125025 0.05 0.075 0.1
Kilometres

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

File: \\uk.wspgroup.com\Central Data\Projects\700173xx\70017314 - Bassingthorpe Farm\E Models and Drawings\Drawings\PDF Date Modified: 29/4/17 Drawn By: UKRH0048



Legend

Site Boundary

Shaft from Coal Authority Report

Adit from Coal Authority Report

Mine Entry

Pillar and Stall Mining

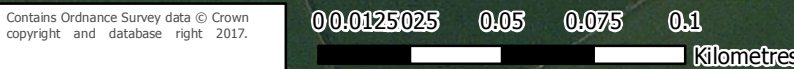
Past Shallow Coal Workings

Coal Outcrops

Probable Shallow Coal Workings

Dynamic sample boreholes (with rotary follow on)

Trial Pit/trench



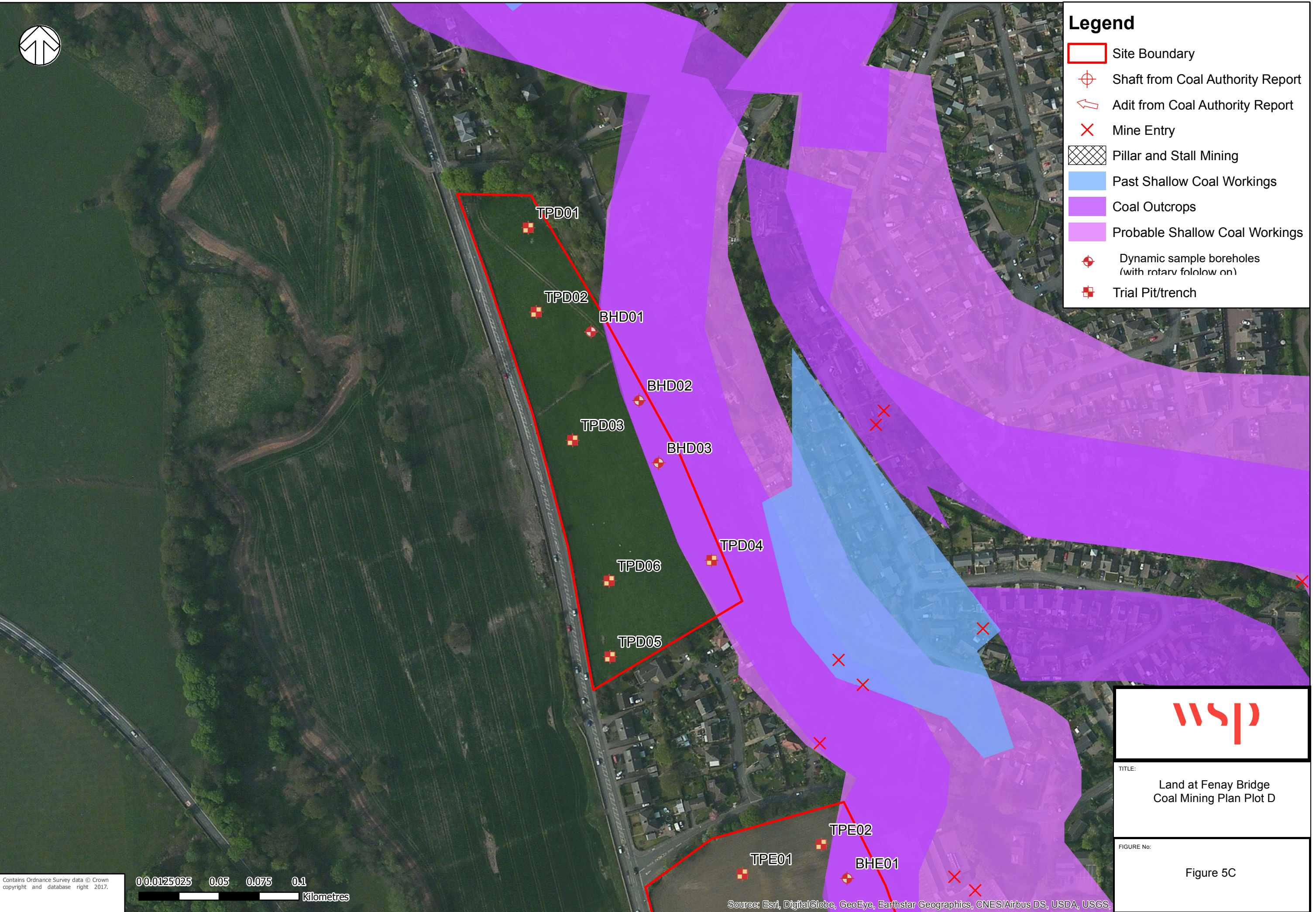
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

TITLE:
Land at Fenay Bridge
Coal Mining Plan Plot E

FIGURE No:

Figure 5B

File: \\uk.wspgroup.com\Central Data\Projects\700173xx\70017314 - Bassingthorpe Farm\E Models and Drawings\Drawings\PDF Date Modified: 29/4/17 Drawn By: UKRH048



Legend

 Site Boundary

 Shaft from Coal Authority Report

 Adit from Coal Authority Report

 Mine Entry

 Pillar and Stall Mining

 Past Shallow Coal Workings

 Coal Outcrops

 Probable Shallow Coal Workings

 Dynamic sample boreholes (with rotary follow on)

 Trial Pit/trench

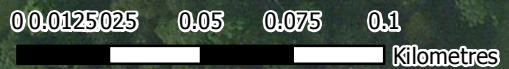


TITLE:
Land at Fenay Bridge
Coal Mining Plan Plot D

FIGURE No:

Figure 5C

Contains Ordnance Survey data © Crown copyright and database right 2017.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,



Legend

Site Boundary

Dynamic sample boreholes
(with rotary fololow on)

Trial Pit/trench



TITLE:

Land at Fenay Bridge

FIGURE No:

Exploratory Hole Location Plan

Appendix A

ENVIROCHECK



Historical Mapping Legends

Ordnance Survey County Series 1:10,560

	Gravel Pit		Sand Pit		Other Pits
	Quarry		Shingle		Orchard
	Osiers		Reeds		Marsh
	Mixed Wood		Deciduous		Brushwood
	Fir		Furze		Rough Pasture
	Arrow denotes flow of water		Trigonometrical Station		
	Site of Antiquities		Bench Mark		
	Pump, Guide Post, Signal Post		Well, Spring, Boundary Post		
	•285 Surface Level				
	Sketched Contour		Instrumental Contour		
	Main Roads		Minor Roads		
	Sunken Road		Raised Road		
	Road over Railway		Railway over River		
	Railway over Road		Level Crossing		
	Road over River or Canal		Road over Stream		
	Road over Stream				
	County Boundary (Geographical)				
	County & Civil Parish Boundary				
	Administrative County & Civil Parish Boundary				
	County Borough Boundary (England)				
	County Burgh Boundary (Scotland)				
	Rural District Boundary				
	Civil Parish Boundary				

Ordnance Survey Plan 1:10,000

	Chalk Pit, Clay Pit or Quarry		Gravel Pit
	Sand Pit		Disused Pit or Quarry
	Refuse or Slag Heap		Lake, Loch or Pond
	Dunes		Boulders
	Coniferous Trees		Non-Coniferous Trees
	Orchard		Scrub
	Bracken		Heath
	Marsh		Reeds
	Building		Glasshouse
	Sloping Masonry		Pylon
	Cutting		Embankment
	Road Under		Road Over
	Level Crossing		Foot Bridge
	Standard Gauge Multiple Track		Standard Gauge Single Track
	Siding, Tramway or Mineral Line		Narrow Gauge
	Geographical County		Administrative County, County Borough or County of City
	Municipal Borough, Urban or Rural District, Burgh or District Council		Borough, Burgh or County Constituency
	Civil Parish		
	BP, BS Boundary Post or Stone		Police Station
	Church		Post Office
	Club House		Public Convenience
	Fire Engine Station		Public House
	Foot Bridge		Signal Box
	Fountain		Spring
	Guide Post		Telephone Call Box
	Mile Post		Telephone Call Post
	Mile Stone		Well

1:10,000 Raster Mapping

	Gravel Pit		Refuse tip or slag heap
	Rock		Rock (scattered)
	Boulders		Boulders (scattered)
	Shingle		Mud
	Sand		Sand Pit
	Slopes		Top of cliff
	General detail		Underground detail
	Overhead detail		Narrow gauge railway
	Multi-track railway		Single track railway
	County boundary (England only)		Civil, parish or community boundary
	District, Unitary, Metropolitan, London Borough boundary		Constituency boundary
	Area of wooded vegetation		Non-coniferous trees
	Non-coniferous trees (scattered)		Coniferous trees
	Coniferous trees (scattered)		Positioned tree
	Orchard		Coppice or Osiers
	Rough Grassland		Heath
	Scrub		Marsh, Salt Marsh or Reeds
	Water feature		Flow arrows
	Mean high water (springs)		Mean low water (springs)
	Telephone line (where shown)		Electricity transmission line (with poles)
	Bench mark (where shown)		Triangulation station
	Point feature (e.g. Guide Post or Mile Stone)		Pylon, flare stack or lighting tower
	Site of (antiquity)		Glasshouse
	General Building		Important Building

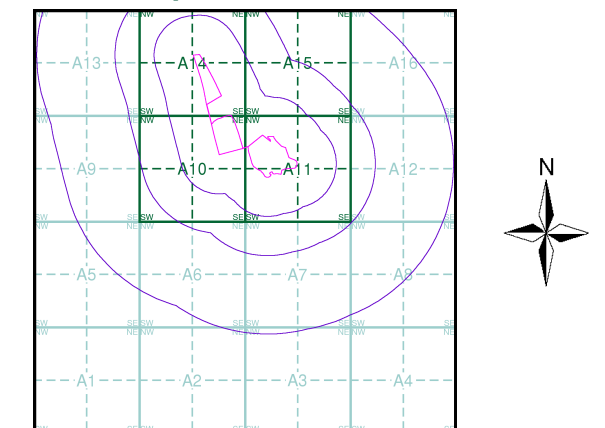
Envirocheck®

LANDMARK INFORMATION GROUP®

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Yorkshire	1:10,560	1854	3
Yorkshire	1:10,560	1894	4
Yorkshire	1:10,560	1908	5
Yorkshire	1:10,560	1930	6
Yorkshire	1:10,560	1933	7
Yorkshire	1:10,560	1938	8
Yorkshire	1:10,560	1948	9
Ordnance Survey Plan	1:10,000	1955 - 1956	10
Ordnance Survey Plan	1:10,000	1965 - 1968	11
Ordnance Survey Plan	1:10,000	1976 - 1979	12
Ordnance Survey Plan	1:10,000	1980 - 1989	13
Batley	1:10,000	1983	14
Huddersfield	1:10,000	1984	15
Ordnance Survey Plan	1:10,000	1992 - 1993	16
10K Raster Mapping	1:10,000	2000	17
10K Raster Mapping	1:10,000	2006	18
VectorMap Local	1:10,000	2017	19

Historical Map - Slice A



Order Details

Order Number: 132631275_1_1
Customer Ref: 70035780
National Grid Reference: 418870, 414330
Slice: A
Site Area (Ha): 10.7
Search Buffer (m): 1000

Site Details

Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS

Landmark®
INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Russian Military Mapping Legends

1:5,000 and 1:10,000 mapping

a. Not drawn to scale b. Drawn to scale

Government and Administrative Buildings Military and Industrial Buildings

Military and Communication Areas Subway Entrance

Fireproof Building Prominent Fireproof Building

Non-fireproof Building Non-fireproof Building (non-dwelling)

Factory, mill, and flour mill, with chimneys Factory, mill, and flour mill, without chimneys

Power Station, drawn to scale Hydroelectric Power Station

Radio Station, drawn to scale Telephone Station, drawn to scale

Abandoned Open-pit Mine or Quarry Open-pit Salt Mine

Pit Oil Deposit or Well Oil Seepage

Tailings Pile Fuel Storage Tanks Natural Gas Tank

Bench Mark Drill Hole Burial Mound Triangulation Point on Burial Mound

Single-track Railroad Double-track Railroad and Station Building

Coniferous Forest Deciduous Forest Mixed Forest

Lawns Citrus Orchard Wet Ground Scattered Vegetation

243.8 Values for prominent elevations

186.0 Numbers for spot elevations, depth soundings, contour lines, etc.

0.2 Velocity of the current, width of river bed, depth of river

180/12 Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the diameter of trees

Russian Alphabet (For reference and phonetic interpretation of map text)

А а (A)	З з (Z)	П п (P)	Ч ч (CH)
Б б (B)	И и (I)	Р р (R)	Ш ш (SH)
В в (V)	Й й (Y)	С с (S)	Щ щ (SHCH)
Г г (G)	К к (K)	Т т (T)	Ъ (-)
Д д (D)	Л л (L)	У у (U)	Ы (Y)
Е е (E)	М м (M)	Ф ф (F)	Ь (')
Ё ё (YO)	Н н (N)	Х х (KH)	Э э (E)
Ж ж (ZH)	О о (O)	Ц ц (TS)	Ю ю (YU or IU)
			Я я (YA or IA)

1:25,000 mapping

a. Not drawn to scale b. Drawn to scale

Government and Administrative Buildings Military and Industrial Buildings

Military and Communication Areas Subway Entrance

Partly Demolished Buildings Demolished Buildings

Built-Up Area with Fireproof Buildings Predominant Built-Up Area with Non-Fireproof Buildings Predominant

Individual Fireproof Building Prominent Industrial Building

Individual Dwelling, Fireproof Ruins of an Individual Dwelling

Factory or Mill Chimney Factory or Mill with Chimney Factory or Mill without Chimney Mine or Open Pit Mine

Operating Shaft or Mine Non-Operating Shaft or Mine Salt Mine Tailings Pile

Pit Stone Quarry Gas Pump or Service Station Fuel Storage or Natural Gas Tank

Oil or Natural Gas Derrick Small Hydroelectric Power Station Power Station Transformer Station

Cemetery Burial Mound (height in metres) Triangulation Point on Burial Mound Triangulation Point

Bench Mark Bench Mark (monumented) Telegraph Office Telephone Station

Radio Station Radio Tower Airfield or Seaplane Base Landing Strip

Telegraph/Telephone Lines Main Highway Highway under Construction Improved Dirt Road (former truck road)

Double-track Railroad with First Class Station Dismantled Railroad Railroad Under Construction

Shore Embankment River or Ditch with Embankment Direction and velocity of current Water Gauge Water Level Mark

Well Water Reservoir or Rain Water Pit Spring Isobath with value

Heavy (Index) Contour Line Contour Line and Value Half Contour Line Spot Elevation Value

Coniferous Deciduous Mixed Scrub

Key to Numbers on Mapping

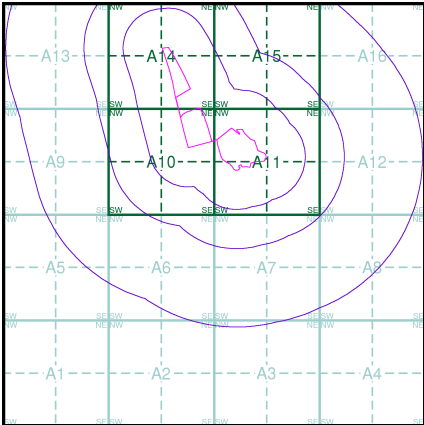
Envirocheck®

LANDMARK INFORMATION GROUP®

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Yorkshire	1:10,560	1854	3
Yorkshire	1:10,560	1894	4
Yorkshire	1:10,560	1908	5
Yorkshire	1:10,560	1930	6
Yorkshire	1:10,560	1933	7
Yorkshire	1:10,560	1938	8
Yorkshire	1:10,560	1948	9
Ordnance Survey Plan	1:10,000	1955 - 1956	10
Ordnance Survey Plan	1:10,000	1965 - 1968	11
Ordnance Survey Plan	1:10,000	1976 - 1979	12
Ordnance Survey Plan	1:10,000	1980 - 1989	13
Batley	1:10,000	1983	14
Huddersfield	1:10,000	1984	15
Ordnance Survey Plan	1:10,000	1992 - 1993	16
10K Raster Mapping	1:10,000	2000	17
10K Raster Mapping	1:10,000	2006	18
VectorMap Local	1:10,000	2017	19

Russian Map - Slice A



Order Details

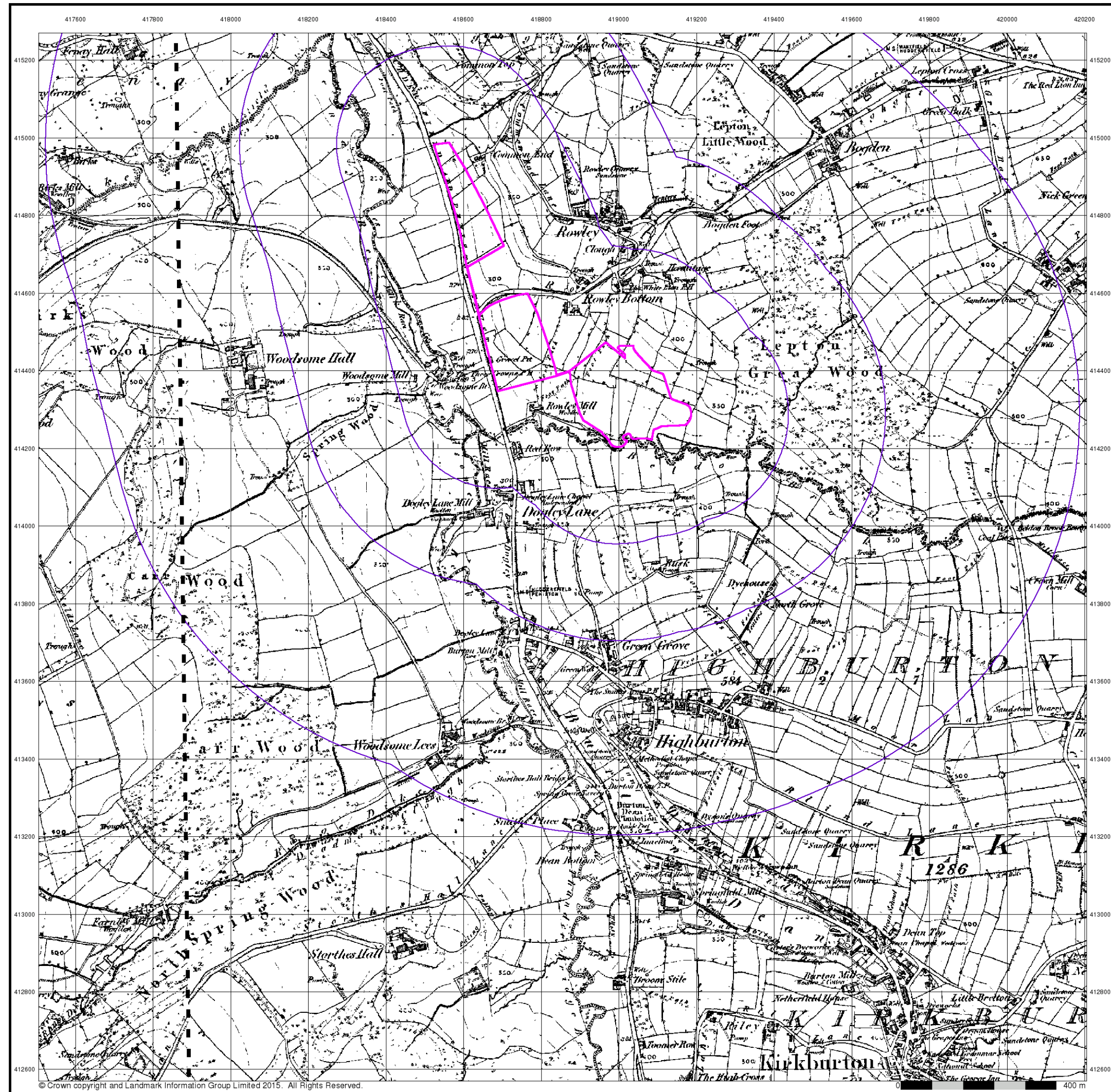
Order Number: 132631275_1_1
Customer Ref: 70035780
National Grid Reference: 418870, 414330
Slice: A
Site Area (Ha): 10.7
Search Buffer (m): 1000

Site Details

Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS

Landmark®
INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



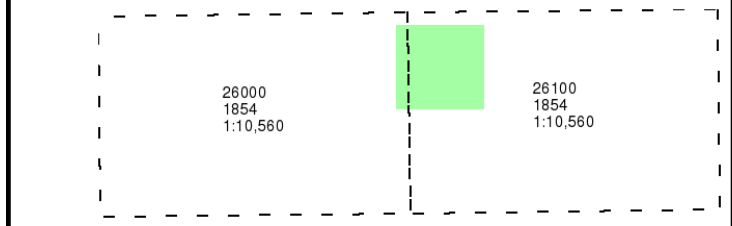
Yorkshire

Published 1854

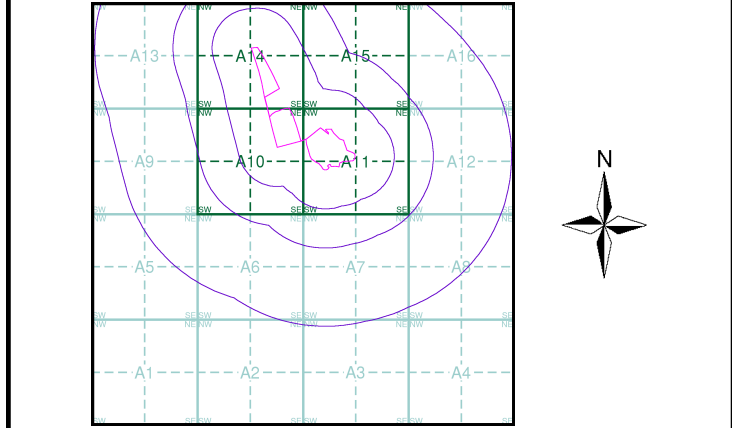
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number: 132631275_1_1

Customer Ref: 70035780

National Grid Reference: 418870, 414330

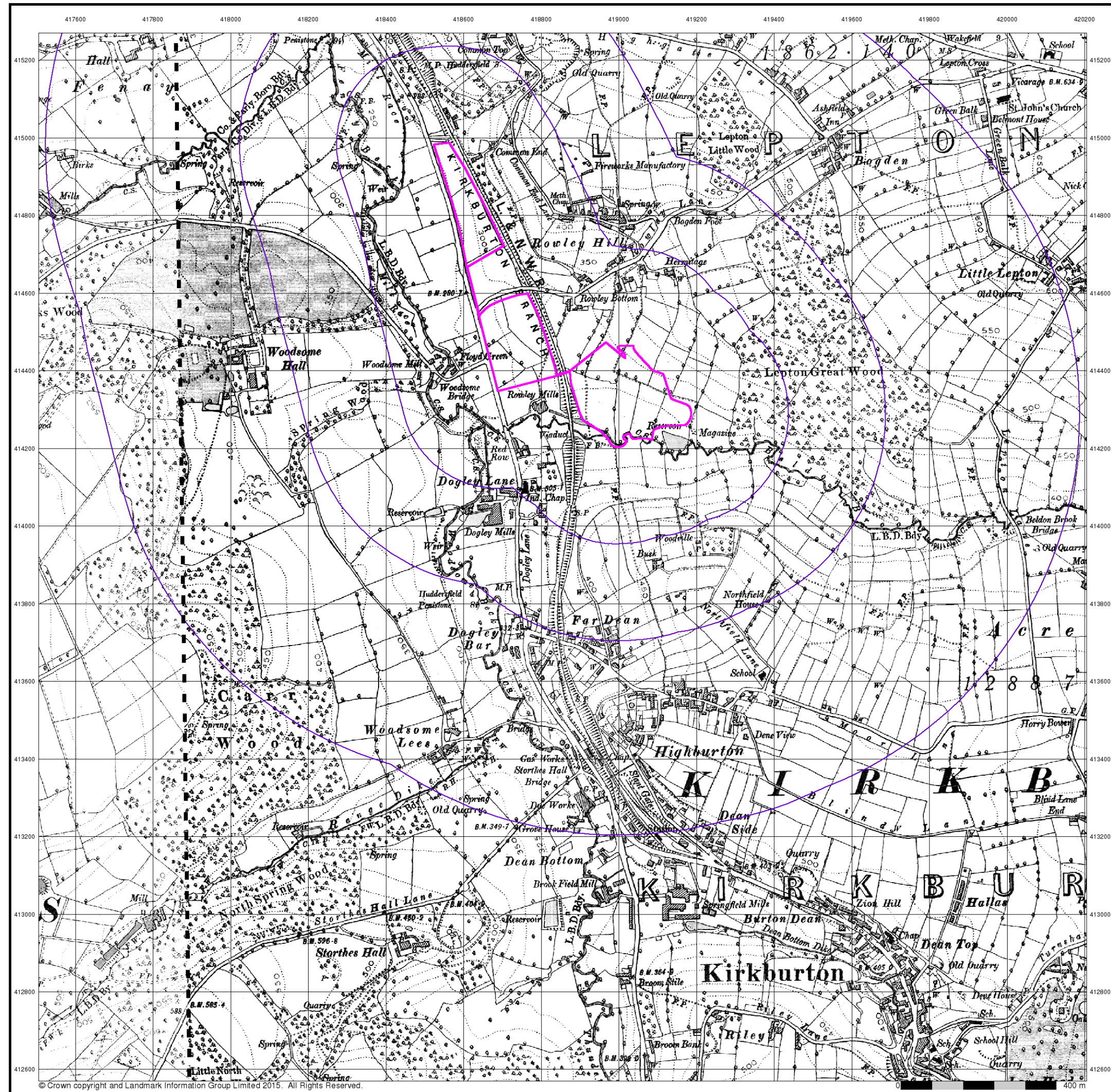
Slice: A

Site Area (Ha): 10.7

Search Buffer (m): 1000

Site Details

Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS



Envirocheck®

LANDMARK INFORMATION GROUP®

Yorkshire

Published 1894

Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

260NE
1894
1:10,560

261NW
1894
1:10,560

Historical Map - Slice A

Order Details

Order Number:	132631275_1_1
Customer Ref:	70035780
National Grid Reference:	418870, 414330
Slice:	A
Site Area (Ha):	10.7
Search Buffer (m):	1000

Site Details

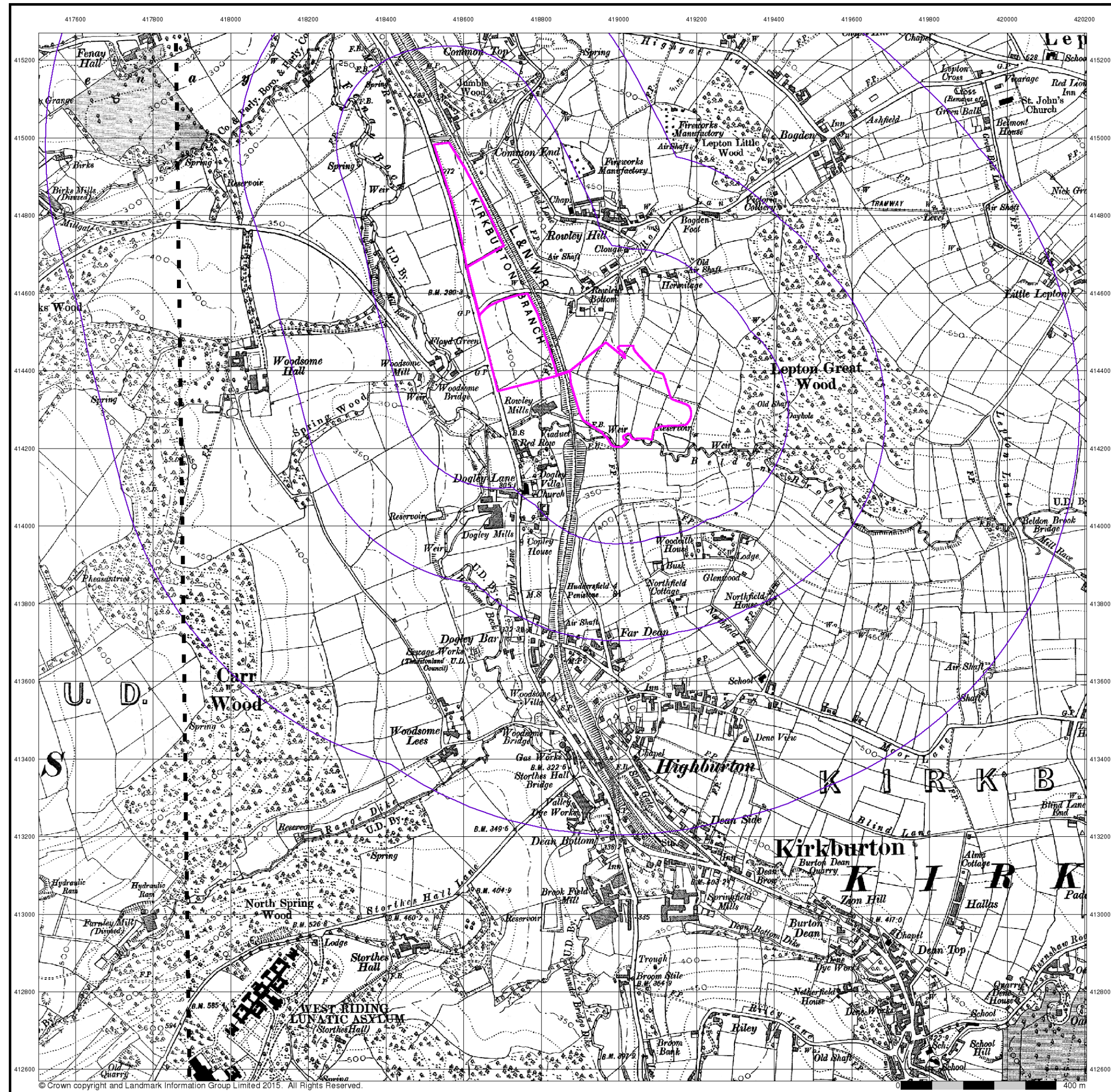
Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS

Landmark®

INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

A Landmark Information Group Service v50.0 18-Jul-2017 Page 4 of 19



Envirocheck[®]

LANDMARK INFORMATION GROUP[®]

Yorkshire

Published 1908

Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

260NE 1908 1:10,560	261NW 1908 1:10,560
---------------------------	---------------------------

Historical Map - Slice A

Order Details

Order Number:	132631275_1_1
Customer Ref:	70035780
National Grid Reference:	418870, 414330
Slice:	A
Site Area (Ha):	10.7
Search Buffer (m):	1000

Site Details

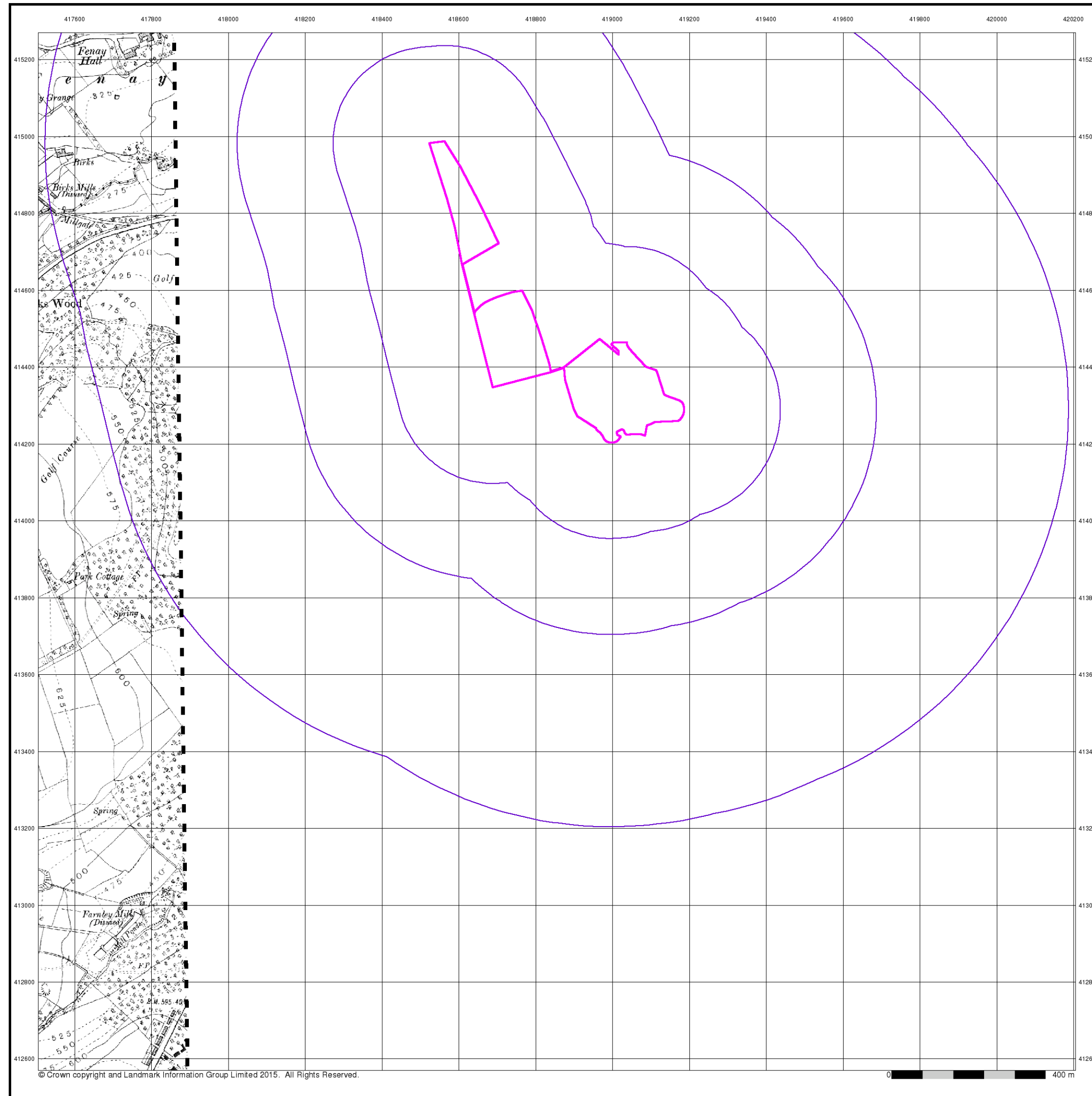
Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS

Landmark[®]

INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

A Landmark Information Group Service v50.0 18-Jul-2017 Page 5 of 19



Yorkshire

Published 1930

Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

260NE

1930

1:10,560

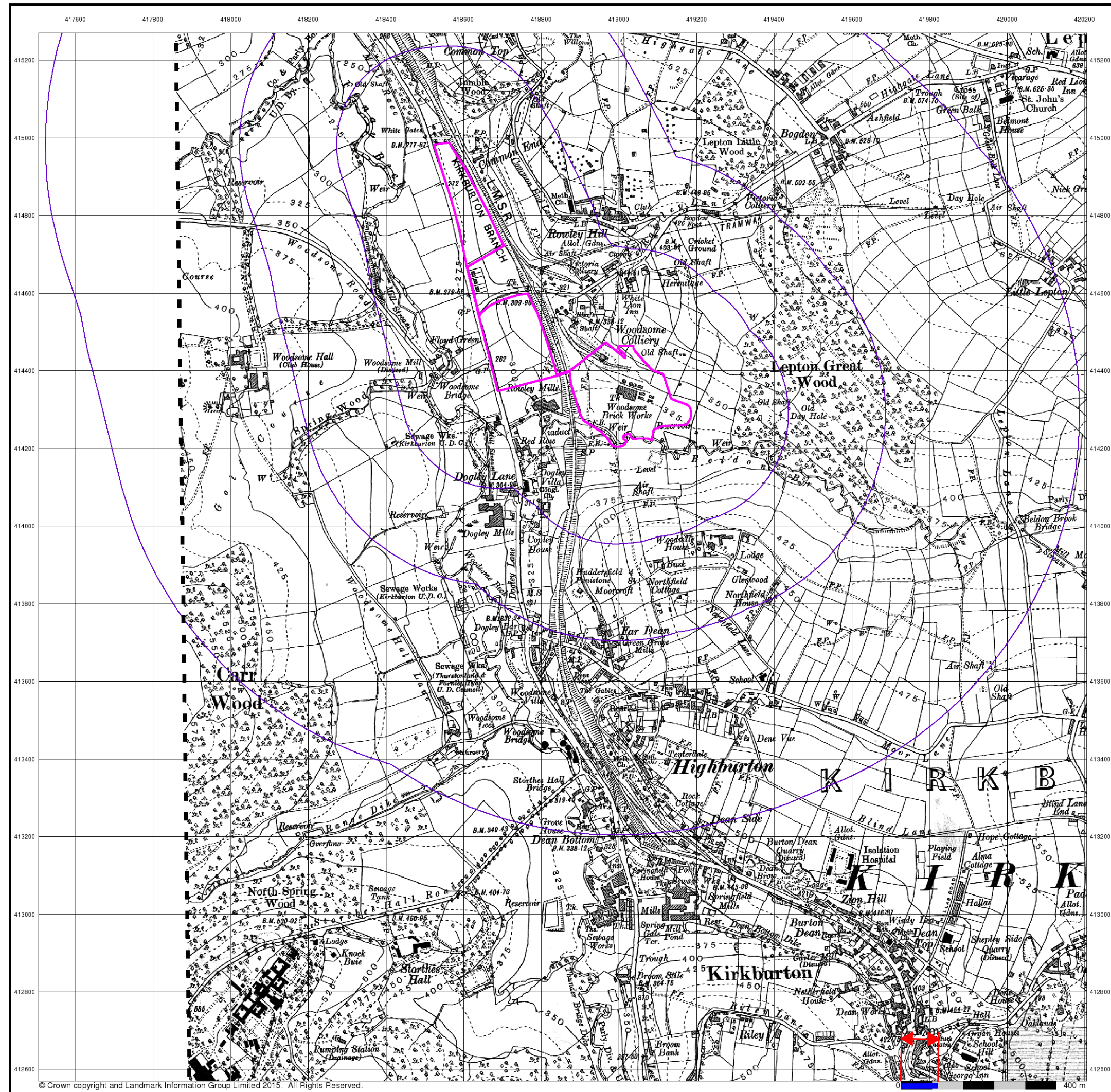
Historical Map - Slice A

Order Details

Order Number:	132631275_1_1
Customer Ref:	70035780
National Grid Reference:	418870, 414330
Slice:	A
Site Area (Ha):	10.7
Search Buffer (m):	1000

Site Details

Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS



Envirocheck®

LANDMARK INFORMATION GROUP®

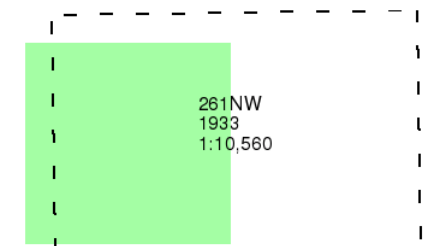
Yorkshire

Published 1933

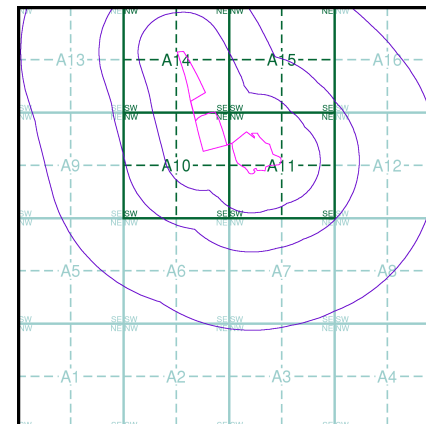
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

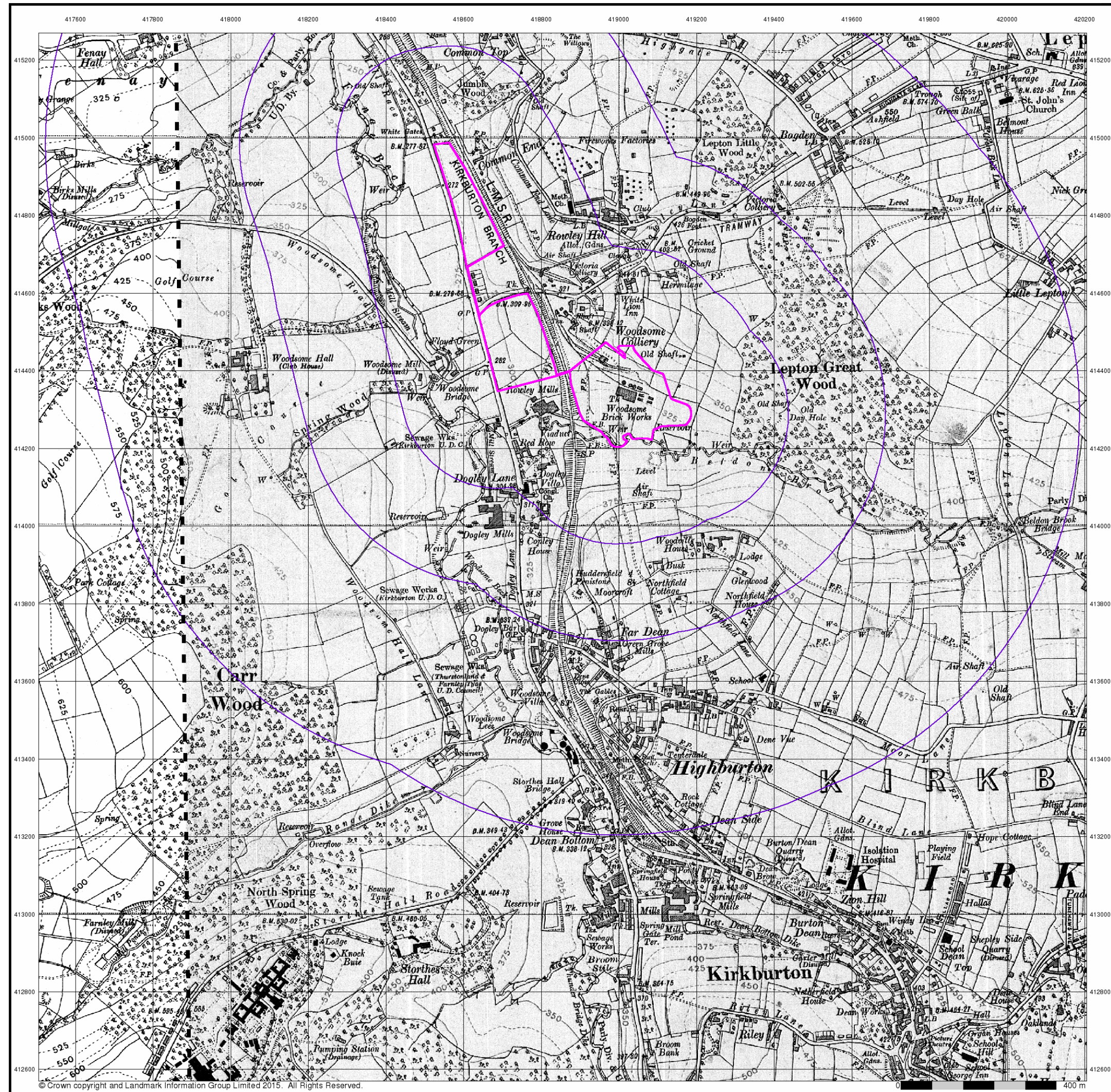
Order Number: 132631275_1_1
Customer Ref: 70035780
National Grid Reference: 418870, 414330
Slice: A
Site Area (Ha): 10.7
Search Buffer (m): 1000

Site Details

Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS

Landmark®
LANDMARK INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

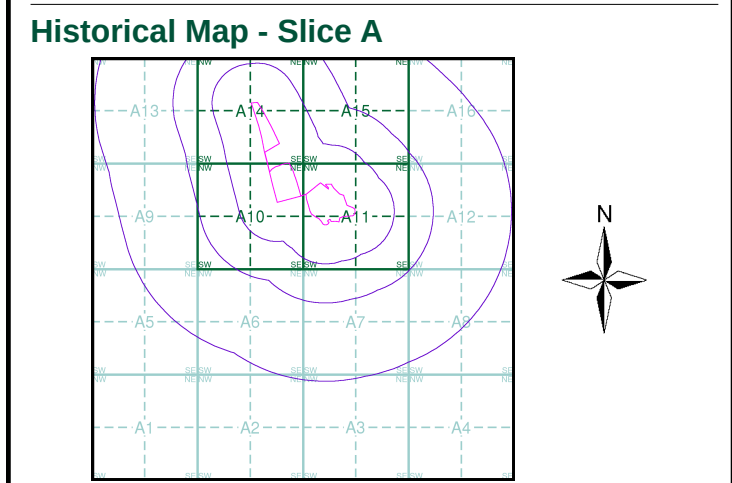
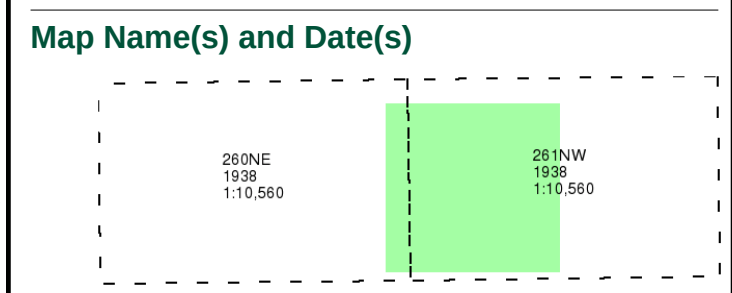


Yorkshire

Published 1938

Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

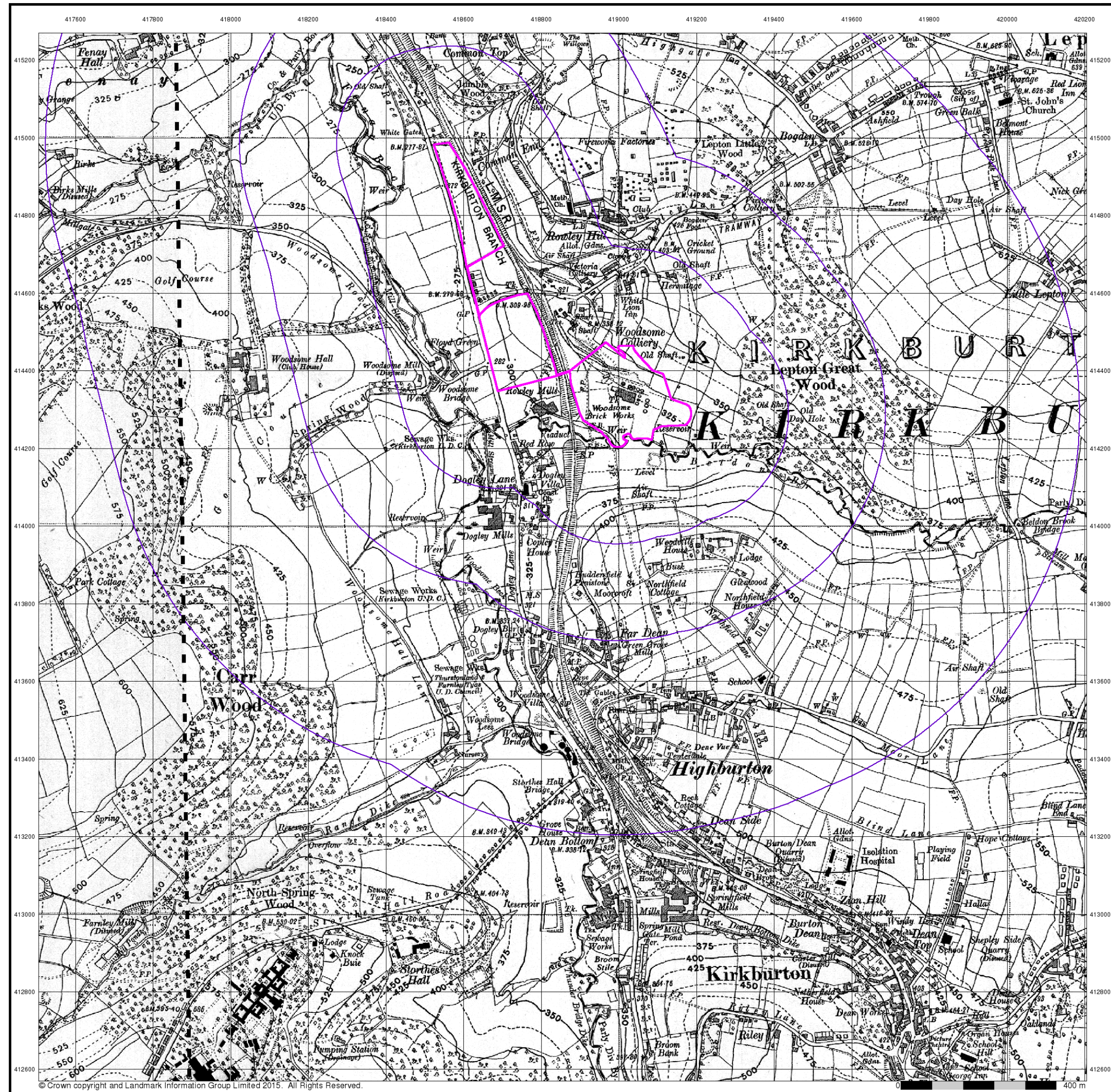


Order Details

Order Number:	132631275_1_1
Customer Ref:	70035780
National Grid Reference:	418870, 414330
Slice:	A
Site Area (Ha):	10.7
Search Buffer (m):	1000

Site Details

Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS



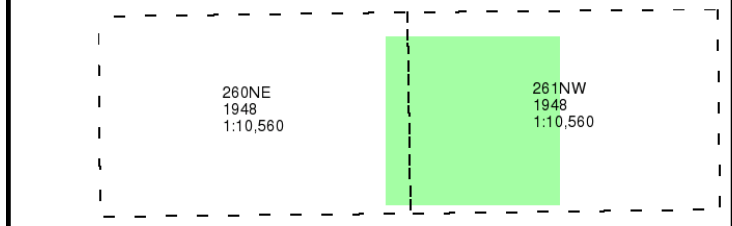
Yorkshire

Published 1948

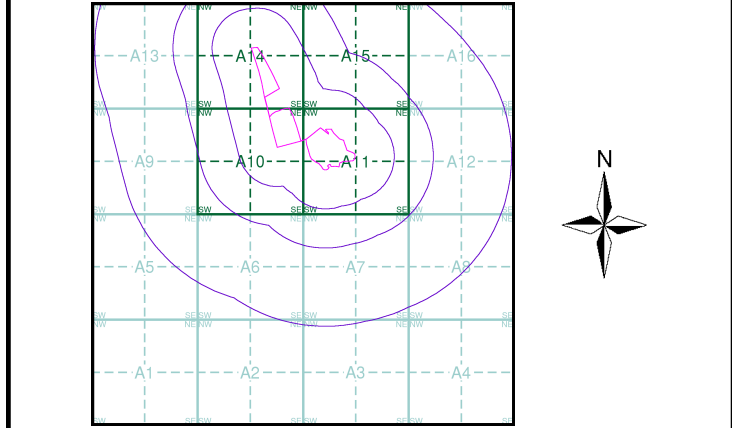
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



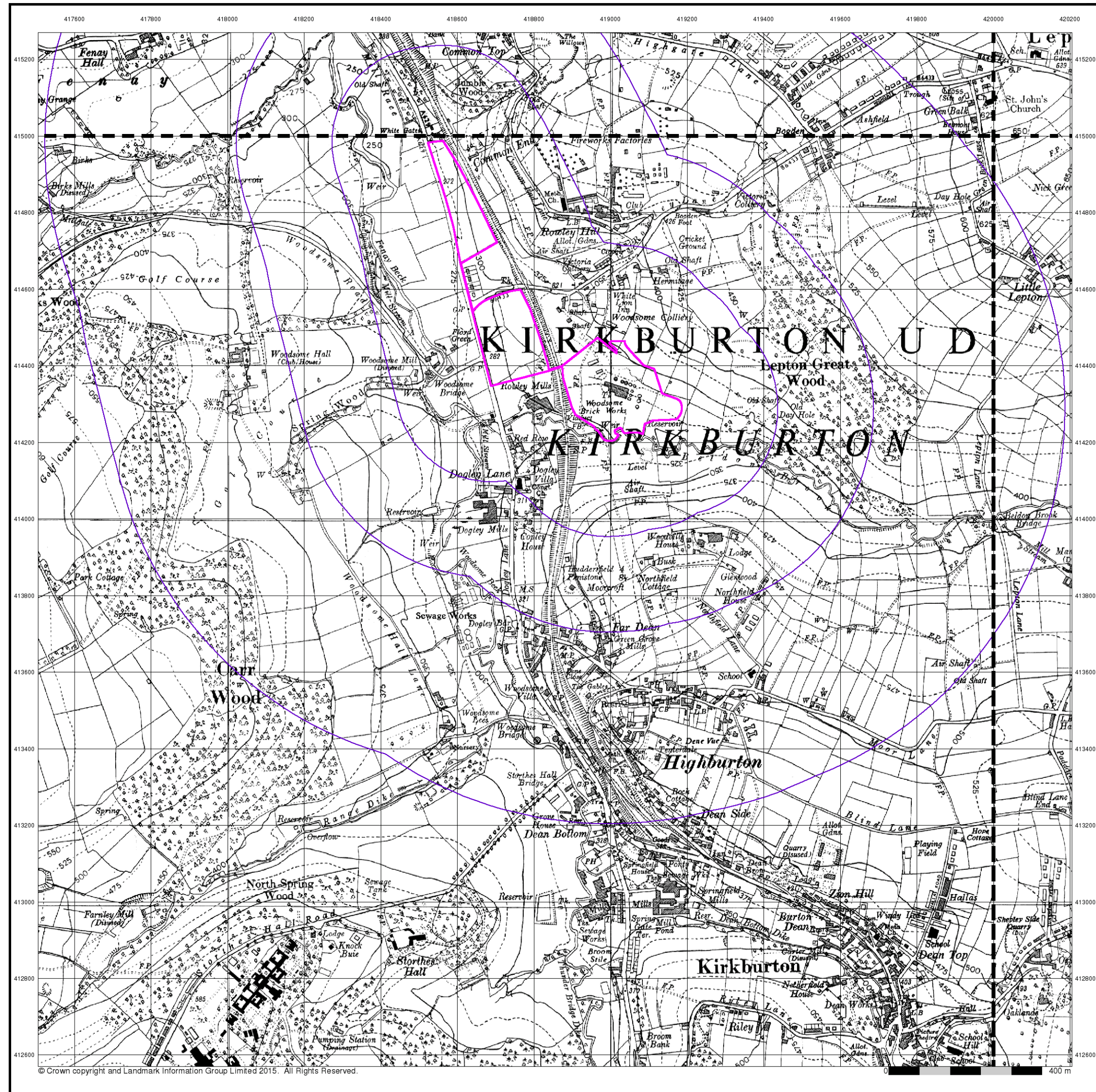
Historical Map - Slice A



Order Details	
Order Number:	132631275_1_1
Customer Ref:	70035780
National Grid Reference:	418870, 414330
Slice:	A
Site Area (Ha):	10.7
Search Buffer (m):	1000

Site Details

Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS



Envirocheck®

LANDMARK INFORMATION GROUP®

Ordnance Survey Plan

Published 1955 - 1956

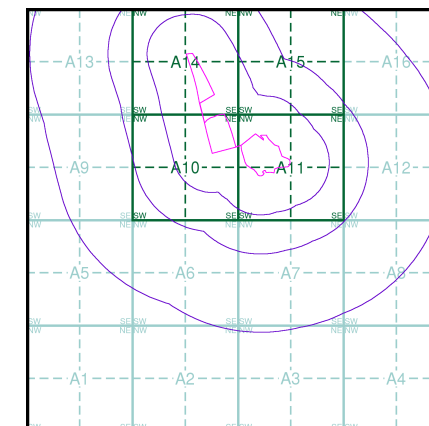
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SE11NE	SE21NW
1956	1955
1:10,560	1:10,560
SE11SE	SE21SW
1955	1955
1:10,560	1:10,560

Historical Map - Slice A



Order Details

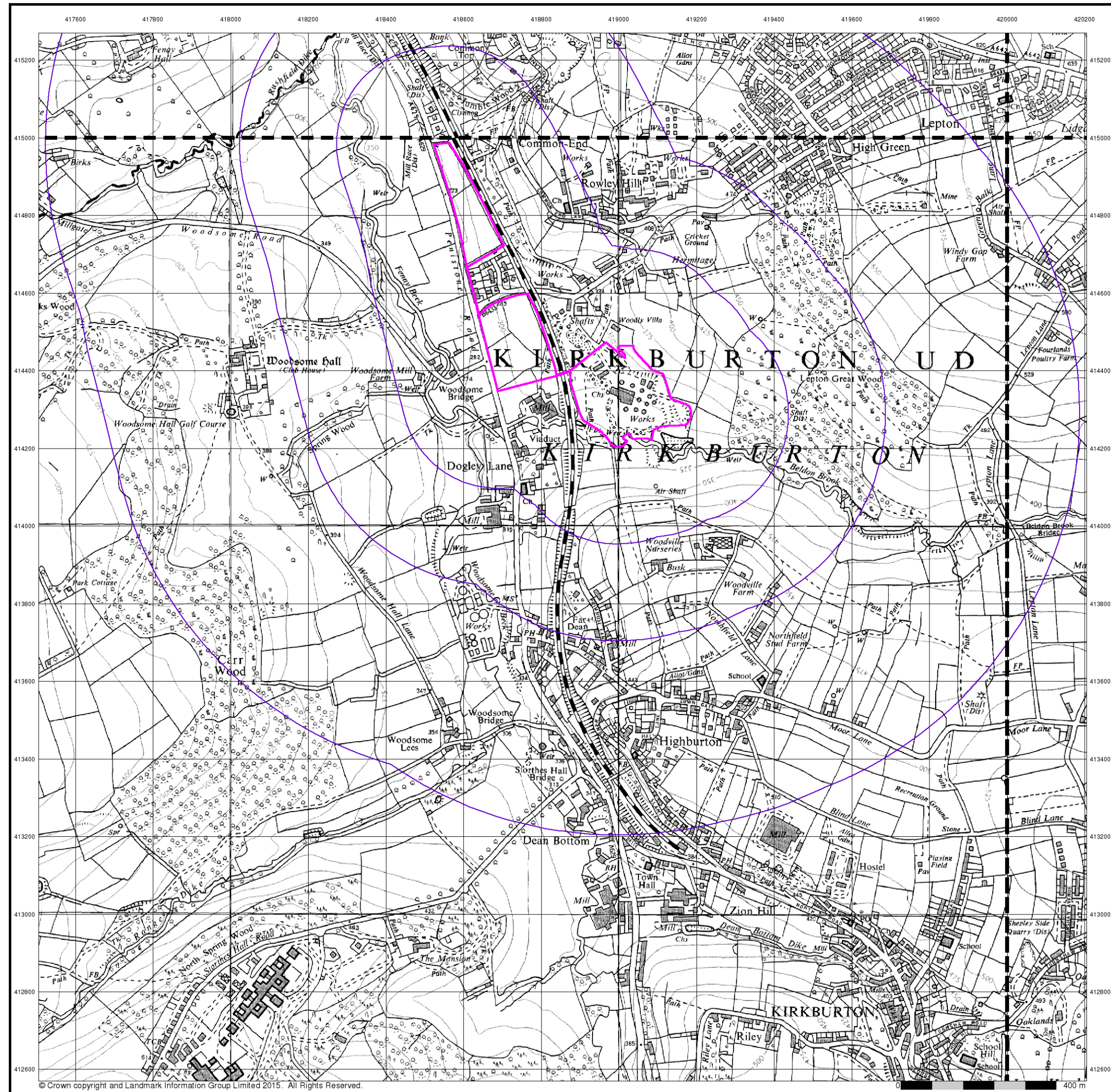
Order Number: 132631275_1_1
Customer Ref: 70035780
National Grid Reference: 418870, 414330
Slice: A
Site Area (Ha): 10.7
Search Buffer (m): 1000

Site Details

Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS

Landmark®
INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Envirocheck®

LANDMARK INFORMATION GROUP®

Ordnance Survey Plan

Published 1965 - 1968

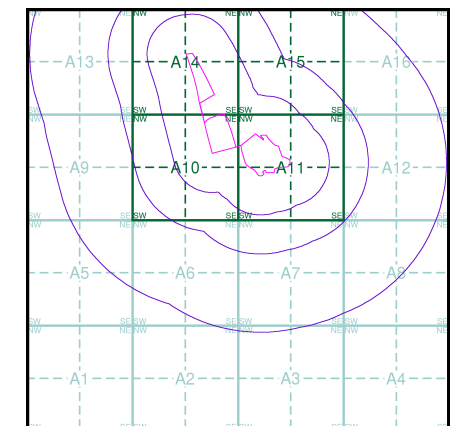
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SE11NE	SE21NW
1965	1966
1:10,560	1:10,560
SE11SE	SE21SW
1968	1967
1:10,560	1:10,560

Historical Map - Slice A



Order Details

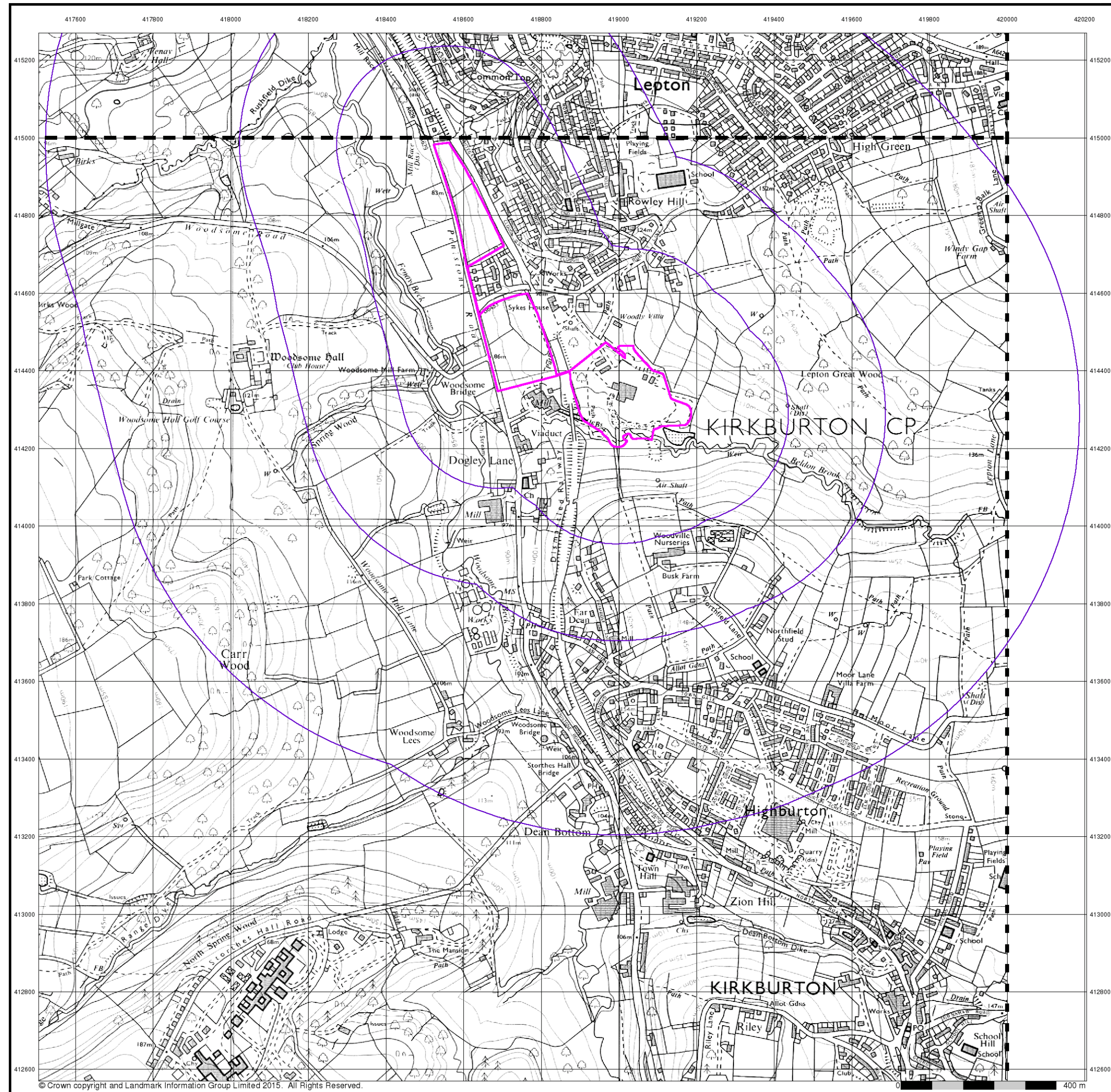
Order Number: 132631275_1_1
Customer Ref: 70035780
National Grid Reference: 418870, 414330
Slice: A
Site Area (Ha): 10.7
Search Buffer (m): 1000

Site Details

Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS

Landmark®
LANDMARK INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Ordnance Survey Plan

Published 1976 - 1979

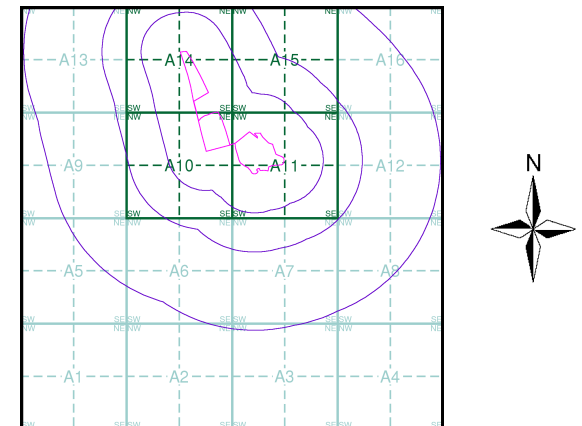
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SE11NE	1976	1:10,000
SE11SE	1979	1:10,000

Historical Map - Slice A



Order Details

Order Number: 132631275_1_1

Customer Ref: 70035780

National Grid Reference: 418870, 414330

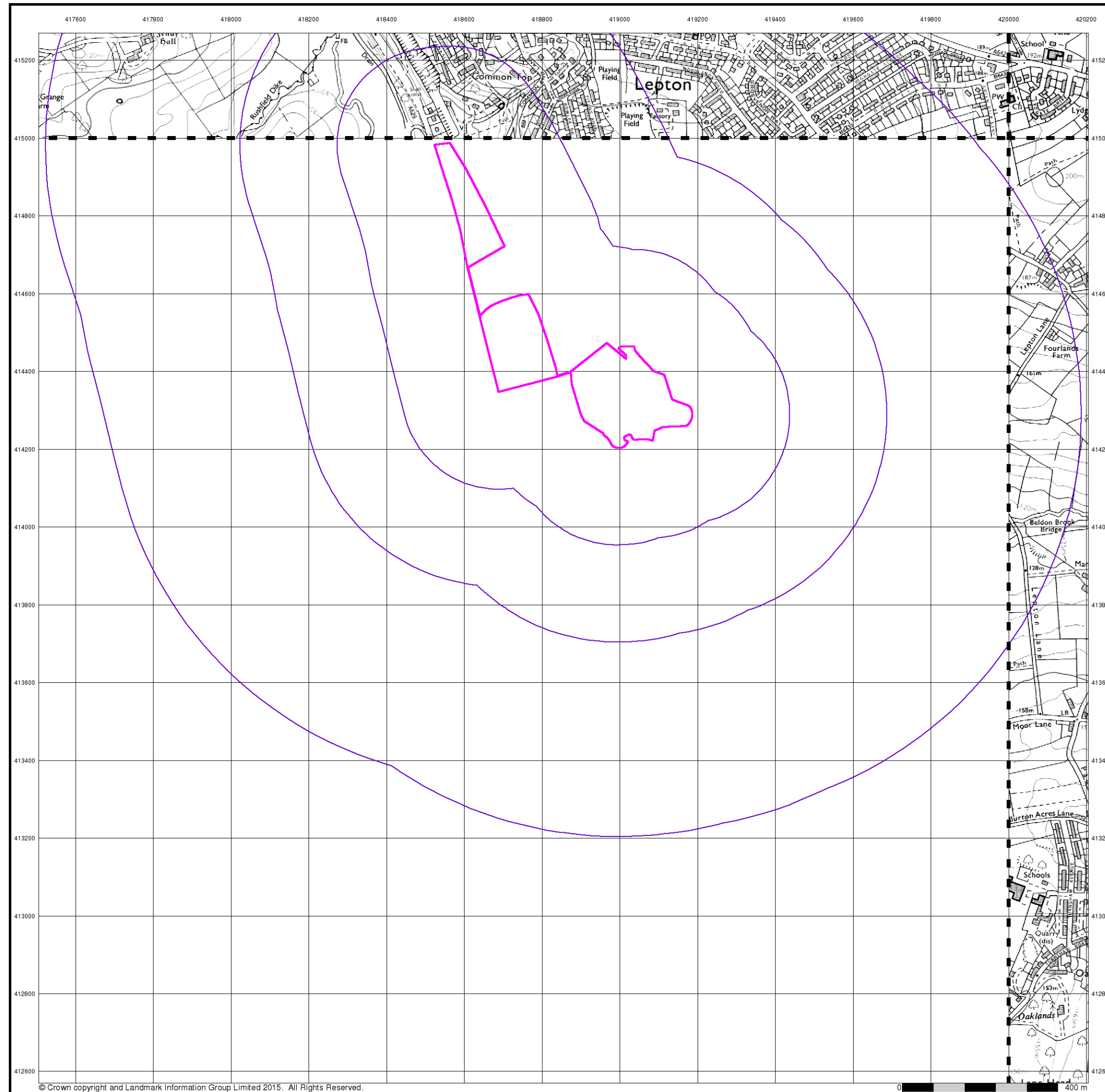
Slice: A

Site Area (Ha): 10.7

Search Buffer (m): 1000

Site Details

Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS



Ordnance Survey Plan

Published 1980 - 1989

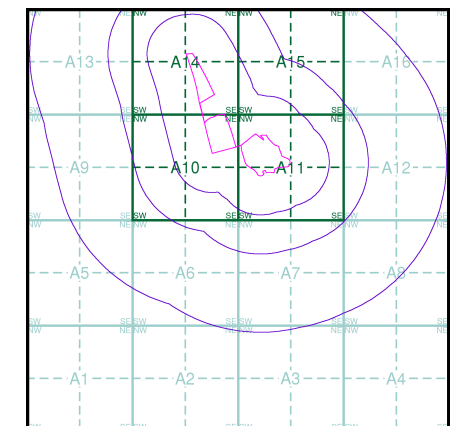
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SE11NE 1989 1:10,000	SE21NW 1983 1:10,000
	SE21SW 1980 1:10,000

Historical Map - Slice A

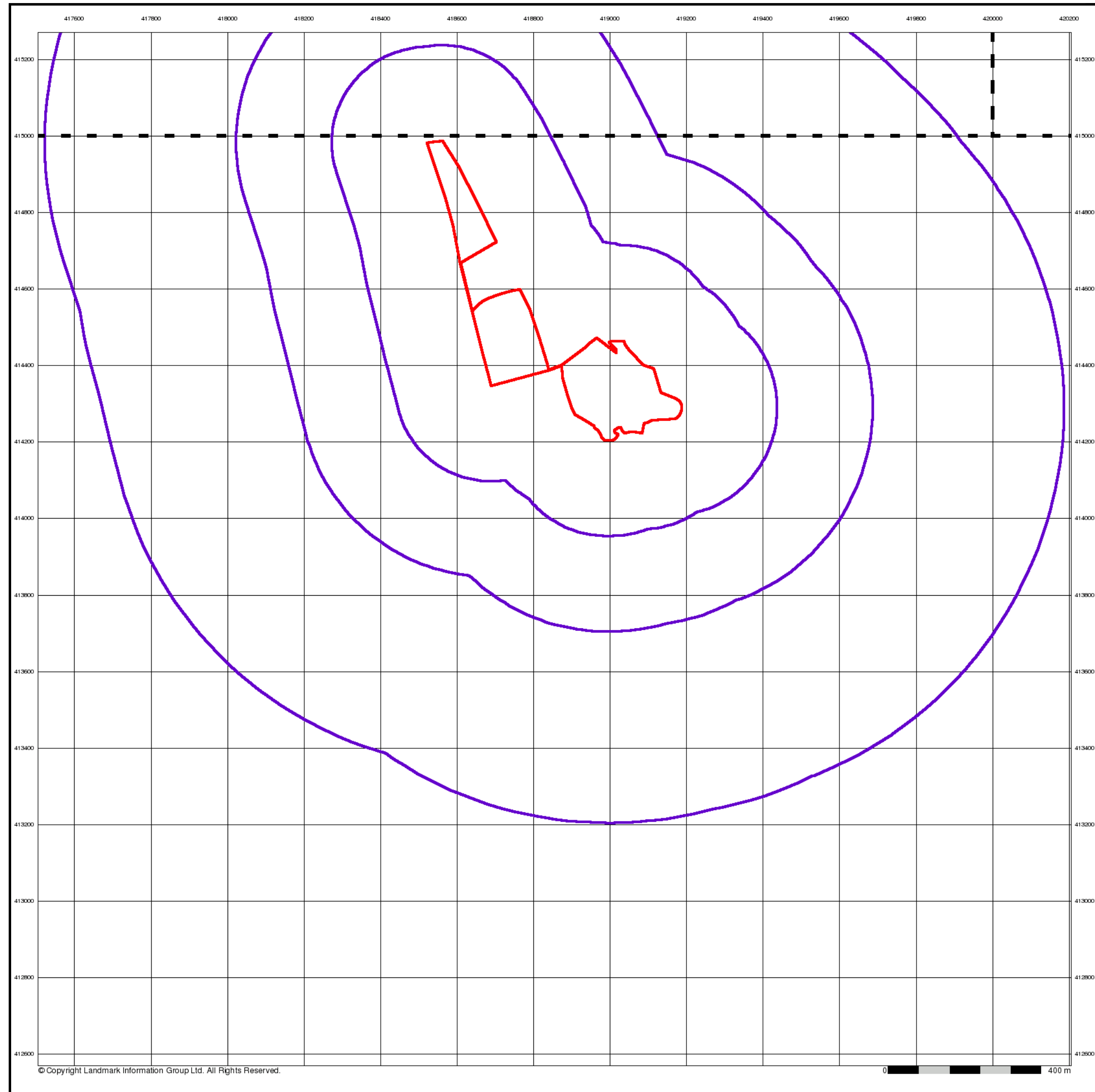


Order Details

Order Number: 132631275_1_1
Customer Ref: 70035780
National Grid Reference: 418870, 414330
Slice: A
Site Area (Ha): 10.7
Search Buffer (m): 1000

Site Details

Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS



Batley

Published 1983

Source map scale - 1:10,000

These maps were produced by the Russian military during the Cold War between 1950 and 1997, and cover 103 towns and cities throughout the U.K. The maps are produced at 1:25,000, 1:10,000 and 1:5,000 scale, and show detailed land use, with colour-coded areas for development, green areas, and non-developed areas. Buildings are coloured black and important building uses (such as hospitals, post offices, factories etc.) are numbered, with a numbered key describing their use.

They were produced by the Russians for the benefit of navigation, as well as strategic military sites and transport hubs, for use if they were to have invaded the U.K. The detailed information provided indicates that the areas were surveyed using land-based personnel, on the ground, in the cities that are mapped.

Map Name(s) and Date(s)

SE11NE 1983 1:10,000	SE21NW 1983 1:10,000
----------------------------	----------------------------

Russian Map - Slice A

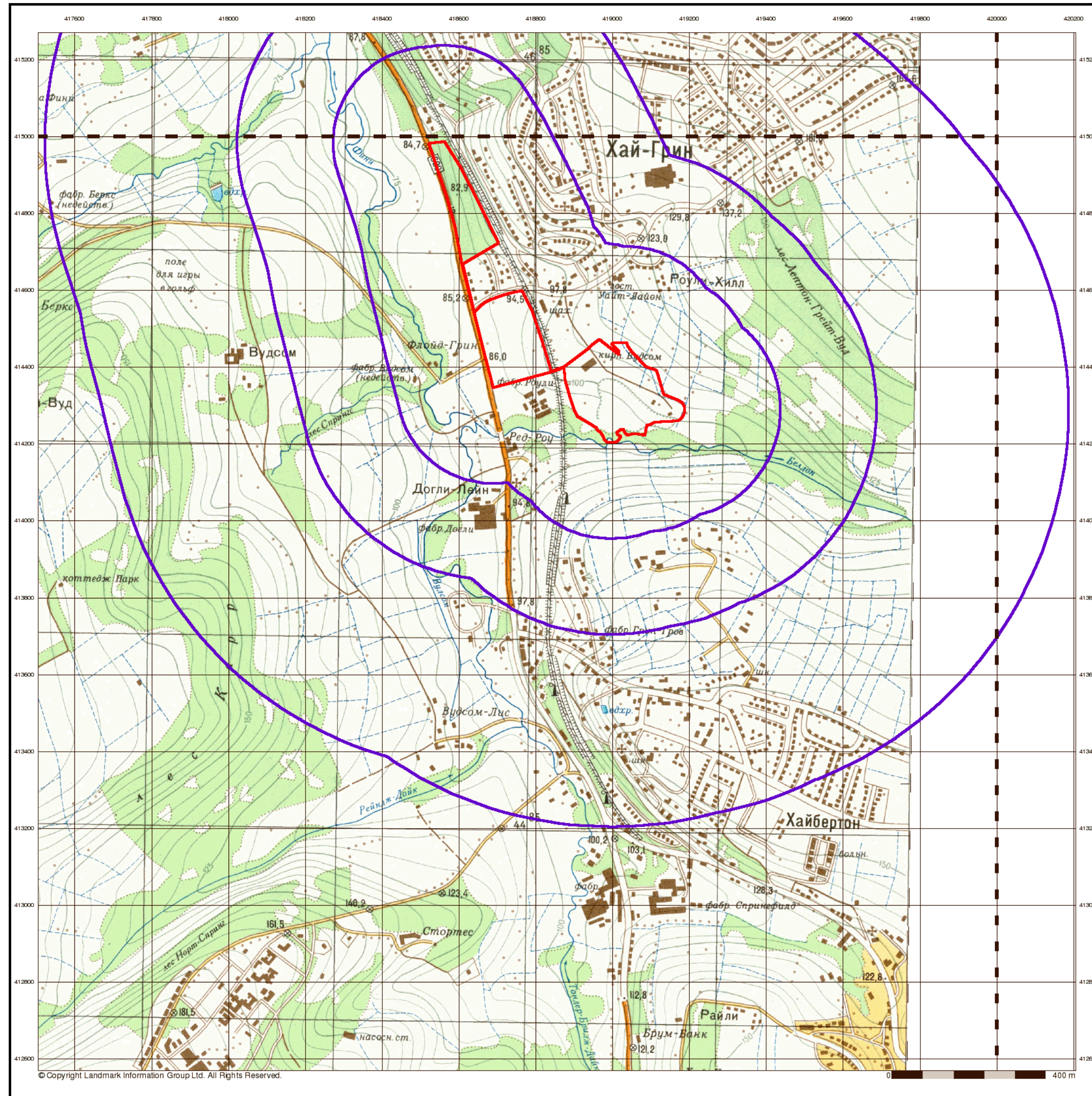
N

Order Details

Order Number: 132631275_1_1
Customer Ref: 70035780
National Grid Reference: 418870, 414330
Slice: A
Site Area (Ha): 10.7
Search Buffer (m): 1000

Site Details

Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS



© Copyright Landmark Information Group Ltd. All Rights Reserved.

0 400 m

Envirocheck®

LANDMARK INFORMATION GROUP®

Huddersfield

Published 1984

Source map scale - 1:10,000

These maps were produced by the Russian military during the Cold War between 1950 and 1997, and cover 103 towns and cities throughout the U.K. The maps are produced at 1:25,000, 1:10,000 and 1:5,000 scale, and show detailed land use, with colour-coded areas for development, green areas, and non-developed areas. Buildings are coloured black and important building uses (such as hospitals, post offices, factories etc.) are numbered, with a numbered key describing their use.

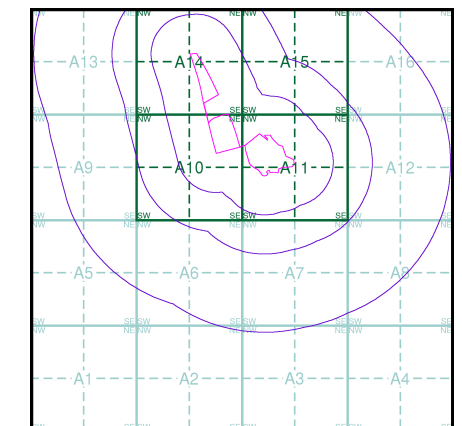
They were produced by the Russians for the benefit of navigation, as well as strategic military sites and transport hubs, for use if they were to have invaded the U.K. The detailed information provided indicates that the areas were surveyed using land-based personnel, on the ground, in the cities that are mapped.

Map Name(s) and Date(s)

SE11 NE
1984
1:10,000

SE11 SE
1984
1:10,000

Russian Map - Slice A



Order Details

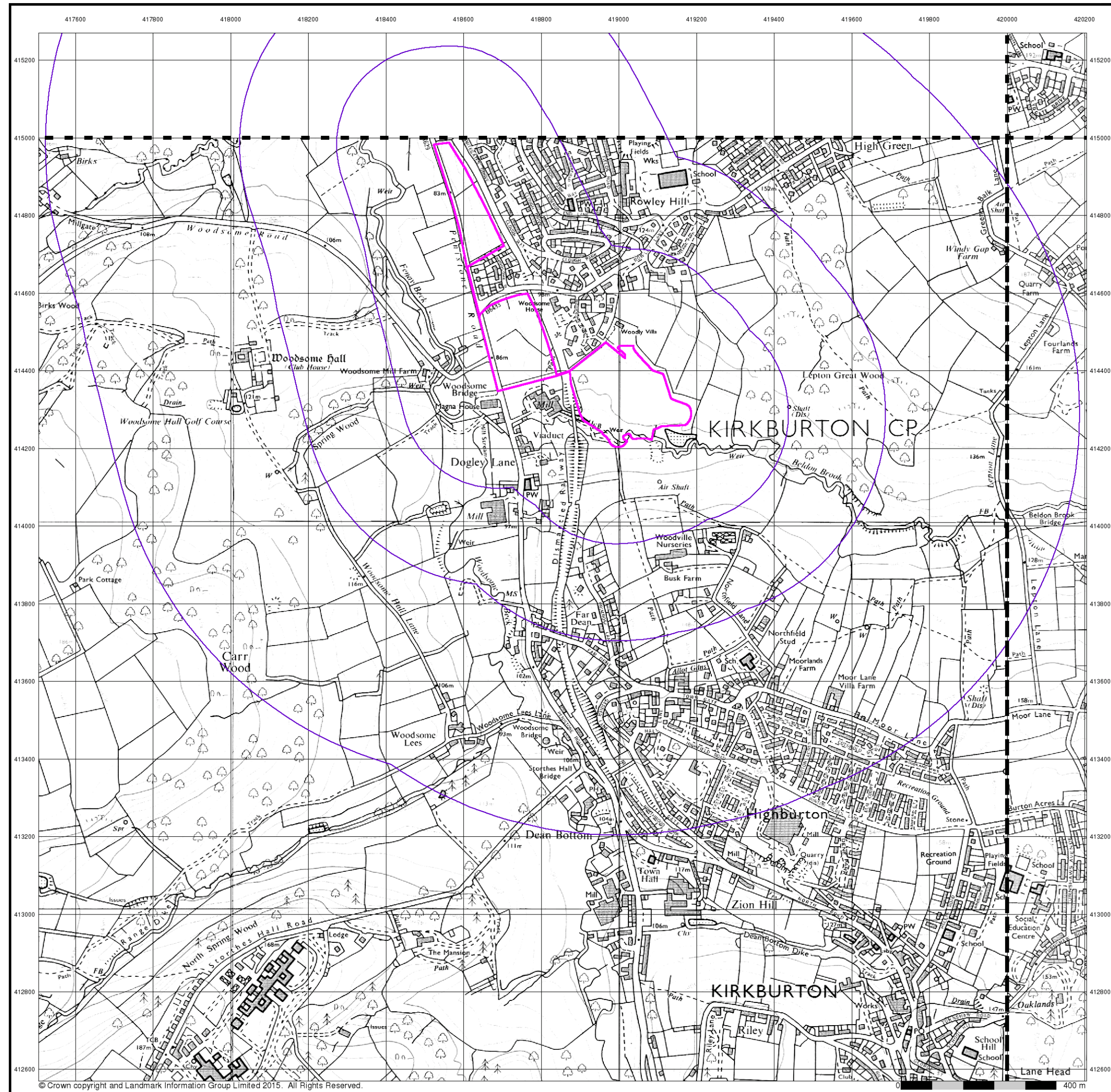
Order Number: 132631275_1_1
Customer Ref: 70035780
National Grid Reference: 418870, 414330
Slice: A
Site Area (Ha): 10.7
Search Buffer (m): 1000

Site Details

Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS

Landmark®
INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Ordnance Survey Plan

Published 1992 - 1993

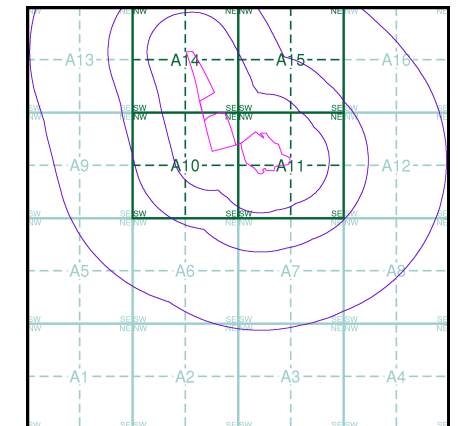
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SE21NW	1993	1:10,000
SE11SE	1992	1:10,000
SE21SW	1993	1:10,000

Historical Map - Slice A

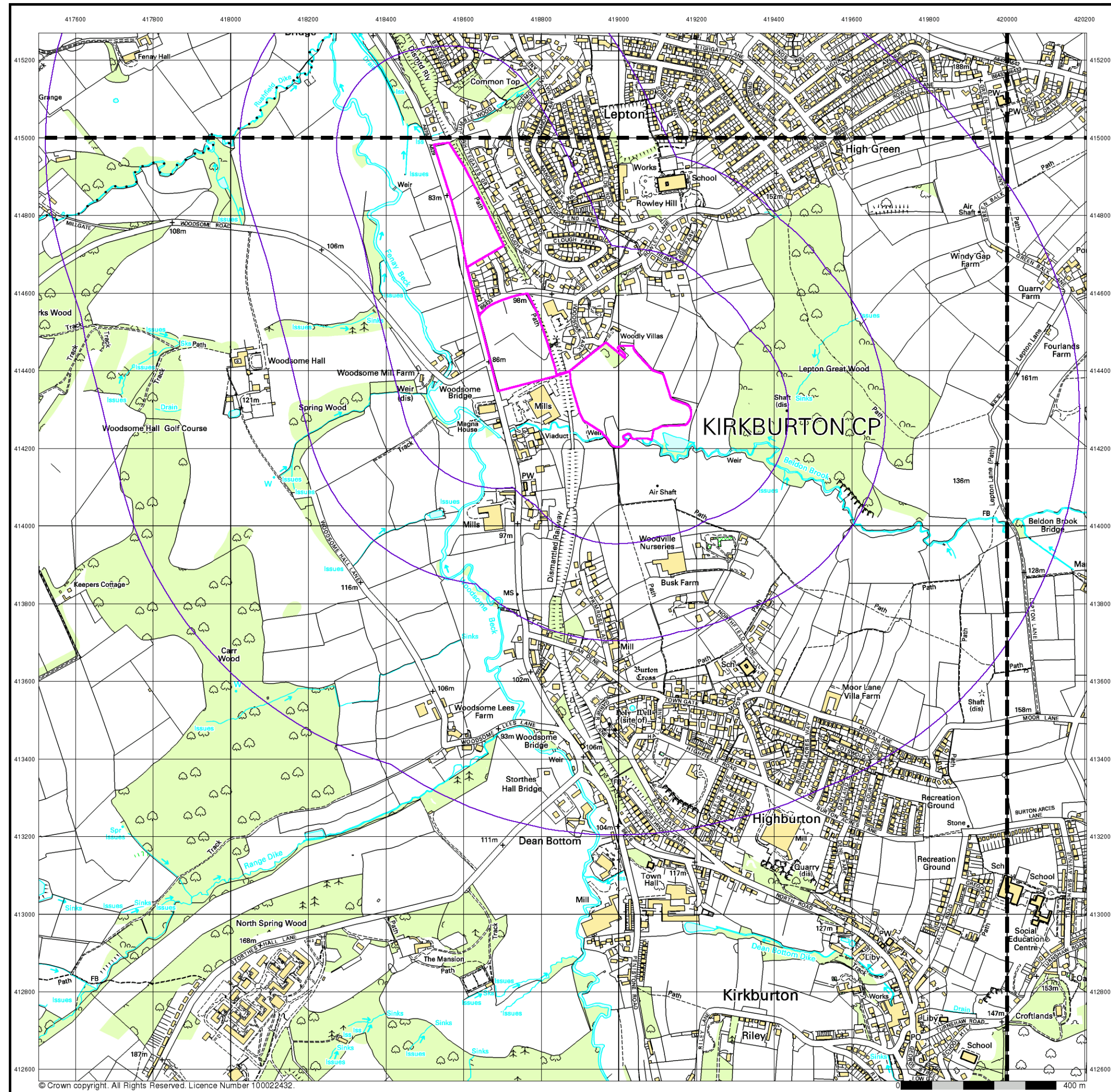


Order Details

Order Number: 132631275_1_1
Customer Ref: 70035780
National Grid Reference: 418870, 414330
Slice: A
Site Area (Ha): 10.7
Search Buffer (m): 1000

Site Details

Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS



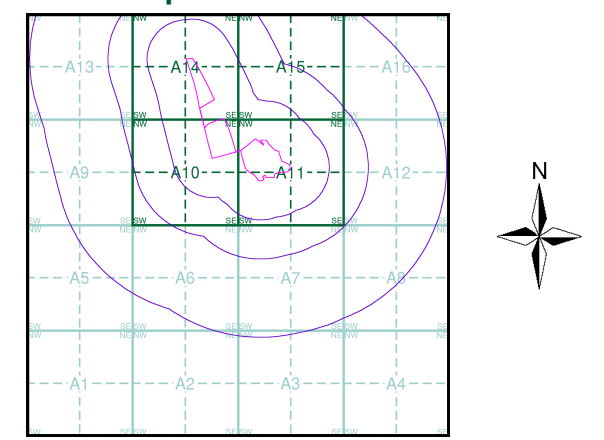
10k Raster Mapping
Published 2000
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey's 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

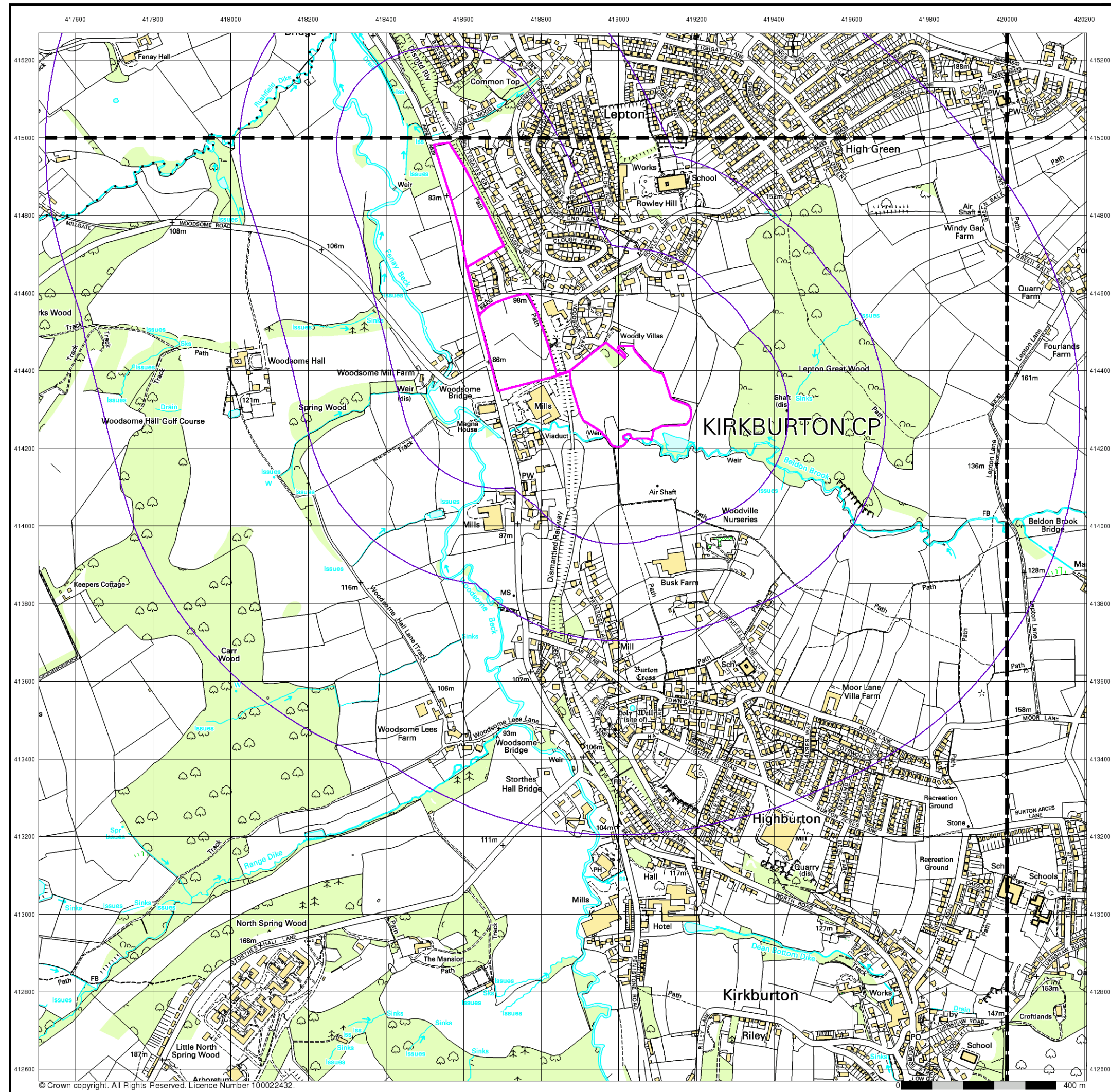
SE11NE	SE21NW
2000	2000
1:10,000	1:10,000
SE11SE	SE21SW
2000	2000
1:10,000	1:10,000

Historical Map - Slice A



Order Details
Order Number: 132631275_1_1
Customer Ref: 70035780
National Grid Reference: 418870, 414330
Slice: A
Site Area (Ha): 10.7
Search Buffer (m): 1000

Site Details
Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS



Envirocheck®

LANDMARK INFORMATION GROUP®

10k Raster Mapping

Published 2006

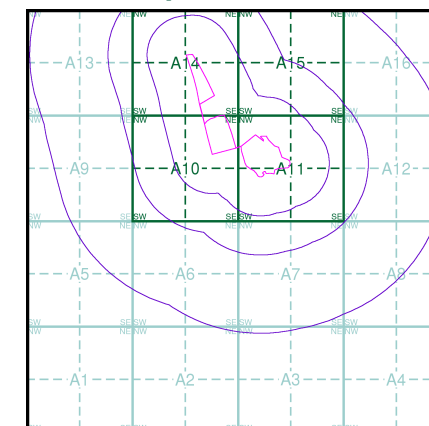
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey's 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

SE11NE	SE21NW
2006	2006
1:10,000	1:10,000
SE11SE	SE21SW
2006	2006
1:10,000	1:10,000

Historical Map - Slice A



Order Details

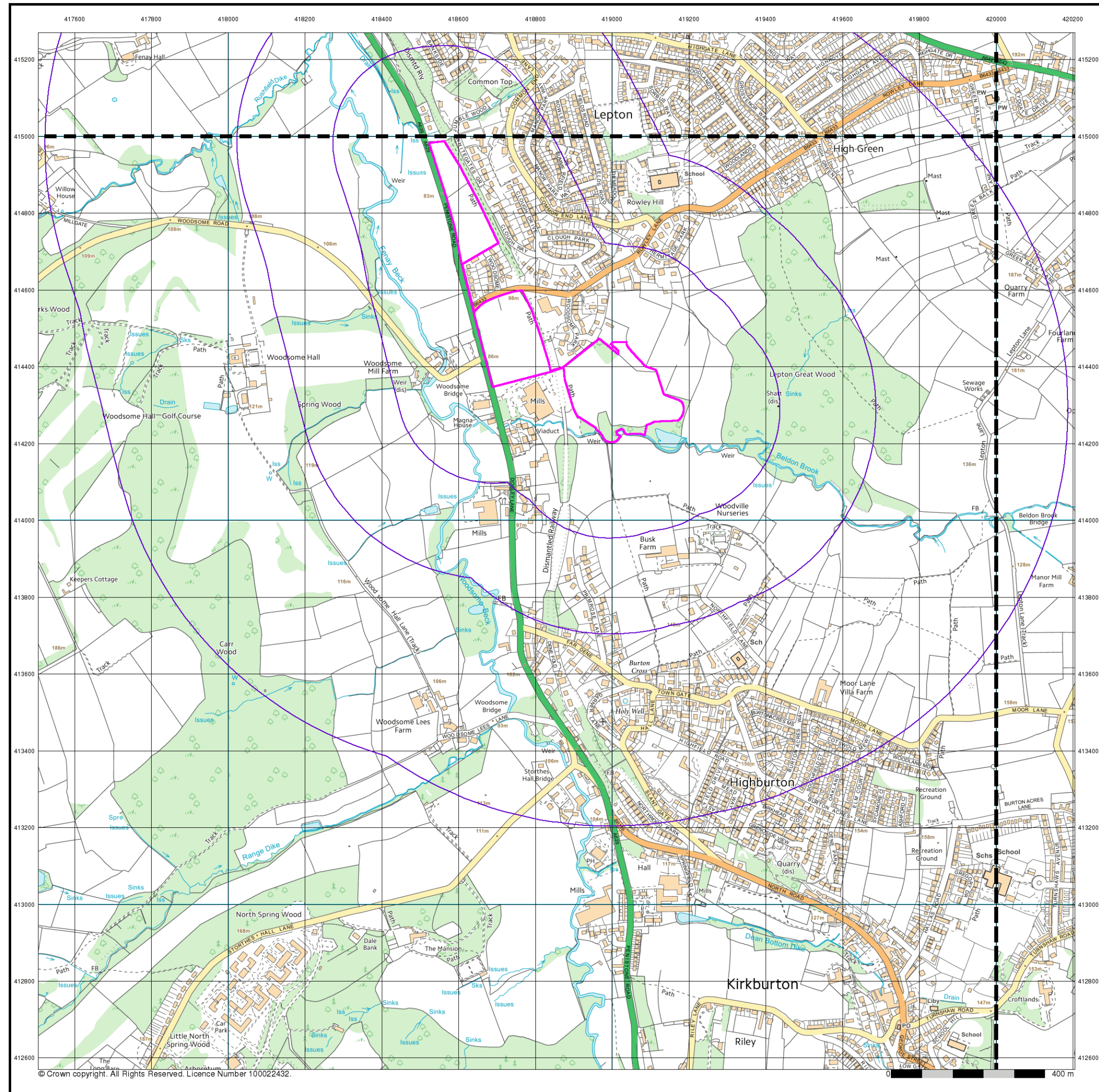
Order Number: 132631275_1_1
Customer Ref: 70035780
National Grid Reference: 418870, 414330
Slice: A
Site Area (Ha): 10.7
Search Buffer (m): 1000

Site Details

Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS

Landmark®
LANDMARK INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Envirocheck[®]

LANDMARK INFORMATION GROUP[®]

VectorMap Local

Published 2017

Source map scale - 1:10,000

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities), 1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)

SE11NE 2017 Variable	SE21NW 2017 Variable
SE11SE 2017 Variable	SE21SW 2017 Variable

Historical Map - Slice A

Order Details

Order Number:	132631275_1_1
Customer Ref:	70035780
National Grid Reference:	418870, 414330
Slice:	A
Site Area (Ha):	10.7
Search Buffer (m):	1000

Site Details

Land at Fenay Bridge, Fenay Bridge, HUDDERSFIELD, HD8 0JS

Landmark[®]

INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

A Landmark Information Group Service v50.0 18-Jul-2017 Page 19 of 19

Envirocheck[®] Report:

Datasheet

Order Details:

Order Number:

132631275_1_1

Customer Reference:

70035780

National Grid Reference:

418870, 414330

Slice:

A

Site Area (Ha):

10.7

Search Buffer (m):

1000

Site Details:

Land at Fenay Bridge

Fenay Bridge

HUDDERSFIELD

HD8 0JS

Client Details:

Mr K Smith

WSP UK Ltd

Three White Rose Office Park

Millshaw Park Lane

Leeds

West Yorkshire

LS11 0DL

Report Section	Page Number
Summary	-
Agency & Hydrological	1
Waste	34
Hazardous Substances	-
Geological	36
Industrial Land Use	56
Sensitive Land Use	60
Data Currency	61
Data Suppliers	66
Useful Contacts	67

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination. For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

Copyright Notice

© Landmark Information Group Limited 2017. The Copyright on the information and data and its format as contained in this Envirocheck® Report ("Report") is the property of Landmark Information Group Limited ("Landmark") and several other Data Providers, including (but not limited to) Ordnance Survey, British Geological Survey, the Environment Agency/Natural Resources Wales and Natural England, and must not be reproduced in whole or in part by photocopying or any other method. The Report is supplied under Landmark's Terms and Conditions accepted by the Customer.

A copy of Landmark's Terms and Conditions can be found with the Index Map for this report. Additional copies of the Report may be obtained from Landmark, subject to Landmark's charges in force from time to time. The Copyright, design rights and any other intellectual rights shall remain the exclusive property of Landmark and /or other Data providers, whose Copyright material has been included in this Report.

Natural England Copyright Notice

Site of Special Scientific Interest, National Nature Reserve, Ramsar, Special Protection Area, Special Conservation Area, Marine Nature Reserve data (derived from Ordnance Survey 1:10000 raster) is provided by, and used with the permission of, Natural England who retain the copyright and Intellectual Property Rights for the data.

Ove Arup Copyright Notice

The Data provided in this report was obtained on Licence from Ove Arup & Partners Limited (for further information, contact mining.review@arup.com). No reproduction or further use of such Data is to be made without the prior written consent of Ove Arup & Partners Limited. The information and data supplied in the product are derived from publicly available records and other third party sources and neither Ove Arup & Partners nor Landmark warrant the accuracy or completeness of such information or data.

Peter Brett Associates Copyright Notice

The cavity data presented has been extracted from the PBA enhanced version of the original DEFRA national cavity databases. PBA/DEFRA retain the copyright & intellectual property rights in the data. Whilst all reasonable efforts are made to check that the information contained in the cavity databases is accurate we do not warrant that the data is complete or error free. The information is based upon our own researches and those collated from a number of external sources and is continually being augmented and updated by PBA. In no event shall PBA/DEFRA or Landmark be liable for any loss or damage including, without limitation, indirect or consequential loss or damage arising from the use of this data.

Radon Potential dataset Copyright Notice

Information supplied from a joint dataset compiled by The British Geological Survey and Public Health England.

Report Version v53.0

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
BGS Groundwater Flooding Susceptibility	pg 1	Yes	Yes	Yes	n/a
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 6		1	1	8
Prosecutions Relating to Controlled Waters			n/a	n/a	n/a
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls					
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature		Yes			
Pollution Incidents to Controlled Waters	pg 9		11	3	3
Prosecutions Relating to Authorised Processes					
Registered Radioactive Substances					
River Quality	pg 12		2		
River Quality Biology Sampling Points	pg 12		1		
Substantiated Pollution Incident Register					
River Quality Chemistry Sampling Points					
Water Abstractions	pg 12		11	1	1 (*28)
Water Industry Act Referrals					
Groundwater Vulnerability	pg 22	Yes	n/a	n/a	n/a
Drift Deposits			n/a	n/a	n/a
Bedrock Aquifer Designations	pg 23	Yes	n/a	n/a	n/a
Superficial Aquifer Designations	pg 23	Yes	n/a	n/a	n/a
Source Protection Zones	pg 23				1
Extreme Flooding from Rivers or Sea without Defences	pg 23	Yes		n/a	n/a
Flooding from Rivers or Sea without Defences	pg 23	Yes	Yes	n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
OS Water Network Lines	pg 23	1	27	16	41

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites	pg 34		1		1
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)	pg 34				1
Licensed Waste Management Facilities (Locations)					
Local Authority Landfill Coverage	pg 34	1	n/a	n/a	n/a
Local Authority Recorded Landfill Sites					
Potentially Infilled Land (Non-Water)	pg 34	3	4	4	6
Potentially Infilled Land (Water)	pg 35				1
Registered Landfill Sites					
Registered Waste Transfer Sites					
Registered Waste Treatment or Disposal Sites					
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Geological					
BGS 1:625,000 Solid Geology	pg 36	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 36	Yes	Yes	Yes	Yes
BGS Recorded Mineral Sites	pg 46	2	4	4	11
BGS Urban Soil Chemistry					
BGS Urban Soil Chemistry Averages					
CBSCB Compensation District			n/a	n/a	n/a
Coal Mining Affected Areas	pg 50	Yes	n/a	n/a	n/a
Mining Instability	pg 50	Yes	n/a	n/a	n/a
Man-Made Mining Cavities	pg 50	1	1		2
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 51	Yes	Yes	n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 51	Yes	Yes	n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 52	Yes	Yes	n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 54	Yes	Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 54	Yes	Yes	n/a	n/a
Radon Potential - Radon Affected Areas	pg 55	Yes	n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a
Industrial Land Use					
Contemporary Trade Directory Entries	pg 56		8	4	8
Fuel Station Entries					
Points of Interest - Commercial Services	pg 57			2	4
Points of Interest - Education and Health					
Points of Interest - Manufacturing and Production	pg 58		1	3	4
Points of Interest - Public Infrastructure	pg 59		4		1
Points of Interest - Recreational and Environmental					
Gas Pipelines					
Underground Electrical Cables					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Sensitive Land Use					
Ancient Woodland	pg 60		1		1
Areas of Adopted Green Belt	pg 60	1			
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones					
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					
World Heritage Sites					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10NE (NW)	0	1	418650 414550
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A10NE (NW)	0	1	418700 414550
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A10NE (NW)	0	1	418750 414550
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A10NE (W)	0	1	418700 414350
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11NW (NE)	0	1	418900 414350
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14SE (NW)	0	1	418600 414650
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A11SW (SE)	0	1	419000 414250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11NW (E)	0	1	419000 414300
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14SE (NW)	0	1	418650 414750
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14SE (NW)	0	1	418650 414600
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14SE (NW)	0	1	418700 414600
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14SE (NW)	0	1	418700 414700
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10NE (W)	0	1	418700 414333
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11NW (E)	0	1	419000 414333
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A11NW (E)	0	1	419050 414333
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A11SW (S)	0	1	418900 414250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11SW (SE)	0	1	418950 414250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14SE (NW)	0	1	418600 414900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A10NE (N)	0	1	418850 414450
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11NW (NE)	0	1	418950 414450
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14SE (NW)	0	1	418550 414850
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14SE (NW)	0	1	418600 414850

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14SE (NW)	0	1	418650 414850
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11NW (NE)	0	1	418950 414400
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11NW (NE)	0	1	419000 414400
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A10NE (NW)	0	1	418650 414500
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10NE (NW)	0	1	418800 414500
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11NW (N)	0	1	418874 414500
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A11NW (SW)	0	1	418874 414333
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NE (NW)	0	1	418550 414950
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NE (NW)	0	1	418600 414950
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10NE (W)	1	1	418650 414400
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11SW (SE)	4	1	418950 414200
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14SE (NW)	4	1	418750 414600
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A10NE (NW)	12	1	418600 414500
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NE (N)	14	1	418600 415000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NE (NW)	15	1	418550 415000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A14SE (NW)	16	1	418550 414650
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A10NE (W)	25	1	418650 414333
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NW (NW)	30	1	418500 415000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A14NE (N)	39	1	418850 415000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A10NE (W)	47	1	418700 414300
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A10NE (W)	49	1	418750 414300
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A11SW (SE)	54	1	418950 414150

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11SW (SE)	54	1	419000 414150
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A14SW (NW)	63	1	418500 414800
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A14NW (NW)	76	1	418450 415000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10SE (SW)	98	1	418750 414250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10SE (SW)	130	1	418800 414200
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NW (NW)	139	1	418450 415100
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A11SW (SE)	139	1	419150 414100
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10NW (NW)	170	1	418450 414550
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A10SE (S)	171	1	418850 414100
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NW (NW)	173	1	418350 414950
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NW (NW)	174	1	418350 415000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14SW (NW)	176	1	418350 414900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10NW (W)	183	1	418450 414500
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14SW (NW)	187	1	418400 414650
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A10NW (NW)	190	1	418400 414550
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11SE (SE)	205	1	419300 414100
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10SE (S)	206	1	418850 414050
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14SW (NW)	208	1	418400 414600
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NW (NW)	209	1	418400 415150
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NE (N)	214	1	418600 415200
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11NE (E)	220	1	419400 414350
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NW (NW)	224	1	418300 415000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10NW (W)	231	1	418400 414400
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NW (NW)	234	1	418300 415050
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A15NW (N)	235	1	418874 415000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11NE (E)	263	1	419450 414300
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11NE (E)	264	1	419450 414333
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NE (N)	264	1	418600 415250
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NW (NW)	274	1	418250 415000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11SE (SE)	277	1	419400 414100
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A14NW (NW)	280	1	418300 415150
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NW (NW)	282	1	418250 415050
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NE (N)	284	1	418800 415200
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10NW (W)	292	1	418350 414450
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NE (N)	297	1	418750 415250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NW (NW)	298	1	418250 415100
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A15NW (N)	304	1	418874 415100
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A11SE (SE)	309	1	419400 414050
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A15SE (NE)	313	1	419400 414600
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A11SE (E)	315	1	419500 414250
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A11NE (E)	318	1	419500 414350
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NE (N)	319	1	418850 415200
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NW (NW)	319	1	418350 415250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A14NW (NW)	321	1	418250 415150

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A15NW (N)	322	1	418900 415050
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NE (N)	323	1	418800 415250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11SE (E)	325	1	419500 414200
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A11NE (E)	326	1	419400 414550
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10NW (W)	328	1	418300 414500
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A15NW (N)	330	1	418874 415150
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A11NE (E)	331	1	419450 414500
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10NW (W)	341	1	418300 414450
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	(N)	342	1	418750 415300
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11SE (SE)	347	1	419450 414050
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A14NW (NW)	349	1	418300 415250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A15SE (NE)	350	1	419350 414650
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A15NW (N)	355	1	419050 415050
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	(N)	364	1	418550 415350
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A15NW (N)	373	1	418900 415150
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A14NW (NW)	383	1	418250 415250
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12SW (E)	387	1	419550 414150
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A15NW (N)	388	1	419000 415000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A15SE (NE)	389	1	419350 414700
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11SE (SE)	418	1	419500 414000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A15SE (NE)	424	1	419350 414750
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	(NW)	431	1	418300 415350

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NE (NW)	432	1	418150 415200
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10NW (W)	437	1	418200 414450
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NE (NW)	456	1	418100 415150
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A15NW (N)	456	1	419100 414950
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12SW (SE)	457	1	419550 414000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A7NW (S)	463	1	418874 413750
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	(N)	468	1	418500 415450
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	(NW)	474	1	418300 415400
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NE (NW)	476	1	418050 415150
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A15NW (N)	478	1	419100 415000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A9NE (W)	486	1	418150 414450
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NE (NW)	488	1	418050 415100
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12SW (SE)	488	1	419550 413950
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A15SE (NE)	495	1	419400 414800
1	Discharge Consents Operator: Reliance Precision Limited Property Type: MAKING OF MACHINERY/ENGINE/PUMP/FURNACE/TRACTOR Location: Rowley Mills Penistone Road, Lepton, Huddersfield, West Yorkshire Authority: Environment Agency, North East Region Catchment Area: Calder Reference: Wra8969 Permit Version: 1 Effective Date: 27th July 2006 Issued Date: 27th July 2006 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Cooling Water Discharge: Freshwater Stream/River Environment: Receiving Water: Beldon Brook Via Old Mill Pond Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995) Positional Accuracy: Located by supplier to within 10m	A11SW (SE)	19	2	418950 414220

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
2	Discharge Consents Operator: Woodsome Hall Golf Club Ltd Property Type: HOLIDAY ACCOM/CAMP SITE/CARAVAN SITE/HOTEL/HOSTEL Location: Woodsome Golf Club, Fenay Bridge, Huddersfield, West Yorkshire, Hd8 0lq Authority: Environment Agency, North East Region Catchment Area: Calder Reference: Wra8218 Permit Version: 1 Effective Date: 9th June 2004 Issued Date: 9th June 2004 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Springwood Beck Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995) Positional Accuracy: Located by supplier to within 10m	A10NW (W)	382	2	418310 414290
3	Discharge Consents Operator: Yorkshire Water Services Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Dogley Cso Dogley Lane (Off), Kirkburton, Huddersfield, West Yorkshire Authority: Environment Agency, North East Region Catchment Area: Calder Reference: Wra9237 Permit Version: 1 Effective Date: 31st August 2007 Issued Date: 31st August 2007 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Woodsome Beck Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995) Positional Accuracy: Located by supplier to within 10m	A6NE (S)	519	2	418690 413780
3	Discharge Consents Operator: Yorkshire Water Services Ltd Property Type: Sewage Disposal Works Location: Dogley Old Stw, KIRKBURTON, West Yorkshire Authority: Environment Agency, North East Region Catchment Area: Aire And Calder Navigation Reference: S/UD/112 Permit Version: Not Supplied Effective Date: Not Supplied Issued Date: Not Supplied Revocation Date: Not Supplied Discharge Type: Storm /emergency overflow Discharge: Unknown Environment: Receiving Water: Not Supplied Status: Not Supplied Positional Accuracy: Located by supplier to within 100m	A6NE (S)	524	2	418680 413780
3	Discharge Consents Operator: Yorkshire Water Services Ltd Property Type: Sewerage Network - Sewers Location: Dogley Old Sewage Treatment Works, West Yorkshire Authority: Environment Agency, North East Region Catchment Area: Calder Reference: S/UD/112 Permit Version: Not Supplied Effective Date: Not Supplied Issued Date: 5th June 1963 Revocation Date: Not Supplied Discharge Type: Sewage Effluent Discharge-Storm Effluent Discharge: Unknown Environment: Receiving Water: Not Supplied Status: Not Supplied Positional Accuracy: Located by supplier to within 100m	A6NE (S)	528	2	418680 413775

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
4	Discharge Consents Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Little Lepton Stw, Highburton, Huddersfield, West Yorkshire Authority: Environment Agency, North East Region Catchment Area: Calder Reference: 1612 Permit Version: 3 Effective Date: 10th October 1996 Issued Date: 10th October 1996 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Of Belden Brook Status: Varied by Application - (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995) Positional Accuracy: Located by supplier to within 100m	A12NE (E)	813	2	420000 414300
4	Discharge Consents Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Little Lepton Stw, Highburton, Huddersfield, West Yorkshire Authority: Environment Agency, North East Region Catchment Area: Calder Reference: 1612 Permit Version: 2 Effective Date: 26th June 1985 Issued Date: 26th June 1985 Revocation Date: 9th October 1996 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Of Belden Brook Status: Transferred from COPA 1974 Positional Accuracy: Located by supplier to within 100m	A12NE (E)	813	2	420000 414300
4	Discharge Consents Operator: Kirkburton Urban District Council Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Little Lepton Stw, Highburton, Huddersfield, West Yorkshire Authority: Environment Agency, North East Region Catchment Area: Calder Reference: 1612 Permit Version: 1 Effective Date: 9th September 1963 Issued Date: 9th September 1963 Revocation Date: 25th June 1985 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Of Belden Brook Status: Transferred from Rivers (Prevention of Pollution) Act 1951-1961 Positional Accuracy: Located by supplier to within 100m	A12NE (E)	813	2	420000 414300
5	Discharge Consents Operator: Windy Gap Barn Property Type: DOMESTIC PROPERTY (SINGLE) (INCL FARM HOUSE) Location: Proposed Dwelling, Windy Gap Farm, Kirkburton Authority: Environment Agency, North East Region Catchment Area: Calder Reference: Wa5969 Permit Version: 2 Effective Date: 26th July 2012 Issued Date: 26th July 2012 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge: Land/Soakaway Environment: Receiving Water: Grdwaters At/Adj Prop Dwelling Status: Transferred from Water Act 1989 Positional Accuracy: Located by supplier to within 100m	A16SE (E)	818	2	419900 414700

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
5	Discharge Consents Operator: Windy Gap Barn Property Type: DOMESTIC PROPERTY (SINGLE) (INCL FARM HOUSE) Location: Proposed Dwelling, Windy Gap Farm, Kirkburton Authority: Environment Agency, North East Region Catchment Area: Calder Reference: Wa5969 Permit Version: 1 Effective Date: 12th March 1990 Issued Date: 12th March 1990 Revocation Date: 25th July 2012 Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge: Land/Soakaway Environment: Receiving Water: Grdwaters At/Adj Prop Dwelling Status: Transferred from Water Act 1989 Positional Accuracy: Located by supplier to within 100m	A16SE (E)	818	2	419900 414700
	Nearest Surface Water Feature	A11SW (SE)	0	-	418958 414237
6	Pollution Incidents to Controlled Waters Property Type: Water Company Sewage: Foul Sewer Location: Bridge A642/Fenay Bridge Fenay Beck 04 Authority: Environment Agency, North East Region Pollutant: Unknown Sewage Note: Not Supplied Incident Date: 8th January 1994 Incident Reference: 149574 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A14NW (NW)	29	2	418501 415001
7	Pollution Incidents to Controlled Waters Property Type: Water Company Sewage: Foul Sewer Location: Fenay Beck Authority: Environment Agency, North East Region Pollutant: Other Sewage Note: Fish Killed: No Information Incident Date: 31st August 1995 Incident Reference: SL950145 Catchment Area: Calder Tributaries Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A10NE (W)	49	2	418700 414300
8	Pollution Incidents to Controlled Waters Property Type: Industrial Premises Location: Mouth/Todmorden Calder Afl Authority: Environment Agency, North East Region Pollutant: Chemicals - Other Organic Note: Not Supplied Incident Date: 19th June 1989 Incident Reference: 100428 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A14SW (NW)	122	2	418500 414600
9	Pollution Incidents to Controlled Waters Property Type: Water Company Sewage: Foul Sewer Location: /woodsme Bridge Fenay Beck 05, FENAY BRIDGE Authority: Environment Agency, North East Region Pollutant: Unknown Sewage Note: Not Supplied Incident Date: 3rd April 1990 Incident Reference: 109259 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A10NW (NW)	146	2	418500 414500

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
10	Pollution Incidents to Controlled Waters Property Type: Other General Premises Location: Fenay Beck, KIRKBURTON Authority: Environment Agency, North East Region Pollutant: Chlorinated Water Note: Pollution Found; No Fish Killed Incident Date: 22nd January 1996 Incident Reference: SL960115 Catchment Area: Calder Tributaries Receiving Water: Freshwater Stream/River Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A10SE (SW)	148	2	418700 414200
10	Pollution Incidents to Controlled Waters Property Type: Other General Premises Location: Fenay Beck, KIRKBURTON Authority: Environment Agency, North East Region Pollutant: Chlorinated Water Note: No Fish Killed Incident Date: 22nd January 1996 Incident Reference: SL960115 Catchment Area: Calder Tributaries Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A10SE (SW)	153	2	418700 414195
11	Pollution Incidents to Controlled Waters Property Type: Water Company Sewage: Foul Sewer Location: Woodsome/Source Fenay Beck Afu Authority: Environment Agency, North East Region Pollutant: Unknown Note: Not Supplied Incident Date: 27th April 1990 Incident Reference: 109983 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A10SE (SW)	172	2	418600 414200
12	Pollution Incidents to Controlled Waters Property Type: Water Company Sewage: Foul Sewer Location: Huddersfld/Source Colne Afu Authority: Environment Agency, North East Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 7th April 1992 Incident Reference: 131982 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A14NE (N)	175	2	418700 415095
12	Pollution Incidents to Controlled Waters Property Type: Water Company Sewage: Foul Sewer Location: Mouth/Huddersfld Colne Afu Authority: Environment Agency, North East Region Pollutant: Unknown Sewage Note: Not Supplied Incident Date: 29th April 1994 Incident Reference: 150837 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A14NE (N)	178	2	418700 415100
13	Pollution Incidents to Controlled Waters Property Type: Other General Premises Location: Calder 04C Authority: Environment Agency, North East Region Pollutant: Unknown Note: Fish Killed: No Information Incident Date: 17th September 1995 Incident Reference: SL950877 Catchment Area: Calder Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A10NW (W)	195	2	418500 414300

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
14	Pollution Incidents to Controlled Waters Property Type: Miscellaneous Premises: Unknown Location: Todmorden/Source Calder Afu Authority: Environment Agency, North East Region Pollutant: Unknown Note: Not Supplied Incident Date: 10th December 1989 Incident Reference: 106059 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A11SE (E)	229	2	419400 414200
15	Pollution Incidents to Controlled Waters Property Type: Textile industry Location: Fenay Beck Authority: Environment Agency, North East Region Pollutant: Other Chemicals Note: Pollution Found; No Fish Killed Incident Date: Not Supplied Incident Reference: SL961327 Catchment Area: Calder Receiving Water: Freshwater Stream/River Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A14NW (NW)	323	2	418201 415001
16	Pollution Incidents to Controlled Waters Property Type: Other General Premises Location: Fenay Beck Authority: Environment Agency, North East Region Pollutant: Unknown Note: Fish Killed: No Information Incident Date: 13th January 1995 Incident Reference: SL950184 Catchment Area: Calder Tributaries Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A10SE (SW)	343	2	418700 414000
17	Pollution Incidents to Controlled Waters Property Type: Water Company Sewage: Foul Sewer Location: Mouth/Huddersfld Colne Af Authority: Environment Agency, North East Region Pollutant: Crude Sewage Note: Not Supplied Incident Date: 1st May 1991 Incident Reference: 121979 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A14SW (W)	414	2	418200 414600
18	Pollution Incidents to Controlled Waters Property Type: Miscellaneous Premises: Unknown Location: Mouth/Source Fenay Beck Af Authority: Environment Agency, North East Region Pollutant: Unknown Note: Not Supplied Incident Date: 26th June 1990 Incident Reference: 112066 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A15NE (NE)	733	2	419400 415100
19	Pollution Incidents to Controlled Waters Property Type: Miscellaneous Premises: Unknown Location: Woodsome/Source Fenay Beck Afu Authority: Environment Agency, North East Region Pollutant: Unknown Note: Not Supplied Incident Date: 14th November 1991 Incident Reference: 128227 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A6SE (S)	855	2	418700 413400

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
20	Pollution Incidents to Controlled Waters Property Type: Industrial Premises Location: Huddersfield Narrow Canal Authority: Environment Agency, North East Region Pollutant: Industrial Effluent Note: Not Supplied Incident Date: 24th June 1992 Incident Reference: 134284 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (W)	941	2	417600 414800
	River Quality Name: Fenay_Beck/Shepley_Dike GQA Grade: River Quality B Reach: Woodsome_Rd_Ox_Field_Bec Estimated Distance (km): 2.6 Flow Rate: Flow less than 0.31 cumecs Flow Type: River Year: 2000	A14SW (NW)	85	2	418443 414763
	River Quality Name: Fenay_Beck/Shepley_Dike GQA Grade: River Quality B Reach: Upper_Cumberworth_Woodsome_R Estimated Distance (km): 9.6 Flow Rate: Flow less than 0.31 cumecs Flow Type: River Year: 2000	A10SE (SW)	111	2	418666 414200
21	River Quality Biology Sampling Points Name: Fenay Beck Reach: Woodsome Rd To Ox Field Beck Estimated Distance: 2.60 Positional Accuracy: Located by supplier to within 10m Year: 1990 GQA Grade: River Quality Biology GQA Grade Not Supplied Year: 1995 GQA Grade: River Quality Biology GQA Grade C - Fairly Good Year: 2000 GQA Grade: River Quality Biology GQA Grade C - Fairly Good Year: 2002 GQA Grade: River Quality Biology GQA Grade C - Fairly Good Year: 2003 GQA Grade: River Quality Biology GQA Grade C - Fairly Good Year: 2004 GQA Grade: River Quality Biology GQA Grade E - Poor Year: 2005 GQA Grade: River Quality Biology GQA Grade E - Poor Year: 2006 GQA Grade: River Quality Biology GQA Grade E - Poor Year: 2007 GQA Grade: River Quality Biology GQA Grade E - Poor Year: 2008 GQA Grade: River Quality Biology GQA Grade E - Poor Year: 2009 GQA Grade: River Quality Biology GQA Grade E - Poor	A14SW (NW)	83	2	418458 414916
22	Water Abstractions Operator: Reliance Precision Ltd Licence Number: 2/27/11/077 Permit Version: 103 Location: Borehole-Coal Measures-Fenay Bridge Authority: Environment Agency, North East Region Abstraction: Textiles & Leather: Non-Evaporative Cooling Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Rowley Mills, Fenay Bridge, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 22nd June 2006 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A10NE (SW)	42	2	418850 414310

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
22	Water Abstractions Operator: Reliance Precision Ltd Licence Number: 2/27/11/077 Permit Version: 103 Location: Borehole-Coal Measures-Fenay Bridge Authority: Environment Agency, North East Region Abstraction: Textiles And Leather: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Rowley Mills, Fenay Bridge, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 22nd June 2006 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A10NE (SW)	42	2	418850 414310
22	Water Abstractions Operator: Reliance Precision Ltd Licence Number: 2/27/11/077 Permit Version: 102 Location: Borehole-Coal Measures-Fenay Bridge Authority: Environment Agency, North East Region Abstraction: Textiles And Leather: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Rowley Mills, Fenay Bridge, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 20th April 2005 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A10NE (SW)	42	2	418850 414310
23	Water Abstractions Operator: Reliance Precision Ltd Licence Number: 2/27/11/077 Permit Version: 104 Location: Borehole-Coal Measures-Fenay Bridge Authority: Environment Agency, North East Region Abstraction: Textiles & Leather: Non-Evaporative Cooling Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 13th October 2014 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A10NE (SW)	44	2	418848 414310
23	Water Abstractions Operator: Reliance Precision Ltd Licence Number: 2/27/11/077 Permit Version: 104 Location: Borehole-Coal Measures-Fenay Bridge Authority: Environment Agency, North East Region Abstraction: Textiles And Leather: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 13th October 2014 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A10NE (SW)	44	2	418848 414310

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
23	Water Abstractions Operator: Reliance Gear Co Ltd Licence Number: 2/27/11/077 Permit Version: 101 Location: Borehole - Coal Measures - Fenay Bridge Authority: Environment Agency, North East Region Abstraction: Textiles And Leather: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Rowley Mills, Fenay Bridge, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 3rd July 2001 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A10NE (SW)	74	2	418800 414300
23	Water Abstractions Operator: Springwood Engineering Co Ltd Licence Number: 2/27/11/077 Permit Version: 100 Location: Borehole Authority: Environment Agency, North East Region Abstraction: Textiles And Leather: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 286 Yearly Rate (m3): 59098 Details: Rowley Mills, Fenay Bridge, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 23rd December 1981 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A10NE (SW)	74	2	418800 414300
24	Water Abstractions Operator: Mr A Mallinson Licence Number: 2/27/11/078 Permit Version: 103 Location: Beldon Brook-Fenay Bridge-Huddersfield Authority: Environment Agency, North East Region Abstraction: Amenity: Lake And Pond Throughflow Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Land At Fenay Bridge, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 20th June 2004 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A11SW (E)	54	2	419190 414210
24	Water Abstractions Operator: Reliance Gear Co Ltd Licence Number: 2/27/11/078 Permit Version: 102 Location: Beldon Brook - Fenay Bridge Authority: Environment Agency, North East Region Abstraction: Amenity: Lake And Pond Throughflow Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Rowleymills, Fenay Bridge, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 18th June 2002 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A11SE (E)	67	2	419200 414200

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
24	Water Abstractions Operator: Reliance Gear Company Limited Licence Number: 2/27/11/078 Permit Version: 101 Location: Beldon Brook - Fenay Bridge Authority: Environment Agency, North East Region Abstraction: Machinery and Electronics: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Rowleymills, Fenay Bridge, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 3rd July 2001 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A11SE (E)	67	2	419200 414200
24	Water Abstractions Operator: Springwood Engineering Co Ltd Licence Number: 2/27/11/078 Permit Version: 100 Location: Beldon Brook Authority: Environment Agency, North East Region Abstraction: Other Industrial/Commercial/Public Services: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): 255 Yearly Rate (m3): 7728 Details: Rowleymills, Fenay Bridge, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 30th June 1980 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A11SE (E)	67	2	419200 414200
25	Water Abstractions Operator: Kirklees Metropolitan Council & Kirklees Countryside Unit Licence Number: 2/27/11/174 Permit Version: 100 Location: Woodsome Beck Authority: Environment Agency, North East Region Abstraction: Holiday Sites; Camp Sites And Tourist Attractions: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): 15 Yearly Rate (m3): 180000 Details: Dogley Nature Reserve, Penistone Road, Kirkburton, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 14th July 1994 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A6NE (S)	500	2	418680 413810
26	Water Abstractions Operator: Woodsome Hall Golf Club Ltd Licence Number: 2/27/11/156 Permit Version: 100 Location: Pond - Woodsome Hall Authority: Environment Agency, North East Region Abstraction: Golf Courses: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): 41 Yearly Rate (m3): 6819 Details: Woodsome Hall Golf Course Authorised Start: 01 March Authorised End: 31 October Permit Start Date: 16th December 1970 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A9NE (W)	777	2	417900 414300

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Yorkshire Regional Health Authority; Regional Works Department; Clarendon A Licence Number: 2/27/11/CR02 Permit Version: Not Supplied Location: Location Description Not Available Authority: Environment Agency, North East Region Abstraction: Unclassified (Other) Abstraction Type: Not Supplied Source: Groundwater Daily Rate (m3): 0 Yearly Rate (m3): 0 Details: Coal Measures Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A6SE (S)	1033	2	418570 413260
	Water Abstractions Operator: Penmoor Uk Ltd Licence Number: 2/27/11/167 Permit Version: 106 Location: Borehole - Lower Coal Measures - Brookfield Mills Authority: Environment Agency, North East Region Abstraction: Food And Drink: Water Bottling Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Brookfield Mill, Highburton Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 17th August 2016 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3NW (S)	1054	2	418964 413151
	Water Abstractions Operator: Penmoor Uk Ltd Licence Number: 2/27/11/167 Permit Version: 107 Location: Borehole - Lower Coal Measures - Brookfield Mills Authority: Environment Agency, North East Region Abstraction: Food And Drink: Water Bottling Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Brookfield Mill, Highburton Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 17th August 2016 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3NW (S)	1054	2	418964 413151
	Water Abstractions Operator: Ubrique Investments Ltd Licence Number: 2/27/11/177 Permit Version: 105 Location: Borehole-Coal Measures-Kirkburton Authority: Environment Agency, North East Region Abstraction: Commercial Private Water Undertaking: Drinking; Cooking; Sanitary; Washing; (Small Garden) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Storthes Hall Park, Kirkburton, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 15th June 2006 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A6SW (S)	1059	2	418510 413260

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Ubrique Investments Ltd Licence Number: 2/27/11/177 Permit Version: 104 Location: Borehole-Coal Measures-Kirkburton Authority: Environment Agency, North East Region Abstraction: Commercial Private Water Undertaking: Drinking; Cooking; Sanitary; Washing; (Small Garden) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Storthes Hall Park, Kirkburton, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 31st July 2004 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A6SW (S)	1059	2	418510 413260
	Water Abstractions Operator: University Of Huddersfield Licence Number: 2/27/11/177 Permit Version: 103 Location: Borehole-Coal Measures-Kirkburton Authority: Environment Agency, North East Region Abstraction: Private Water Undertaking: Raw Water Supply Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Storthes Hall Park, Kirkburton, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 8th November 2002 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A6SW (S)	1059	2	418510 413260
	Water Abstractions Operator: Thomas Birkhead & Sons Limited Licence Number: 2/27/11/181 Permit Version: 100 Location: Borehole - Coal Measures - High Burton Authority: Environment Agency, North East Region Abstraction: Textiles And Leather: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 600 Yearly Rate (m3): 120000 Details: Southfield Mills, Highburton, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 17th December 1997 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A3NE (SE)	1102	2	419470 413190
	Water Abstractions Operator: University Of Huddersfield Licence Number: 2/27/11/177 Permit Version: 102 Location: Borehole - Coal Measures - Kirkburton Authority: Environment Agency, North East Region Abstraction: Private Water Undertaking: Raw Water Supply Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 210 Yearly Rate (m3): 71700 Details: Storthes Hall Park, Kirkburton, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 31st July 1999 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A2NW (S)	1117	2	418500 413200

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Kevard Textile Machinery Ltd Licence Number: 2/27/11/027 Permit Version: Not Supplied Location: Location Description Not Available Authority: Environment Agency, North East Region Abstraction: General Industrial Abstraction Type: Not Supplied Source: Surface Daily Rate (m3): 409 Yearly Rate (m3): 102285 Details: Licence Revoked Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A5NW (SW)	1131	2	417700 413800
	Water Abstractions Operator: Penmoor Uk Ltd Licence Number: 2/27/11/167 Permit Version: 106 Location: Borehole A-Lower Coal Measures-Brookfield Mill-Highburton Authority: Environment Agency, North East Region Abstraction: Food And Drink: Water Bottling Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Brookfield Mill, Highburton Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 17th August 2016 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3NW (S)	1234	2	419010 412970
	Water Abstractions Operator: Penmoor Uk Ltd Licence Number: 2/27/11/167 Permit Version: 105 Location: Borehole A-Lower Coal Measures-Brookfield Mill-Highburton Authority: Environment Agency, North East Region Abstraction: Food And Drink: Water Bottling Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Brookfield Mill, Highburton Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 16th March 2015 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3NW (S)	1234	2	419010 412970
	Water Abstractions Operator: Penmoor Uk Ltd Licence Number: 2/27/11/167 Permit Version: 104 Location: Borehole-Lower Coal Measures-Brookfield Mill-Highburton Authority: Environment Agency, North East Region Abstraction: Food And Drink: Water Bottling Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 26th July 2006 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3NW (S)	1234	2	419010 412970

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Whitley Willows Ltd Licence Number: 2/27/11/167 Permit Version: 103 Location: Borehole-Lower Coal Measures-Brookfield Mill-Highburton Authority: Environment Agency, North East Region Abstraction: Textiles And Leather: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Brookfield Mills, Penistone Road, Kirkburton, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 8th September 2005 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3NW (S)	1234	2	419010 412970
	Water Abstractions Operator: Whitley Willows Limited Licence Number: 2/27/11/167a Permit Version: 100 Location: Borehole-Lower Coal Measures-Brookfield Mills-Huddersfield Authority: Environment Agency, North East Region Abstraction: Textiles And Leather: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Brookfield Mills, Penistone Road, Highburton, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st February 2002 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3NW (S)	1234	2	419010 412970
	Water Abstractions Operator: Whitley Willows Ltd Licence Number: 2/27/11/167 Permit Version: 102 Location: Borehole-Lower Coal Measures-Brookfield Mill-Highburton Authority: Environment Agency, North East Region Abstraction: Textiles And Leather: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Brookfield Mills, Penistone Road, Kirkburton, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st February 2002 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3NW (S)	1234	2	419010 412970
	Water Abstractions Operator: G Mallinson & Sons Ltd Licence Number: 2/27/11/129 Permit Version: Not Supplied Location: Springfield Mills, Kirkburton, HUDDERSFIELD Authority: Environment Agency, North East Region Abstraction: General Industrial Abstraction Type: Not Supplied Source: Surface Daily Rate (m3): 18 Yearly Rate (m3): 546 Details: Status: Lapsed Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A3NE (S)	1240	2	419300 413000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Penmoor Uk Ltd Licence Number: 2/27/11/167 Permit Version: 107 Location: Borehole B-Lower Coal Measures-Highburton Authority: Environment Agency, North East Region Abstraction: Food And Drink: Water Bottling Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Brookfield Mill, Highburton Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 17th August 2016 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3NW (S)	1245	2	418940 412960
	Water Abstractions Operator: Penmoor Uk Ltd Licence Number: 2/27/11/167 Permit Version: 105 Location: Borehole B-Lower Coal Measures-Highburton Authority: Environment Agency, North East Region Abstraction: Food And Drink: Water Bottling Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Brookfield Mill, Highburton Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 16th March 2015 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3NW (S)	1245	2	418940 412960
	Water Abstractions Operator: Penmoor Uk Ltd Licence Number: 2/27/11/167 Permit Version: 104 Location: Borehole-Lower Coal Measures-Highburton Authority: Environment Agency, North East Region Abstraction: Food And Drink: Water Bottling Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 26th July 2006 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3NW (S)	1245	2	418940 412960
	Water Abstractions Operator: Whitley Willows Ltd Licence Number: 2/27/11/167 Permit Version: 103 Location: Borehole-Lower Coal Measures-Kirkburton Authority: Environment Agency, North East Region Abstraction: Textiles And Leather: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Brookfield Mills, Penistone Road, Kirkburton, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 8th September 2005 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3SW (S)	1307	2	418910 412900

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Penmoor Uk Ltd Licence Number: 2/27/11/168 Permit Version: 103 Location: Shepley Dyke - Highburton Authority: Environment Agency, North East Region Abstraction: Textiles And Leather: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 December Authorised End: 31 March Permit Start Date: 16th March 2015 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A3SW (S)	1308	2	418900 412900
	Water Abstractions Operator: Whitley Willows Ltd Licence Number: 2/27/11/168 Permit Version: 102 Location: Shepley Dyke Authority: Environment Agency, North East Region Abstraction: Textiles And Leather: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Brookfield Mill, Highburton, Huddersfield Authorised Start: 01 December Authorised End: 31 March Permit Start Date: 8th September 2005 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A3SW (S)	1308	2	418900 412900
	Water Abstractions Operator: Whitley Willows Limited Licence Number: 2/27/11/167a Permit Version: 100 Location: Borehole - Lower Coal Measures - Kirkburton Authority: Environment Agency, North East Region Abstraction: Textiles And Leather: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Brookfield Mills, Penistone Road, Highburton, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st February 2002 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A3SW (S)	1308	2	418900 412900
	Water Abstractions Operator: Whitley Willows Ltd Licence Number: 2/27/11/167 Permit Version: 102 Location: Borehole - Lower Coal Measures - Kirkburton Authority: Environment Agency, North East Region Abstraction: Textiles And Leather: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Brookfield Mills, Penistone Road, Kirkburton, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st February 2002 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A3SW (S)	1308	2	418900 412900

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Whitley Willows Ltd Licence Number: 2/27/11/168 Permit Version: 101 Location: Shepley Dyke Authority: Environment Agency, North East Region Abstraction: Textiles And Leather: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): 136 Yearly Rate (m3): 10500 Details: Brookfield Mill, Highburton, Huddersfield Authorised Start: 01 December Authorised End: 31 March Permit Start Date: 19th October 1998 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3SW (S)	1308	2	418900 412900
	Water Abstractions Operator: Whitley Willows Limited Licence Number: 2/27/11/167 Permit Version: 101 Location: Borehole - Lower Coal Measures - Kirkburton Authority: Environment Agency, North East Region Abstraction: Textiles And Leather: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 546 Yearly Rate (m3): 125460 Details: Brookfield Mills, Penistone Road, Kirkburton, Huddersfield Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 19th October 1998 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3SW (S)	1308	2	418900 412900
	Water Abstractions Operator: Yorkshire Regional Health Authority; Regional Works Department; Clarendon A Licence Number: 2/27/11/CR01 Permit Version: Not Supplied Location: Location Description Not Available Authority: Environment Agency, North East Region Abstraction: Unclassified (Other) Abstraction Type: Not Supplied Source: Surface Daily Rate (m3): 0 Yearly Rate (m3): 0 Details: Not Supplied Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A2SW (S)	1694	2	418270 412670
	Water Abstractions Operator: Sykes & Tunncliffe Ltd Licence Number: 2/27/11/106 Permit Version: Not Supplied Location: Location Description Not Available Authority: Environment Agency, North East Region Abstraction: General Industrial Abstraction Type: Not Supplied Source: Groundwater Daily Rate (m3): 25 Yearly Rate (m3): 5501 Details: Coal Measures Licence Revoked Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(W)	1925	2	416660 414500
	Groundwater Vulnerability Soil Classification: Soils of High Leaching Potential (H3)- Coarse textured or moderately shallow soils which readily transmit non-absorbed pollutants and liquid discharges but which have some ability to attenuate absorbed pollutants because of their large clay or organic matter contents Map Sheet: Sheet 11 South Pennines Scale: 1:100,000	A11SW (S)	0	2	418886 414224

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Groundwater Vulnerability Soil Classification: Soils of High Leaching Potential (U) - Soil information for restored mineral workings and urban areas is based on fewer observations than elsewhere. A worst case vulnerability classification (H) assumed, until proved otherwise Map Sheet: Sheet 11 South Pennines Scale: 1:100,000	A11NW (E)	0	2	418891 414332
	Groundwater Vulnerability Soil Classification: Soils of Intermediate Leaching Potential (I1) - Soils which can possibly transmit a wide range of pollutants Map Sheet: Sheet 11 South Pennines Scale: 1:100,000	A11NW (SW)	0	2	418874 414333
	Drift Deposits None				
	Bedrock Aquifer Designations Aquifer Designation: Secondary Aquifer - A	A11NW (SW)	0	1	418874 414333
	Superficial Aquifer Designations Aquifer Designation: Secondary Aquifer - A	A11NW (S)	0	1	418855 414263
	Superficial Aquifer Designations Aquifer Designation: Secondary Aquifer - A	A10SE (SW)	0	1	418735 414253
27	Source Protection Zones Name: Storthes Hall Park Source: Environment Agency, Head Office Reference: Ne168 Type: Zone II (Outer Protection Zone): Either 25% of the source area or a 400 day travel time whichever is greater.	A6SE (S)	809	2	418592 413496
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A11SW (S)	0	2	418855 414250
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10SE (S)	0	2	418850 414250
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10NE (W)	49	2	418569 414398
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				
28	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 569.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Beldon Brook Catchment Name: Aire and Calder Primacy: 1	A11SW (S)	0	3	418868 414255
29	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 106.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A14NE (NW)	21	3	418538 415010

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
30	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 14.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A14NE (NW)	26	3	418549 415014
31	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 78.3 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A14NE (NW)	30	3	418568 415023
32	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 79.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A11SW (SE)	37	3	419120 414213
33	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 252.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Beldon Brook Catchment Name: Aire and Calder Primacy: 1	A11SW (E)	56	3	419192 414208
34	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 123.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A14SW (NW)	69	3	418450 414905
35	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 7.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A14NW (NW)	81	3	418456 415028
36	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 4.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A14NE (N)	85	3	418626 415044
37	OS Water Network Lines Watercourse Form: Lake Watercourse Length: 7.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A14NE (N)	86	3	418633 415046
38	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 87.4 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A14NW (NW)	88	3	418453 415035

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
39	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 227.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A10NE (W)	90	3	418655 414259
40	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 85.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A14NE (N)	92	3	418637 415046
41	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 405.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A14NW (NW)	93	3	418444 415032
42	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 3.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A10NE (W)	94	3	418655 414259
43	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 93.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Beldon Brook Catchment Name: Aire and Calder Primacy: 1	A10SE (SW)	94	3	418732 414248
44	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 292.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Woodsome Beck Catchment Name: Aire and Calder Primacy: 1	A10SE (W)	98	3	418654 414256
45	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 426.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A10NE (W)	102	3	418566 414409
46	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 5.2 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Beldon Brook Catchment Name: Aire and Calder Primacy: 1	A10SE (SW)	106	3	418737 414250
47	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 820.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Fenay Beck Catchment Name: Aire and Calder Primacy: 1	A14SW (NW)	123	3	418396 414685

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
48	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 19.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A10NE (W)	157	3	418522 414370
49	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 323.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A14NW (NW)	169	3	418423 415117
50	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 16.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A10NW (W)	170	3	418513 414353
51	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 117.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A14NE (N)	176	3	418704 415091
52	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 456.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A10NW (W)	179	3	418507 414338
53	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 318.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A10NW (NW)	205	3	418390 414589
54	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 123.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Beldon Brook Catchment Name: Aire and Calder Primacy: 1	A11SE (E)	208	3	419383 414213
55	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 146.1 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A11SE (E)	208	3	419383 414213
56	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 277.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A11NE (E)	273	3	419456 414339

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
57	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 56.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A11SE (E)	276	3	419427 414145
58	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 244.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Beldon Brook Catchment Name: Aire and Calder Primacy: 1	A11SE (E)	276	3	419427 414145
59	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 27.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A10SE (SW)	322	3	418590 414036
60	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 27.5 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A10SE (SW)	323	3	418569 414048
61	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 468.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Woodsome Beck Catchment Name: Aire and Calder Primacy: 1	A10SE (SW)	328	3	418592 414034
62	OS Water Network Lines Watercourse Form: Lake Watercourse Length: 37.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A10SE (SW)	345	3	418545 414034
63	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 92.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A10SW (SW)	369	3	418513 414022
64	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 194.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A14NW (NW)	372	3	418197 415163
65	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 394.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Rushfield Dike Catchment Name: Aire and Calder Primacy: 1	A13NE (NW)	383	3	418176 415144

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
66	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 345.4 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A10NW (W)	423	3	418211 414515
67	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 3.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A10SW (SW)	437	3	418437 413990
68	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 158.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A10SW (SW)	440	3	418434 413989
69	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 5.5 Watercourse Level: Underground Permanent: True Watercourse Name: Beldon Brook Catchment Name: Aire and Calder Primacy: 1	A12SW (E)	480	3	419604 414042
70	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 352.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Beldon Brook Catchment Name: Aire and Calder Primacy: 1	A12SW (E)	483	3	419604 414037
71	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 50.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A15SE (NE)	483	3	419375 414808
72	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 111.4 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A6NE (S)	533	3	418691 413762
73	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 384.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Woodsome Beck Catchment Name: Aire and Calder Primacy: 1	A6NE (S)	533	3	418691 413762
74	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 98.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A13SE (NW)	534	3	418029 414773

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
75	OS Water Network Lines Watercourse Form: Lake Watercourse Length: 38.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A13SE (NW)	543	3	417994 414864
76	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 86.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A13SE (NW)	555	3	417965 414889
77	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 41.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A9SE (W)	566	3	418157 414155
78	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 64.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A9SE (W)	566	3	418157 414155
79	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 50.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Rushfield Dike Catchment Name: Aire and Calder Primacy: 1	A13NE (NW)	568	3	417954 414967
80	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 286.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Rushfield Dike Catchment Name: Aire and Calder Primacy: 1	A13NE (NW)	570	3	417954 414967
81	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 19.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A9SE (W)	614	3	418121 414116
82	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 12.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A9SE (W)	632	3	418107 414100
83	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 1.1 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A9SE (W)	632	3	418108 414100

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
84	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 813.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A6NE (SW)	635	3	418595 413705
85	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 43.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A9SE (W)	664	3	418082 414077
86	OS Water Network Lines Watercourse Form: Lake Watercourse Length: 21.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A9NE (W)	721	3	417958 414297
87	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 48.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A12SW (E)	733	3	419844 413958
88	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 295.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Beldon Brook Catchment Name: Aire and Calder Primacy: 1	A12SW (E)	733	3	419844 413958
89	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 24.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A9NE (W)	740	3	417937 414301
90	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 57.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A9SE (W)	744	3	418012 414041
91	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 3.1 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A9NE (W)	759	3	417916 414309
92	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 542.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A6SE (S)	759	3	418738 413487

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
93	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 656.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Rushfield Dike Catchment Name: Aire and Calder Primacy: 1	A13SW (NW)	760	3	417755 414883
94	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 3.5 Watercourse Level: Underground Permanent: True Watercourse Name: Rushfield Dike Catchment Name: Aire and Calder Primacy: 1	A13SW (NW)	760	3	417766 414919
95	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 146.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A6SE (S)	761	3	418732 413488
96	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 17.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A9NE (W)	763	3	417912 414309
97	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 121.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A9NE (W)	766	3	417869 414467
98	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 85.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A9NE (W)	766	3	417869 414467
99	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 66.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A9NE (W)	806	3	417871 414298
100	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 33.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 2	A6SE (S)	875	3	418637 413404
101	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 27.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A6SE (S)	875	3	418640 413402

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
102	OS Water Network Lines Watercourse Form: Lake Watercourse Length: 17.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A9NW (W)	882	3	417763 414414
103	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 74.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A12SE (E)	895	3	420041 414014
104	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 278.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Beldon Brook Catchment Name: Aire and Calder Primacy: 1	A12SE (E)	895	3	420041 414014
105	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 86.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A9NW (W)	898	3	417748 414407
106	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 25.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A6SE (S)	899	3	418620 413384
107	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 46.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 2	A6SE (S)	913	3	418592 413382
108	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 29.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A6SE (S)	918	3	418597 413375
109	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 162.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A6SE (S)	944	3	418574 413357
110	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 3.6 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A12SE (E)	948	3	420077 413958

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
111	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 47.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A12SE (E)	951	3	420080 413956
112	OS Water Network Lines Watercourse Form: Lake Watercourse Length: 9.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Aire and Calder Primacy: 1	A12SE (E)	997	3	420119 413928

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
113	Historical Landfill Sites Licence Holder: Not Supplied Location: Netheroyd Hill Road, Huddersfield, West Yorkshire Name: Netheroyd Hill Tip Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD31706 First Input Date: Not Supplied Last Input Date: Not Supplied Specified Waste: Not Supplied Type: EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: Not Supplied BGS Ref: 2139 Other Ref: Not Supplied	A11SW (SE)	94	2	419167 414156
114	Historical Landfill Sites Licence Holder: Land Reclamation Northern Limited Location: Low Fold Farm, Little Lepton, Huddersfield, West Yorkshire Name: Low Fold Farm Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD33022 First Input Date: 31st March 1985 Last Input Date: Not Supplied Specified Waste: Deposited Waste included Industrial, Commercial and Household Waste Type: EA Waste Ref: 60999 Regis Ref: YQ1/L/LAN001 WRC Ref: 4700/0753 BGS Ref: Not Supplied Other Ref: 491, NE4662	A12NE (E)	924	2	420111 414338
115	Licensed Waste Management Facilities (Landfill Boundaries) Name: Low Fold Farm Licence Number: 60999 Location: Low Fold Farm, Little Lepton, Huddersfield, West Yorkshire, HD8 0LN Licence Holder: Land Reclamation Northern Limited Authority: Environment Agency - North East Region, Ridings Area Site Category: Household, Commercial And Industrial Waste Landfills Max Input Rate: Small (Less than 25,000 tonnes per year) Licence Status: Inactive Issued: 21st March 1985 Positional Accuracy: Positioned by the supplier Boundary Accuracy: As Supplied	A12NE (E)	924	2	420111 414338
	Local Authority Landfill Coverage Name: Kirklees Metropolitan Borough Council - Has not been able to supply Landfill data		0	4	418874 414333
116	Potentially Infilled Land (Non-Water) Bearing Ref: N Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A11NW (N)	0	-	418879 414416
117	Potentially Infilled Land (Non-Water) Bearing Ref: E Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A11NW (E)	0	-	418882 414335
118	Potentially Infilled Land (Non-Water) Bearing Ref: NW Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A10NE (NW)	0	-	418672 414425
119	Potentially Infilled Land (Non-Water) Bearing Ref: N Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A15SW (N)	22	-	418878 414598
120	Potentially Infilled Land (Non-Water) Bearing Ref: N Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A14SE (N)	141	-	418848 414712
121	Potentially Infilled Land (Non-Water) Bearing Ref: NW Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1989	A14NW (NW)	207	-	418400 415148

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
122	Potentially Infilled Land (Non-Water) Bearing Ref: N Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A15SW (N)	210	-	418879 414854
123	Potentially Infilled Land (Non-Water) Bearing Ref: N Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1989	A14NE (N)	298	-	418762 415208
124	Potentially Infilled Land (Non-Water) Bearing Ref: NE Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A15SE (NE)	390	-	419254 414787
125	Potentially Infilled Land (Non-Water) Bearing Ref: N Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1989	A15NW (N)	423	-	418940 415180
126	Potentially Infilled Land (Non-Water) Bearing Ref: S Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A7NW (S)	483	-	418863 413739
127	Potentially Infilled Land (Non-Water) Bearing Ref: NE Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A15NW (NE)	533	-	419182 414976
128	Potentially Infilled Land (Non-Water) Bearing Ref: S Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A7SW (S)	810	-	418921 413397
129	Potentially Infilled Land (Non-Water) Bearing Ref: S Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A7SW (S)	848	-	419063 413359
130	Potentially Infilled Land (Non-Water) Bearing Ref: E Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1993	A12SE (E)	881	-	420010 413968
131	Potentially Infilled Land (Non-Water) Bearing Ref: E Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1993	A12NE (E)	931	-	420068 414594
132	Potentially Infilled Land (Non-Water) Bearing Ref: S Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A7SW (S)	934	-	419144 413281
133	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A15NE (NE)	631	-	419367 415001

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Pennine Lower Coal Measures Formation And South Wales Lower Coal Measures Formation (Undifferentiated)	A11NW (SW)	0	1	418874 414333
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A10NE (SW)	0	1	418839 414272
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A10NE (NW)	0	1	418677 414586
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A10SE (SW)	0	1	418735 414253
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A11SW (SE)	0	1	418936 414239
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A11NW (NE)	0	1	418914 414376
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 120 - 180 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A10NE (NW)	0	1	418650 414529

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A11SW (S)	0	1	418878 414215
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A10SE (SW)	0	1	418832 414245
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A11NW (NE)	0	1	419028 414430
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A11NW (SW)	0	1	418874 414333
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 120 - 180 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A11NW (S)	1	1	418855 414263
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 35 - 45 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A14NE (N)	14	1	418641 415000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A14SE (NW)	16	1	418524 414926
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A14NE (NW)	17	1	418535 415000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 120 - 180 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A10NE (W)	39	1	418651 414292
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A14SE (N)	65	1	418819 414715
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 120 - 180 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A11SE (E)	72	1	419238 414226
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A14NE (N)	73	1	418719 415000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A11NE (E)	77	1	419247 414348
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A11NW (NE)	113	1	419153 414513
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A11SW (S)	116	1	418958 414077
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 35 - 45 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A15NW (N)	139	1	418861 415000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A10SE (W)	140	1	418570 414247
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A14SW (NW)	163	1	418372 414848

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 15 - 30 mg/kg Concentration:	A10SE (W)	164	1	418546 414239
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 25 - 35 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 15 - 30 mg/kg Concentration:	A14NW (NW)	184	1	418340 415000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 25 - 35 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 15 - 30 mg/kg Concentration:	A15NW (N)	203	1	418874 415000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 15 - 30 mg/kg Concentration:	A14SW (NW)	207	1	418342 414869
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 35 - 45 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 30 - 45 mg/kg Concentration:	A14NW (NW)	208	1	418316 415000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 25 - 35 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 15 - 30 mg/kg Concentration:	A11SE (E)	227	1	419389 414179

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 35 - 45 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A14NW (NW)	289	1	418235 415000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 35 - 45 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A15NW (N)	292	1	418944 415053
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A7NW (SE)	304	1	419100 413912
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 120 - 180 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A10SE (SW)	321	1	418685 414027
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A10SE (SW)	347	1	418681 414000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A15SE (NE)	366	1	419370 414657

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A15NW (N)	415	1	419115 415000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A13SE (NW)	425	1	418006 414828
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 35 - 45 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A13NE (NW)	458	1	418101 415184
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A15SE (NE)	471	1	419509 414665
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A15NE (NE)	524	1	419300 415021
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A6NE (SW)	529	1	418535 413841

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A12NW (E)	530	1	419705 414404
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A16SW (E)	557	1	419648 414622
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A7NW (S)	561	1	419036 413644
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A6NE (SW)	576	1	418572 413781
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 35 - 45 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A13NW (NW)	717	1	417808 414934
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A15NE (NE)	721	1	419492 415023

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 35 - 45 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 30 - 45 mg/kg Concentration:	A13NW (NW)	722	1	417802 415000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 15 - 30 mg/kg Concentration:	A5NE (SW)	728	1	418154 413846
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 25 - 35 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 120 - 180 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 30 - 45 mg/kg Concentration:	A13SW (NW)	738	1	417788 414912
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 15 - 30 mg/kg Concentration:	A9SE (W)	772	1	418000 414000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 25 - 35 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 15 - 30 mg/kg Concentration:	A12NE (E)	814	1	420000 414270
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 25 - 35 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 15 - 30 mg/kg Concentration:	A12NE (E)	815	1	420000 414342

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: 100 - 200 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A7SE (SE)	828	1	419500 413500
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A12SE (E)	832	1	420000 414110
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A16SE (E)	858	1	419939 414725
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A16NW (NE)	863	1	419783 414936
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A16SE (E)	875	1	420000 414618
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 30 - 45 mg/kg Concentration:	A16NW (NE)	902	1	419779 415000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 35 - 45 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 30 - 45 mg/kg Concentration:	A13SW (W)	921	1	417617 414801
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 25 - 35 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 90 - 120 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 15 - 30 mg/kg Concentration:	A12NE (E)	931	1	420105 414445
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 15 - 30 mg/kg Concentration:	A5NE (SW)	934	1	417943 413785
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 25 - 35 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8NE (SE)	939	1	419942 413719
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: 100 - 200 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SW (SE)	945	1	419733 413500
134	BGS Recorded Mineral Sites Site Name: Woodsome Colliery Location: , Rowley Hill, Fenay Bridge, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 13350 Type: Underground Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A11NW (NE)	0	1	418930 414425

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
135	BGS Recorded Mineral Sites Site Name: Rowley Bottom Gravel Pit Location: , Rowley Hill, Fenay Bridge, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 94352 Type: Opencast Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Alluvium Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A10NE (NW)	0	1	418673 414426
136	BGS Recorded Mineral Sites Site Name: Beldon Brook Mine Location: , Rowley Hill, Fenay Bridge, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 94426 Type: Underground Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A11SW (SE)	57	1	419089 414165
137	BGS Recorded Mineral Sites Site Name: Victoria Colliery Location: , Rowley Hill, Fenay Bridge, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 13349 Type: Underground Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A14SE (N)	69	1	418810 414650
138	BGS Recorded Mineral Sites Site Name: Lepton Great Wood Coal Pits Location: , Rowley Hill, Fenay Bridge, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 94424 Type: Underground Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A11NE (E)	226	1	419413 414280
138	BGS Recorded Mineral Sites Site Name: Lepton Great Wood Coal Pits Location: , Rowley Hill, Fenay Bridge, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 94425 Type: Underground Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A11NE (E)	255	1	419442 414298
139	BGS Recorded Mineral Sites Site Name: Rowley Location: , Rowley Hill, Fenay Bridge, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 94351 Type: Opencast Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Kirkburton Sandstone Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A15SW (N)	236	1	418876 414907

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
140	BGS Recorded Mineral Sites Site Name: Cowmes Top Location: Station Road, Fenay Bridge, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 94293 Type: Opencast Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A14NE (N)	347	1	418847 415185
141	BGS Recorded Mineral Sites Site Name: Cowmes Top Location: Station Road, Fenay Bridge, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 94290 Type: Opencast Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A14NE (N)	370	1	418821 415251
142	BGS Recorded Mineral Sites Site Name: Cowmes Top Location: Station Road, Fenay Bridge, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 94291 Type: Opencast Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A15NW (N)	418	1	418933 415182
143	BGS Recorded Mineral Sites Site Name: Victoria Colliery Location: Rowley Lane, Bogden, Rowley Hill, Fenay Bridge, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 13347 Type: Underground Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A15SE (NE)	520	1	419390 414845
144	BGS Recorded Mineral Sites Site Name: Cowmes Top Location: , Lepton, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 94294 Type: Opencast Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A15NW (N)	550	1	419076 415203
145	BGS Recorded Mineral Sites Site Name: Cowmes Top Location: , Lepton, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 94295 Type: Opencast Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A15NW (N)	583	1	419140 415153

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
146	BGS Recorded Mineral Sites Site Name: Bogden Fireclay Mine Location: Rowley Lane, Bogden, Rowley Hill, Fenay Bridge, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 13348 Type: Underground Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Fireclay Positional Accuracy: Located by supplier to within 10m	A16SW (NE)	800	1	419795 414820
146	BGS Recorded Mineral Sites Site Name: Bogden Fireclay Mine Location: Rowley Lane, Bogden, Rowley Hill, Fenay Bridge, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 13348 Type: Underground Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A16SW (NE)	800	1	419795 414820
147	BGS Recorded Mineral Sites Site Name: Highburton Location: , Highburton, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 94427 Type: Opencast Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Kirkburton Sandstone Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A7SW (S)	850	1	419068 413357
148	BGS Recorded Mineral Sites Site Name: Beldon Brook Bridge Coal Pit Location: , Highburton, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 94423 Type: Underground Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A12SE (E)	872	1	420004 413979
149	BGS Recorded Mineral Sites Site Name: Little Lepton Location: , Little Lepton, Fenay Bridge, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 94354 Type: Opencast Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A16SE (E)	918	1	420045 414623

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
149	BGS Recorded Mineral Sites Site Name: Little Lepton Location: , Little Lepton, Fenay Bridge, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 94353 Type: Opencast Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A12NE (E)	939	1	420078 414592
150	BGS Recorded Mineral Sites Site Name: Manor Mill Location: , Highburton, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 94422 Type: Opencast Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Kirkburton Sandstone Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A12SE (E)	948	1	420072 413943
151	BGS Recorded Mineral Sites Site Name: Dyson'S Quarry Location: , Highburton, Huddersfield, West Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 94430 Type: Opencast Status: Ceased Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Kirkburton Sandstone Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A7SW (S)	970	1	419171 413249
	BGS Measured Urban Soil Chemistry No data available				
	BGS Urban Soil Chemistry Averages No data available				
	Coal Mining Affected Areas Description: In an area which may be affected by coal mining activity. It is recommended that a coal mining report is obtained from the Coal Authority. Contact details are included in the Useful Contacts section of this report.	A11NW (SW)	0	5	418874 414333
	Mining Instability Mining Evidence: Inconclusive Coal Mining Source: Ove Arup & Partners Boundary Quality: As Supplied	A11NW (SW)	0	-	418874 414333
	Mining Instability Mining Evidence: Conclusive Rock Mining Source: Ove Arup & Partners Boundary Quality: As Supplied	A11NW (SW)	0	-	418874 414333
	Man-Made Mining Cavities Easting: 419000 Northing: 414300 Distance: 0 Quadrant Reference: A11 Quadrant Reference: NW Bearing Ref: E Cavity Type: Not supplied Commodity: Clay Solid Geology Detail: No Details Superficial Geology: No Details Detail:	A11NW (E)	0	6	419000 414300

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Man-Made Mining Cavities Easting: 418900 Northing: 414700 Distance: 169 Quadrant Reference: A15 Quadrant Reference: SW Bearing Ref: N Cavity Type: Not supplied Commodity: Clay Solid Geology Detail: No Details Superficial Geology No Details Detail:	A15SW (N)	169	6	418900 414700
	Man-Made Mining Cavities Easting: 417900 Northing: 413900 Distance: 907 Quadrant Reference: A5 Quadrant Reference: NE Bearing Ref: SW Cavity Type: Not supplied Commodity: Fireclay Solid Geology Detail: Pennine Lower Coal Measures Superficial Geology No Details Detail:	A5NE (SW)	907	6	417900 413900
	Man-Made Mining Cavities Easting: 419800 Northing: 415000 Distance: 917 Quadrant Reference: A16 Quadrant Reference: NW Bearing Ref: NE Cavity Type: Not supplied Commodity: Fireclay Solid Geology Detail: No Details Superficial Geology No Details Detail:	A16NW (NE)	917	6	419800 415000
	Non Coal Mining Areas of Great Britain No Hazard				
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A11NW (SW)	0	1	418874 414333
	Potential for Collapsible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11NW (S)	0	1	418855 414263
	Potential for Collapsible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A10SE (SW)	0	1	418735 414253
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A15NW (N)	14	1	418874 415000
	Potential for Collapsible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A14NW (NW)	53	1	418474 415000
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A14NW (NW)	184	1	418340 415000
	Potential for Compressible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A11NW (NE)	0	1	418923 414358
	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A10SE (SW)	0	1	418735 414253
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11NW (SW)	0	1	418874 414333
	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A11NW (S)	0	1	418855 414263

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A15NW (N)	14	1	418874 415000
	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A14NW (NW)	53	1	418474 415000
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A14NW (NW)	184	1	418340 415000
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11NW (SW)	0	1	418874 414333
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A15NW (N)	14	1	418874 415000
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A10NE (NW)	0	1	418677 414573
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A11SW (SE)	0	1	418958 414239
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A11NW (SW)	0	1	418874 414333
	Potential for Landslide Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A14NE (NW)	0	1	418554 414944
	Potential for Landslide Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A14SE (N)	5	1	418823 414665
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A11SW (E)	9	1	419183 414256
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A15NW (N)	14	1	418874 415000
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A10NE (SW)	15	1	418830 414277
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A14SE (NW)	16	1	418524 414926
	Potential for Landslide Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A14NE (NW)	17	1	418535 415000
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A14NW (NW)	20	1	418514 415000
	Potential for Landslide Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A10NE (SW)	30	1	418839 414272
	Potential for Landslide Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A11SW (S)	35	1	418859 414234
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A14NW (NW)	53	1	418474 415000
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A14SE (N)	65	1	418819 414715
	Potential for Landslide Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A14NE (N)	73	1	418719 415000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Landslide Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A11SW (S)	75	1	418946 414114
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A11NE (E)	77	1	419247 414348
	Potential for Landslide Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A14NE (NW)	79	1	418527 415062
	Potential for Landslide Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A11NE (E)	91	1	419275 414320
	Potential for Landslide Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A11NE (E)	95	1	419230 414397
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A11NW (NE)	113	1	419153 414513
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A11SW (S)	116	1	418958 414077
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A10NE (W)	127	1	418544 414375
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A15SW (N)	135	1	418857 414767
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A10SE (W)	141	1	418586 414244
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A14NE (N)	152	1	418656 415121
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A11NE (E)	161	1	419347 414313
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A10NE (W)	164	1	418535 414271
	Potential for Landslide Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A10NW (W)	169	1	418497 414417
	Potential for Landslide Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A10SE (W)	171	1	418546 414239
	Potential for Landslide Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A10NW (W)	172	1	418475 414497
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A11SW (S)	173	1	418943 414038
	Potential for Landslide Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A11SW (S)	184	1	418921 414025
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A14NE (N)	203	1	418803 415014
	Potential for Landslide Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A11NE (E)	205	1	419391 414282
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A14SW (NW)	207	1	418342 414869

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A10SE (SW)	210	1	418731 414141
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A11SE (E)	216	1	419371 414167
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A14NE (N)	218	1	418790 415168
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A11SE (E)	227	1	419389 414179
	Potential for Landslide Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A10NW (NW)	232	1	418386 414571
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A14NW (NW)	243	1	418254 415000
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A14SW (NW)	244	1	418315 414764
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11NW (SW)	0	1	418874 414333
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A11NW (S)	0	1	418855 414263
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A10SE (SW)	0	1	418735 414253
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A11NW (NE)	0	1	418923 414358
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A15NW (N)	14	1	418874 415000
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A14NW (NW)	53	1	418474 415000
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A14NW (NW)	184	1	418340 415000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11SW (S)	0	1	418878 414215
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A10SE (SW)	0	1	418832 414245
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11NW (NE)	0	1	419028 414430
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A11NW (NE)	0	1	418914 414376
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11NW (SW)	0	1	418874 414333
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A15NW (N)	14	1	418861 415000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A14SE (NW)	16	1	418524 414926

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A14NE (NW)	17	1	418535 415000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A15NW (N)	53	1	418874 415000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A14SE (N)	65	1	418819 414715
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A14NE (N)	73	1	418719 415000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11NE (E)	77	1	419247 414348
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11NW (NE)	113	1	419153 414513
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11SW (S)	116	1	418958 414077
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A10SE (W)	140	1	418570 414247
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A10SE (W)	164	1	418546 414239
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A14SW (NW)	207	1	418342 414869
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A14NW (NW)	208	1	418316 415000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11SE (E)	227	1	419389 414179
	Radon Potential - Radon Affected Areas Affected Area: The property is in an Intermediate probability radon area (1 to 3% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	A11NW (SW)	0	1	418874 414333
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A11NW (SW)	0	1	418874 414333

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
152	Contemporary Trade Directory Entries Name: Paxman Coolers Ltd Location: International House, Penistone Road, Fenay Bridge, Huddersfield, HD8 0LE Classification: Medical Equipment Manufacturers Status: Inactive Positional Accuracy: Automatically positioned to the address	A10NE (W)	55	-	418662 414300
152	Contemporary Trade Directory Entries Name: Aqua 3 Location: International House, Penistone Rd, Fenay Bridge, Huddersfield, West Yorkshire, HD8 0LE Classification: Water Coolers Status: Inactive Positional Accuracy: Automatically positioned to the address	A10NE (W)	55	-	418662 414300
152	Contemporary Trade Directory Entries Name: Brewfitt Location: International House, Penistone Road, Fenay Bridge, Huddersfield, HD8 0LE Classification: Catering Equipment Status: Inactive Positional Accuracy: Automatically positioned to the address	A10NE (W)	60	-	418647 414305
152	Contemporary Trade Directory Entries Name: Coolfitt Location: International House, Penistone Road, Fenay Bridge, Huddersfield, HD8 0LE Classification: Air Conditioning & Refrigeration Contractors Status: Inactive Positional Accuracy: Automatically positioned to the address	A10NE (W)	60	-	418647 414305
152	Contemporary Trade Directory Entries Name: Easilift Loading Sytems Ltd Location: Pembroke House, Penistone Road, Fenay Bridge, HUDDERSFIELD, HD8 0LF Classification: Lifting Equipment Status: Active Positional Accuracy: Automatically positioned to the address	A10SE (W)	90	-	418687 414257
153	Contemporary Trade Directory Entries Name: Reliance Precision Ltd Location: Rowley Mills, Penistone Road, Fenay Bridge, HUDDERSFIELD, HD8 0LE Classification: Precision Engineers Status: Active Positional Accuracy: Automatically positioned to the address	A10NE (SW)	67	-	418825 414308
154	Contemporary Trade Directory Entries Name: D J Mccarthy Associates Ltd Location: Hermitage House, Rowley Lane, Fenay Bridge, Huddersfield, HD8 0JG Classification: Engineering Machine Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A15SW (NE)	221	-	419164 414645
155	Contemporary Trade Directory Entries Name: Ultrastore Ltd Location: Penistone Road, Fenay Bridge, Huddersfield, HD8 0LF Classification: Tanks, Vats & Cisterns Status: Inactive Positional Accuracy: Automatically positioned to the address	A10SE (SW)	231	-	418761 414094
156	Contemporary Trade Directory Entries Name: Yorkshire Roofline Location: 19, Rowley Hill, Fenay Bridge, Huddersfield, West Yorkshire, HD8 0JF Classification: Fascias and Soffits Status: Inactive Positional Accuracy: Automatically positioned to the address	A15SW (N)	262	-	418961 414772
157	Contemporary Trade Directory Entries Name: Connection Seating Location: Dogley Mills, Penistone Road, Fenay Bridge, Huddersfield, HD8 0LE Classification: Seating Manufacturers Status: Active Positional Accuracy: Automatically positioned to the address	A10SE (SW)	324	-	418688 414023
157	Contemporary Trade Directory Entries Name: Labtex Ltd Location: Dogley Mills, Penistone Road, Fenay Bridge, HUDDERSFIELD, HD8 0LE Classification: Laboratory Equipment, Instruments & Supplies Status: Active Positional Accuracy: Automatically positioned to the address	A10SE (SW)	324	-	418688 414023

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
157	Contemporary Trade Directory Entries Name: Fays Transport Location: Dogley Mills, Penistone Rd, Fenay Bridge, Huddersfield, West Yorkshire, HD8 0NQ Classification: Road Haulage Services Status: Inactive Positional Accuracy: Manually positioned to the address or location	A10SE (SW)	324	-	418688 414023
158	Contemporary Trade Directory Entries Name: Sydney H Shaw & Co Ltd Location: Primrose Lane, Kirkburton, Huddersfield, West Yorkshire, HD8 0QY Classification: Clothing & Fabrics - Manufacturers Status: Inactive Positional Accuracy: Automatically positioned to the address	A7NW (S)	519	-	418980 413686
159	Contemporary Trade Directory Entries Name: C G Hobson & Son Location: 159, Penistone Road, Kirkburton, Huddersfield, HD8 0RB Classification: Waste Disposal Services Status: Active Positional Accuracy: Automatically positioned to the address	A6NE (S)	633	-	418808 413598
160	Contemporary Trade Directory Entries Name: Burton Safe Co Location: 165-167, Penistone Road, Kirkburton, Huddersfield, HD8 0PH Classification: Safes & Vaults - Suppliers & Installers Status: Inactive Positional Accuracy: Automatically positioned to the address	A6SE (S)	668	-	418834 413555
161	Contemporary Trade Directory Entries Name: B P Scrap Metal Location: 2, Ings Way East, Lepton, Huddersfield, HD8 0DT Classification: Scrap Metal Merchants Status: Active Positional Accuracy: Automatically positioned to the address	A15NE (NE)	805	-	419352 415227
162	Contemporary Trade Directory Entries Name: Parkview Engineering Location: 197, Penistone Road, Kirkburton, Huddersfield, HD8 0PH Classification: Mechanical Engineers Status: Inactive Positional Accuracy: Automatically positioned to the address	A7SW (S)	805	-	418932 413402
163	Contemporary Trade Directory Entries Name: United Co Operatives Location: Penistone Rd, Waterloo, Huddersfield, West Yorkshire, HD5 8RL Classification: Petrol Filling Stations Status: Inactive Positional Accuracy: Manually positioned to the road within the address or location	A7SW (S)	820	-	418920 413388
163	Contemporary Trade Directory Entries Name: Easilift Loading Systems Ltd Location: Spring Grove, Penistone Road, Kirkburton, Huddersfield, HD8 0PL Classification: Materials Handling Equipment Status: Inactive Positional Accuracy: Automatically positioned to the address	A7SW (S)	835	-	418884 413376
164	Contemporary Trade Directory Entries Name: A & P Engineering Location: 1, Storthes Hall Lane, Kirkburton, Huddersfield, HD8 0PP Classification: Engineers - General Status: Inactive Positional Accuracy: Automatically positioned to the address	A6SE (S)	858	-	418813 413366
165	Points of Interest - Commercial Services Name: Fays Transport Location: Dogley Mills, Penistone Rd, Fenay Bridge, Huddersfield, West Yorkshire, HD8 0NQ Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A10SE (SW)	324	7	418688 414023
165	Points of Interest - Commercial Services Name: Fays Transport Ltd Location: Dogley Mills, Penistone Road, Fenay Bridge, Huddersfield, HD8 0NQ Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A10SE (SW)	324	7	418688 414023

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
166	Points of Interest - Commercial Services Name: P C S Asbestos Consultants Location: 2 Moor Lane, Kirkburton, Huddersfield, HD8 0QS Category: Recycling Services Class Code: Recycling, Reclamation and Disposal Positional Accuracy: Positioned to address or location	A7SE (SE)	731	7	419304 413525
167	Points of Interest - Commercial Services Name: B P Scrap Metal Location: 2 Ings Way East, Lepton, Huddersfield, HD8 0DT Category: Recycling Services Class Code: Scrap Metal Merchants Positional Accuracy: Positioned to address or location	A15NE (NE)	805	7	419352 415227
167	Points of Interest - Commercial Services Name: B P Scrap Metal Location: 2 Ings Way East, Lepton, Huddersfield, HD8 0DT Category: Recycling Services Class Code: Scrap Metal Merchants Positional Accuracy: Positioned to address or location	A15NE (NE)	805	7	419352 415227
168	Points of Interest - Commercial Services Name: Natural Health Distribution Ltd Location: 54 Moor Lane, Kirkburton, Huddersfield, HD8 0QS Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A8SW (SE)	978	7	419687 413429
169	Points of Interest - Manufacturing and Production Name: Shaft (Disused) Location: HD8 Category: Extractive Industries Class Code: Unspecified Quarries Or Mines Positional Accuracy: Positioned to address or location	A11NE (E)	246	7	419433 414297
170	Points of Interest - Manufacturing and Production Name: Rangeley Location: Busk Farm, Northfield La, Kirkburton, Huddersfield, West Yorkshire, HD8 0QT Category: Farming Class Code: Livestock Farming Positional Accuracy: Positioned to address or location	A7NW (SE)	311	7	419090 413905
170	Points of Interest - Manufacturing and Production Name: D Rangeley Location: 33 Northfield Lane, Kirkburton, Huddersfield, HD8 0QT Category: Farming Class Code: Livestock Farming Positional Accuracy: Positioned to address or location	A7NW (SE)	311	7	419090 413906
171	Points of Interest - Manufacturing and Production Name: Lion Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A15SW (N)	363	7	419026 414889
172	Points of Interest - Manufacturing and Production Name: Tank Location: HD8 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	A12NE (E)	776	7	419962 414313
172	Points of Interest - Manufacturing and Production Name: Tank Location: HD8 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	A12NE (E)	782	7	419968 414321
172	Points of Interest - Manufacturing and Production Name: Tanks Location: HD8 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A12NE (E)	787	7	419973 414325
172	Points of Interest - Manufacturing and Production Name: Tank Location: HD8 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	A12NE (E)	791	7	419977 414332

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
173	Points of Interest - Public Infrastructure Name: Weir Location: HD8 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A11SW (SE)	6	7	418955 414233
174	Points of Interest - Public Infrastructure Name: Weir Location: HD8 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A14SW (NW)	119	7	418433 414874
175	Points of Interest - Public Infrastructure Name: Weir Location: HD8 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A11SE (E)	126	7	419282 414195
176	Points of Interest - Public Infrastructure Name: Weir (Disused) Location: HD8 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A10NE (W)	147	7	418531 414373
177	Points of Interest - Public Infrastructure Name: Weir Location: HD8 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A6SE (S)	806	7	418839 413413

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
178	Ancient Woodland Name: Lepton Great Wood Reference: 1103068 Area(m ²): 216498.46 Type: Ancient and Semi-Natural Woodland	A11SE (E)	107	8	419286 414239
179	Ancient Woodland Name: Carr Wood Reference: 1103057 Area(m ²): 617991.95 Type: Ancient and Semi-Natural Woodland	A13SE (NW)	705	8	417849 414777
180	Areas of Adopted Green Belt Authority: Kirklees Metropolitan Borough Council Plan Name: Kirklees Unitary Development Plan Status: Adopted Plan Date: 1st March 1999	A11NW (SW)	0	9	418874 414333

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices Wakefield City Metropolitan District Council - Environmental Health Kirklees Metropolitan Borough Council - Planning Services	March 2015 November 2013	Annual Rolling Update Annual Rolling Update
Discharge Consents Environment Agency - North East Region	April 2017	Quarterly
Enforcement and Prohibition Notices Environment Agency - North East Region	March 2013	As notified
Integrated Pollution Controls Environment Agency - North East Region	October 2008	Not Applicable
Integrated Pollution Prevention And Control Environment Agency - North East Region	April 2017	Quarterly
Local Authority Integrated Pollution Prevention And Control Kirklees Metropolitan Borough Council - Environmental Health Department Wakefield City Metropolitan District Council - Environmental Health	April 2014 June 2014	Annual Rolling Update Annual Rolling Update
Local Authority Pollution Prevention and Controls Kirklees Metropolitan Borough Council - Environmental Health Department Wakefield City Metropolitan District Council - Environmental Health	April 2014 June 2014	Annual Rolling Update Annual Rolling Update
Local Authority Pollution Prevention and Control Enforcements Kirklees Metropolitan Borough Council - Environmental Health Department Wakefield City Metropolitan District Council - Environmental Health	April 2014 June 2014	Annual Rolling Update Annual Rolling Update
Nearest Surface Water Feature Ordnance Survey	May 2017	
Pollution Incidents to Controlled Waters Environment Agency - North East Region	December 1998	Not Applicable
Prosecutions Relating to Authorised Processes Environment Agency - North East Region	March 2013	As notified
Prosecutions Relating to Controlled Waters Environment Agency - North East Region	March 2013	As notified
Registered Radioactive Substances Environment Agency - North East Region	January 2015	
River Quality Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points Environment Agency - Head Office	July 2012	Annually
River Quality Chemistry Sampling Points Environment Agency - Head Office	July 2012	Annually
Substantiated Pollution Incident Register Environment Agency - North East Region - Ridings Area Environment Agency - North East Region - Yorkshire Area	April 2017 April 2017	Quarterly Quarterly
Water Abstractions Environment Agency - North East Region	April 2017	Quarterly
Water Industry Act Referrals Environment Agency - North East Region	April 2017	Quarterly
Groundwater Vulnerability Environment Agency - Head Office	April 2015	Not Applicable
Drift Deposits Environment Agency - Head Office	January 1999	Not Applicable
Bedrock Aquifer Designations British Geological Survey - National Geoscience Information Service	August 2015	As notified
Superficial Aquifer Designations British Geological Survey - National Geoscience Information Service	August 2015	As notified

Agency & Hydrological	Version	Update Cycle
Source Protection Zones Environment Agency - Head Office	April 2017	Quarterly
Extreme Flooding from Rivers or Sea without Defences Environment Agency - Head Office	May 2017	Quarterly
Flooding from Rivers or Sea without Defences Environment Agency - Head Office	May 2017	Quarterly
Areas Benefiting from Flood Defences Environment Agency - Head Office	May 2017	Quarterly
Flood Water Storage Areas Environment Agency - Head Office	May 2017	Quarterly
Flood Defences Environment Agency - Head Office	May 2017	Quarterly
OS Water Network Lines Ordnance Survey	April 2017	6 Weekly
Surface Water 1 in 30 year Flood Extent Environment Agency - Head Office	October 2013	As notified
Surface Water 1 in 100 year Flood Extent Environment Agency - Head Office	October 2013	As notified
Surface Water 1 in 1000 year Flood Extent Environment Agency - Head Office	October 2013	As notified
Surface Water Suitability Environment Agency - Head Office	October 2013	As notified
BGS Groundwater Flooding Susceptibility British Geological Survey - National Geoscience Information Service	May 2013	Annually

Waste	Version	Update Cycle
BGS Recorded Landfill Sites British Geological Survey - National Geoscience Information Service	June 1996	Not Applicable
Historical Landfill Sites Environment Agency - Head Office	May 2017	Quarterly
Integrated Pollution Control Registered Waste Sites Environment Agency - North East Region	October 2008	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries) Environment Agency - North East Region - Ridings Area Environment Agency - North East Region - Yorkshire Area	May 2017 May 2017	Quarterly Quarterly
Licensed Waste Management Facilities (Locations) Environment Agency - North East Region - Ridings Area Environment Agency - North East Region - Yorkshire Area	May 2017 May 2017	Quarterly Quarterly
Local Authority Landfill Coverage Kirklees Metropolitan Borough Council - Planning Services Wakefield City Metropolitan District Council - Environmental Health	May 2000 May 2000	Not Applicable Not Applicable
Local Authority Recorded Landfill Sites Kirklees Metropolitan Borough Council - Planning Services Wakefield City Metropolitan District Council - Environmental Health	May 2000 May 2000	Not Applicable Not Applicable
Potentially Infilled Land (Non-Water) Landmark Information Group Limited	December 1999	Not Applicable
Potentially Infilled Land (Water) Landmark Information Group Limited	December 1999	Not Applicable
Registered Landfill Sites Environment Agency - North East Region - Ridings Area Environment Agency - North East Region - Yorkshire Area	March 2003 March 2003	Not Applicable Not Applicable
Registered Waste Transfer Sites Environment Agency - North East Region - Ridings Area Environment Agency - North East Region - Yorkshire Area	March 2003 March 2003	Not Applicable Not Applicable
Registered Waste Treatment or Disposal Sites Environment Agency - North East Region - Ridings Area Environment Agency - North East Region - Yorkshire Area	March 2003 March 2003	Not Applicable Not Applicable
Hazardous Substances	Version	Update Cycle
Control of Major Accident Hazards Sites (COMAH) Health and Safety Executive	March 2017	Bi-Annually
Explosive Sites Health and Safety Executive	March 2017	Bi-Annually
Notification of Installations Handling Hazardous Substances (NIHHS) Health and Safety Executive	November 2000	Not Applicable
Planning Hazardous Substance Enforcements Kirklees Metropolitan Borough Council - Planning Services Wakefield City Metropolitan District Council	August 2015 February 2016	Annual Rolling Update Annual Rolling Update
Planning Hazardous Substance Consents Kirklees Metropolitan Borough Council - Planning Services Wakefield City Metropolitan District Council	August 2015 February 2016	Annual Rolling Update Annual Rolling Update

Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology British Geological Survey - National Geoscience Information Service	January 2009	Not Applicable
BGS Estimated Soil Chemistry British Geological Survey - National Geoscience Information Service	October 2015	As notified
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	April 2017	Bi-Annually
CBSCB Compensation District Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011	Not Applicable
Coal Mining Affected Areas The Coal Authority - Property Searches	March 2014	As notified
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Radon Potential - Radon Affected Areas British Geological Survey - National Geoscience Information Service	July 2011	As notified
Radon Potential - Radon Protection Measures British Geological Survey - National Geoscience Information Service	July 2011	As notified
Industrial Land Use	Version	Update Cycle
Contemporary Trade Directory Entries Thomson Directories	March 2017	Quarterly
Fuel Station Entries Catalist Ltd - Experian	May 2017	Quarterly
Gas Pipelines National Grid	July 2014	Quarterly
Points of Interest - Commercial Services PointX	December 2016	Quarterly
Points of Interest - Education and Health PointX	December 2016	Quarterly
Points of Interest - Manufacturing and Production PointX	December 2016	Quarterly
Points of Interest - Public Infrastructure PointX	December 2016	Quarterly
Points of Interest - Recreational and Environmental PointX	December 2016	Quarterly
Underground Electrical Cables National Grid	December 2015	Bi-Annually

Sensitive Land Use	Version	Update Cycle
Ancient Woodland Natural England	May 2017	Bi-Annually
Areas of Adopted Green Belt Kirklees Metropolitan Borough Council Wakefield City Metropolitan District Council	May 2017 May 2017	As notified As notified
Areas of Unadopted Green Belt Kirklees Metropolitan Borough Council Wakefield City Metropolitan District Council	May 2017 May 2017	As notified As notified
Areas of Outstanding Natural Beauty Natural England	January 2017	Bi-Annually
Environmentally Sensitive Areas Natural England	January 2017	Annually
Forest Parks Forestry Commission	April 1997	Not Applicable
Local Nature Reserves Natural England	June 2017	Bi-Annually
Marine Nature Reserves Natural England	January 2017	Bi-Annually
National Nature Reserves Natural England	January 2017	Bi-Annually
National Parks Natural England	February 2017	Bi-Annually
Nitrate Vulnerable Zones Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	October 2015	Annually
Ramsar Sites Natural England	January 2017	Bi-Annually
Sites of Special Scientific Interest Natural England	January 2017	Bi-Annually
Special Areas of Conservation Natural England	January 2017	Bi-Annually
Special Protection Areas Natural England	January 2017	Bi-Annually
World Heritage Sites English Heritage - National Monument Record Centre	May 2017	Bi-Annually

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	 British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL
Centre for Ecology and Hydrology	 Centre for Ecology & Hydrology NATURAL ENVIRONMENT RESEARCH COUNCIL
Natural Resources Wales	
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Peter Brett Associates	

Contact	Name and Address	Contact Details
1	British Geological Survey - Enquiry Service British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
2	Environment Agency - National Customer Contact Centre (NCCC) PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 03708 506 506 Email: enquiries@environment-agency.gov.uk
3	Ordnance Survey Adanac Drive, Southampton, Hampshire, SO16 0AS	Telephone: 023 8079 2000 Email: customerservices@ordnancesurvey.co.uk Website: www.ordnancesurvey.gov.uk
4	Kirklees Metropolitan Borough Council - Planning Services PO BOX B93, Civic Centre III, Off Market Street, Huddersfield, West Yorkshire, HD1 2JR	Telephone: 01484 221000 Fax: 01484 221613 Website: www.kirklees.gov.uk
5	The Coal Authority - Property Searches 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG	Telephone: 0345 762 6848 Fax: 01623 637 338 Email: groundstability@coal.gov.uk
6	Peter Brett Associates Caversham Bridge House, Waterman Place, Reading, Berkshire, RG1 8DN	Telephone: 0118 950 0761 Fax: 0118 959 7498 Email: reading@pba.co.uk Website: www.pba.co.uk
7	PointX 7 Abbey Court, Eagle Way, Sowton, Exeter, Devon, EX2 7HY	Website: www.pointx.co.uk
8	Natural England County Hall, Spetchley Road, Worcester, WR5 2NP	Telephone: 0300 060 3900 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
9	Kirklees Metropolitan Borough Council Town Hall, Civic Centre, Huddersfield, West Yorkshire, HD1 2TA	Telephone: 01484 221000 Fax: 01484 442768 Website: www.kirklees.gov.uk
10	Environment Agency - Head Office Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, Avon, BS32 4UD	Telephone: 01454 624400 Fax: 01454 624409
-	Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	Landmark Information Group Limited Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Please note that the Environment Agency / Natural Resources Wales / SEPA have a charging policy in place for enquiries.

Appendix B

GENERAL LIMITATIONS



REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

GENERAL

1. WSP UK Limited has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed and outlined in the body of the report.
2. Unless explicitly agreed otherwise, in writing, this report has been prepared under WSP UK Limited standard Terms and Conditions as included within our proposal to the Client.
3. Project specific appointment documents may be agreed at our discretion and a charge may be levied for both the time to review and finalise appointments documents and also for associated changes to the appointment terms. WSP UK Limited reserves the right to amend the fee should any changes to the appointment terms create an increase risk to WSP UK Limited.
4. The report needs to be considered in the light of the WSP UK Limited proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

PHASE 1 GEO ENVIRONMENTAL AND PRELIMINARY RISK ASSESSMENTS

Coverage: *This section covers reports with the following titles or combination of titles: phase 1; desk top study; geo environmental assessment; development appraisal; preliminary environmental risk assessment; constraints report; due diligence report; geotechnical development review; environmental statement; environmental chapter; project scope summary report (PSSR), program environmental impact report (PEIR), geotechnical development risk register; and, baseline environmental assessment.*

5. The works undertaken to prepare this report comprised a study of available and easily documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the Site and correspondence with relevant authorities and other interested parties. Due to the short timescales associated with these projects responses may not have been received from all parties. WSP UK Limited cannot be held responsible for any disclosures that are provided post production of our report and will not automatically update our report.
6. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only for the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, WSP UK Limited reserves the right to review such information and, if warranted, to modify the opinions accordingly.
7. It should be noted that any risks identified in this report are perceived risks based on the information reviewed. Actual risks can only be assessed following intrusive investigations of the site.
8. WSP UK Limited does not warrant work / data undertaken / provided by others.

REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

INTRUSIVE INVESTIGATION REPORTS

Coverage: *The following report titles (or combination) may cover this category of work: geo environmental site investigation; geotechnical assessment; GIR (Ground Investigation reports); preliminary environmental and geotechnical risk assessment; and, geotechnical risk register.*

9. The investigation has been undertaken to provide information concerning either:
 - i. The type and degree of contamination present at the site in order to allow a generic quantitative risk assessment to be undertaken; or
 - ii. Information on the soil properties present at the site to allow for geotechnical development constraints to be considered.
10. The scope of the investigation was selected on the basis of the specific development and land use scenario proposed by the Client and may be inappropriate to another form of development or scheme. If the development layout was not known at the time of the investigation the report findings may need revisiting once the development layout is confirmed.
11. For contamination purposes, the objectives of the investigation are limited to establishing the risks associated with potential contamination sources with the potential to cause harm to human health, building materials, the environment (including adjacent land), or controlled waters.
12. For geotechnical investigations the purpose is to broadly consider potential development constraints associated with the physical property of the soils underlying the site within the context of the proposed future or continued use of the site, as stated within the report.
13. The amount of exploratory work, soil property testing and chemical testing undertaken has necessarily been restricted by various factors which may include accessibility, the presence of services; existing buildings; current site usage or short timescales. The exploratory holes completed assess only a small percentage of the area in relation to the overall size of the Site, and as such can only provide a general indication of conditions.
14. The number of sampling points and the methods of sampling and testing do not preclude the possible existence of contamination where concentrations may be significantly higher than those actually encountered or ground conditions that vary from those identified. In addition, there may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.
15. The inspection, testing and monitoring records relate specifically to the investigation points and the timeframe that the works were undertaken. They will also be limited by the techniques employed. As part of this assessment, WSP UK Limited has used reasonable skill and care to extrapolate conditions between these points based upon assumptions to develop our interpretation and conclusions. The assumption made in forming our conclusions is that the ground and groundwater conditions (both chemically and physically) are the same as have been encountered during the works undertaken at the specific points of investigation. Conditions can change between investigation points and these interpretations should be considered indicative.
16. The risk assessment and opinions provided are based on currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values. Specific assumptions associated

REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

with the WSP UK Limited risk assessment process have been outlined within the body or associated appendix of the report.

17. Additional investigations may be required in order to satisfy relevant planning conditions or to resolve any engineering and environmental issues.
18. Where soil contamination concentrations recorded as part of this investigation are used for commentary on potential waste classification of soils for disposal purposes, these should be classed as indicative only. Due consideration should be given to the variability of contaminant concentrations taken from targeted samples versus bulk excavated soils and the potential variability of contaminant concentrations between sampling locations. Where major waste disposal operations are considered, targeted waste classification investigations should be designed.
19. The results of the asbestos testing are factually reported and interpretation given as to how this relates to the previous use of the site, the types of ground encountered and site conceptualisation. This does not however constitute a formal asbestos assessment. These results should be treated cautiously and should not be relied upon to provide detailed and representative information on the delineation, type and extent of bulk ACMs and / or trace loose asbestos fibres within the soil matrix at the site.
20. If costs have been included in relation to additional site works, and / or site remediation works these must be considered as indicative only and must be confirmed by a qualified quantity surveyor.

EUROCODE 7: GEOTECHNICAL DESIGN

21. On 1st April 2010, BS EN 1997-1:2004 (Eurocode 7: Geotechnical Design – Part 1) became the mandatory baseline standard for geotechnical ground investigations.
22. In terms of geotechnical design for foundations, slopes, retaining walls and earthworks, EC7 sets guidance on design procedures including specific guidance on the numbers and spacings of boreholes for geotechnical design, there are limits to methods of ground investigation and the quality of data obtained and there are also prescriptive methods of assessing soil strengths and methods of design. Unless otherwise explicitly stated, the work has not been undertaken in accordance with EC7. A standard geotechnical interpretative report will not meet the requirements of the Geotechnical Design Report (GDR) under Eurocode 7. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. The report is likely to represent a Ground Investigation Report (GIR) under the Eurocode 7 guidance.

DETAILED QUANTITATIVE RISK ASSESSMENTS AND REMEDIAL STRATEGY REPORTS

23. These reports build upon previous report versions and associated notes. The scope of the investigation, further testing and monitoring and associated risk assessments were selected on the basis of the specific development and land use scenario proposed by the Client and may not be appropriate to another form of development or scheme layout. The risk assessment and opinions provided are based on currently available approaches in the generation of Site Specific Assessment Criteria relating to contamination concentrations and are not considered to represent a risk in a specific land use scenario to a specific receptor. No liability can be accepted for the retrospective effects of any future changes or amendments to these values, associated models or associated guidance.



REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

- 24. The outputs of the Detailed Quantitative Risk Assessments are based upon WSP UK Limited manipulation of standard risk assessment models. These are our interpretation of the risk assessment criteria.
- 25. Prior to adoption on site they will need discussing and agreeing with the Regulatory Authorities prior to adoption on site. The regulatory discussion and engagement process may result in an alternative interpretation being determined and agreed. The process and timescales associated with the Regulatory Authority engagement are not within the control of WSP UK Limited. All costs and programmes presented as a result of this process should be validated by a quantity surveyor and should be presumed to be indicative.

GEOTECHNICAL DESIGN REPORT (GDR)

- 26. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. All the relevant information needs to be provided to allow for a GDR to be produced.

MONITORING (INCLUDING REMEDIATION MONITORING REPORTS)

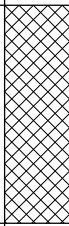
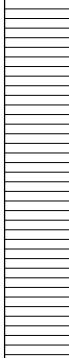
- 27. These reports are factual in nature and comprise monitoring, normally groundwater and ground gas and data provided by contractors as part of an earthworks or remedial works.
- 28. The data is presented and will be compared with assessment criteria.

Appendix C

EXPLORATORY HOLE LOGS



 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:	BOREHOLE LOG		Hole No. BHA1	
	Project Land at Fenay Bridge		Sheet 1 of 3	
Job No 70035780		Client Farnley Estates		Date 24-08-17 22-08-17
Contractor / Driller Geocore	Method/Plant Used Comacchio Geo 205	Logged By Geocore	Co-Ordinates (NGR) E 418992.331 N 414395.339	Ground Level (m AOD) 102.318

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P. Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. 50 mm
0.40-0.50	ES		0					(1.80)	Soft brown gravelly CLAY. Gravel is coarse angular of brick. (MADE GROUND)		CMG	
1.50-1.50	SPT	2,5,4 4,5,8 N=21(C)					100.52	1.80	Soft brown and yellow gravelly CLAY. Gravel is fine angular of mudstone and sandstone. (WEATHERED ROCK)		PLCM	
2.40-2.40	SPT	7,7,8 10,11,9 N=38(C)					99.92	2.40	Grey MUDSTONE recovered as fine angular gravel.		PLCM	
							96.92	5.40	Light grey MUDSTONE recovered as fine angular gravel.		PLCM	
							96.22	6.10	Black COAL recovered as fine angular gravel.		PLCM	
							95.32	7.00	Grey MUDSTONE recovered as fine angular gravel.		PLCM	

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Hole terminated at 21mbgl					
From	To	Hours	Tool	From	To						
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

08 WSP BH LOG FENAY BRIDGE.GPJ WSPTEMPLATE1.03.GDT 3/10/17

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		BOREHOLE LOG			Hole No. BHA1	
					Sheet 2 of 3	
Job No 70035780		Project Land at Fenay Bridge			Date 24-08-17 22-08-17	
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205	Logged By Geocore	Co-Ordinates (NGR) E 418992.331 N 414395.339		Ground Level (m AOD) 102.318

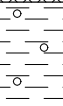
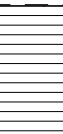
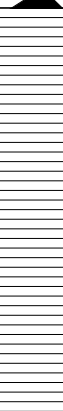
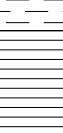
[illegible]

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added							
From	To	Hours	Tool	From	To	General Remarks Hole terminated at 21mbgl					
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

102.31821.00

8 WSP BH LOG FENAY BRIDGE.GPJ WSPTEMPLATE1.03.GDT 3/10/17

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		BOREHOLE LOG		Hole No. BHA2	
Project Land at Fenay Bridge		Sheet 1 of 3			
Job No 70035780		Client Farnley Estates		Date 24-08-17 22-08-17	
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205		Logged By Geocore	
		Co-Ordinates (NGR) E 419084.775 N 414342.134		Ground Level (m AOD) 100.732	

SAMPLES & TESTS							STRATA					Install / Backfill	
Depth	Type	Test Result	PID (ppmV)	HSV (kNm/m2)	P. Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. 50 mm	
0.50-0.60	ES		0					(1.70)	Soft brown gravelly CLAY. Gravel is coarse angular of brick and crushed clay pipe. (MADE GROUND)		CMG		
1.50	D SPT	4,3,4 4,4,6 N=18(C)					99.03	1.70	Stiff brown gravelly CLAY. Gravel is fine angular of mudstone. (WEATHERED ROCK)		PLCM		
2.50	EW						98.13	2.60	Grey MUDSTONE recovered as fine angular gravel.		PLCM		
2.70	D SPT	25,0,50 0,0,0 N=50/ 0.02(C)						(1.10)					
							97.03	3.70					
							96.83	3.90	Grey SILTSTONE recovered as fine angular gravel.		PLCM		
								(0.70)	Black COAL recovered as fine angular gravel.		PLCM		
							96.13	4.60					
								(3.50)	Grey MUDSTONE recovered as fine angular gravel. (WEATHERED ROCK)		PLCM		
						92.63	8.10						
						92.33	8.40	Light grey CLAY. (WEATHERED ROCK)		PLCM			
								Light grey MUDSTONE recovered as fine angular gravel. (WEATHERED ROCK)		PLCM			

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
						24-08-17		2.70			
Chiselling				Water Added		General Remarks Hole terminated at 21.3mbgl					
From	To	Hours	Tool	From	To						
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

08 WSP BH LOG_FENAY BRIDGE.GPJ WSPTEMPLATE1.03 GDT 3/10/17

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:	BOREHOLE LOG				Hole No. BHA2				
	Project Land at Fenay Bridge				Sheet 2 of 3				
Job No 70035780		Client Farnley Estates				Date 24-08-17 22-08-17			
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205		Logged By Geocore		Co-Ordinates (NGR) E 419084.775 N 414342.134		Ground Level (m AOD) 100.732	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kNm2)	P Pen (kNm2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. 50 mm
								(6.80)	Light grey MUDSTONE recovered as fine angular gravel. (WEATHERED ROCK) (continued)		PLCM	
							85.53	15.20	Grey SANDSTONE recovered as fine angular gravel.		PLCM	
								(6.10)				

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Hole terminated at 21.3mbgl					
From	To	Hours	Tool	From	To						
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

08 WSP BH LOG FENAY BRIDGE.GPJ WSPETEMPLATE1.03 GDT 3/10/17

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		BOREHOLE LOG			Hole No. BHA2				
					Sheet 3 of 3				
Job No 70035780		Project Land at Fenay Bridge			Date 24-08-17 22-08-17				
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205		Logged By Geocore		Co-Ordinates (NGR) E 419084.775 N 414342.134		Ground Level (m AOD) 100.732	

[illegible]

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added							
From	To	Hours	Tool	From	To	General Remarks Hole terminated at 21.3mbgl					
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		BOREHOLE LOG			Hole No. BHA3
		Project Land at Fenay Bridge			Sheet 2 of 3
Job No 70035780		Client Farnley Estates			Date 24-08-17 22-08-17
Contractor / Driller Geocore	Method/Plant Used Comacchio Geo 205	Logged By Geocore	Co-Ordinates (NGR) E 419066.600 N 414311.480	Ground Level (m AOD) 99.990	

[illegible]

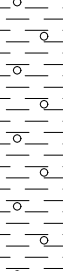
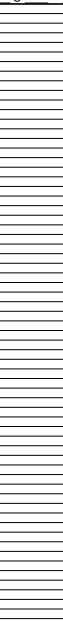
Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added							
From	To	Hours	Tool	From	To	General Remarks Hole terminated at 21mbgl					
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		BOREHOLE LOG			Hole No. BHA3				
					Sheet 3 of 3				
Job No 70035780		Project Land at Fenay Bridge			Date 24-08-17 22-08-17				
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205		Logged By Geocore		Co-Ordinates (NGR) E 419066.600 N 414311.480		Ground Level (m AOD) 99.990	

[illegible]

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added							
From	To	Hours	Tool	From	To	General Remarks Hole terminated at 21mbgl					
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		BOREHOLE LOG		Hole No. BHA4	
Project Land at Fenay Bridge		Sheet 1 of 3			
Job No 70035780		Client Farnley Estates		Date 24-08-17 18-08-17	
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205		Logged By Geocore	
		Co-Ordinates (NGR) E 418969.059 N 414368.153		Ground Level (m AOD) 101.298	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kNm/m2)	P. Pen (kNm/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. 50 mm
6.00	EW							(2.20)	Soft dark brown gravelly CLAY. Gravel is coarse subangular of brick and crushed clay pipe. (MADE GROUND)		CMG	
							99.10 2.20					
							98.90 2.40	Stiff light brown gravelly CLAY. Gravel is coarse angular of brick and crushed clay pipe. (MADE GROUND)		CMG		
								(2.40)	Stiff brown gravelly CLAY. Gravel is fine angular of mudstone. (WEATHERED ROCK)		PLCM	
96.50 4.80		Grey MUDSTONE recovered as fine angular gravel.		PLCM								
		(7.00)										

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Hole terminated at 22.5mbgl					
From	To	Hours	Tool	From	To						
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		BOREHOLE LOG		Hole No. BHA4	
Project Land at Fenay Bridge		Sheet 2 of 3			
Job No 70035780		Client Farnley Estates		Date 24-08-17 18-08-17	
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205		Logged By Geocore	
		Co-Ordinates (NGR) E 418969.059 N 414368.153		Ground Level (m AOD) 101.298	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kNm2)	P Pen (kNm2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. 50 mm
									Grey MUDSTONE recovered as fine angular gravel. (continued)		PLCM	
							89.50	11.80	Yellow SANDSTONE recovered as fine angular gravel.		PLCM	
								(7.30)				
							82.20	19.10	Grey MUDSTONE recovered as fine angular gravel.		PLCM	

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Hole terminated at 22.5mbgl					
From	To	Hours	Tool	From	To						
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

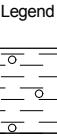
08 WSP BH LOG FENAY BRIDGE.GPJ WSPETEMPLATE1.03.GDT 3/10/17

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		BOREHOLE LOG			Hole No. BHA4	
					Sheet 3 of 3	
Job No 70035780		Project Land at Fenay Bridge			Date 24-08-17 18-08-17	
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205	Logged By Geocore	Co-Ordinates (NGR) E 418969.059 N 414368.153		Ground Level (m AOD) 101.298

SAMPLES & TESTS							STRATA					Install Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. 50 mm
								(3.40)	Grey MUDSTONE recovered as fine angular gravel. (continued)		PLCM	
							78.80	22.50				

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added							
From	To	Hours	Tool	From	To	General Remarks Hole terminated at 22.5mbgl					
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		BOREHOLE LOG		Hole No. BHD1	
Project Land at Fenay Bridge		Sheet 1 of 3			
Job No 70035780		Client Farnley Estates		Date 22-08-17 15-08-17	
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205		Logged By Geocore	
		Co-Ordinates (NGR) E 418605.478 N 414893.836		Ground Level (m AOD) 92.983	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kNm2)	P Pen (kNm2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. 50 mm
0.70	SPT	2,3,3 4,4,5 N=16(C)					92.28	0.70	Soft brown gravelly CLAY. Gravel is fine to coarse subangular of sandstone. (WEATHERED ROCK)		PLCM	
								(2.90)	Brown and grey MUDSTONE.		PLCM	
							89.38	3.60	Dark grey MUDSTONE recovered as fine angular gravel.		PLCM	
								(7.60)				

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Hole terminated at 21mbgl					
From	To	Hours	Tool	From	To						
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		BOREHOLE LOG			Hole No. BHD1		
					Sheet 2 of 3		
Job No 70035780		Client Farnley Estates			Date 22-08-17 15-08-17		
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205		Logged By Geocore		Co-Ordinates (NGR) E 418605.478 N 414893.836	
						Ground Level (m AOD) 92.983	

SAMPLES & TESTS							STRATA					Install Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m ²)	P.Pen (kN/m ²)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. 50 mm
									Dark grey MUDSTONE recovered as fine angular gravel. <i>(continued)</i>		PLCM	
							81.78	11.20				
							81.68	11.30	Yellow brown SANDSTONE recovered as fine angular gravel.		PLCM	
									Grey SILTSTONE recovered as fine angular gravel.			
								(5.00)			PLCM	
							76.68	16.30	Grey MUDSTONE recovered as fine angular gravel.			
											PLCM	
								(4.70)				

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
						22-08-17		18.00			
Chiselling				Water Added		General Remarks Hole terminated at 21mbgl					
From	To	Hours	Tool	From	To						
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

92.983

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:	BOREHOLE LOG			Hole No. BHD2	
	Project Land at Fenay Bridge			Sheet 1 of 3	
Job No 70035780		Client Farnley Estates			Date 22-08-17 16-08-17
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205	Logged By Geocore	Co-Ordinates (NGR) E 418635.355 N 414850.907	Ground Level (m AOD) 94.974

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kNm2)	P Pen (kNm2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. 50 mm
0.70	SPT	2.4.4 4.5.5 N=18(C)					94.27	0.70	Soft brown gravelly CLAY. Gravel is fine to coarse subangular of sandstone and mudstone. (WEATHERED ROCK)		PLCM	
									Brownish brown MUDSTONE recovered as fine angular gravel.		PLCM	
							90.27	4.70	Grey MUDSTONE recovered as fine angular gravel.		PLCM	
								(9.70)				

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Hole terminated at 21mbgl					
From	To	Hours	Tool	From	To						
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

08 WSP BH LOG FENAY BRIDGE.GPJ WSPETEMPLATE1.03.GDT 3/10/17

94.974PI CM

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

8 WSP BH LOG FENAY BRIDGE.GPJ WSPTEMPLATE1.03.GDT 3/10/17

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		BOREHOLE LOG			Hole No. BHD3				
					Sheet 2 of 3				
Job No 70035780		Client Farnley Estates			Date 23-08-17 23-08-17				
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205		Logged By Geocore		Co-Ordinates (NGR) E 418647.631 N 414811.773		Ground Level (m AOD) 95.251	

[illegible]

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added							
From	To	Hours	Tool	From	To	General Remarks Hole terminated at 24mbgl					
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		BOREHOLE LOG			Hole No. BHD3		
					Sheet 3 of 3		
Job No 70035780		Project Land at Fenay Bridge			Date 23-08-17 23-08-17		
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205		Logged By Geocore		Co-Ordinates (NGR) E 418647.631 N 414811.773	
						Ground Level (m AOD) 95.251	

SAMPLES & TESTS							STRATA					Install Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m ²)	P.Pen (kN/m ²)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. 50 mm
									Grey MUDSTONE recovered as fine angular gravel. <i>(continued)</i>			
								(4.80)			PLCM	
							71.25	24.00				

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Hole terminated at 24mbgl					
From	To	Hours	Tool	From	To						
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:	BOREHOLE LOG			Hole No. BHE1	
	Project Land at Fenay Bridge			Sheet 1 of 3	
Job No 70035780		Client Farnley Estates			Date 23-08-17 17-08-17
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205	Logged By Geocore	Co-Ordinates (NGR) E 418765.309 N 414552.649	Ground Level (m AOD) 96.823

SAMPLES & TESTS							STRATA					Install / Backfill					
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P. Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. 50 mm					
0.20-0.25	D						96.47	0.35	Soft brown gravelly CLAY. Gravel is fine to coarse subangular of sandstone. (WEATHERED ROCK)		PLCM						
							96.32	0.50	Stiff yellowish brown gravelly CLAY. Gravel is coarse subangular of sandstone. (WEATHERED ROCK)		PLCM						
									Yellow SANDSTONE recovered as fine angular gravel.								
1.50	SPT	5,6,10 11,10,11 N=42(C)															
								(5.70)			PLCM						
							90.62	6.20									
							90.22	6.60	Grey SILTSTONE recovered as fine angular gravel.		PLCM						
									Yellow SANDSTONE recovered as fine angular gravel.								
								(1.50)			PLCM						
							88.72	8.10									
									Grey MUDSTONE recovered as fine angular gravel.								
											PLCM						

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Hole terminated at 21mbgl					
From	To	Hours	Tool	From	To						
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

08 WSP BH LOG FENAY BRIDGE.GPJ WSPTEMPLATE1.03.GDT 3/10/17

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		BOREHOLE LOG			Hole No. BHE1	
					Sheet 3 of 3	
Job No 70035780		Project Land at Fenay Bridge			Date 23-08-17 17-08-17	
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205	Logged By Geocore	Co-Ordinates (NGR) E 418765.309 N 414552.649		Ground Level (m AOD) 96.823

[illegible]

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added							
From	To	Hours	Tool	From	To	General Remarks Hole terminated at 21mbgl					
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		BOREHOLE LOG			Hole No. BHE2	
					Sheet 1 of 3	
Job No 70035780		Client Farnley Estates			Date 24-08-17 17-08-17	
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205	Logged By Geocore	Co-Ordinates (NGR) E 418769.814 N 414520.168		Ground Level (m AOD) 96.351

SAMPLES & TESTS							STRATA					Install Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. 50 mm
0.50-0.55 0.50	D SPT	5,9,10 10,10,12 N=42(C)					95.85	0.50	Soft brown gravelly CLAY. Gravel is fine to coarse subangular of sandstone.		PLCM	
									Yellow SANDSTONE recovered as fine angular gravel.			
								(9.10)			PLCM	
							86.75	9.60	Grey MUDSTONE recovered as fine angular gravel.		PLCM	

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added							
From	To	Hours	Tool	From	To	General Remarks Hole terminated at 21mbgl					
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		BOREHOLE LOG		Hole No. BHE3	
				Sheet 2 of 3	
Job No 70035780		Client Farnley Estates		Date 24-08-17 18-08-17	
Contractor / Driller Geocore	Method/Plant Used Comacchio Geo 205	Logged By Geocore	Co-Ordinates (NGR) E 418796.824 N 414489.275		Ground Level (m AOD) 96.876

[illegible]

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added							
From	To	Hours	Tool	From	To	General Remarks Hole terminated at 21mbgl					
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		BOREHOLE LOG		Hole No. BHE3	
				Sheet 3 of 3	
Job No 70035780		Client Farnley Estates		Date 24-08-17 18-08-17	
Contractor / Driller Geocore		Method/Plant Used Comacchio Geo 205		Logged By Geocore	
				Co-Ordinates (NGR) E 418796.824 N 414489.275	
				Ground Level (m AOD) 96.876	

SAMPLES & TESTS							STRATA					Install Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. 50 mm
									Grey MUDSTONE recovered as fine angular gravel. <i>(continued)</i>			
							75.38	21.50			PLCM	

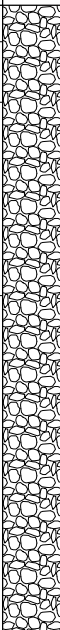
Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added							
From	To	Hours	Tool	From	To	General Remarks Hole terminated at 21mbgl					
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

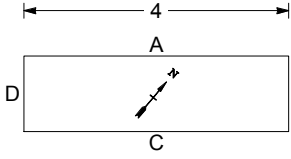
 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		TRIAL PIT LOG			Hole No. TPA03				
					Sheet 1 of 1				
Job No 70035780		Client Farnley Estates			Date 17-08-17 17-08-17				
Contractor / Driller Pudsey Plant Hire		Method/Plant Used JCB-3CX		Logged By C. Wainwright		Co-Ordinates (NGR) E 419012.465 N 414351.873		Ground Level (m AOD) 100.019	

SAMPLES & TESTS					STRATA					Install Backfill	
Depth	Type	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	
0.20-0.40 0.20-0.40	B ES	0				99.82	0.20	Grass over dark brown sandy CLAY. (TOPSOIL)		TS	
						99.62	0.40	Greyish brown clayey fine and medium subrounded to subangular GRAVEL of mudstone with brick fragments. (MADE GROUND)		GMG	

	Length 3.50m	Shoring/Support: None	Water Strikes						
	Width 0.60m		Stability: Good	Date	Time	Strike	Minutes	Standing	Remarks
	Orientation 180 degrees from north	General Remarks Hole terminated at brick foundations							
Scale 1:31.25	Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.								

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:	TRIAL PIT LOG		Hole No. TPA07	
	Project Land at Fenay Bridge		Sheet 1 of 1	
Job No 70035780	Client Farnley Estates		Date 18-08-17 18-08-17	
Contractor / Driller Pudsey Plant Hire	Method/Plant Used JCB-3CX	Logged By C. Wainwright	Co-Ordinates (NGR) E 419056.394 N 414272.684	Ground Level (m AOD) 100.040

SAMPLES & TESTS						STRATA					Install / Backfill
Depth	Type	PID (ppmV)	HSV (kN/m2)	P Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	
0.50-0.60 0.60-0.80	ES B	1				99.89	0.15	Grass over soft dark brown sandy CLAY. (TOPSOIL)		TS	
						99.64	(0.25) 0.40	Dark greyish brown sandy fine to coarse angular GRAVEL of ash and brick. (MADE GROUND)		GMG	
							(0.80)	Dark grey sandy fine to coarse angular GRAVEL of various lithologies including crushed brick and ash. Numerous crushed terracotta pipes. (MADE GROUND) 0.40 - 0.60 Concrete slab		GMG	
						98.84	1.20	Reddish grey fine and medium angular smooth GRAVEL of crushed brick and ash. (MADE GROUND)		GMG	
							(1.40)				
						97.44	2.60				

	Length	4.00m	Shoring/Support:	Water Strikes					
	Width	0.60m		Stability:	Date	Time	Strike	Minutes	Standing
	Orientation	140 degrees from north	None						
				Poor	General Remarks Hole terminated due to hole collapsing				

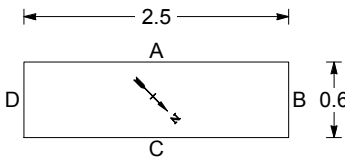
Scale 1:31.25

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

08 WSP TP LOG STANDARD FENAY BRIDGE.GPJ WSPTEMPLATE1.03.GDT 3/10/17

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:	TRIAL PIT LOG			Hole No. TPA08	
	Project Land at Fenay Bridge			Sheet 1 of 1	
Job No 70035780		Client Farnley Estates			Date 18-08-17 18-08-17
Contractor / Driller Pudsey Plant Hire		Method/Plant Used JCB-3CX	Logged By C. Wainwright	Co-Ordinates (NGR) E 419011.139 N 414263.767	Ground Level (m AOD) 100.274

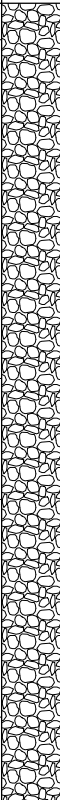
SAMPLES & TESTS						STRATA					Install / Backfill
Depth	Type	PID (ppmV)	HSV (kN/m2)	P Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	
0.30-0.40	ES	0	73.33			100.17	0.10	Grass over soft dark brown sandy CLAY. (TOPSOIL)		TS	
						100.07	0.20	Dark brownish grey sandy fine and medium angular GRAVEL of various lithologies. (MADE GROUND)		GMG	
							(0.60)	Stiff grey mottled orange CLAY. (MADE GROUND)			
1.00-1.20	D					99.47	0.80	Grey sandy fine and medium angular GRAVEL of various lithologies including ash and brick fragments with occasional brick. (MADE GROUND)		GMG	
							(2.30)				
						97.17	3.10				

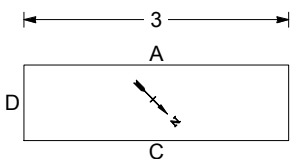
	Length	2.50m	Shoring/Support:	Water Strikes					
	Width	0.60m		Stability:	Date	Time	Strike	Minutes	Standing
	Orientation	45 degrees from north	None						
				Poor	General Remarks Hole terminated due to hole collapsing				

Scale 1:31.25 Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

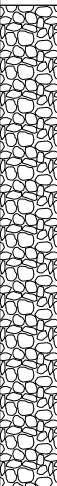
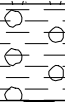
08 WSP TP LOG STANDARD FENAY BRIDGE.GPJ WSPTEMPLATE1.03.GDT 3/10/17

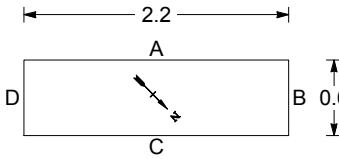
 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:	TRIAL PIT LOG		Hole No. TPA09	
	Project Land at Fenay Bridge		Sheet 1 of 1	
Job No 70035780	Client Farnley Estates		Date 18-08-17 18-08-17	
Contractor / Driller Pudsey Plant Hire	Method/Plant Used JCB-3CX	Logged By C. Wainwright	Co-Ordinates (NGR) E 418965.330 N 414311.224	Ground Level (m AOD) 99.437

SAMPLES & TESTS							STRATA				Install / Backfill
Depth	Type	PID (ppmV)	HSV (kNm/m2)	P Pen (kNm/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	
0.80-0.90	B		100			99.29	0.15	Grass over soft brown CLAY. (TOPSOIL)		TS	
								Stiff grey gravelly CLAY. Gravel is coarse angular of mudstone. (MADE GROUND)		CMG	
1.60-1.70	ES	0				97.89	1.55	Greyish red sandy fine angular GRAVEL of brick. (MADE GROUND)		GMG	
						97.39	2.05	Reddish grey sandy fine angular GRAVEL of brick and ash. (MADE GROUND)		GMG	
3.20-3.30	D		60			96.49	2.95	Firm yellowish orange slightly gravelly CLAY. Gravel is fine and medium angular of mudstone. (WEATHERED ROCK)		PLCM	
						96.14	3.30				

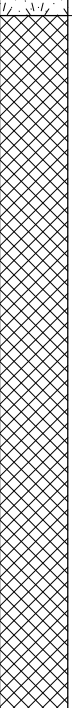
	Length	3.00m	Shoring/Support:	Water Strikes					
	Width	0.60m		Stability:	Date	Time	Strike	Minutes	Standing
	Orientation	45 degrees from north	Good		General Remarks Hole terminated at 3.3mbgl				
	Scale 1:31.25			Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.					

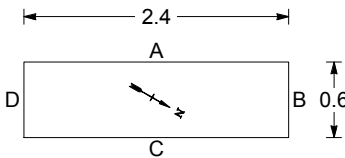
 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:	TRIAL PIT LOG		Hole No. TPA10	
	Project Land at Fenay Bridge		Sheet 1 of 1	
Job No 70035780		Client Farnley Estates		Date 18-08-17 18-08-17
Contractor / Driller Pudsey Plant Hire	Method/Plant Used JCB-3CX	Logged By C. Wainwright	Co-Ordinates (NGR) E 418928.018 N 414339.635	Ground Level (m AOD) 99.959

SAMPLES & TESTS						STRATA					Install / Backfill
Depth	Type	PID (ppmV)	HSV (kN/m2)	P Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	
0.10-0.20	ES	0				99.66	(0.30) 0.30	Grass over soft dark brown sandy CLAY. (TOPSOIL)		TS	
0.50-0.60	B					99.26	(0.40) 0.70	Yellow gravelly friable CLAY. Gravel is coarse subangular of sandstone. Occasional sandstone cobbles. (WEATHERED ROCK)		PLCM	
						98.76	(0.50) 1.20	Black bright COAL recovered as fine and medium angular gravel.		PLCM	
						97.96	(0.80) 2.00	Very stiff grey friable slightly gravelly CLAY. Gravel is fine angular of mudstone lithorelics. (WEATHERED ROCK)		PLCM	

	Length	2.20m	Shoring/Support:	Water Strikes						
	Width	0.60m		None	Date	Time	Strike	Minutes	Standing	Remarks
	Orientation	45 degrees from north	Stability:	Good	General Remarks Hole terminated due to hard digging					
Scale 1:31.25		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.								

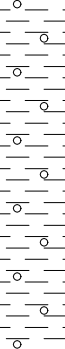
 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:	TRIAL PIT LOG		Hole No. TPA11	
	Project Land at Fenay Bridge		Sheet 1 of 1	
Job No 70035780	Client Farnley Estates		Date 18-08-17 18-08-17	
Contractor / Driller Pudsey Plant Hire	Method/Plant Used JCB-3CX	Logged By C. Wainwright	Co-Ordinates (NGR) E 418925.810 N 414375.881	Ground Level (m AOD) 101.639

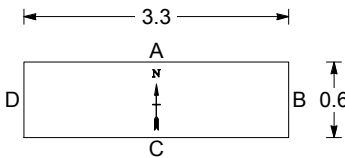
SAMPLES & TESTS						STRATA						Install / Backfill
Depth	Type	PID (ppmV)	HSV (kN/m2)	P Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology		
						101.44	0.20	Grass over soft dark brown sandy CLAY. (TOPSOIL)		TS		
0.80-0.90	ES	0						Firm locally stiff greyish yellow gravelly CLAY with numerous brick and. Gravel is fine to coarse angular of mudstone coal and brick. Occasional rootlets. (MADE GROUND)		CMG		
1.00-1.20	B		70									
							(2.90)					
			80									
			49			98.54	3.10	Grey MUDSTONE recovered as medium and coarse angular gravel.		PLCM		
						98.24	(0.30) 3.40					

	Length	2.40m	Shoring/Support:	Water Strikes						
	Width	0.60m		None	Date	Time	Strike	Minutes	Standing	Remarks
	Orientation	60 degrees from north	Stability:	General Remarks Hole terminated at bedrock						
			Good							
Scale 1:31.25		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.								

08 WSP TP LOG STANDARD FENAY BRIDGE.GPJ WSPTEMPLATE1.03.GDT 3/10/17

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:	TRIAL PIT LOG			Hole No. TPD01	
	Project Land at Fenay Bridge			Sheet 1 of 1	
Job No 70035780		Client Farnley Estates			Date 16-08-17 16-08-17
Contractor / Driller Pudsey Plant Hire		Method/Plant Used JCB-3CX	Logged By C. Wainwright	Co-Ordinates (NGR) E 418566.204 N 414958.751	Ground Level (m AOD) 89.077

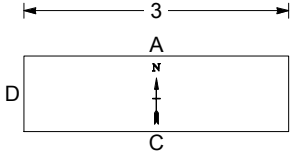
SAMPLES & TESTS					Water	STRATA					Install / Backfill
Depth	Type	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)		Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	
0.10-0.15	ES	0			1	88.93	0.15	Brown sandy CLAY. (TOPSOIL)		TS	
								Hard grey mottled orange CLAY. (WEATHERED ROCK)		PLCM	
0.60-0.70	B		106.67				(1.05)				
1.00-1.50	ES	0				87.88	1.20	Very stiff bluish grey gravelly CLAY. Gravel is fine and medium angular of sandstone and mudstone lithorelics. (WEATHERED ROCK)			
							(1.50)				
					86.38	2.70					

	Length 3.30m	Shoring/Support: None	Water Strikes					
	Width 0.60m		Date 16-08-17	Time	Strike 2.40	Minutes	Standing	Remarks
	Orientation 180 degrees from north	Stability: Good	General Remarks Hole terminated at bedrock					
	Scale 1:31.25							

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:	TRIAL PIT LOG			Hole No. TPD02	
	Project Land at Fenay Bridge			Sheet 1 of 1	
Job No 70035780	Client Farnley Estates			Date 16-08-17 16-08-17	
Contractor / Driller Pudsey Plant Hire	Method/Plant Used JCB-3CX	Logged By C. Wainwright	Co-Ordinates (NGR) E 418571.175 N 414906.127	Ground Level (m AOD) 87.709	

SAMPLES & TESTS							STRATA				Install / Backfill
Depth	Type	PID (ppmV)	HSV (kNm2)	P Pen (kNm2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	
0.10-0.20	ES	0				87.46	(0.25) 0.25	Dark brown sandy CLAY. (TOPSOIL)		TS	
0.60-0.70	D						(0.75)	Hard yellowish brown CLAY. (WEATHERED ROCK)		PLCM	
0.70-0.80	ES	0				86.71	1.00	Orangish grey slightly clayey MUDSTONE recovered as slightly clayey medium and coarse angular gravel.		PLCM	
						86.41	(0.30) 1.30				

	Length 3.00m	Shoring/Support: None	Water Strikes					
	Width 0.60m		Date	Time	Strike	Minutes	Standing	Remarks
	Orientation 180 degrees from north	Stability: Good	General Remarks Hole terminated at bedrock					
	Scale 1:31.25							

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

08 WSP TP LOG STANDARD FENAY BRIDGE.GPJ WSPTEMPLATE1.03.GDT 3/10/17

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		TRIAL PIT LOG			Hole No. TPD05				
					Sheet 1 of 1				
Job No 70035780		Client Farnley Estates			Date 16-08-17 16-08-17				
Contractor / Driller Pudsey Plant Hire		Method/Plant Used JCB-3CX		Logged By C. Wainwright		Co-Ordinates (NGR) E 418617.366 N 414691.024		Ground Level (m AOD) 85.718	

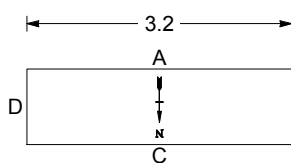
SAMPLES & TESTS						Water	STRATA				Install Backfill
Depth	Type	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Elev. (mAOD)		Depth (Thickness)	Description	Legend	Geology	
0.20-0.25	ES	0				85.47	(0.25) 0.25	Dark brown sandy CLAY. (TOPSOIL)		TS	
0.50-0.60	B					85.22	(0.25) 0.50	Reddish brown slightly clayey SAND with rare sandstone boulders. (MADE GROUND)		GMG	
0.70-0.80	ES	0					(0.70)	Very stiff yellowish brown slightly sandy friable CLAY. (WEATHERED ROCK)		PLCM	
						84.52	1.20				

	Length 3.00m	Shoring/Support: None	Water Strikes						
	Width 0.60m		Stability: Good	Date	Time	Strike	Minutes	Standing	Remarks
	Orientation 180 degrees from north	General Remarks Hole terminated at stiff clay							
Scale 1:31.25	Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.								

8 WSP TP LOG STANDARD FENAY BRIDGE.GPJ WSPTEMPLATE1.03.GDT 3/10/17

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		TRIAL PIT LOG			Hole No. TPD06				
					Sheet 1 of 1				
Job No 70035780		Client Farnley Estates			Date 16-08-17 16-08-17				
Contractor / Driller Pudsey Plant Hire		Method/Plant Used JCB-3CX		Logged By C. Wainwright		Co-Ordinates (NGR) E 418616.741 N 414738.425		Ground Level (m AOD) 86.815	

SAMPLES & TESTS						Water	STRATA				Install Backfill
Depth	Type	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Elev. (mAOD)		Depth (Thickness)	Description	Legend	Geology	
0.40-0.60 0.40-0.60	D ES	0					Dark brown sandy CLAY. (TOPSOIL)		TS		
					86.47	0.35	Stiff brownish orange very sandy CLAY with occasional gravel of mudstone lithorelics. (WEATHERED ROCK)		PLCM		
					86.02	0.80	Greyish brown MUDSTONE recovered as medium and coarse angular gravel of mudstone. (WEATHERED ROCK)		PLCM		
					85.62	1.20					

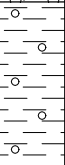


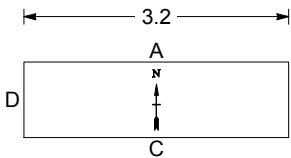
 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		TRIAL PIT LOG			Hole No. TPE01
		Project Land at Fenay Bridge			Sheet 1 of 1
Job No 70035780		Client Farnley Estates			Date 16-08-17 16-08-17
Contractor / Driller Pudsey Plant Hire	Method/Plant Used JCB-3CX	Logged By C. Wainwright	Co-Ordinates (NGR) E 418699.925 N 414555.328	Ground Level (m AOD) 93.544	

[illegible]

	Length 3.50m	Shoring/Support: None	Water Strikes						
	Width 0.60m		Stability: Good	Date	Time	Strike	Minutes	Standing	Remarks
	Orientation 90 degrees from north	General Remarks Hole terminated at bedrock							
Scale 1:31.25	Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.								

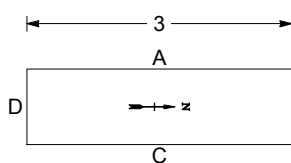
 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:	TRIAL PIT LOG		Hole No. TPE04	
	Project Land at Fenay Bridge		Sheet 1 of 1	
Job No 70035780	Client Farnley Estates		Date 17-08-17 17-08-17	
Contractor / Driller Pudsey Plant Hire	Method/Plant Used JCB-3CX	Logged By C. Wainwright	Co-Ordinates (NGR) E 418819.324 N 414406.170	Ground Level (m AOD) 98.753

SAMPLES & TESTS							STRATA				Install / Backfill
Depth	Type	PID (ppmV)	HSV (kNm ²)	P Pen (kNm ²)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	
0.60-0.70 0.60-0.70	B ES	0				98.45	(0.30) 0.30	Dark brown sandy CLAY. (TOPSOIL)		TS	
						97.75	(0.70) 1.00	Very stiff light brown gravelly friable CLAY. Gravel is medium and coarse subangular of mudstone and sandstone.		PLCM	
						97.55	1.20	Light greyish brown SANDSTONE recovered as fine and medium angular tabular gravel of sandstone.		PLCM	

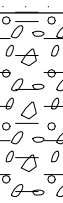
	Length	3.20m	Shoring/Support:	Water Strikes						
	Width	0.60m		None	Date	Time	Strike	Minutes	Standing	Remarks
	Orientation	180 degrees from north	Stability:	Good	General Remarks Hole terminated at Bedrock					
Scale 1:31.25		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.								

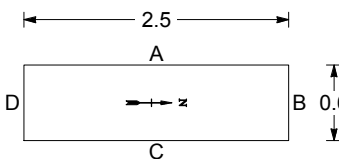
08 WSP TP LOG STANDARD FENAY BRIDGE.GPJ WSPTEMPLATE1.03.GDT 3/10/17

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:		TRIAL PIT LOG			Hole No. TPE05				
					Sheet 1 of 1				
Job No 70035780		Client Farnley Estates			Date 17-08-17 17-08-17				
Contractor / Driller Pudsey Plant Hire		Method/Plant Used JCB-3CX		Logged By C. Wainwright		Co-Ordinates (NGR) E 418738.950 N 414391.209		Ground Level (m AOD) 92.886	

[illegible]

 WSP Three White Rose Office Park LS110DL Telephone: 01133956400 Fax:	TRIAL PIT LOG		Hole No. TPE06	
	Project Land at Fenay Bridge		Sheet 1 of 1	
Job No 70035780	Client Farnley Estates		Date 16-08-17 16-08-17	
Contractor / Driller Pudsey Plant Hire	Method/Plant Used JCB-3CX	Logged By C. Wainwright	Co-Ordinates (NGR) E 418694.201 N 414453.348	Ground Level (m AOD) 89.587

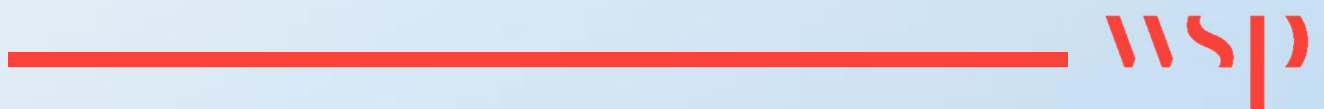
SAMPLES & TESTS						STRATA					Install / Backfill	
Depth	Type	PID (ppmV)	HSV (kN/m2)	P Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology		
0.30-0.50 0.40-0.50	ES B	0				89.39	0.20	Dark brown sandy CLAY. (TOPSOIL)		TS		
							(0.60)	Greyish brown clayey gravelly SAND. Gravel is fine and medium subangular to angular of sandstone. Clay inclusions. (WEATHERED ROCK)		PLCM		
						88.79	0.80	Greyish brown clayey medium and coarse angular GRAVEL of sandstone. (GRENOSIDE SANDSTONE)		PLCM		
							(0.80)					
						87.99	1.60					

	Length	2.50m	Shoring/Support:	Water Strikes							
	Width	0.60m		Stability:	Date	Time	Strike	Minutes	Standing	Remarks	
	Orientation	90 degrees from north	Good		General Remarks Hole terminated due to hard digging						
	Scale 1:31.25			Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.							

08 WSP TP LOG STANDARD FENAY BRIDGE.GPJ WSPTEMPLATE1.03.GDT 3/10/17

Appendix D

CHEMICAL LABORATORY RESULTS



AND SCREENING

Aliphatics and Aromatics

Result > Assessment Criteria Limit of detection > Assessment Criteria				PointID	BHA1	TPA01	TPA05	TPA07	TPA11
					0.4 - 0.5	0.3 - 0.4	0.8 - 1	0.5 - 0.6	0.8 - 0.9
				Depth (m bgl)	21/08/17	17/08/17	17/08/17	18/08/17	18/08/17
				Sample Date					
				Geology (at top depth of sample)	Made Ground Cohesive	Made Ground Granular	Made Ground Granular	Made Ground Granular	Made Ground Cohesive
Analyte	Units	LOD	GAC						
Aliphatic C05-C06	mg/kg	0.010	42.0		<0.01	<0.01	0.0125	0.0118	<0.01
Aliphatic C06-C08	mg/kg	0.010	103		<0.01	<0.01	0.0456	0.033	0.011
Aliphatic C08-C10	mg/kg	0.010	27.0		<0.01	<0.01	0.0182	0.0165	0.011
Aliphatic C10-C12	mg/kg	0.010	132		<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatic C12-C16	mg/kg	0.10	1,030		0.521	3.11	8.66	2.51	0.336
Aliphatic C35-C44	mg/kg	0.10	88,400		<0.1	<0.1	<0.1	<0.1	<0.1
Aromatic C07-C08	mg/kg	0.010	130		<0.01	<0.01	<0.01	0.0177	<0.01
Aromatic C08-C10	mg/kg	0.010	34.0		<0.01	<0.01	0.016	0.0177	<0.01
Aromatic C10-C12	mg/kg	0.010	74.0		<0.01	<0.01	<0.01	<0.01	<0.01
Aromatic C12-C16	mg/kg	0.10	141		1.01	1.43	11.9	5.07	<0.1
Aromatic C16-C21	mg/kg	0.10	249		3.42	3.77	17.1	7.5	0.16
Aromatic C21-C35	mg/kg	0.10	873		17	8.01	44.8	20.6	1.02
Aromatic C35-C44	mg/kg	0.10	873		2.81	0.395	7.61	2.1	<0.1

BTEX and Fuel Additives

	Result > Assessment Criteria Limit of detection > Assessment Criteria			PointID	BHA1	TPA01	TPA05	TPA07	TPA11
				Depth (m bgl)	0.4 - 0.5	0.3 - 0.4	0.8 - 1	0.5 - 0.6	0.8 - 0.9
				Sample Date	21/08/17	17/08/17	17/08/17	18/08/17	18/08/17
				Geology (at top depth of sample)	Made Ground Cohesive	Made Ground Granular	Made Ground Granular	Made Ground Granular	Made Ground Cohesive
Analyte	Units	LOD	GAC						
Benzene	mg/kg	0.009	0.089		<0.09	<0.09	<0.09	<0.09	<0.09
Ethylbenzene	mg/kg	0.004	47.0		<0.04	<0.04	<0.04	<0.04	<0.04
Methyl t-butylether (MTBE)	mg/kg	0.010	62.0		<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.007	131		<0.07	<0.07	<0.07	<0.07	<0.07
Xylene - Total (Summed)	mg/kg	-999	57.0		0.1	0.1	0.1	0.1	0.1
Xylene-m & p	mg/kg	0.010	57.0		<0.1	<0.1	<0.1	<0.1	<0.1
Xylene-o	mg/kg	0.010	57.0		<0.1	<0.1	<0.1	<0.1	<0.1

Metals

Result > Assessment Criteria Limit of detection > Assessment Criteria				PointID	BHA1	BHA2	BHA3	TPA01	TPA02	TPA03	TPA05	TPA06	TPA07	TPA08	TPA09	TPA10	TPA11
					0.4 - 0.5	0.5 - 0.6	0.2 - 0.3	0.3 - 0.4	0.5 - 0.6	0.2 - 0.4	0.8 - 1	0.5 - 0.6	0.5 - 0.6	0.3 - 0.4	1.6 - 1.7	0.1 - 0.2	0.8 - 0.9
				Depth (m bgl)	21/08/17	21/08/17	22/08/17	17/08/17	17/08/17	17/08/17	17/08/17	17/08/17	18/08/17	18/08/17	18/08/17	18/08/17	18/08/17
				Sample Date													
				Geology (at top depth of sample)	Made Ground Cohesive	Made Ground Cohesive	Made Ground Cohesive	Made Ground Granular	Made Ground Cohesive	Made Ground Granular	Made Ground Granular	Made Ground Granular	Made Ground Granular	Made Ground Cohesive	Made Ground Granular	Topsoil	Made Ground Cohesive
Analyte	Units	LOD	GAC														
Arsenic	mg/kg	0.60	32.0		18.4	14.8	16.8	14.1	31.5	9.09	25.4	9.8	24.9	3.79	16.1	52.6	7.25
Cadmium	mg/kg	0.020	12.0		0.0938	<0.02	0.469	<0.02	0.0277	0.339	0.214	<0.02	0.0472	<0.02	<0.02	0.527	<0.02
Copper	mg/kg	1.40	2,490		40	30.8	41.6	36.4	41.2	33.6	68.5	31.7	48.1	29.7	41.6	108	34.8
Lead	mg/kg	0.70	148		74.1	28.9	69.1	28.8	36	25.5	9.69	19.1	18.8	21.8	30.6	123	24.8
Mercury	mg/kg	0.14	39.0		0.476	0.611	0.678	0.373	0.319	0.467	0.371	0.277	<0.14	0.521	0.389	1.01	0.557
Nickel	mg/kg	0.20	126		27.7	25.3	30.7	40.4	44.8	34.1	37	31.2	24.5	38.1	39.4	27.3	31.5
Selenium	mg/kg	1.00	258		2.07	1.5	1.79	2.28	1.1	1.62	<1	<1	<1	1.75	2.88	3.36	1.82
Zinc	mg/kg	1.90	3,860		108	70.7	116	105	101	88.4	14.8	68.9	24.9	90.9	99.2	120	83.7

PAHs

Result > Assessment Criteria Limit of detection > Assessment Criteria PointID Depth (m bgl) Sample Date Geology (at top depth of sample) Analyte Units LOD GAC				BHA1	BHA2	BHA3	TPA01	TPA02	TPA03	TPA05	TPA06	TPA07	TPA08	TPA09	TPA10	TPA11			
				0.4 - 0.5	0.5 - 0.6	0.2 - 0.3	0.3 - 0.4	0.5 - 0.6	0.2 - 0.4	0.8 - 1	0.5 - 0.6	0.5 - 0.6	0.3 - 0.4	1.6 - 1.7	0.1 - 0.2	0.8 - 0.9			
				21/08/17	21/08/17	22/08/17	17/08/17	17/08/17	17/08/17	17/08/17	17/08/17	18/08/17	18/08/17	18/08/17	18/08/17	18/08/17			
				Made Ground Cohesive	Made Ground Cohesive	Made Ground Cohesive	Made Ground Granular	Made Ground Cohesive	Made Ground Granular	Made Ground Granular	Made Ground Granular	Made Ground Granular	Made Ground Cohesive	Made Ground Granular	Topsoil	Made Ground Cohesive			
Benzo (a) pyrene				mg/kg	0.015	1.60	0.258	<0.015	0.193	0.0181	0.17	0.159	0.0927	0.0264	0.203	<0.015	<0.015	0.444	<0.015
Naphthalene				mg/kg	0.009	2.30	0.0473	<0.009	0.0531	0.093	0.071	0.0945	0.469	0.081	0.395	<0.009	0.0768	0.0912	0.0288

Metals

Result > Assessment Criteria Limit of detection > Assessment Criteria				PointID	BHD3	TPD01	TPD02	TPD03	TPD04		TPD05		TPD06
					0.3	0.1 - 0.15	0.1 - 0.2	0.1 - 0.2	0.1 - 0.2	0.5 - 0.6	0.2 - 0.25	0.7 - 0.8	0.4 - 0.6
				Depth (m bgl)	23/08/17	16/08/17	16/08/17	16/08/17	16/08/17	16/08/17	16/08/17	16/08/17	16/08/17
				Sample Date									
				Geology (at top depth of sample)	Pennine Lower Coal Measures Formation	Topsoil	Topsoil	Topsoil	Topsoil	Pennine Lower Coal Measures Formation	Topsoil	Pennine Lower Coal Measures Formation	Pennine Lower Coal Measures Formation
Analyte	Units	LOD	GAC										
Arsenic	mg/kg	0.60	32.0		42.4	27.4	6.99	27.6	41.9	6.2	28.5	5.2	9.59
Cadmium	mg/kg	0.020	12.0		0.513	<0.02	<0.02	0.0914	<0.02	<0.02	<0.02	<0.02	<0.02
Copper	mg/kg	1.40	2,490		52.5	39.3	40.2	42.4	50	36.9	42.1	38.1	41.8
Lead	mg/kg	0.70	148		108	70.8	22.5	65	65	21.2	72.6	32.4	26.8
Mercury	mg/kg	0.14	39.0		0.894	0.368	0.813	0.796	0.849	0.55	2.2	0.847	0.772
Nickel	mg/kg	0.20	126		27.1	20.5	47.5	27.8	28.7	37.4	28.4	37	37.9
Selenium	mg/kg	1.00	258		1.32	<1	5.4	2.28	4.58	1.48	1.62	<1	<1
Zinc	mg/kg	1.90	3,860		118	93.9	91.7	99.7	121	94.2	106	94.1	115

PAHs

Result > Assessment Criteria Limit of detection > Assessment Criteria PointID Depth (m bgl) Sample Date Geology (at top depth of sample)				BHD3	TPD01	TPD02	TPD03	TPD04		TPD05		TPD06
				0.3	0.1 - 0.15	0.1 - 0.2	0.1 - 0.2	0.1 - 0.2	0.5 - 0.6	0.2 - 0.25	0.7 - 0.8	0.4 - 0.6
				23/08/17	16/08/17	16/08/17	16/08/17	16/08/17	16/08/17	16/08/17	16/08/17	16/08/17
				Pennine Lower Coal Measures Formation	Topsoil	Topsoil	Topsoil	Topsoil	Pennine Lower Coal Measures Formation	Topsoil	Pennine Lower Coal Measures Formation	Pennine Lower Coal Measures Formation
Analyte	Units	LOD	GAC									
Benzo (a) pyrene	mg/kg	0.015	1.60		0.177	0.139	<0.015	0.185	0.116	<0.015	0.147	<0.015
Naphthalene	mg/kg	0.009	2.30		0.335	0.0569	<0.009	0.0438	0.0546	<0.009	0.0526	<0.009

Metals

	Result > Assessment Criteria Limit of detection > Assessment Criteria			PointID	BHE1	BHE2	BHE3	TPE01	TPE02	TPE03	TPE04	TPE05	TPE06	TPE07		
					0.2 - 0.25	0.5 - 0.55	0.2 - 0.3	0.1 - 0.15	0.4 - 0.5	0.1 - 0.15	0.6 - 0.7	0.4 - 0.5	0.3 - 0.5	0.1 - 0.15		
					22/08/17	22/08/17	22/08/17	16/08/17	16/08/17	17/08/17	17/08/17	17/08/17	16/08/17	16/08/17		
					Sample Date	Geology (at top depth of sample)	Pennine Lower Coal Measures Formation	Pennine Lower Coal Measures Formation	Pennine Lower Coal Measures Formation	Topsoil	Pennine Lower Coal Measures Formation	Topsoil	Pennine Lower Coal Measures Formation	Pennine Lower Coal Measures Formation	Pennine Lower Coal Measures Formation	Topsoil
					Analyte	Units	LOD	GAC								
Arsenic	mg/kg	0.60	32.0		31.9	23.2	19.4	18.7	10.1	24.6	6.02	5.36	5.62	24.1		
Cadmium	mg/kg	0.020	12.0		0.44	0.362	0.0775	0.0706	<0.02	0.483	<0.02	<0.02	<0.02	0.128		
Copper	mg/kg	1.40	2,490		48	33.5	34	33.1	26.1	38.7	28.2	11.7	23.9	39		
Lead	mg/kg	0.70	148		71.6	111	50.3	55.4	35.5	59.5	32.5	29	19.2	70.5		
Mercury	mg/kg	0.14	39.0		0.577	0.659	0.272	0.409	0.361	0.489	0.879	0.459	0.533	0.347		
Nickel	mg/kg	0.20	126		23.2	17.6	27.4	26.8	32.1	21.3	35.1	31.2	21.8	23		
Selenium	mg/kg	1.00	258		1.24	1.89	3.01	2.11	2.24	2.66	3.31	1.98	2.83	3.24		
Zinc	mg/kg	1.90	3,860		109	102	100	97.8	78.8	110	98.5	68.4	65.3	97.9		

PAHs

Result > Assessment Criteria Limit of detection > Assessment Criteria AnalyteUnitsLODGAC				PointID	BHE1	BHE3	TPE01	TPE02	TPE03	TPE04	TPE05	TPE06	TPE07			
					0.2 - 0.25	0.2 - 0.3	0.1 - 0.15	0.4 - 0.5	0.1 - 0.15	0.6 - 0.7	0.4 - 0.5	0.3 - 0.5	0.1 - 0.15			
				Depth (m bgl)	22/08/17	22/08/17	16/08/17	16/08/17	17/08/17	17/08/17	17/08/17	16/08/17	16/08/17			
				Sample Date												
				Geology (at top depth of sample)	Pennine Lower Coal Measures Formation	Pennine Lower Coal Measures Formation	Topsoil	Pennine Lower Coal Measures Formation	Topsoil	Pennine Lower Coal Measures Formation	Pennine Lower Coal Measures Formation	Pennine Lower Coal Measures Formation	Topsoil			
Benzo (a) pyrene					mg/kg	0.015	1.60	0.334	0.0602	0.484	0.0559	0.141	<0.015	0.0255	<0.015	0.654
Naphthalene					mg/kg	0.009	2.30	0.0774	0.121	0.137	0.0239	0.0778	<0.009	0.0147	<0.009	0.147



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

WSP PB MLN
The Victoria
150-182 The Quays
Salford
Manchester
Lancashire
M50 3SP

Attention: Charley Wainwright

CERTIFICATE OF ANALYSIS

Date:	06 September 2017
Customer:	H_WSP_MAN
Sample Delivery Group (SDG):	170829-5
Your Reference:	70035780
Location:	Fenay Bridge
Report No:	423123

We received 29 samples on Tuesday August 29, 2017 and 29 of these samples were scheduled for analysis which was completed on Wednesday September 06, 2017. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 423123
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
16085712	BHA1	ES	0.40 - 0.50	21/08/2017
16085708	BHA2	ES	0.50 - 0.60	21/08/2017
16085717	BHA3	ES	0.20 - 0.30	22/08/2017
16085705	BHE3	ES	0.20 - 0.30	22/08/2017
16085651	TPA01	ES	0.30 - 0.40	17/08/2017
16085656	TPA02	ES	0.50 - 0.60	17/08/2017
16085661	TPA03	ES	0.20 - 0.40	17/08/2017
16085665	TPA05	ES	0.80 - 1.00	17/08/2017
16085675	TPA06	ES	0.50 - 0.60	17/08/2017
16085680	TPA07	ES	0.50 - 0.60	18/08/2017
16085685	TPA08	ES	0.30 - 0.40	18/08/2017
16085690	TPA09	ES	1.60 - 1.70	18/08/2017
16085695	TPA10	ES	0.10 - 0.20	18/08/2017
16085700	TPA11	ES	0.80 - 0.90	18/08/2017
16085753	TPD01	ES	0.10 - 0.15	16/08/2017
16085748	TPD02	ES	0.10 - 0.20	16/08/2017
16085737	TPD03	ES	0.10 - 0.20	16/08/2017
16085616	TPD04	ES	0.10 - 0.20	16/08/2017
16085670	TPD04	ES	0.50 - 0.60	16/08/2017
16085722	TPD05	ES	0.20 - 0.25	16/08/2017
16085727	TPD05	ES	0.70 - 0.80	16/08/2017
16085732	TPD06	ES	0.40 - 0.60	16/08/2017
16085758	TPE01	ES	0.10 - 0.15	16/08/2017
16085621	TPE02	ES	0.40 - 0.50	16/08/2017
16085641	TPE03	ES	0.10 - 0.20	17/08/2017
16085636	TPE04	ES	0.60 - 0.70	17/08/2017
16085646	TPE05	ES	0.40 - 0.50	17/08/2017
16085626	TPE06	ES	0.30 - 0.50	16/08/2017
16085631	TPE07	ES	0.10 - 0.20	16/08/2017

Maximum Sample/Coolbox Temperature (°C) : 15.6

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number:
Superseded Report:

423123

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type
16085675	TPA06	ES	0.50 - 0.60	250g Amber Jar (ALE210)	S
16085665	TPA05	ES	0.80 - 1.00	60g VOC (ALE215)	S
16085661	TPA03	ES	0.20 - 0.40	250g Amber Jar (ALE210)	S
16085656	TPA02	ES	0.50 - 0.60	250g Amber Jar (ALE210)	S
16085651	TPA01	ES	0.30 - 0.40	60g VOC (ALE215)	S
16085705	BHE3	ES	0.20 - 0.30	1kg TUB	S
16085717	BHA3	ES	0.20 - 0.30	250g Amber Jar (ALE210)	S
16085708	BHA2	ES	0.50 - 0.60	250g Amber Jar (ALE210)	S
16085712	BHA1	ES	0.40 - 0.50	250g Amber Jar (ALE210)	S
16085712	BHA1	ES	0.40 - 0.50	1kg TUB	S
Anions by Kone (soil)	All	NDPs: 0 Tests: 10			
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 29			
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 5			
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 5			
GRO by GC-FID (S)	All	NDPs: 0 Tests: 5			
Metals in solid samples by OES	All	NDPs: 0 Tests: 29			
PAH by GCMS	All	NDPs: 0 Tests: 29			
pH	All	NDPs: 0 Tests: 13			
Sample description	All	NDPs: 0 Tests: 29			
Total Organic Carbon	All	NDPs: 0 Tests: 12			
TPH CWG GC (S)	All	NDPs: 0 Tests: 5			
VOC MS (S)	All	NDPs: 0 Tests: 5			



CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 423123
Superseded Report:

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water
 Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Results Legend	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container		Sample Type	
	16085626	TP06	ES	0.30 - 0.50	250g Amber Jar (ALE210)	S						
	16085646	TP05	ES	0.40 - 0.50	250g Amber Jar (ALE210)	S						
	16085636	TP04	ES	0.60 - 0.70	250g Amber Jar (ALE210)	S						
	16085641	TP03	ES	0.10 - 0.20	250g Amber Jar (ALE210)	S						
	16085621	TP02	ES	0.40 - 0.50	250g Amber Jar (ALE210)	S						
Anions by Kone (soil)	All	NDPs: 0 Tests: 10										
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 29										
Metals in solid samples by OES	All	NDPs: 0 Tests: 29										
PAH by GCMS	All	NDPs: 0 Tests: 29										
pH	All	NDPs: 0 Tests: 13										
Sample description	All	NDPs: 0 Tests: 29										
Total Organic Carbon	All	NDPs: 0 Tests: 12										



CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 423123
Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
-----------	----------	------	-----------------	--------	-------------	--------	------------	-------------	-------

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
16085712	BHA1	0.40 - 0.50	Dark Brown	Sandy Clay Loam	Vegetation	Stones
16085708	BHA2	0.50 - 0.60	Dark Brown	Sandy Loam	Stones	Vegetation
16085717	BHA3	0.20 - 0.30	Dark Brown	Sandy Clay Loam	Vegetation	Stones
16085705	BHE3	0.20 - 0.30	Dark Brown	Sand	Stones	Vegetation
16085651	TPA01	0.30 - 0.40	Dark Brown	Loamy Sand	Stones	Vegetation
16085656	TPA02	0.50 - 0.60	Dark Brown	Sandy Loam	Stones	Vegetation
16085661	TPA03	0.20 - 0.40	Dark Brown	Silty Clay	Brick	Stones
16085665	TPA05	0.80 - 1.00	Black	Loamy Sand	Crushed Brick	Stones
16085675	TPA06	0.50 - 0.60	Light Brown	Sandy Loam	Stones	Crushed Brick
16085680	TPA07	0.50 - 0.60	Dark Brown	Sand	Stones	Brick
16085685	TPA08	0.30 - 0.40	Light Brown	Sandy Clay Loam	Stones	Vegetation
16085690	TPA09	1.60 - 1.70	Dark Brown	Sandy Clay Loam	Stones	Brick
16085695	TPA10	0.10 - 0.20	Dark Brown	Sandy Clay	Vegetation	Stones
16085700	TPA11	0.80 - 0.90	Light Brown	Clay	Stones	Vegetation
16085753	TPD01	0.10 - 0.15	Dark Brown	Sandy Silt Loam	Stones	Vegetation
16085748	TPD02	0.10 - 0.20	Light Brown	Silty Clay Loam	Stones	Vegetation
16085737	TPD03	0.10 - 0.20	Light Brown	Sandy Loam	Vegetation	None
16085616	TPD04	0.10 - 0.20	Dark Brown	Loamy Sand	Vegetation	None
16085670	TPD04	0.50 - 0.60	Light Brown	Silty Clay Loam	Stones	Vegetation
16085722	TPD05	0.20 - 0.25	Dark Brown	Sandy Silt Loam	Stones	Vegetation
16085727	TPD05	0.70 - 0.80	Dark Brown	Loamy Sand	Stones	Vegetation
16085732	TPD06	0.40 - 0.60	Dark Brown	Loamy Sand	Stones	Vegetation
16085758	TPE01	0.10 - 0.15	Dark Brown	Loamy Sand	Vegetation	Brick
16085621	TPE02	0.40 - 0.50	Dark Brown	Sandy Loam	Stones	Vegetation
16085641	TPE03	0.10 - 0.20	Dark Brown	Loamy Sand	Stones	Vegetation
16085636	TPE04	0.60 - 0.70	Light Brown	Sandy Loam	Stones	Vegetation
16085646	TPE05	0.40 - 0.50	Light Brown	Loamy Sand	Stones	Vegetation
16085626	TPE06	0.30 - 0.50	Grey	Sandy Loam	Vegetation	Concrete/Aggregate
16085631	TPE07	0.10 - 0.20	Dark Brown	Sandy Loam	Stones	Vegetation

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5 Client Reference: 70035780 Report Number: 423123
 Location: Fenay Bridge Order Number: 70035780-S01 Superseded Report:

Asbestos Identification - Soil

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	BHA1 ES 0.40 - 0.50 SOLID 21/08/2017 00:00:00 30/08/2017 09:13:26 170829-5 16085712 TM048	05/09/17	Renata Hatos	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	BHA2 ES 0.50 - 0.60 SOLID 21/08/2017 00:00:00 29/08/2017 15:44:03 170829-5 16085708 TM048	05/09/17	Eva Guerra	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	BHA3 ES 0.20 - 0.30 SOLID 22/08/2017 00:00:00 29/08/2017 15:07:07 170829-5 16085717 TM048	5/9/17	Neville Mann	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	BHE3 ES 0.20 - 0.30 SOLID 22/08/2017 00:00:00 29/08/2017 15:47:58 170829-5 16085705 TM048	5/9/17	Christian Hallam	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPA01 ES 0.30 - 0.40 SOLID 17/08/2017 00:00:00 29/08/2017 14:07:19 170829-5 16085651 TM048	5/9/17	Neville Mann	Loose fibres in soil	Not Detected (#)	Trace (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

Validated

SDG:	170829-5	Client Reference:	70035780	Report Number:	423123
Location:	Fenay Bridge	Order Number:	70035780-S01	Superseded Report:	

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPA02 ES 0.50 - 0.60 SOLID 17/08/2017 00:00:00 29/08/2017 14:25:38 170829-5 16085656 TM048	05/09/17	Eva Guerra	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPA03 ES 0.20 - 0.40 SOLID 17/08/2017 00:00:00 29/08/2017 15:11:15 170829-5 16085661 TM048	05/09/17	Renata Hatos	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPA05 ES 0.80 - 1.00 SOLID 17/08/2017 00:00:00 29/08/2017 15:14:28 170829-5 16085665 TM048	05/09/17	Christian Hallam	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPA06 ES 0.50 - 0.60 SOLID 17/08/2017 00:00:00 29/08/2017 14:05:16 170829-5 16085675 TM048	5/9/17	Neville Mann	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPA07 ES 0.50 - 0.60 SOLID 18/08/2017 00:00:00 29/08/2017 15:09:04 170829-5 16085680 TM048	04/09/17	Eva Guerra	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPA08 ES 0.30 - 0.40 SOLID 18/08/2017 00:00:00 30/08/2017 09:15:07 170829-5 16085685 TM048	05/08/17	Eva Guerra	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5 Client Reference: 70035780 Report Number: 423123
Location: Fenay Bridge Order Number: 70035780-S01 Superseded Report:

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPA09 ES 1.60 - 1.70 SOLID 18/08/2017 00:00:00 29/08/2017 15:05:09 170829-5 16085690 TM048	05/09/17	Eva Guerra	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPA10 ES 0.10 - 0.20 SOLID 18/08/2017 00:00:00 29/08/2017 13:52:36 170829-5 16085695 TM048	05/09/17	Renata Hatos	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPA11 ES 0.80 - 0.90 SOLID 18/08/2017 00:00:00 29/08/2017 13:51:20 170829-5 16085700 TM048	5/9/17	Neville Mann	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPD01 ES 0.10 - 0.15 SOLID 16/08/2017 00:00:00 29/08/2017 18:47:09 170829-5 16085753 TM048	5/9/17	Neville Mann	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPD02 ES 0.10 - 0.20 SOLID 16/08/2017 00:00:00 29/08/2017 14:30:02 170829-5 16085748 TM048	5/9/17	Neville Mann	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPD03 ES 0.10 - 0.20 SOLID 16/08/2017 00:00:00 29/08/2017 18:49:23 170829-5 16085737 TM048	5/9/17	Neville Mann	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

Validated

SDG:	170829-5	Client Reference:	70035780	Report Number:	423123
Location:	Fenay Bridge	Order Number:	70035780-S01	Superseded Report:	

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPD04 ES 0.10 - 0.20 SOLID 16/08/2017 00:00:00 29/08/2017 14:08:33 170829-5 16085616 TM048	5/9/17	Neville Mann	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPD04 ES 0.50 - 0.60 SOLID 16/08/2017 00:00:00 29/08/2017 14:08:24 170829-5 16085670 TM048	05/09/17	Renata Hatos	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPD05 ES 0.20 - 0.25 SOLID 16/08/2017 00:00:00 29/08/2017 15:12:47 170829-5 16085722 TM048	05/09/17	Eva Guerra	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPD05 ES 0.70 - 0.80 SOLID 16/08/2017 00:00:00 29/08/2017 14:11:14 170829-5 16085727 TM048	5/9/17	Neville Mann	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPD06 ES 0.40 - 0.60 SOLID 16/08/2017 00:00:00 29/08/2017 14:09:34 170829-5 16085732 TM048	5/9/17	Barbara Urbanek-Walsh	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPE01 ES 0.10 - 0.15 SOLID 16/08/2017 00:00:00 30/08/2017 12:20:25 170829-5 16085758 TM048	05/09/17	Eva Guerra	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

Validated

SDG:	170829-5	Client Reference: 70035780	Report Number: 423123
Location:	Fenay Bridge	Order Number: 70035780-S01	Superseded Report:

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPE02 ES 0.40 - 0.50 SOLID 16/08/2017 00:00:00 29/08/2017 18:48:16 170829-5 16085621 TM048	5/9/17	Neville Mann	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPE03 ES 0.10 - 0.20 SOLID 17/08/2017 00:00:00 29/08/2017 14:14:18 170829-5 16085641 TM048	5/9/17	Christian Hallam	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPE04 ES 0.60 - 0.70 SOLID 17/08/2017 00:00:00 29/08/2017 14:28:06 170829-5 16085636 TM048	5/9/17	Neville Mann	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPE05 ES 0.40 - 0.50 SOLID 17/08/2017 00:00:00 29/08/2017 15:15:57 170829-5 16085646 TM048	05/09/17	Eva Guerra	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPE06 ES 0.30 - 0.50 SOLID 16/08/2017 00:00:00 29/08/2017 18:46:12 170829-5 16085626 TM048	5/9/17	Neville Mann	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TPE07 ES 0.10 - 0.20 SOLID 16/08/2017 00:00:00 29/08/2017 14:12:49 170829-5 16085631 TM048	05/09/17	Eva Guerra	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 423123
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
ASB_PREP				
PM001		Preparation of Samples for Metals Analysis		
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
TM218	Determination of PAH by GCMS Microwave extraction	The determination of PAH in soil samples by microwave extraction and GC-MS		
TM243		Mixed Anions In Soils By Kone		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 423123
Superseded Report:

Test Completion Dates

Lab Sample No(s) Customer Sample Ref.	16085712	16085708	16085717	16085705	16085651	16085656	16085661	16085665	16085675	16085680
	BHA1	BHA2	BHA3	BHE3	TPA01	TPA02	TPA03	TPA05	TPA06	TPA07
AGS Ref. Depth Type	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
	0.40 - 0.50	0.50 - 0.60	0.20 - 0.30	0.20 - 0.30	0.30 - 0.40	0.50 - 0.60	0.20 - 0.40	0.80 - 1.00	0.50 - 0.60	0.50 - 0.60
Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (soil)	05-Sep-2017	05-Sep-2017	05-Sep-2017	05-Sep-2017	05-Sep-2017	01-Sep-2017	05-Sep-2017	04-Sep-2017	05-Sep-2017	05-Sep-2017
Asbestos ID in Solid Samples	31-Aug-2017				31-Aug-2017			04-Sep-2017		31-Aug-2017
EPH CWG (Aliphatic) GC (S)	31-Aug-2017				31-Aug-2017			04-Sep-2017		31-Aug-2017
EPH CWG (Aromatic) GC (S)	04-Sep-2017				04-Sep-2017			04-Sep-2017		04-Sep-2017
GRO by GC-FID (S)	04-Sep-2017	04-Sep-2017	05-Sep-2017	04-Sep-2017	04-Sep-2017	04-Sep-2017	05-Sep-2017	05-Sep-2017	04-Sep-2017	04-Sep-2017
Metals in solid samples by OES	04-Sep-2017	04-Sep-2017	04-Sep-2017	04-Sep-2017	04-Sep-2017	04-Sep-2017	06-Sep-2017	06-Sep-2017	04-Sep-2017	04-Sep-2017
PAH by GCMS	31-Aug-2017	31-Aug-2017			31-Aug-2017				31-Aug-2017	
pH	29-Aug-2017	29-Aug-2017	29-Aug-2017	29-Aug-2017	29-Aug-2017	29-Aug-2017	29-Aug-2017	29-Aug-2017	30-Aug-2017	29-Aug-2017
Sample description	04-Sep-2017			04-Sep-2017	31-Aug-2017		04-Sep-2017	05-Sep-2017		
Total Organic Carbon	04-Sep-2017				04-Sep-2017			04-Sep-2017		04-Sep-2017
TPH CWG GC (S)	03-Sep-2017				03-Sep-2017			03-Sep-2017		03-Sep-2017
VOC MS (S)										

Lab Sample No(s) Customer Sample Ref.	16085685	16085690	16085695	16085700	16085753	16085748	16085737	16085616	16085670	16085722
	TPA08	TPA09	TPA10	TPA11	TPD01	TPD02	TPD03	TPD04	TPD04	TPD05
AGS Ref. Depth Type	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
	0.30 - 0.40	1.60 - 1.70	0.10 - 0.20	0.80 - 0.90	0.10 - 0.15	0.10 - 0.20	0.10 - 0.20	0.10 - 0.20	0.50 - 0.60	0.20 - 0.25
Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (soil)		04-Sep-2017		31-Aug-2017					31-Aug-2017	
Asbestos ID in Solid Samples	05-Sep-2017	05-Sep-2017	05-Sep-2017	05-Sep-2017	05-Sep-2017	05-Sep-2017	05-Sep-2017	05-Sep-2017	05-Sep-2017	05-Sep-2017
EPH CWG (Aliphatic) GC (S)				31-Aug-2017						
EPH CWG (Aromatic) GC (S)				31-Aug-2017						
GRO by GC-FID (S)				04-Sep-2017						
Metals in solid samples by OES	05-Sep-2017	04-Sep-2017	05-Sep-2017	05-Sep-2017	01-Sep-2017	04-Sep-2017	04-Sep-2017	04-Sep-2017	04-Sep-2017	01-Sep-2017
PAH by GCMS	04-Sep-2017	04-Sep-2017	04-Sep-2017	04-Sep-2017	31-Aug-2017	31-Aug-2017	04-Sep-2017	04-Sep-2017	31-Aug-2017	30-Aug-2017
pH	31-Aug-2017	31-Aug-2017		31-Aug-2017				31-Aug-2017	31-Aug-2017	
Sample description	29-Aug-2017	29-Aug-2017	29-Aug-2017	29-Aug-2017	29-Aug-2017	29-Aug-2017	29-Aug-2017	30-Aug-2017	29-Aug-2017	29-Aug-2017
Total Organic Carbon					31-Aug-2017		31-Aug-2017	04-Sep-2017		
TPH CWG GC (S)				04-Sep-2017						
VOC MS (S)				03-Sep-2017						

Lab Sample No(s) Customer Sample Ref.	16085727	16085732	16085758	16085621	16085641	16085636	16085646	16085626	16085631
	TPD05	TPD06	TPE01	TPE02	TPE03	TPE04	TPE05	TPE06	TPE07
AGS Ref. Depth Type	ES	ES	ES	ES	ES	ES	ES	ES	ES
	0.70 - 0.80	0.40 - 0.60	0.10 - 0.15	0.40 - 0.50	0.10 - 0.20	0.60 - 0.70	0.40 - 0.50	0.30 - 0.50	0.10 - 0.20
Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (soil)	31-Aug-2017	31-Aug-2017		01-Sep-2017		01-Sep-2017	31-Aug-2017		
Asbestos ID in Solid Samples	05-Sep-2017	05-Sep-2017	05-Sep-2017	05-Sep-2017	05-Sep-2017	05-Sep-2017	05-Sep-2017	05-Sep-2017	05-Sep-2017
Metals in solid samples by OES	01-Sep-2017	01-Sep-2017	04-Sep-2017	04-Sep-2017	05-Sep-2017	04-Sep-2017	04-Sep-2017	04-Sep-2017	04-Sep-2017
PAH by GCMS	30-Aug-2017	30-Aug-2017	04-Sep-2017	31-Aug-2017	04-Sep-2017	04-Sep-2017	04-Sep-2017	04-Sep-2017	04-Sep-2017
pH	30-Aug-2017			31-Aug-2017		31-Aug-2017		30-Aug-2017	
Sample description	29-Aug-2017	29-Aug-2017	30-Aug-2017	29-Aug-2017	29-Aug-2017	29-Aug-2017	29-Aug-2017	30-Aug-2017	29-Aug-2017
Total Organic Carbon	31-Aug-2017			04-Sep-2017		04-Sep-2017			04-Sep-2017



CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 423123
Superseded Report:

Chromatogram

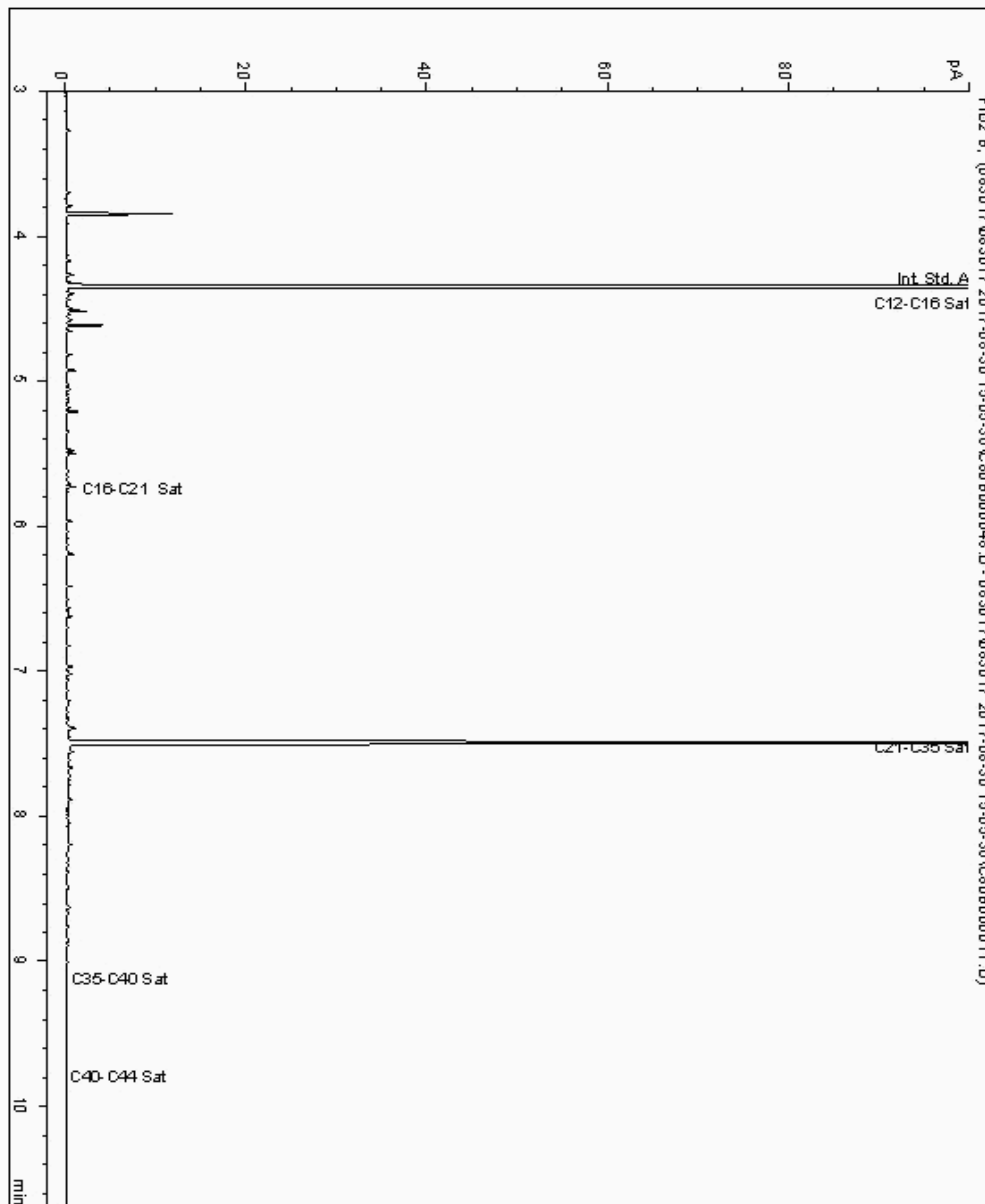
Analysis: EPH CWG (Aliphatic) GC (S)

Sample No : 16088423
Sample ID : TPA11

Depth : 0.80 - 0.90

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 15064799-
Date Acquired : 31/08/17 04:31:28
Units : ppb
Dilution :
CF : 1
Multiplier : 1.050





CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 423123
Superseded Report:

Chromatogram

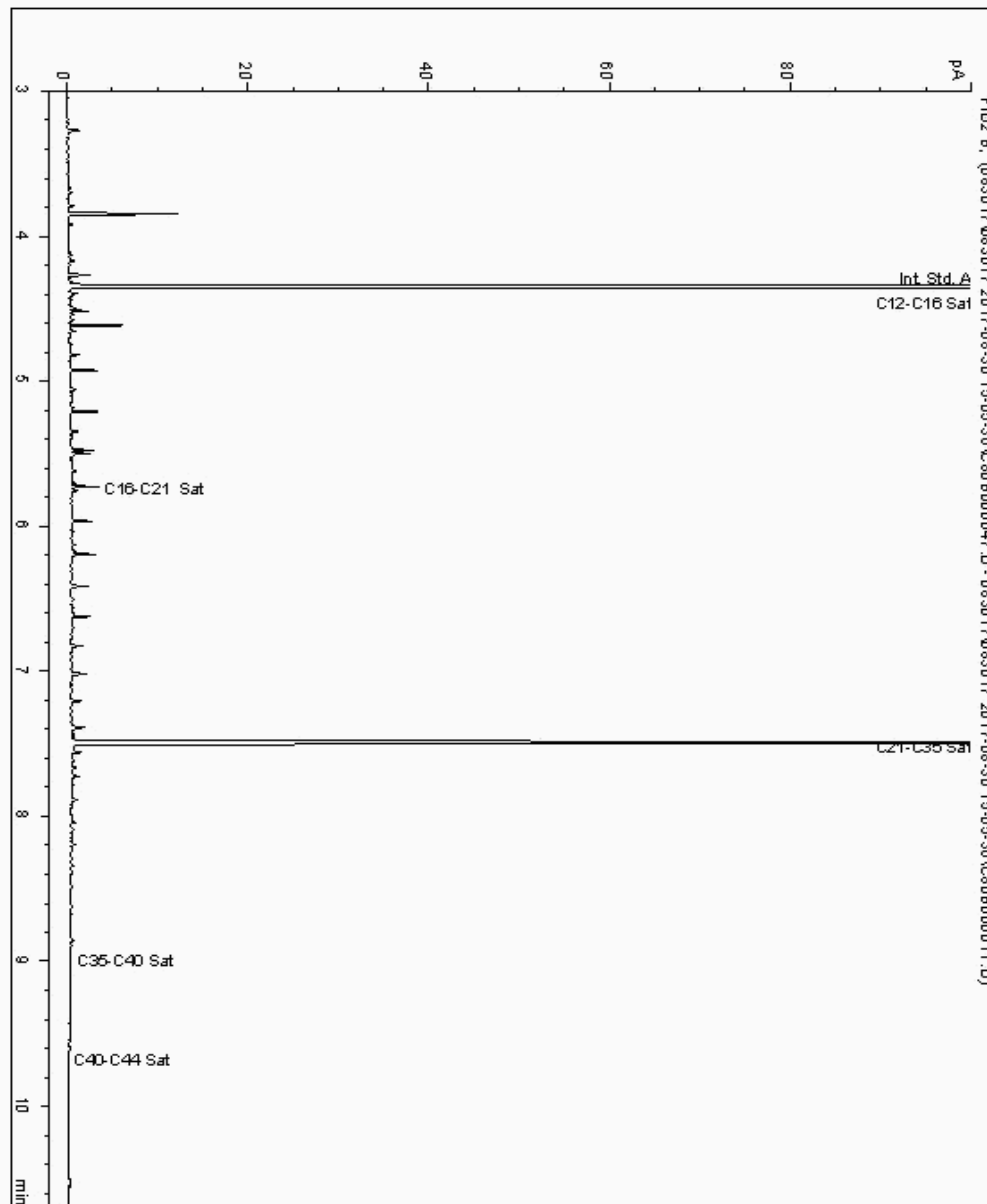
Analysis: EPH CWG (Aliphatic) GC (S)

Sample No : 16088641
Sample ID : TPA01

Depth : 0.30 - 0.40

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 15064682-
Date Acquired : 31/08/17 04:12:16
Units : ppb
Dilution :
CF : 1
Multiplier : 1.030





CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 423123
Superseded Report:

Chromatogram

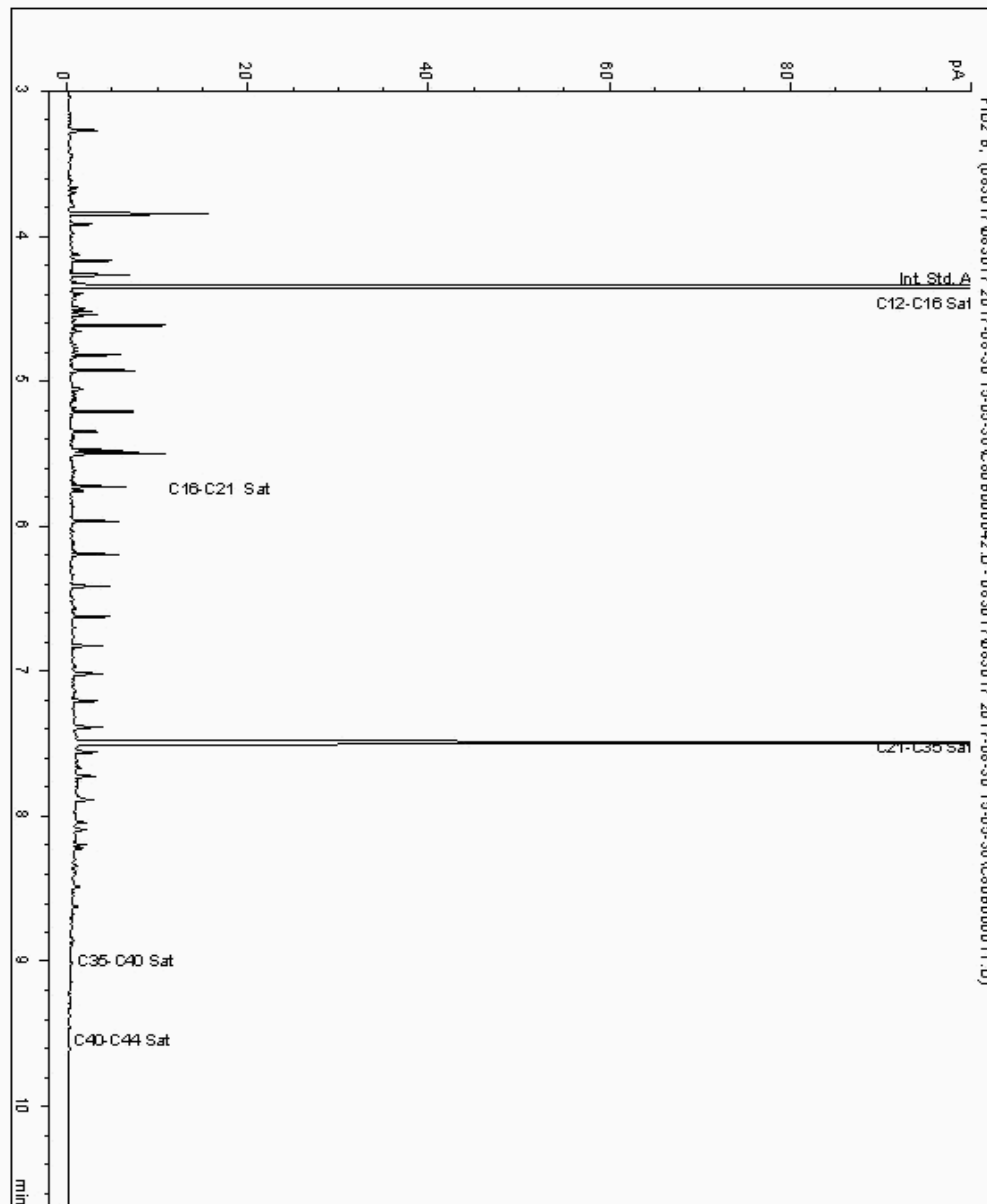
Analysis: EPH CWG (Aliphatic) GC (S)

Sample No : 16088773
Sample ID : TPA05

Depth : 0.80 - 1.00

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 15064713-
Date Acquired : 31/08/17 02:42:46
Units : ppb
Dilution :
CF : 1
Multiplier : 1.030





CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 423123
Superseded Report:

Chromatogram

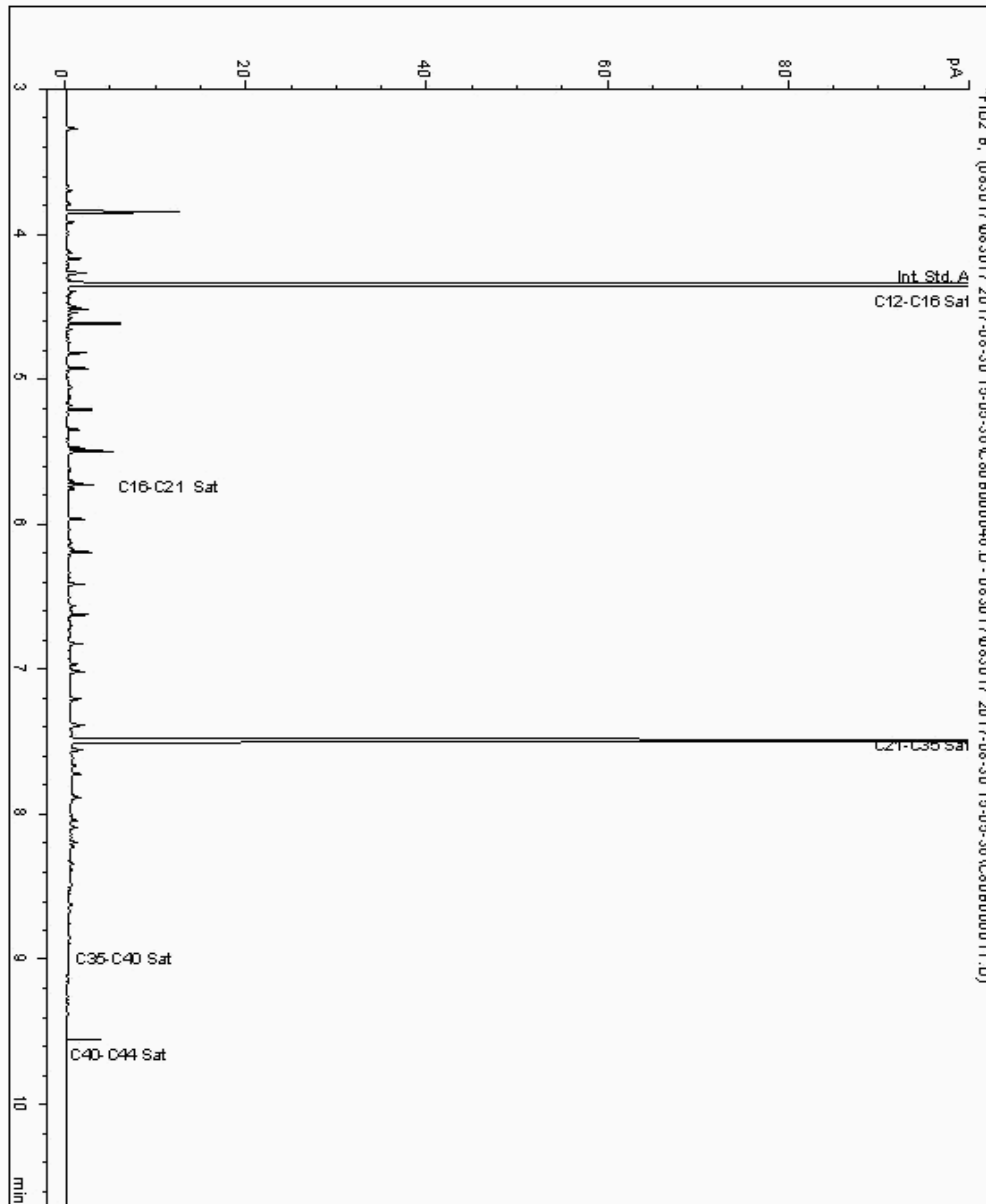
Analysis: EPH CWG (Aliphatic) GC (S)

Sample No : 16088841
Sample ID : TPA07

Depth : 0.50 - 0.60

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 15064755-
Date Acquired : 31/08/17 03:53:00
Units : ppb
Dilution :
CF : 1
Multiplier : 1.040





CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 423123
Superseded Report:

Chromatogram

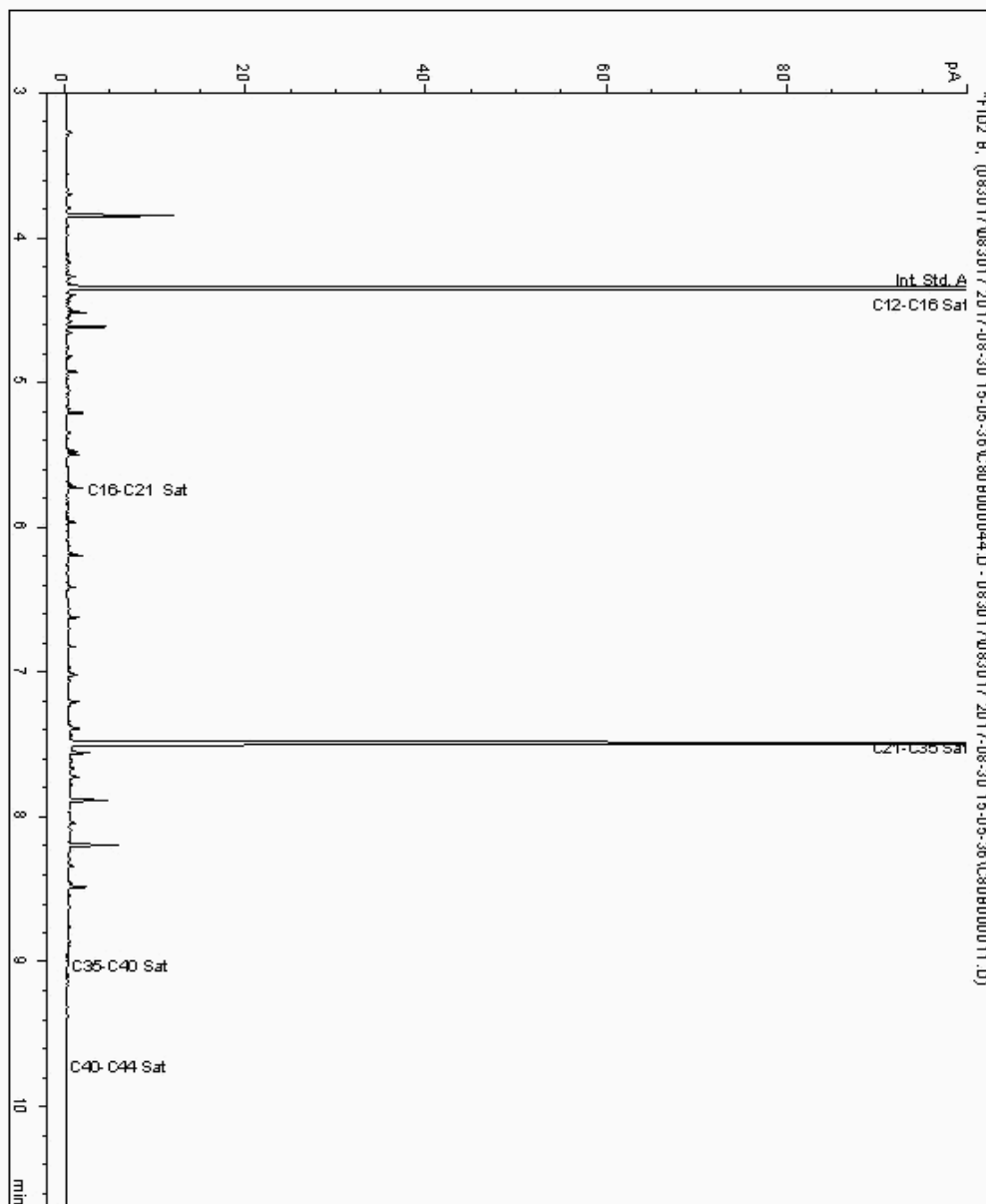
Analysis: EPH CWG (Aliphatic) GC (S)

Sample No : 16089050
Sample ID : BHA1

Depth : 0.40 - 0.50

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 15064834-
Date Acquired : 31/08/17 03:17:44
Units : ppb
Dilution :
CF : 1
Multiplier : 0.960





CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 423123
Superseded Report:

Chromatogram

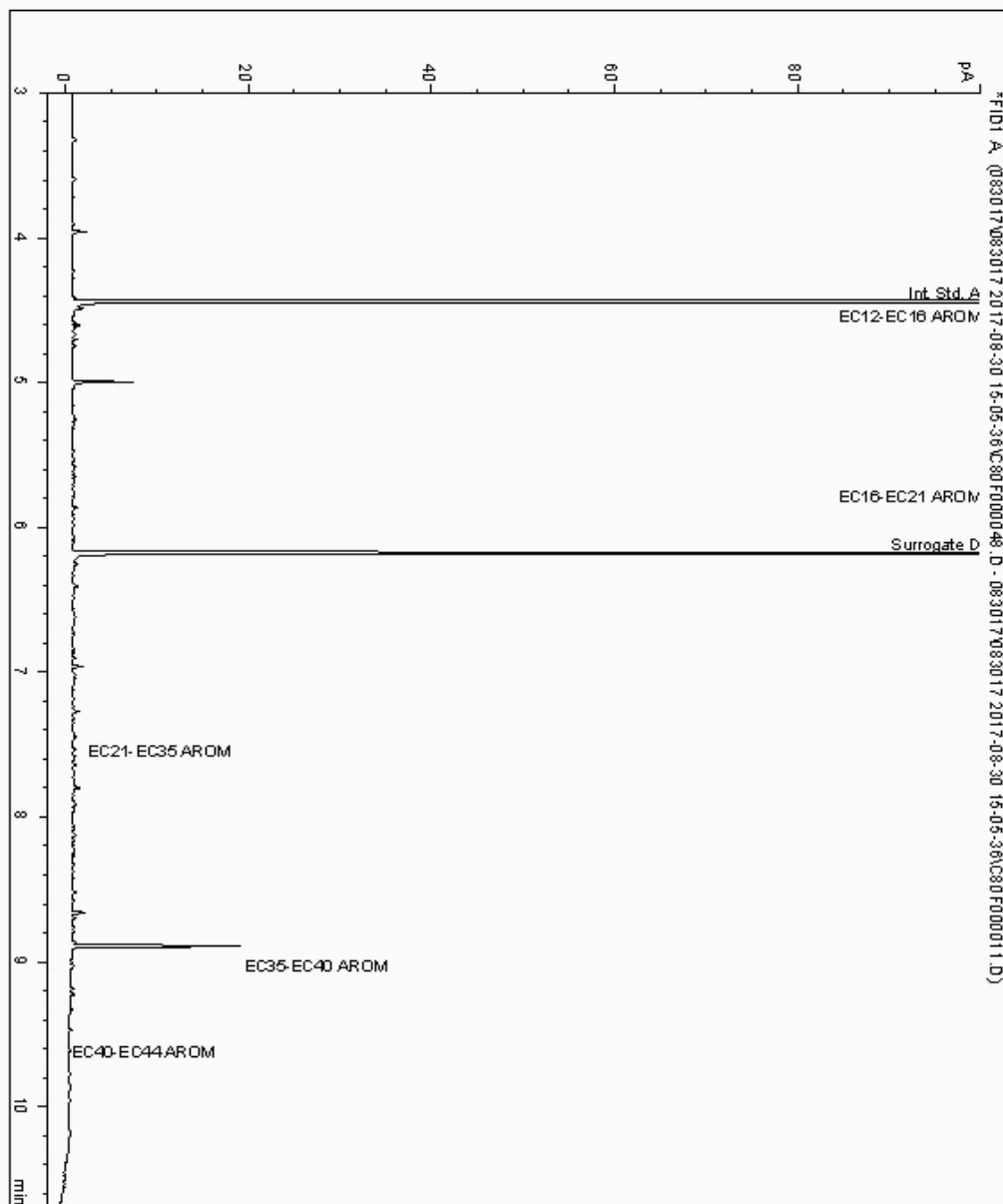
Analysis: EPH CWG (Aromatic) GC (S)

Sample No : 16088423
Sample ID : TPA11

Depth : 0.80 - 0.90

Speciated TPH - AROMS (C12 - C44)

Sample Identity: 15064800-
Date Acquired : 31/08/17 04:31:28
Units : ppb
Dilution :
CF : 1
Multiplier : 1.050





CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 423123
Superseded Report:

Chromatogram

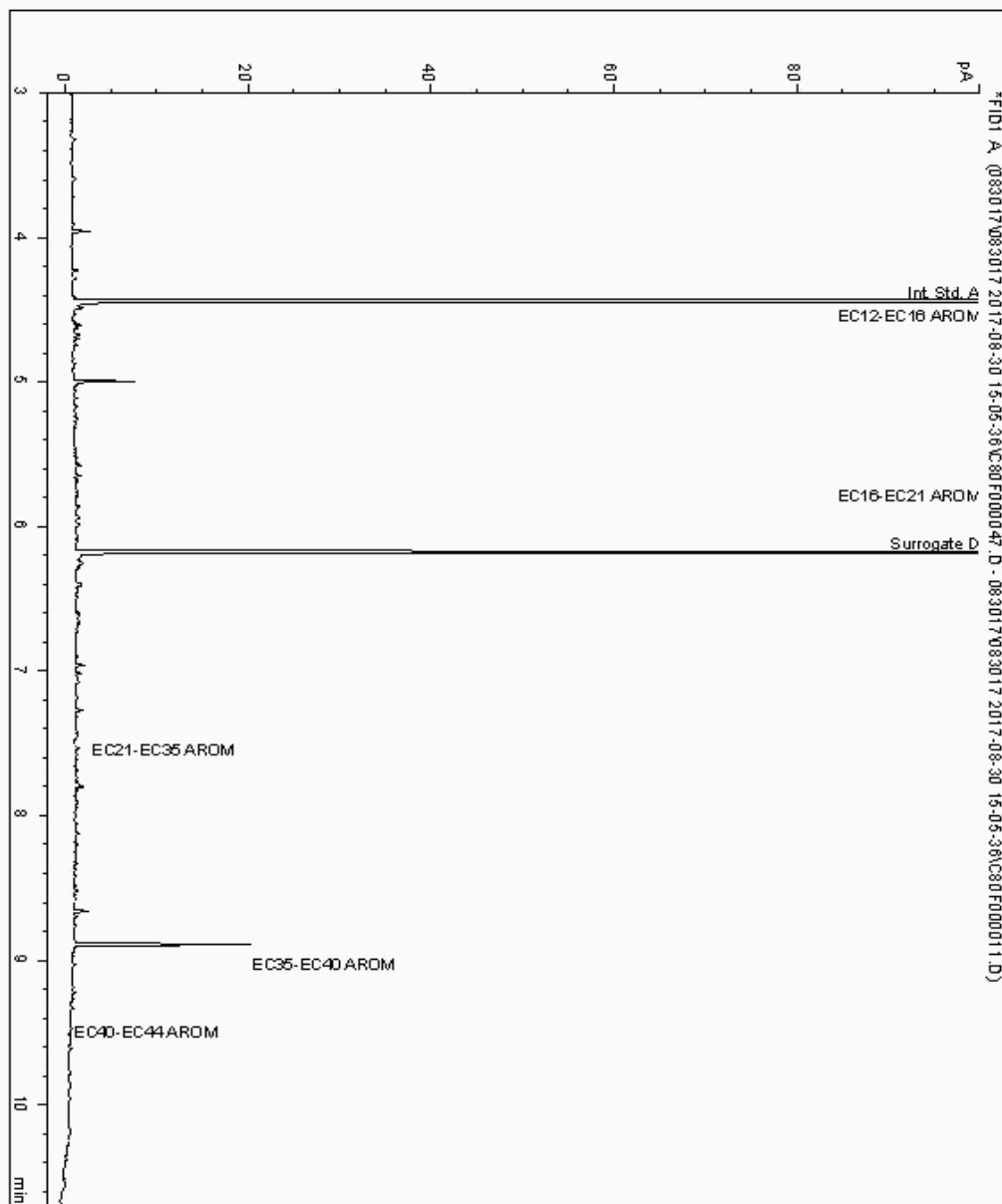
Analysis: EPH CWG (Aromatic) GC (S)

Sample No : 16088641
Sample ID : TPA01

Depth : 0.30 - 0.40

Speciated TPH - AROMS (C12 - C44)

Sample Identity: 15064683-
Date Acquired : 31/08/17 04:12:16
Units : ppb
Dilution :
CF : 1
Multiplier : 1.030





CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 423123
Superseded Report:

Chromatogram

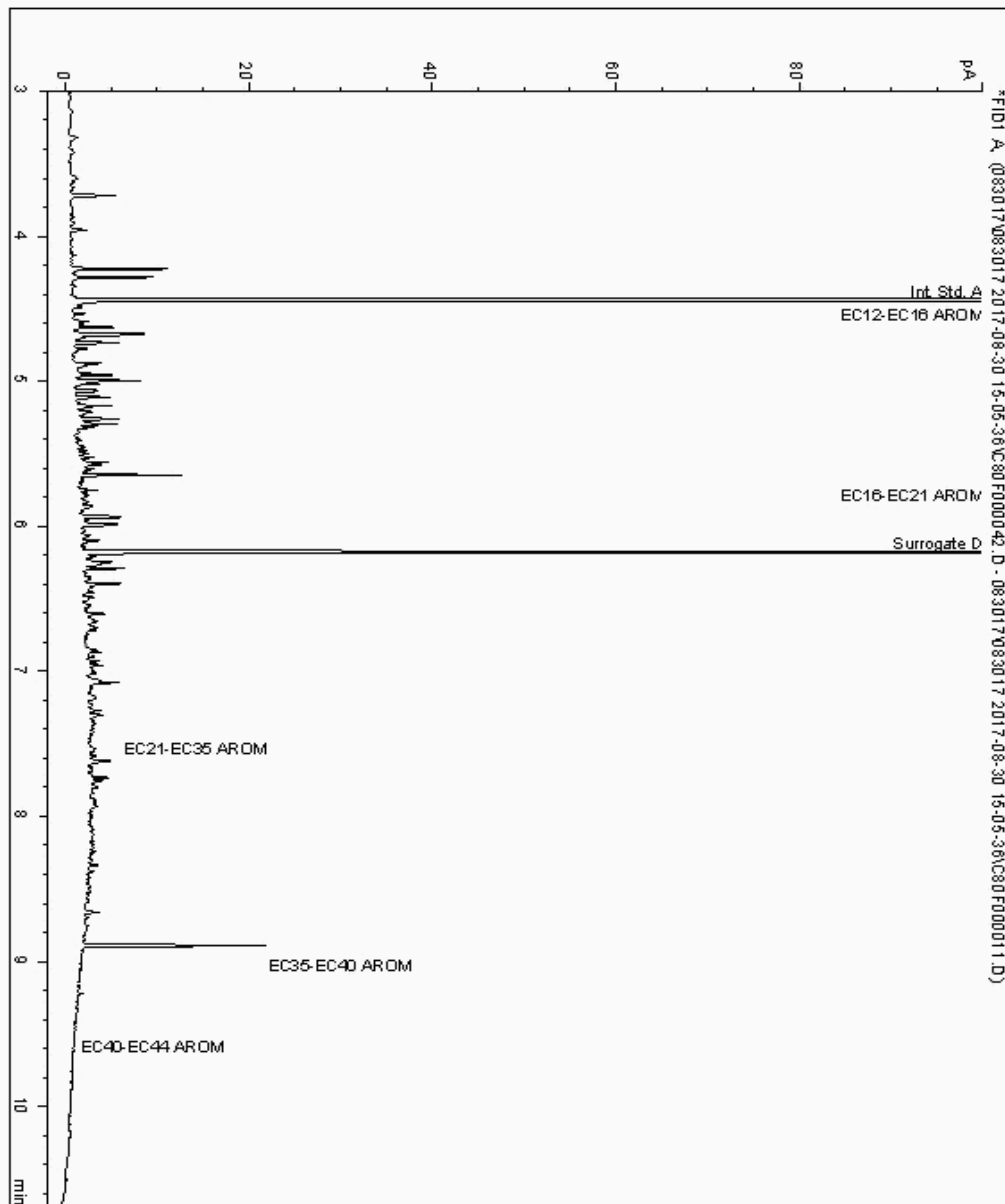
Analysis: EPH CWG (Aromatic) GC (S)

Sample No : 16088773
Sample ID : TPA05

Depth : 0.80 - 1.00

Speciated TPH - AROMS (C12 - C44)

Sample Identity: 15064714-
Date Acquired : 31/08/17 02:42:46
Units : ppb
Dilution :
CF : 1
Multiplier : 1.030



SDG:	170829-5
Location:	Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

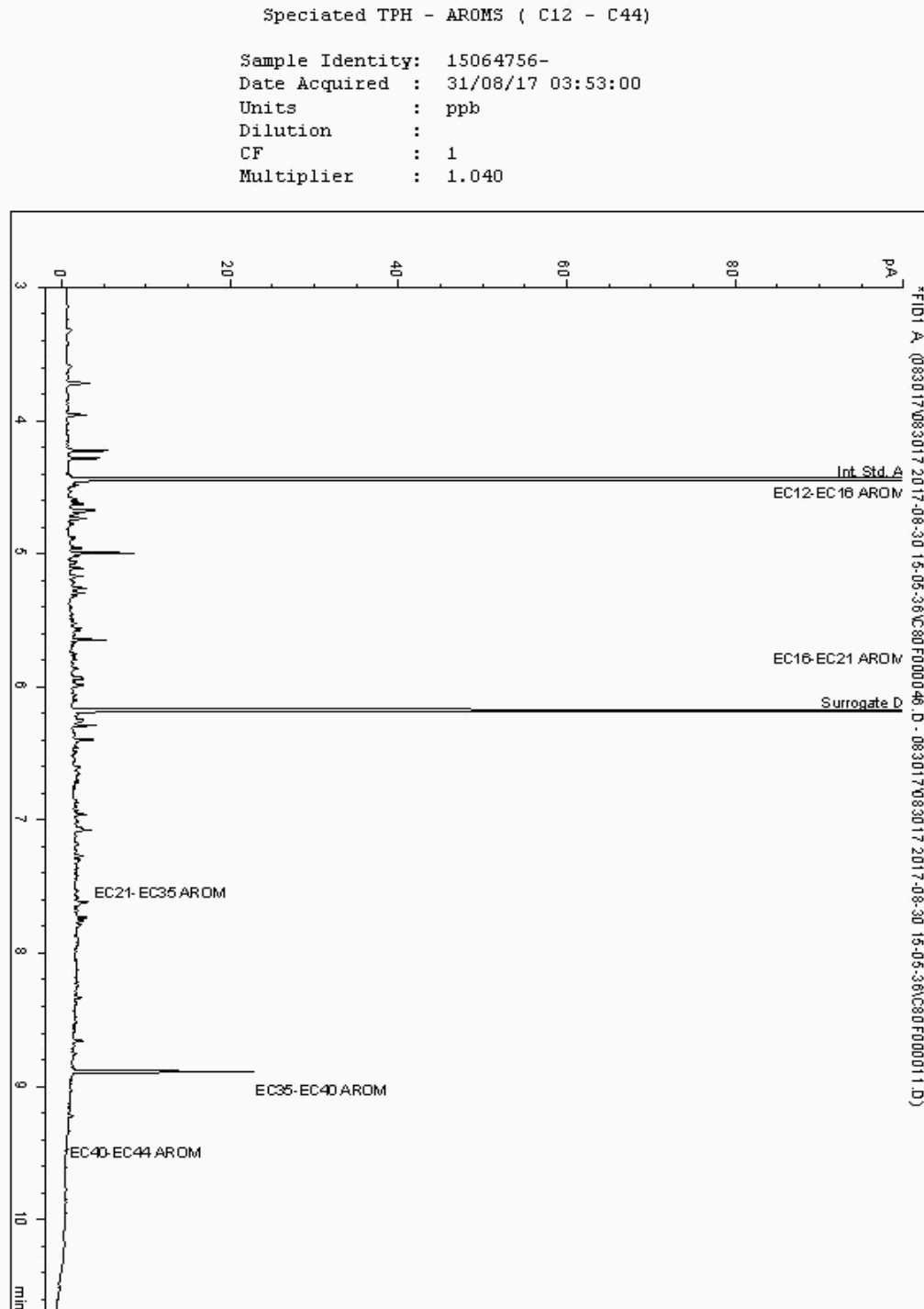
Report Number: 423123
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

Sample No : 16088841
Sample ID : TPA07

Depth : 0.50 - 0.60





CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 423123
Superseded Report:

Chromatogram

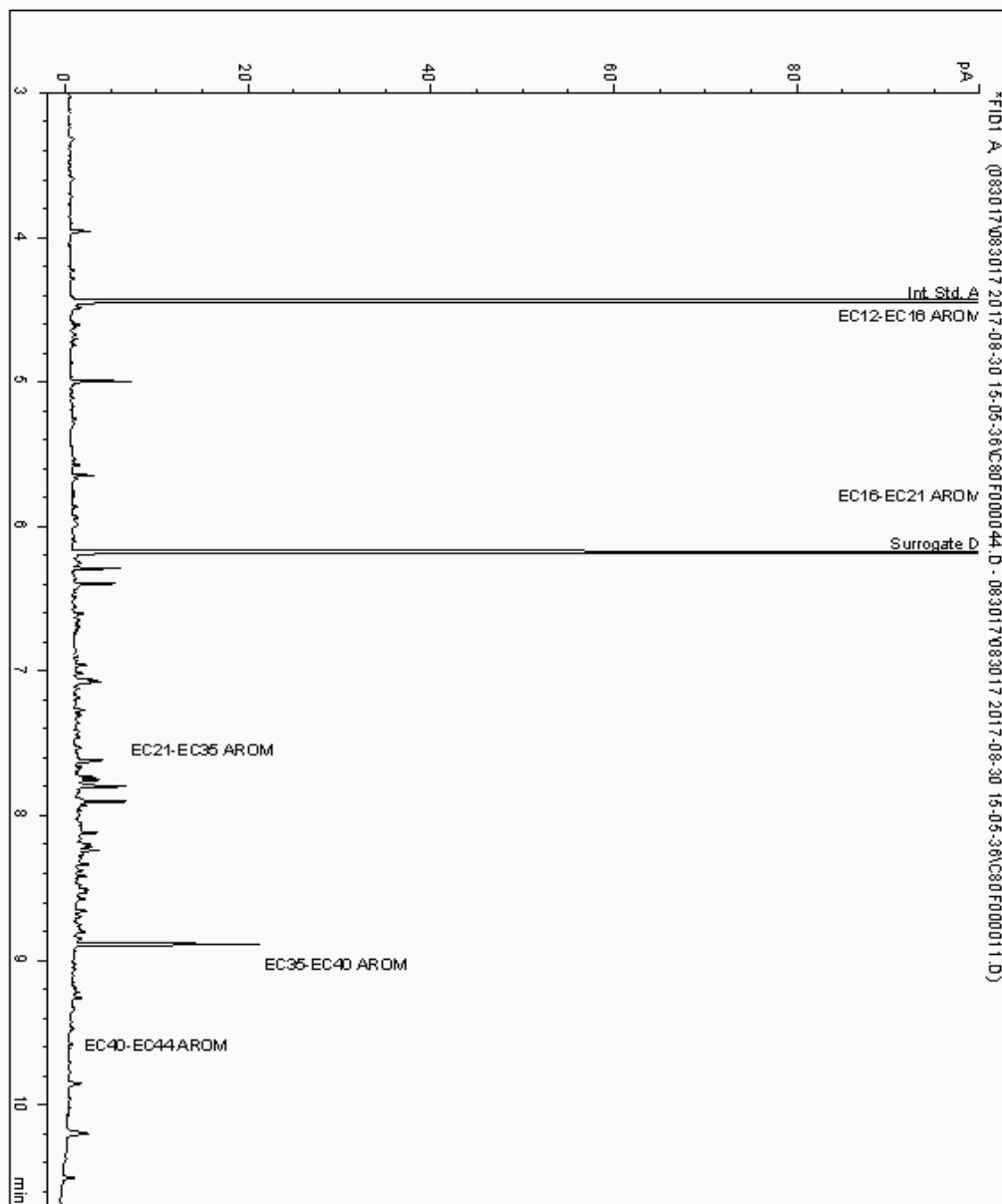
Analysis: EPH CWG (Aromatic) GC (S)

Sample No : 16089050
Sample ID : BHA1

Depth : 0.40 - 0.50

Speciated TPH - AROMS (C12 - C44)

Sample Identity: 15064835-
Date Acquired : 31/08/17 03:17:44
Units : ppb
Dilution :
CF : 1
Multiplier : 0.960





CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

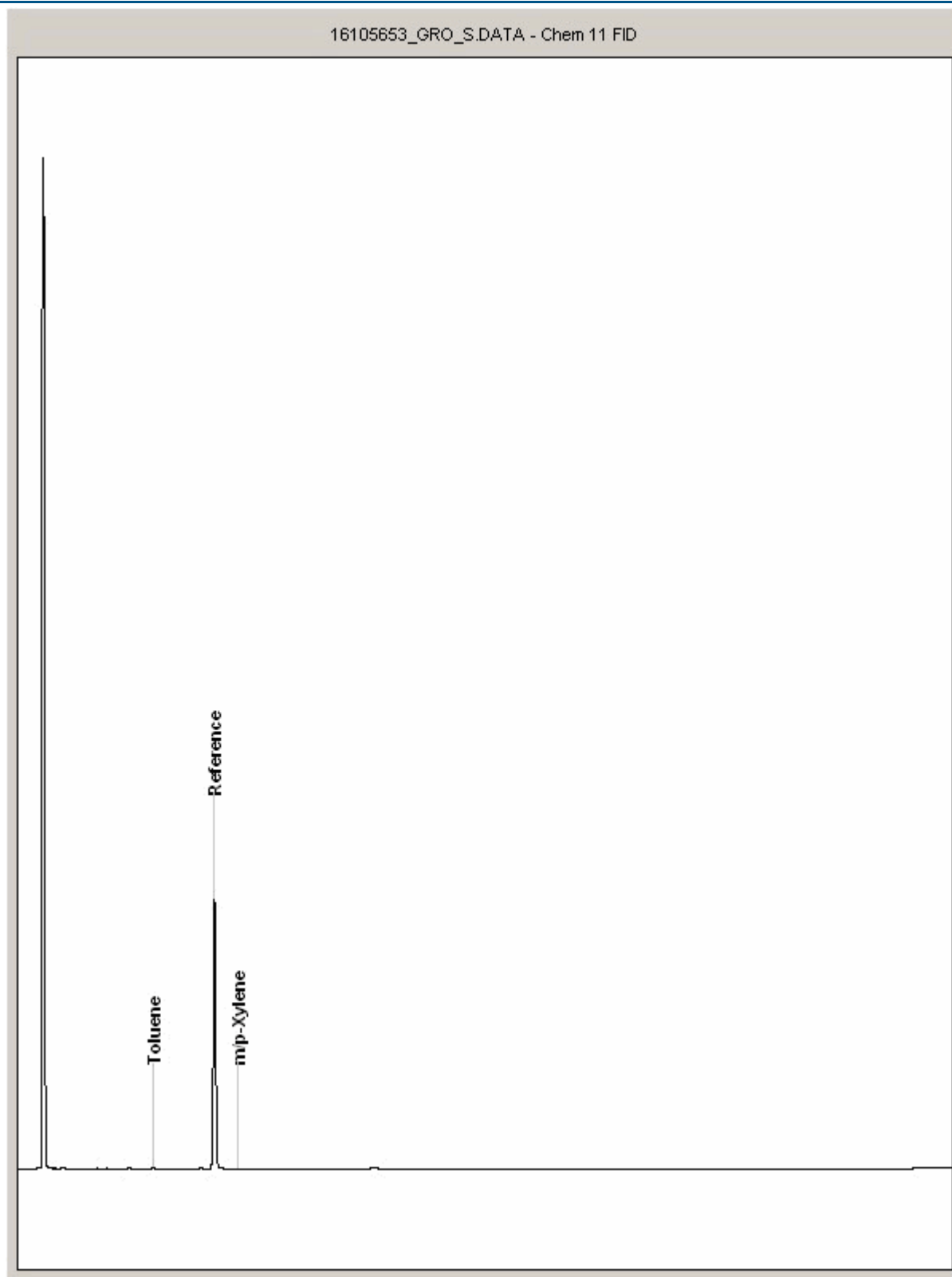
Report Number: 423123
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 16105653
Sample ID : TPA11

Depth : 0.80 - 0.90





CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

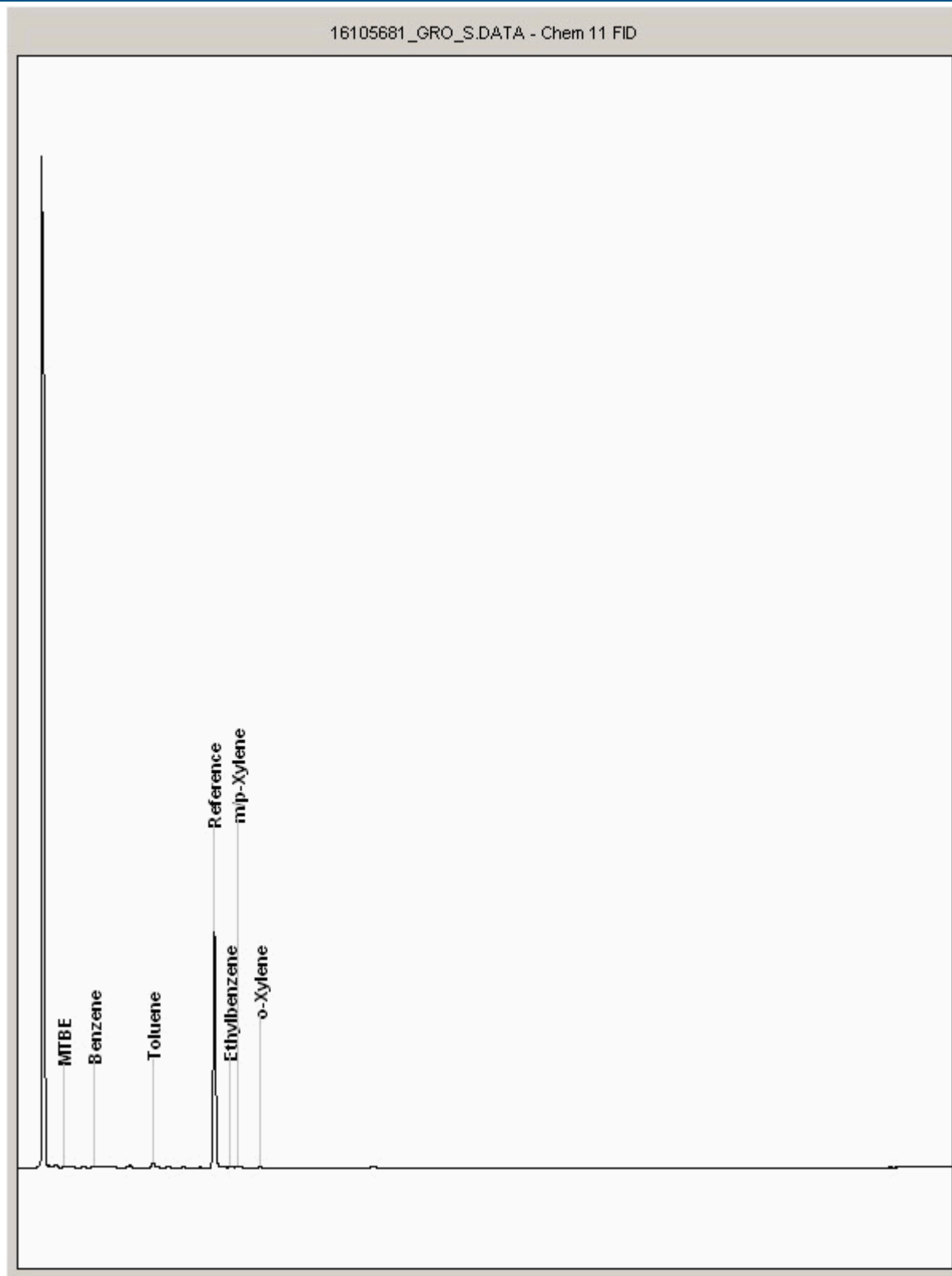
Report Number: 423123
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 16105681
Sample ID : TPA07

Depth : 0.50 - 0.60





CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

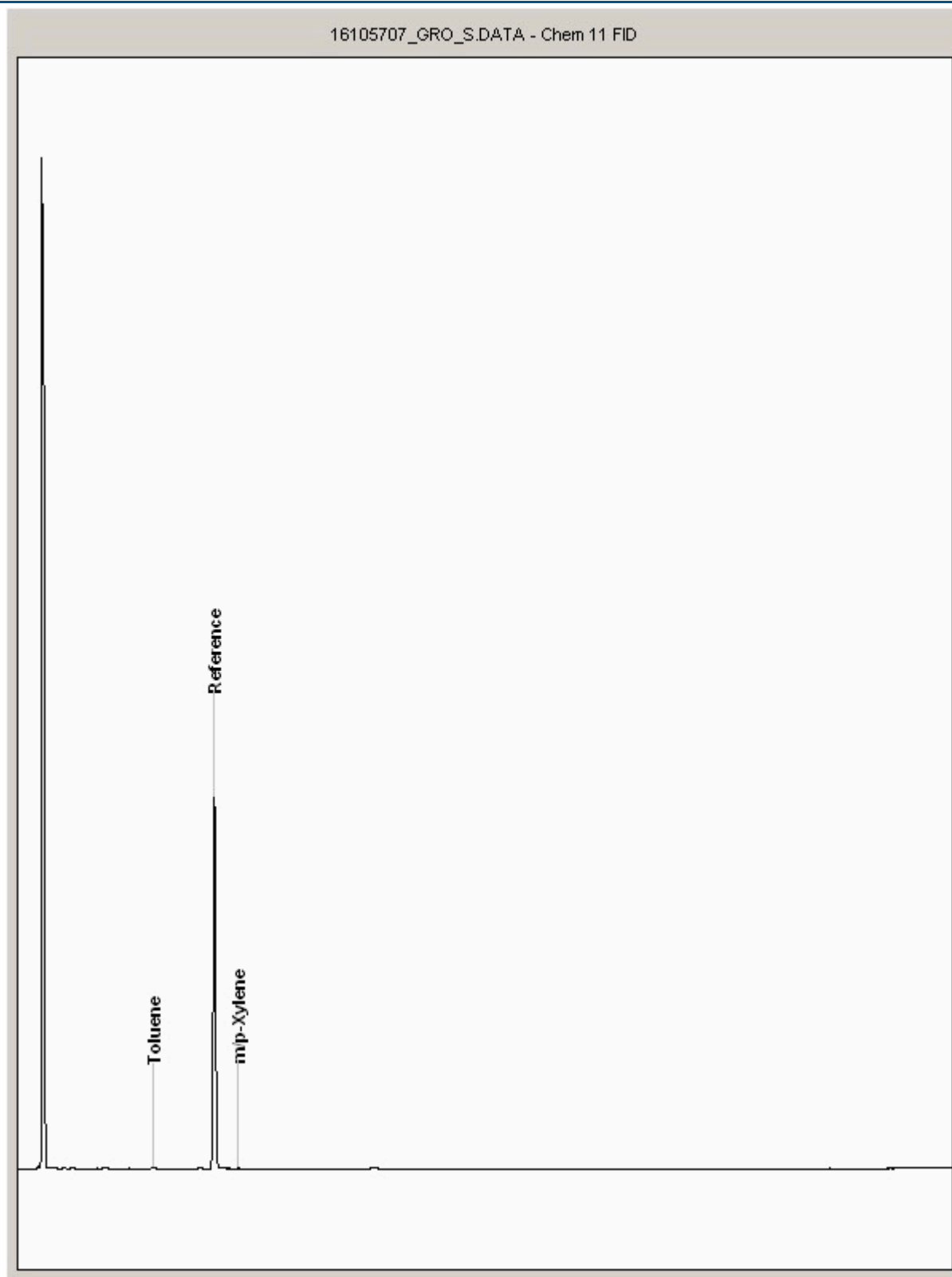
Report Number: 423123
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 16105707
Sample ID : BHA1

Depth : 0.40 - 0.50





CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

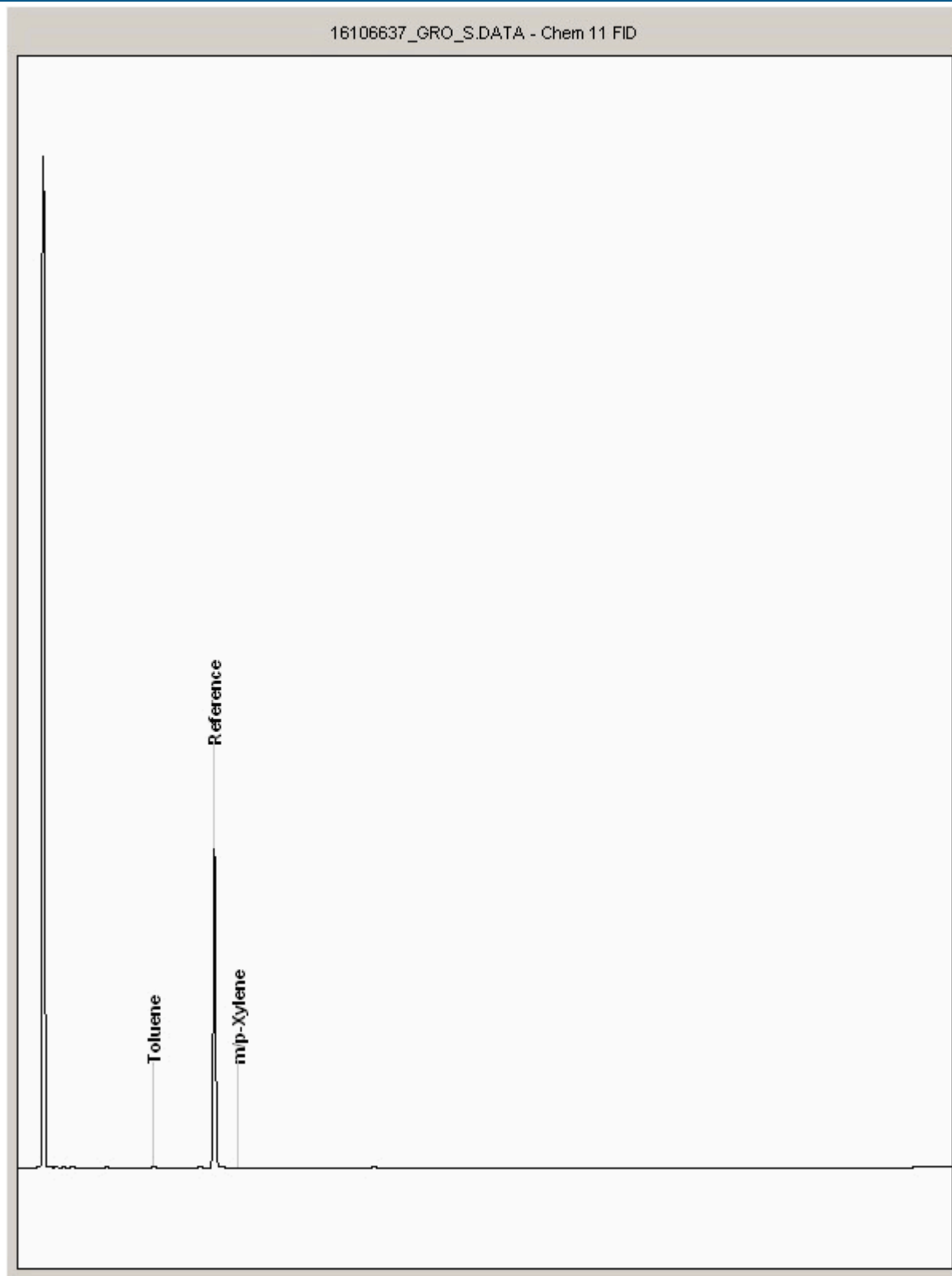
Report Number: 423123
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 16106637
Sample ID : TPA01

Depth : 0.30 - 0.40





CERTIFICATE OF ANALYSIS

Validated

SDG: 170829-5
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

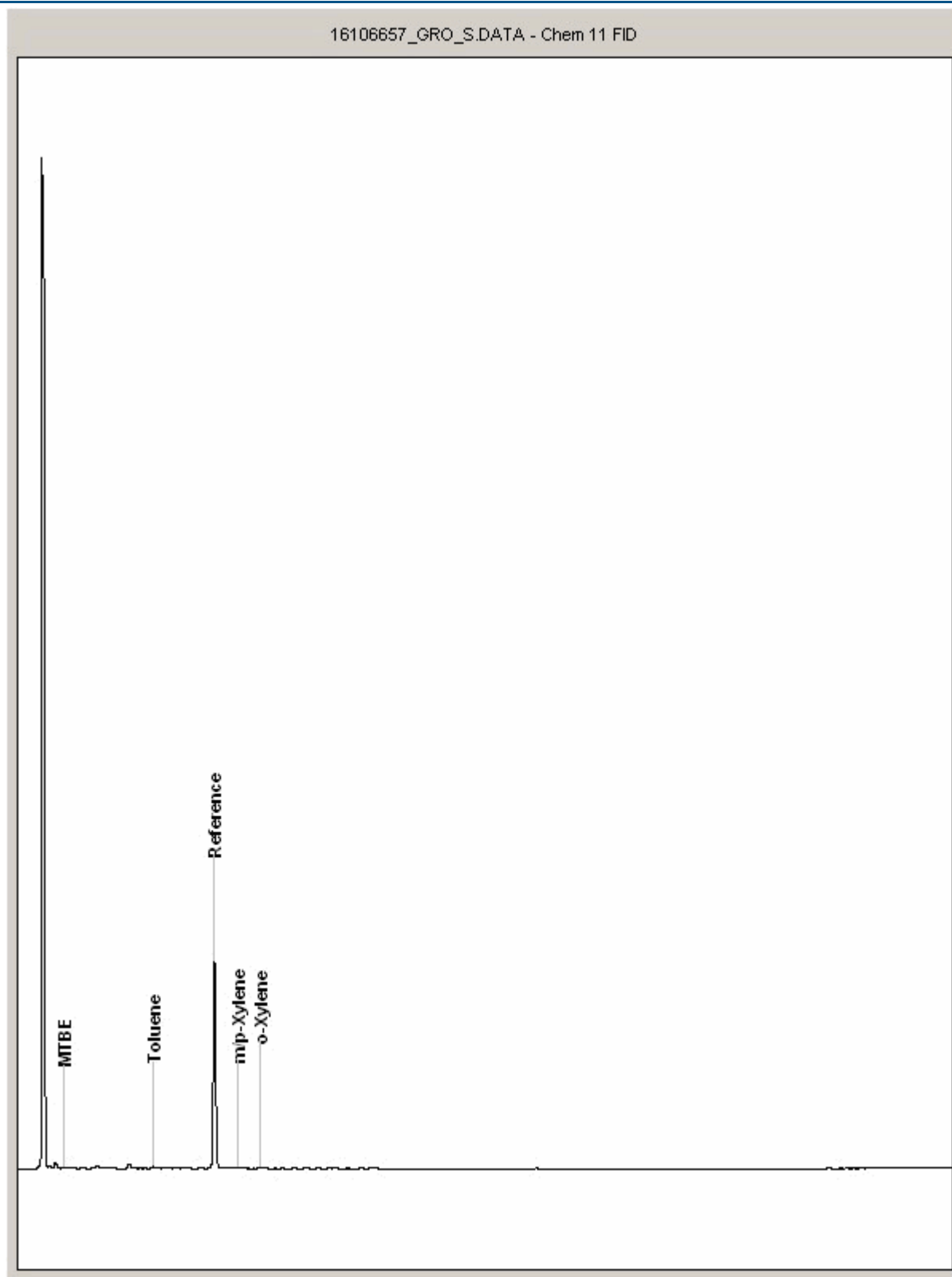
Report Number: 423123
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 16106657
Sample ID : TPA05

Depth : 0.80 - 1.00





CERTIFICATE OF ANALYSIS

SDG: 170829-5 Client Reference: 70035780 Report Number: 423123
Location: Fenay Bridge Order Number: 70035780-S01 Superseded Report:

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)

Hawarden
Deeside
CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

WSP PB MLN
The Victoria
150-182 The Quays
Salford
Manchester
Lancashire
M50 3SP

Attention: Charley Wainwright

CERTIFICATE OF ANALYSIS

Date:	20 September 2017
Customer:	H_WSP_MAN
Sample Delivery Group (SDG):	170913-24
Your Reference:	70035780
Location:	Fenay Bridge
Report No:	424822

We received 6 samples on Wednesday September 13, 2017 and 3 of these samples were scheduled for analysis which was completed on Tuesday September 19, 2017. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 170913-24
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 424822
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
16173882	BHD03	D	0.30	23/08/2017
16173872	BHE01	D	0.20 - 0.25	22/08/2017
16173878	BHE02	D	0.50 - 0.55	22/08/2017
16173891	NO ID			
16173894	NO ID			
16173903	TPE02		0.60	

Maximum Sample/Coolbox Temperature (°C) :

15.6

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 170913-24
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 424822
Superseded Report:

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Results Legend	Lab Sample No(s)		16173882	16173872	16173878
	Customer Sample Reference		BHD03	BHE01	BHE02
	AGS Reference		D	D	D
	Depth (m)		0.30	0.20 - 0.25	0.50 - 0.55
	Container		250g Amber Jar (ALE210) 1kg TUB	250g Amber Jar (ALE210) 1kg TUB	250g Amber Jar (ALE210)
	Sample Type		S	S	S
Anions by Kone (soil)	All	NDPs: 0 Tests: 1			X
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 3	X	X	X
Metals in solid samples by OES	All	NDPs: 0 Tests: 3	X	X	X
PAH by GCMS	All	NDPs: 0 Tests: 2	X	X	
pH	All	NDPs: 0 Tests: 1			X
Sample description	All	NDPs: 0 Tests: 3	X	X	X
Total Organic Carbon	All	NDPs: 0 Tests: 1		X	



CERTIFICATE OF ANALYSIS

Validated

SDG: 170913-24
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 424822
Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
------------------	----------	-------------	-----------------	---------------	-------------	---------------	------------	--------------------	-------

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
16173882	BHD03	0.30	Dark Brown	Loamy Sand	Vegetation	Crushed Brick
16173872	BHE01	0.20 - 0.25	Dark Brown	Loamy Sand	Stones	Vegetation
16173878	BHE02	0.50 - 0.55	Dark Brown	Loamy Sand	Vegetation	Crushed Brick

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



CERTIFICATE OF ANALYSIS

Validated

SDG: 170913-24
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 424822
Superseded Report:

Asbestos Identification - Solid Samples

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	BHD03 D 0.30 SOLID 23/08/2017 00:00:00 13/09/2017 15:38:26 170913-24 16173882 TM048	19/9/17	Neville Mann	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	BHE01 D 0.20 - 0.25 SOLID 22/08/2017 00:00:00 13/09/2017 15:36:51 170913-24 16173872 TM048	19/9/17	Neville Mann	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	BHE02 D 0.50 - 0.55 SOLID 22/08/2017 00:00:00 13/09/2017 15:29:52 170913-24 16173878 TM048	19/9/17	Neville Mann	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

Validated

SDG: 170913-24
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 424822
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM001		Preparation of Samples for Metals Analysis		
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
TM218	Determination of PAH by GCMS Microwave extraction	The determination of PAH in soil samples by microwave extraction and GC-MS		
TM243		Mixed Anions In Soils By Kone		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 170913-24
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 424822
Superseded Report:

Test Completion Dates

Lab Sample No(s)	16173882	16173872	16173878
Customer Sample Ref.	BHD03	BHE01	BHE02
AGS Ref.	D	D	D
Depth	0.30	0.20 - 0.25	0.50 - 0.55
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (soil)			19-Sep-2017
Asbestos ID in Solid Samples	19-Sep-2017	19-Sep-2017	19-Sep-2017
Metals in solid samples by OES	19-Sep-2017	19-Sep-2017	19-Sep-2017
PAH by GCMS	19-Sep-2017	19-Sep-2017	
pH			18-Sep-2017
Sample description	13-Sep-2017	13-Sep-2017	13-Sep-2017
Total Organic Carbon		18-Sep-2017	



CERTIFICATE OF ANALYSIS

SDG:	170913-24	Client Reference:	70035780	Report Number:	424822
Location:	Fenay Bridge	Order Number:	70035780-S01	Superseded Report:	

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Astos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

PRE-REPORT DATA CHECK

 All SampleMatrix fields are complete

Region	Wales and England	Hardness	NA
Water Body	Groundwater	Recieving surface water status	NA
Water Body Type	NA		
Surface Water Type	NA	Altitude	NA

WATER

Site Area(s) selected: A, Whole site
Event selected: All events, Monitoring Round 2

Aquifer: No aquifer entered

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BHA2	BHA3	BHA4
					Response Zone Depth (m bgl)	2.5 - 5	4 - 9	6 - 11
					Sample Date	25/09/17	25/09/17	25/09/17
Analyte	Units	LOD	Reference	GAC				
C16-C35 Aromatics (Unrecoanised code)	ug/l	10.0				< 10	< 10	< 10

WATER

Site Area(s) selected: A, Whole site
Event selected: All events, Monitoring Round 2

Aliphatics and Aromatics

Aquifer: No aquifer entered

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BHA2	BHA3	BHA4
					Response Zone Depth (m bgl)	2.5 - 5	4 - 9	6 - 11
					Sample Date	25/09/17	25/09/17	25/09/17
Analyte	Units	LOD	Reference	GAC				
Aliphatic C05-C06	ug/l	10.0	WHO 2008	15,000		< 10	< 10	< 10
Aliphatic C06-C08	ug/l	10.0	WHO 2008	15,000		< 10	< 10	< 10
Aliphatic C08-C10	ug/l	10.0	WHO 2008	300		< 10	< 10	< 10
Aliphatic C10-C12	ug/l	10.0	WHO 2008	300		< 10	< 10	< 10
Aliphatic C12-C16	ug/l	10.0	WHO 2008	300		< 10	< 10	< 10
Aliphatic C16-C21	ug/l	10.0				< 10	< 10	< 10
Aliphatic C21-C35	ug/l	10.0				< 10	< 10	< 10
Aliphatics C12-C35	ug/l	10.0				< 10	< 10	< 10
Aromatic C06-C07	ug/l	10.0				< 10	< 10	< 10
Aromatic C07-C08	ug/l	10.0				< 10	< 10	< 10
Aromatic C08-C10	ug/l	10.0	WHO 2008	300		< 10	< 10	< 10
Aromatic C10-C12	ug/l	10.0	WHO 2008	90.0		< 10	< 10	< 10
Aromatic C12-C16	ug/l	10.0	WHO 2008	90.0		< 10	< 10	< 10
Aromatic C12-C35	ug/l	10.0				< 10	< 10	< 10
Aromatic C16-C21	ug/l	10.0	WHO 2008	90.0		< 10	< 10	< 10
Aromatic C21-C35	ug/l	10.0	WHO 2008	90.0		< 10	< 10	< 10
Total Aliphatics and Aromatics (C5-C35)	ug/l	10.0	EA 2009	10.0		< 10	< 10	< 10

WATER

Site Area(s) selected: A, Whole site
Event selected: All events, Monitoring Round 2

BTEX and Fuel Additives

Aquifer: No aquifer entered

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BHA2	BHA3	BHA4
					Response Zone Depth (m bgl)	2.5 - 5	4 - 9	6 - 11
					Sample Date	25/09/17	25/09/17	25/09/17
Analyte	Units	LOD	Reference	GAC				
Benzene	ug/l	1.00	UK DWS	1.00		<1	<1	<1
Ethylbenzene	ug/l	1.00	WHO 2017	300		<1	<1	<1
Methyl t-butylether (MTBE)	ug/l	1.00	WHO 2017	15.0		<1	<1	<1
Tertiary Amyl Methyl Ether (TAME)	ug/l	1.00				<1	<1	<1
Toluene	ug/l	1.00	WHO 2017	700		<1	<1	<1
Xylene	ug/l	2.00	WHO 2017	500		<2	<2	<2
Xylene - Total (Summed)	ug/l	1.00				1	1	1
Xylene-m & p	ug/l	1.00				<1	<1	<1
Xylene-o	ug/l	1.00				<1	<1	<1

WATER

Site Area(s) selected: A, Whole site
Event selected: All events, Monitoring Round 2

General Chemistry

Aquifer: No aquifer entered

					PointID	BHA2	BHA3	BHA4
					Response Zone Depth (m bgl)	2.5 - 5	4 - 9	6 - 11
					Sample Date	25/09/17	25/09/17	25/09/17
Analyte	Units	LOD	Reference	GAC				
pH	pH Units	1.00	UK DWS	6.50 / 10.0	6.29	6.61	6.16	

WATER

Site Area(s) selected: A, Whole site
Event selected: All events, Monitoring Round 2

INSITU Aquifer: No aquifer entered

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BHA2	BHA3	BHA4
					Response Zone Depth (m bgl)	2.5 - 5	4 - 9	6 - 11
					Sample Date	25/09/17	25/09/17	25/09/17
Analyte	Units	LOD	Reference	GAC				
Dissolved Oxygen	mg/l					0.98	1.31	3.63
Electrical Conductivity	uS/cm		UK DWS	2,500		440	892	778
pH	pH Units	1.00	UK DWS	6.50 / 10.0		6.11	6.42	6.27
Redox Potential	mV					111	42	-4
Temperature	degC					11.4	11.5	12.4

WATER

Site Area(s) selected: A, Whole site
Event selected: All events, Monitoring Round 2

PAHs Aquifer: No aquifer entered

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BHA2	BHA3	BHA4
					Response Zone Depth (m bgl)	2.5 - 5	4 - 9	6 - 11
					Sample Date	25/09/17	25/09/17	25/09/17
Analyte	Units	LOD	Reference	GAC				
Acenaphthene	ug/l	0.005				0.0132	<0.005	<0.005
Acenaphthylene	ug/l	0.005				0.0146	<0.005	<0.005
Anthracene	ug/l	0.005				<0.005	<0.005	0.0071
Benzo (a) anthracene	ug/l	0.005				0.0149	0.0179	0.03
Benzo (a) pyrene	ug/l	0.002	UK DWS	0.010		0.00275	0.0108	0.0196
Benzo (b) fluoranthene	ug/l	0.005				0.00937	0.0156	0.0287
Benzo (ghi) perylene	ug/l	0.005				<0.005	0.0113	0.0152
Benzo (k) fluoranthene	ug/l	0.005				0.00571	0.00739	0.0155
Chrysene	ug/l	0.005				0.00885	0.0131	0.0202
Dibenzo (ah) anthracene	ug/l	0.005				<0.005	<0.005	<0.005
Fluoranthene	ug/l	0.005				0.00517	0.0109	0.0335
Fluorene	ug/l	0.005				0.0103	0.00759	0.00558
Indeno (1,2,3-cd) pyrene	ug/l	0.005				<0.005	0.00665	0.0104
Naphthalene	ug/l	0.010				0.0751	0.0366	0.0135
PAH (Total)	ug/l	0.082				0.182	0.175	0.273
PAH_4 (Summed) Benzo-b,ah,i,k and Ideno	ug/l	0.005	UK DWS	0.10		0.01508	0.04094	0.0698
Phenanthrene	ug/l	0.005				0.0124	0.022	0.0374
Pyrene	ug/l	0.005				0.0093	0.015	0.0366

WATER

Site Area(s) selected: A, Whole site
Event selected: All events, Monitoring Round 2

TPH/EPH Aquifer: No aquifer entered

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BHA2	BHA3	BHA4
					Response Zone Depth (m bgl)	2.5 - 5	4 - 9	6 - 11
					Sample Date	25/09/17	25/09/17	25/09/17
Analyte	Units	LOD	Reference	GAC				
GRO Surrogate	%					88	92	90
PRO (C5-C12)	ug/l	50.0				<50	<50	<50

Region	Wales and England	Hardness	50-100 mg/l
Water Body	Surface water	Recieving surface water status	Good (or below)
Water Body Type	Inland		
Surface Water Type	River or Stream	Altitude	> 80m Elevation

WATER

Site Area(s) selected: A, Whole site
Event selected: All events, Monitoring Round 2

Aquifer: No aquifer entered

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BHA2	BHA3	BHA4
					Response Zone Depth (m bgl)	2.5 - 5	4 - 9	6 - 11
					Sample Date	25/09/17	25/09/17	25/09/17
Analyte	Units	LOD	Reference	GAC				
C16-C35 Aromatics (Unrecoanised code)	ug/l	10.0				< 10	< 10	< 10

WATER

Site Area(s) selected: A, Whole site
Event selected: All events, Monitoring Round 2

Aliphatics and Aromatics

Aquifer: No aquifer entered

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BHA2	BHA3	BHA4
					Response Zone Depth (m bgl)	2.5 - 5	4 - 9	6 - 11
					Sample Date	25/09/17	25/09/17	25/09/17
Analyte	Units	LOD	Reference	GAC				
Aliphatic C05-C06	ug/l	10.0				< 10	< 10	< 10
Aliphatic C06-C08	ug/l	10.0				< 10	< 10	< 10
Aliphatic C08-C10	ug/l	10.0				< 10	< 10	< 10
Aliphatic C10-C12	ug/l	10.0				< 10	< 10	< 10
Aliphatic C12-C16	ug/l	10.0				< 10	< 10	< 10
Aliphatic C16-C21	ug/l	10.0				< 10	< 10	< 10
Aliphatic C21-C35	ug/l	10.0				< 10	< 10	< 10
Aliphatics C12-C35	ug/l	10.0				< 10	< 10	< 10
Aromatic C06-C07	ug/l	10.0	CL:AIRE 2017	10.0		< 10	< 10	< 10
Aromatic C07-C08	ug/l	10.0	CL:AIRE 2017	74.0		< 10	< 10	< 10
Aromatic C08-C10	ug/l	10.0	CL:AIRE 2017	20.0		< 10	< 10	< 10
Aromatic C10-C12	ug/l	10.0	CL:AIRE 2017	2.00		< 10	< 10	< 10
Aromatic C12-C16	ug/l	10.0	CL:AIRE 2017	2.00		< 10	< 10	< 10
Aromatic C12-C35	ug/l	10.0				< 10	< 10	< 10
Aromatic C16-C21	ug/l	10.0	CL:AIRE 2017	0.10		< 10	< 10	< 10
Aromatic C21-C35	ug/l	10.0	CL:AIRE 2017	0.0002		< 10	< 10	< 10
Total Aliphatics and Aromatics (C5-C35)	ug/l	10.0				< 10	< 10	< 10

WATER

Site Area(s) selected: A, Whole site
Event selected: All events, Monitoring Round 2

BTEX and Fuel Additives

Aquifer: No aquifer entered

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BHA2	BHA3	BHA4
					Response Zone Depth (m bgl)	2.5 - 5	4 - 9	6 - 11
					Sample Date	25/09/17	25/09/17	25/09/17
Analyte	Units	LOD	Reference	GAC				
Benzene	ug/l	1.00	EQS 2015	10.0		<1	<1	<1
Ethylbenzene	ug/l	1.00	Proposed EQS	20.0		<1	<1	<1
Methyl t-butylether (MTBE)	ug/l	1.00				<1	<1	<1
Tertiary Amyl Methyl Ether (TAME)	ug/l	1.00				<1	<1	<1
Toluene	ug/l	1.00	EQS 2015	74.0		<1	<1	<1
Xylene	ug/l	2.00	CL:AIRE 2017	30.0		<2	<2	<2
Xylene - Total (Summed)	ug/l	1.00				1	1	1
Xylene-m & p	ug/l	1.00				<1	<1	<1
Xylene-o	ug/l	1.00				<1	<1	<1

WATER

Site Area(s) selected: A, Whole site
Event selected: All events, Monitoring Round 2

General Chemistry

Aquifer: No aquifer entered

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BHA2	BHA3	BHA4
					Response Zone Depth (m bgl)	2.5 - 5	4 - 9	6 - 11
					Sample Date	25/09/17	25/09/17	25/09/17
Analyte	Units	LOD	Reference	GAC				
pH	pH Units	1.00	EQS 2015	6.00 / 9.00		6.29	6.61	6.16

WATER

Site Area(s) selected: A, Whole site
Event selected: All events, Monitoring Round 2

INSITU Aquifer: No aquifer entered

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BHA2	BHA3	BHA4
					Response Zone Depth (m bgl)	2.5 - 5	4 - 9	6 - 11
					Sample Date	25/09/17	25/09/17	25/09/17
Analyte	Units	LOD	Reference	GAC				
Dissolved Oxygen	mg/l					0.98	1.31	3.63
Electrical Conductivity	uS/cm					440	892	778
pH	pH Units	1.00	EQS 2015	6.00 / 9.00		6.11	6.42	6.27
Redox Potential	mV					111	42	-4
Temperature	degC					11.4	11.5	12.4

WATER

Site Area(s) selected: A, Whole site
Event selected: All events, Monitoring Round 2

PAHs Aquifer: No aquifer entered

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BHA2	BHA3	BHA4
					Response Zone Depth (m bgl)	2.5 - 5	4 - 9	6 - 11
					Sample Date	25/09/17	25/09/17	25/09/17
Analyte	Units	LOD	Reference	GAC				
Acenaphthene	ug/l	0.005				0.0132	<0.005	<0.005
Acenaphthylene	ug/l	0.005				0.0146	<0.005	<0.005
Anthracene	ug/l	0.005	EQS 2015	0.10		<0.005	<0.005	0.0071
Benzo (a) anthracene	ug/l	0.005				0.0149	0.0179	0.03
Benzo (a) pyrene	ug/l	0.002	EQS 2015	0.0002		0.00275	0.0108	0.0196
Benzo (b) fluoranthene	ug/l	0.005	EQS 2015 MAC	0.017		0.00937	0.0156	0.0287
Benzo (ghi) perylene	ug/l	0.005	EQS 2015 MAC	0.008		<0.005	0.0113	0.0152
Benzo (k) fluoranthene	ug/l	0.005	EQS 2015 MAC	0.017		0.00571	0.00739	0.0155
Chrysene	ug/l	0.005				0.00885	0.0131	0.0202
Dibenzo (ah) anthracene	ug/l	0.005				<0.005	<0.005	<0.005
Fluoranthene	ug/l	0.005	EQS 2015	0.006		0.00517	0.0109	0.0335
Fluorene	ug/l	0.005				0.0103	0.00759	0.00558
Indeno (1,2,3-cd) pyrene	ug/l	0.005				<0.005	0.00665	0.0104
Naphthalene	ug/l	0.010	EQS 2015	2.00		0.0751	0.0366	0.0135
PAH (Total)	ug/l	0.082				0.182	0.175	0.273
PAH_4 (Summed) Benzo-b.ghi.k and Ideno	ug/l	0.005				0.01508	0.04094	0.0698
Phenanthrene	ug/l	0.005				0.0124	0.022	0.0374
Pyrene	ug/l	0.005				0.0093	0.015	0.0366

WATER

Site Area(s) selected: A, Whole site
Event selected: All events, Monitoring Round 2

TPH/EPH Aquifer: No aquifer entered

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BHA2	BHA3	BHA4
					Response Zone Depth (m bgl)	2.5 - 5	4 - 9	6 - 11
					Sample Date	25/09/17	25/09/17	25/09/17
Analyte	Units	LOD	Reference	GAC				
GRO Surrogate	%					88	92	90
PRO (C5-C12)	ug/l	50.0				<50	<50	<50



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

WSP PB MLN
The Victoria
150-182 The Quays
Salford
Manchester
Lancashire
M50 3SP

Attention: Charley Wainwright

CERTIFICATE OF ANALYSIS

Date:	05 October 2017
Customer:	H_WSP_MAN
Sample Delivery Group (SDG):	170927-12
Your Reference:	70035780
Location:	Fenay Bridge
Report No:	427079

We received 3 samples on Wednesday September 27, 2017 and 3 of these samples were scheduled for analysis which was completed on Tuesday October 03, 2017. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 170927-12 Client Reference: 70035780 Report Number: 427079
Location: Fenay Bridge Order Number: 70035780-S01 Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
16254817	BHA2	EW20170925	0.00 - 0.00	25/09/2017
16254825	BHA3	EW20170925	0.00 - 0.00	25/09/2017
16254832	BHA4	EW20170925	0.00 - 0.00	25/09/2017

Maximum Sample/Coolbox Temperature (°C) : 15.8

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 170927-12
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 427079
Superseded Report:

Results Legend

- X** Test
N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

	Lab Sample No(s)		16254817	16254825	16254832
	Customer Sample Reference		BHA2	BHA3	BHA4
	AGS Reference		EW20170925	EW20170925	EW20170925
	Depth (m)		0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
	Container		1000ml glass bottle (ALE220)	1000ml glass bottle (ALE220)	1000ml glass bottle (ALE220)
	Sample Type		GW	GW	GW
			Vial (ALE297)	Vial (ALE297)	Vial (ALE297)
EPH CWG (Aliphatic) Aqueous GC (W)	All	NDPs: 0 Tests: 3	X	X	X
EPH CWG (Aromatic) Aqueous GC (W)	All	NDPs: 0 Tests: 3	X	X	X
GRO by GC-FID (W)	All	NDPs: 0 Tests: 3		X	X
PAH Spec MS - Aqueous (W)	All	NDPs: 0 Tests: 3	X	X	X
pH Value	All	NDPs: 0 Tests: 3	X	X	X
TPH CWG (W)	All	NDPs: 0 Tests: 3	X	X	X
VOC MS (W)	All	NDPs: 0 Tests: 3		X	X



CERTIFICATE OF ANALYSIS

Validated

SDG: 170927-12
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 427079
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM174	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID		
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters		
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters		
TM245	By GC-FID	Determination of GRO by Headspace in waters		
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 170927-12
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 427079
Superseded Report:

Test Completion Dates

Lab Sample No(s) 16254817 16254825 16254832
Customer Sample Ref. BHA2 BHA3 BHA4

AGS Ref. EW20170925 EW20170925 EW20170925
Depth 0.00 - 0.00 0.00 - 0.00 0.00 - 0.00
Type Ground Water Ground Water Ground Water

EPH CWG (Aliphatic) Aqueous GC (W)	02-Oct-2017	02-Oct-2017	02-Oct-2017
EPH CWG (Aromatic) Aqueous GC (W)	02-Oct-2017	02-Oct-2017	02-Oct-2017
GRO by GC-FID (W)	03-Oct-2017	03-Oct-2017	03-Oct-2017
PAH Spec MS - Aqueous (W)	29-Sep-2017	29-Sep-2017	29-Sep-2017
pH Value	27-Sep-2017	27-Sep-2017	27-Sep-2017
TPH CWG (W)	03-Oct-2017	03-Oct-2017	03-Oct-2017
VOC MS (W)	03-Oct-2017	03-Oct-2017	03-Oct-2017



CERTIFICATE OF ANALYSIS

Validated

SDG: 170927-12
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

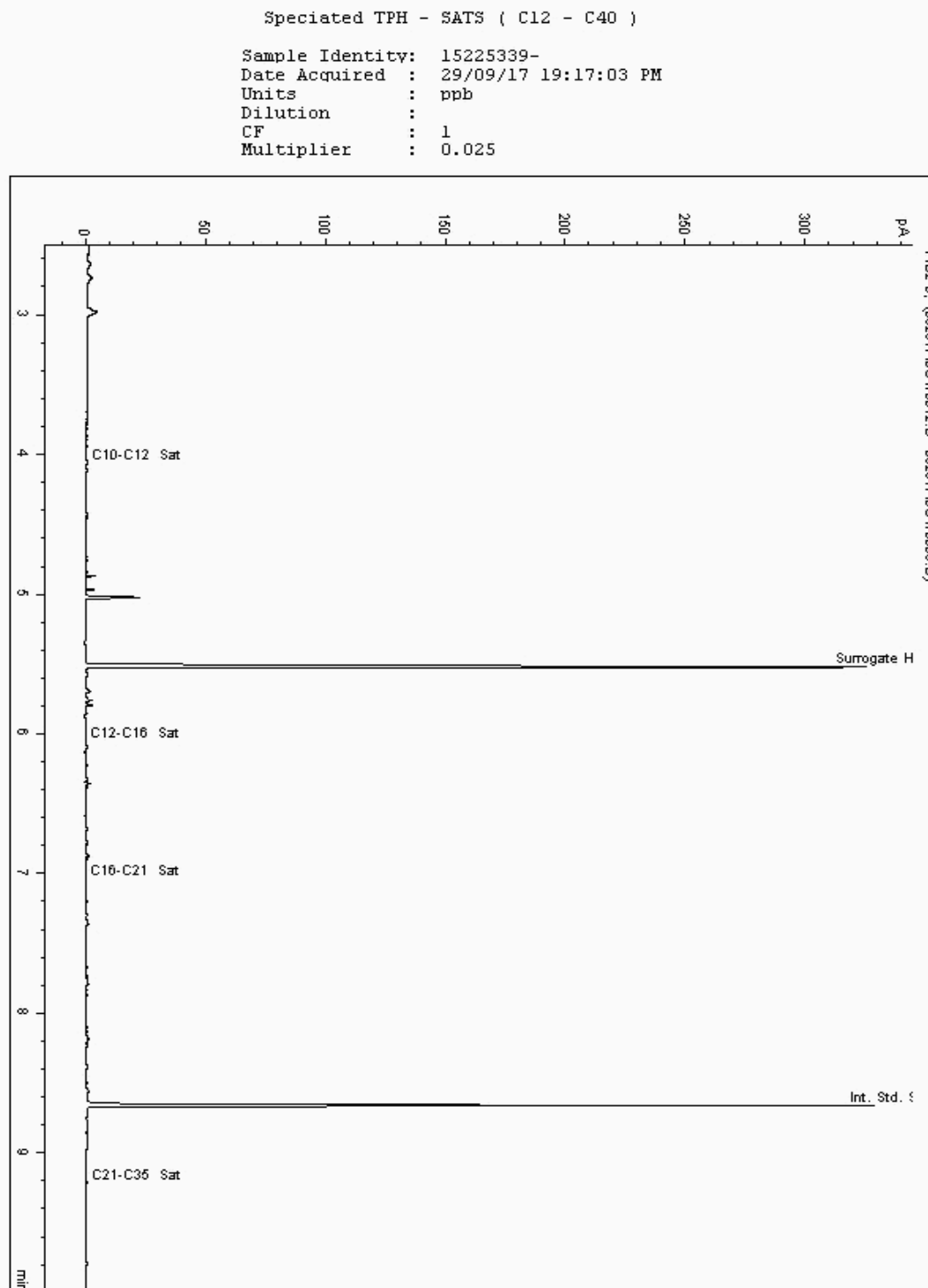
Report Number: 427079
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 16257851
Sample ID : BHA3

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

SDG: 170927-12
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

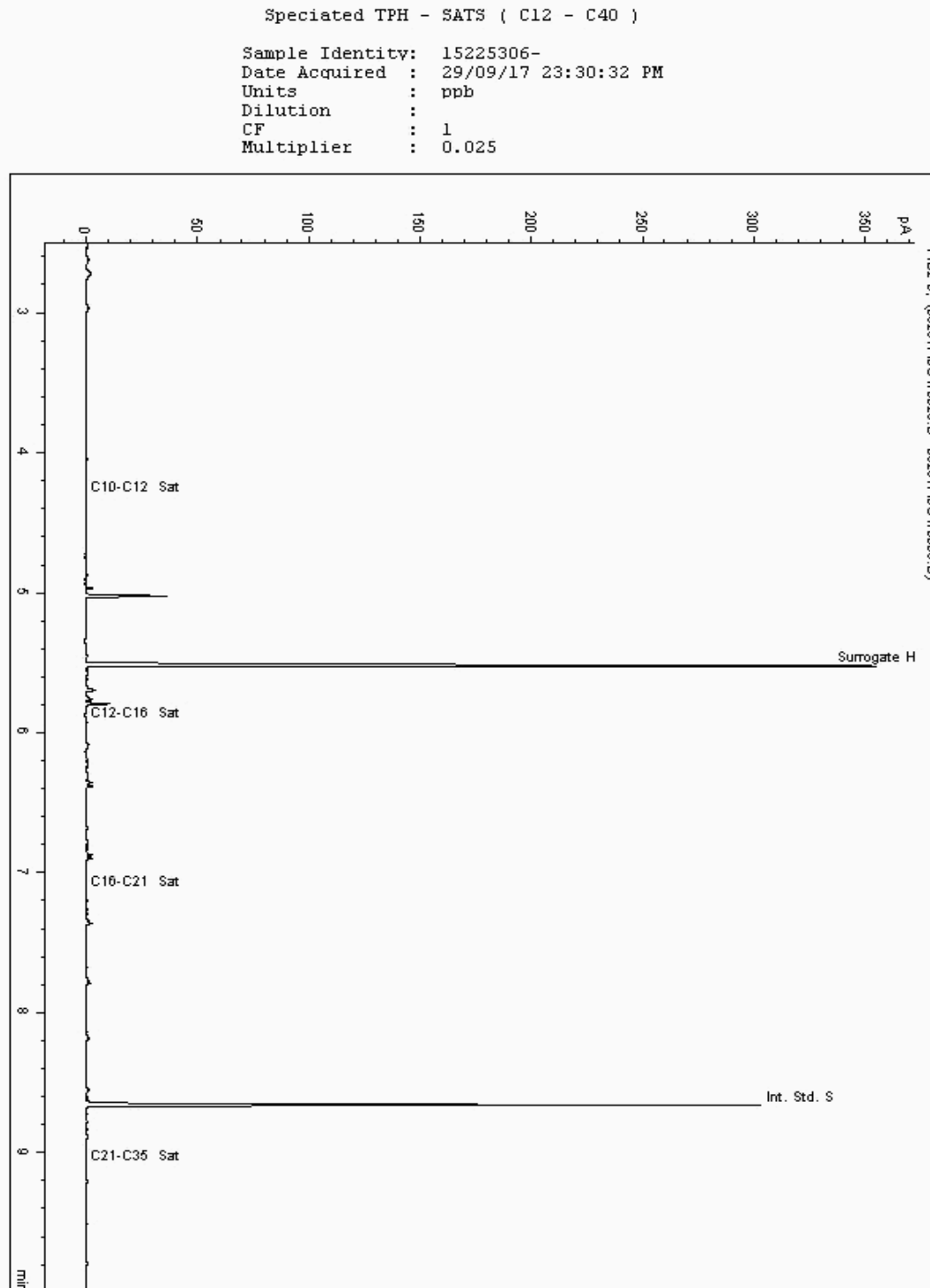
Report Number: 427079
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 16257854
Sample ID : BHA2

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

SDG: 170927-12
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

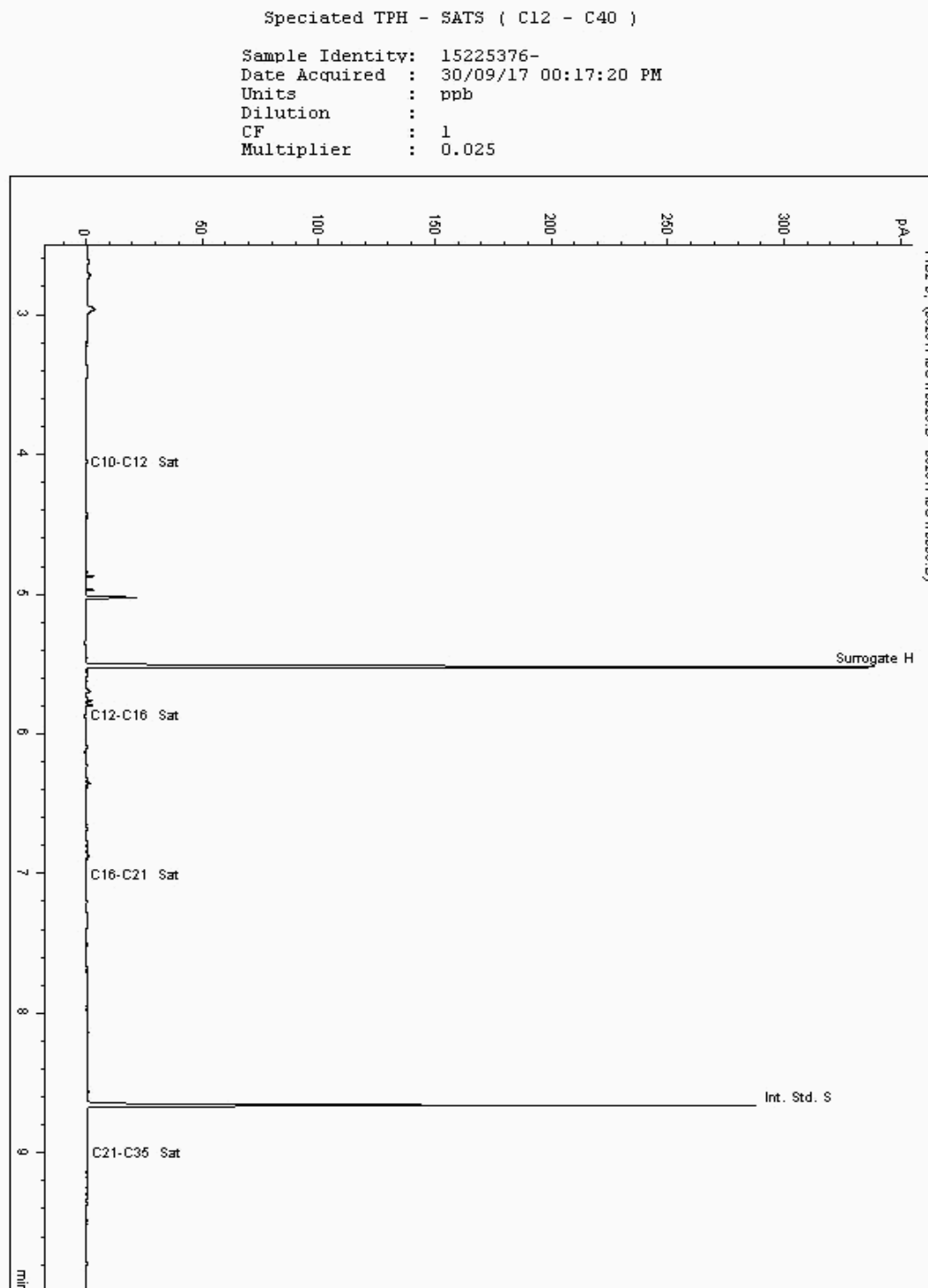
Report Number: 427079
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 16257862
Sample ID : BHA4

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

SDG: 170927-12
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

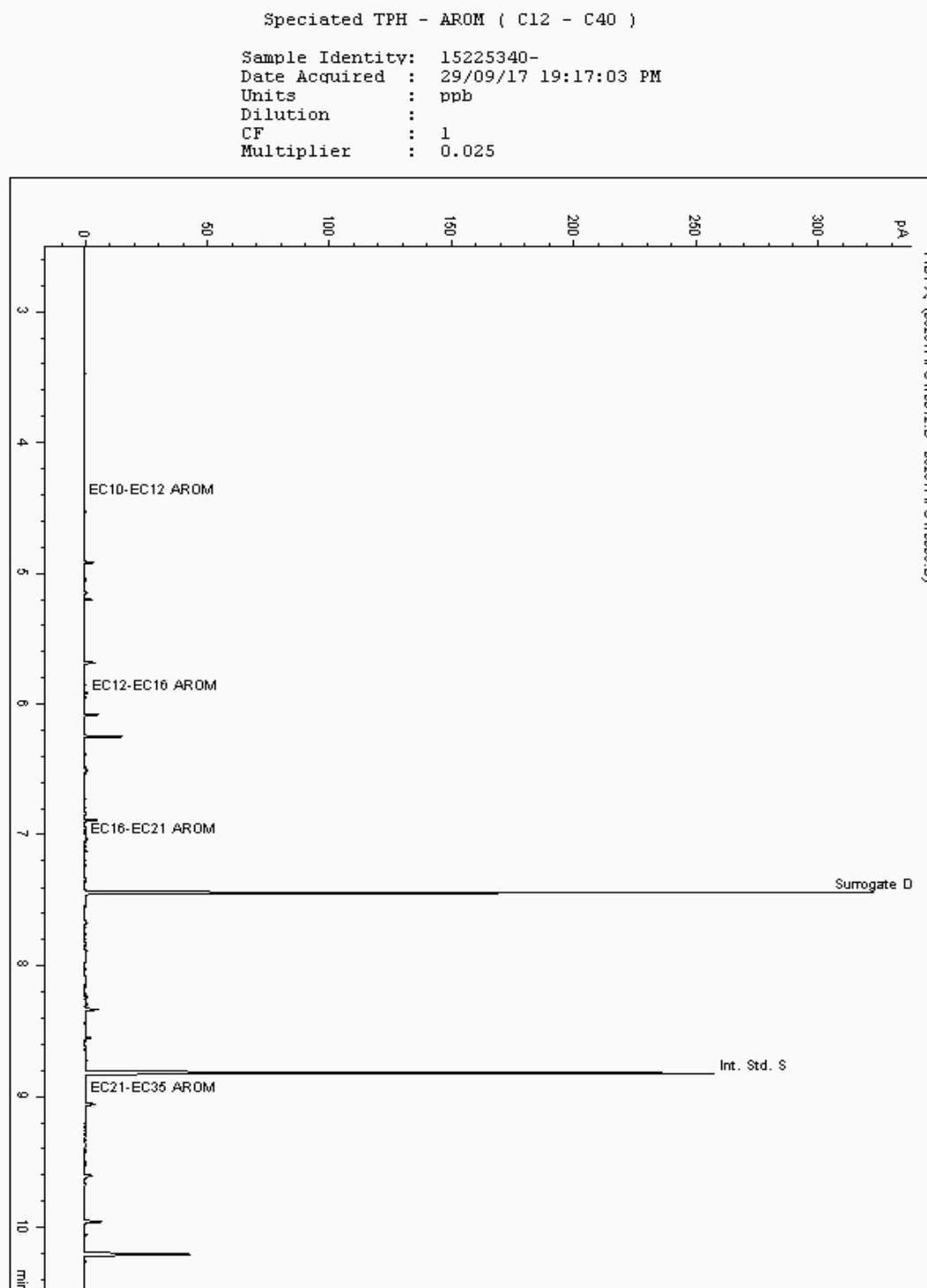
Report Number: 427079
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 16257851
Sample ID : BHA3

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

SDG: 170927-12
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

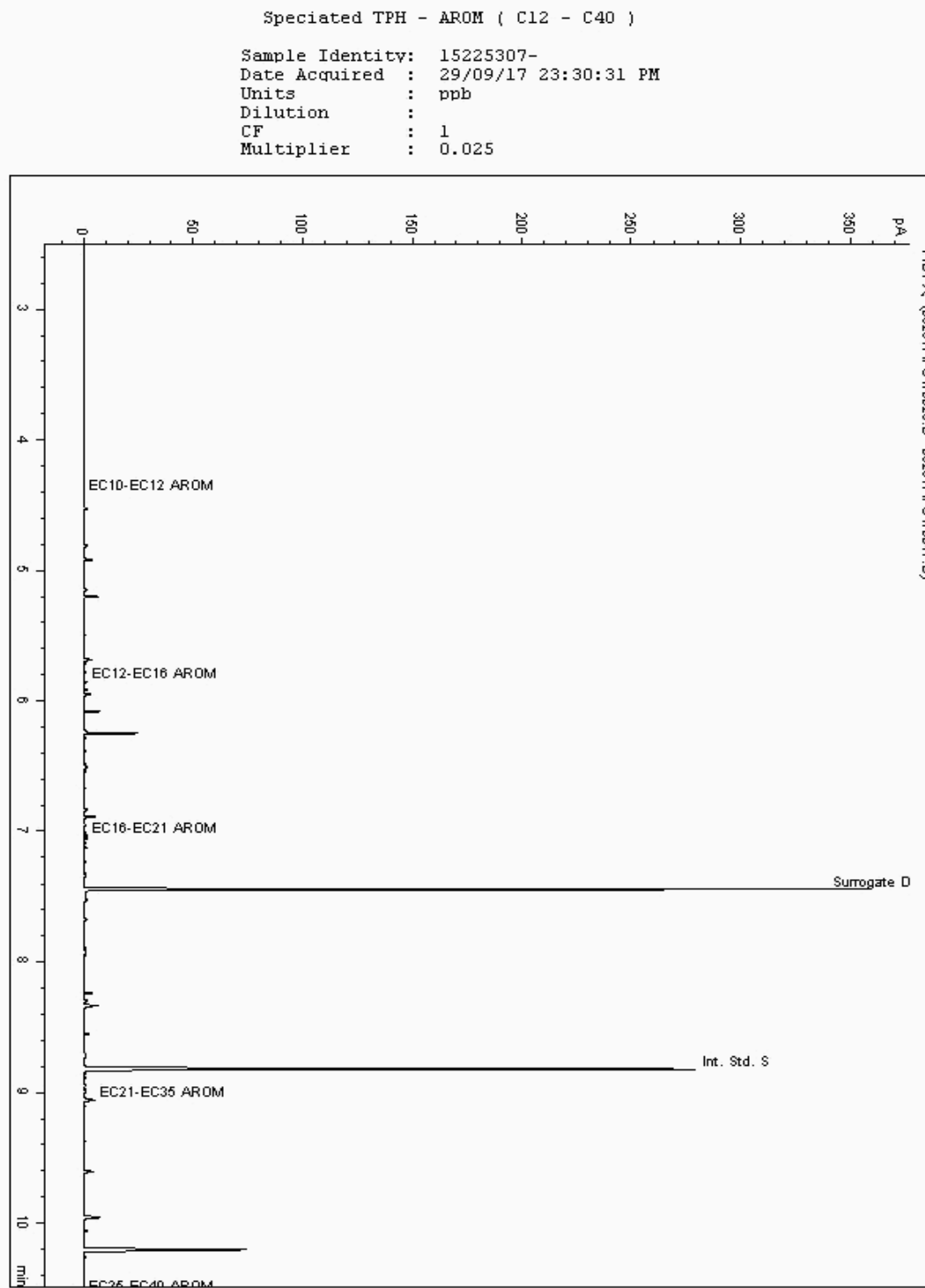
Report Number: 427079
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 16257854
Sample ID : BHA2

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

SDG: 170927-12
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

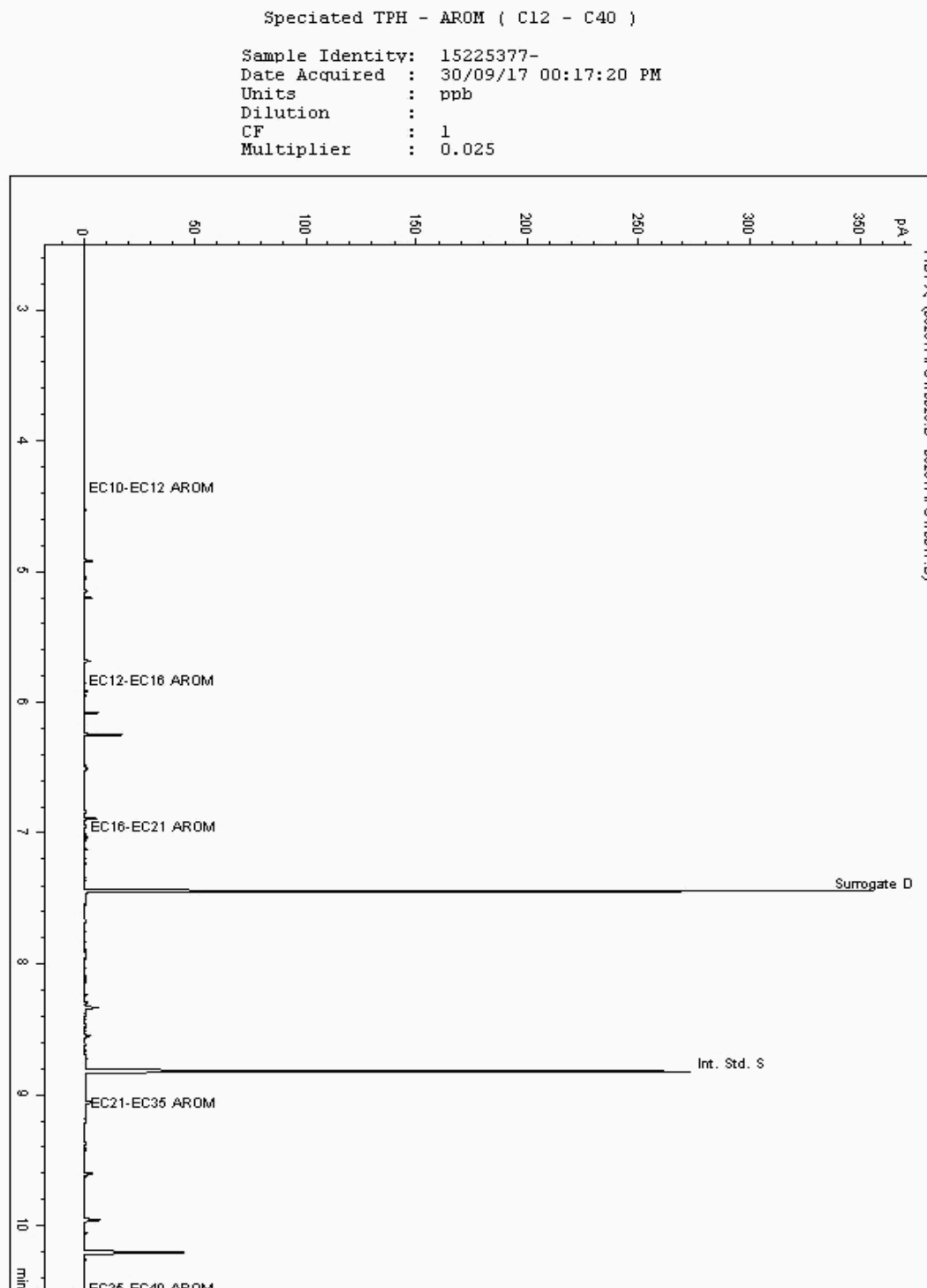
Report Number: 427079
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 16257862
Sample ID : BHA4

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

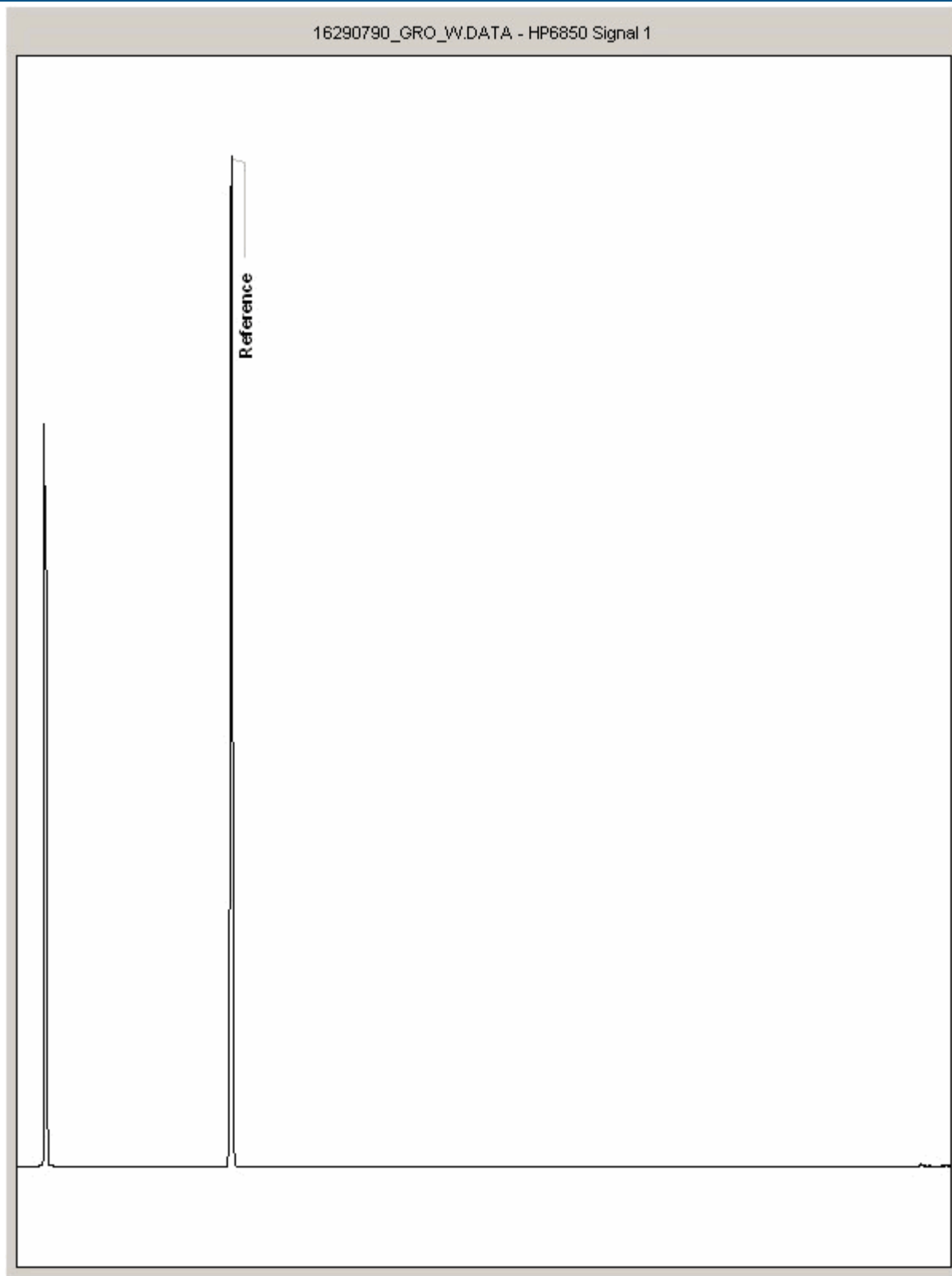
SDG:	170927-12	Client Reference:	70035780	Report Number:	427079
Location:	Fenay Bridge	Order Number:	70035780-S01	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 16290790
Sample ID : BHA4

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

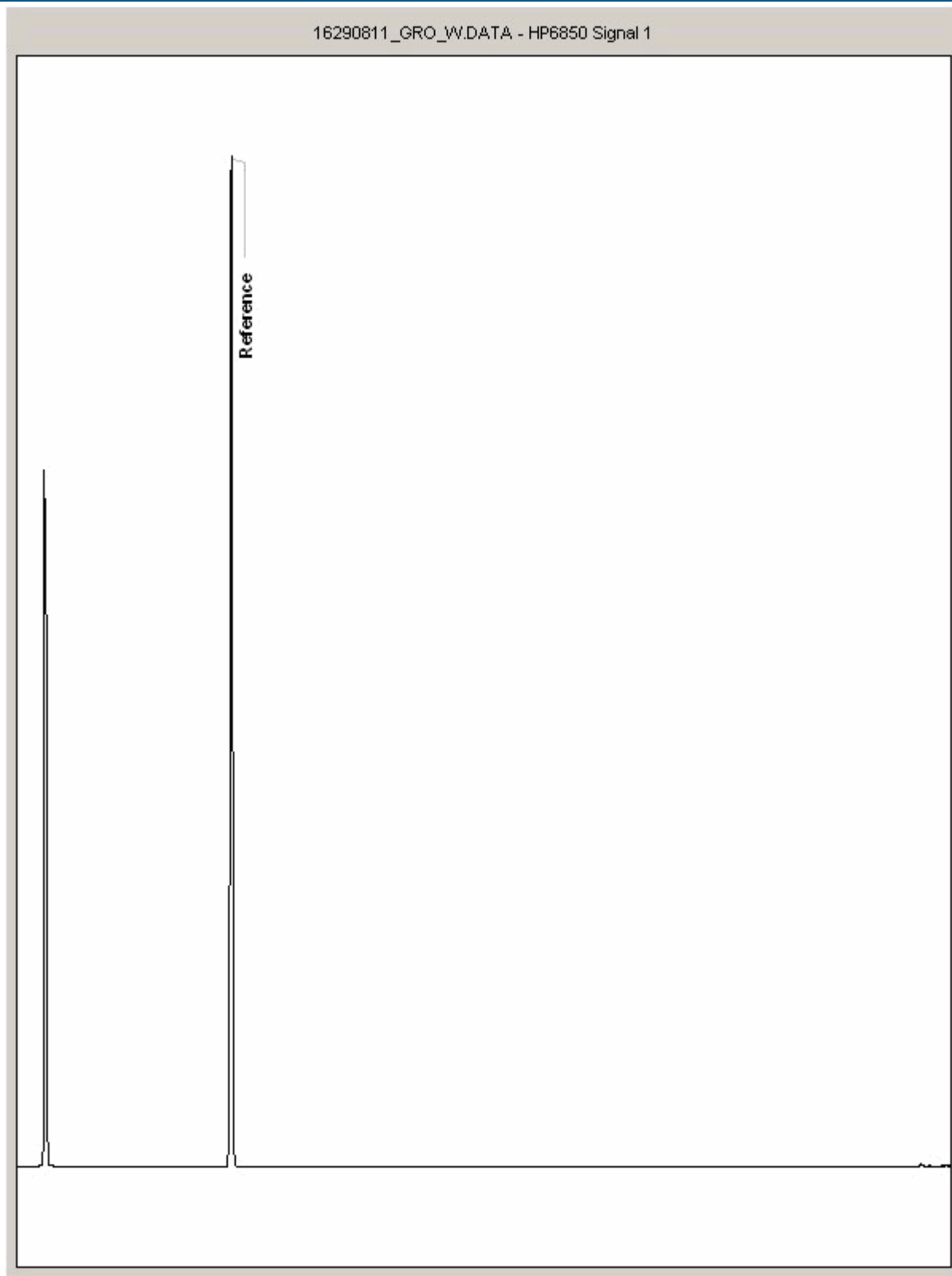
SDG:	170927-12	Client Reference:	70035780	Report Number:	427079
Location:	Fenay Bridge	Order Number:	70035780-S01	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 16290811
Sample ID : BHA3

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

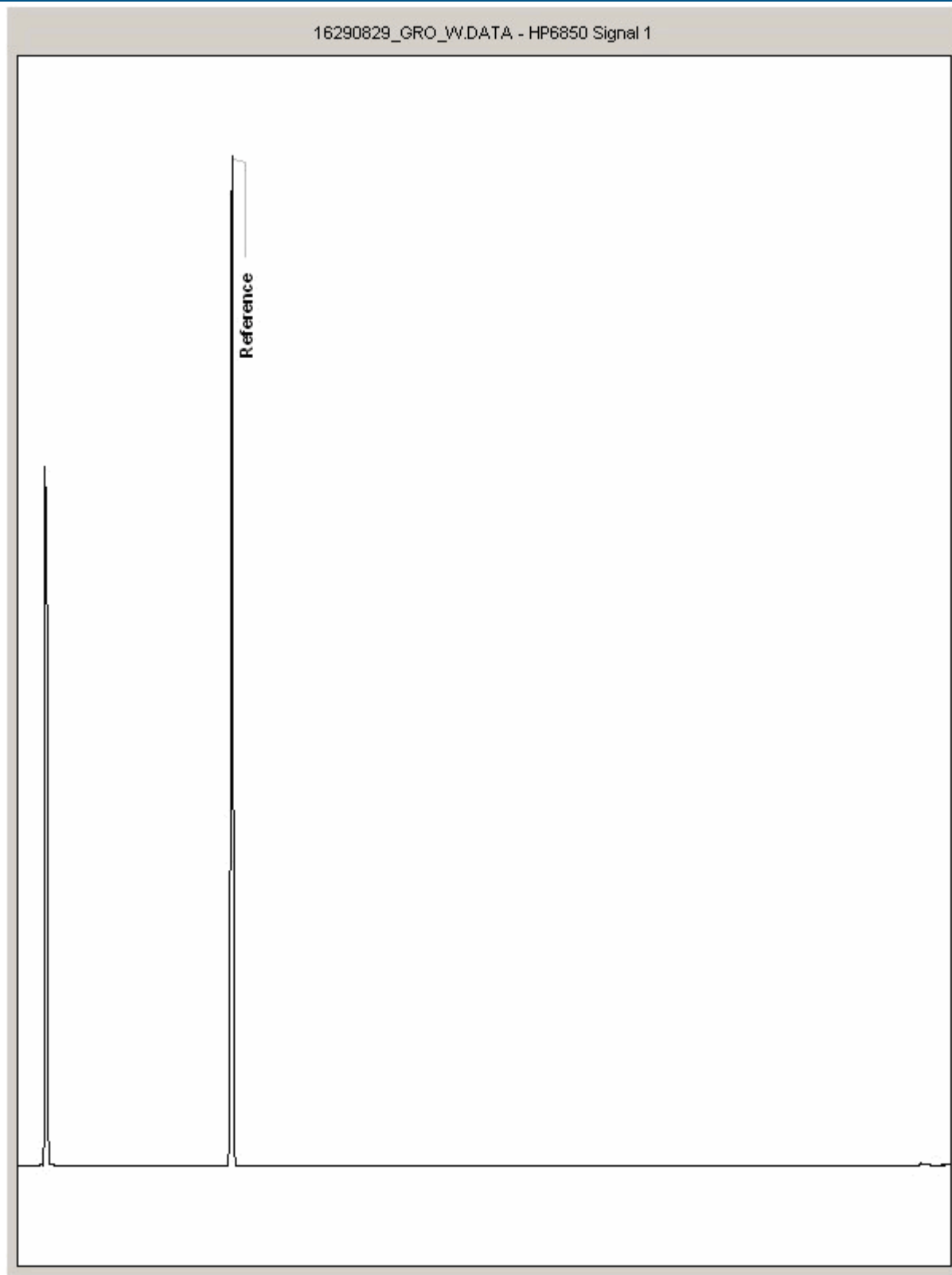
SDG:	170927-12	Client Reference:	70035780	Report Number:	427079
Location:	Fenay Bridge	Order Number:	70035780-S01	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 16290829
Sample ID : BHA2

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

SDG: 170927-12 Client Reference: 70035780 Report Number: 427079
Location: Fenay Bridge Order Number: 70035780-S01 Superseded Report:

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Appendix E

GEOTECHNICAL LABORATORY

RESULTS





Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

WSP PB MLN
The Victoria
150-182 The Quays
Salford
Manchester
Lancashire
M50 3SP

Attention: Charley Wainwright

CERTIFICATE OF ANALYSIS

Date:	26 September 2017
Customer:	H_WSP_MAN
Sample Delivery Group (SDG):	170904-31
Your Reference:	70035780
Location:	Fenay Bridge
Report No:	425622

We received 23 samples on Monday September 04, 2017 and 9 of these samples were scheduled for analysis which was completed on Tuesday September 26, 2017. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager



CERTIFICATE OF ANALYSIS

Validated

SDG: 170904-31
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 425622
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
16119702	TPA01	B	0.30 - 0.40	17/08/2017
16119727	TPA02	B	0.50 - 0.60	17/08/2017
16119737	TPA03	B	0.00 - 0.00	04/09/2017
16119739	TPA05	B	0.80 - 1.00	17/08/2017
16119741	TPA06	B	0.60 - 0.70	17/08/2017
16119744	TPA07	B	0.60 - 0.80	18/08/2017
16119746	TPA08	D	1.00 - 1.20	18/08/2017
16119748	TPA09	B	0.80 - 0.90	18/08/2017
16119750	TPA09	D	3.20 - 3.30	18/08/2017
16119704	TPA10	B	0.50 - 0.60	18/08/2017
16119706	TPA11	B	1.00 - 1.20	18/08/2017
16119708	TPD01	B	0.60 - 0.70	16/08/2017
16119710	TPD02	D	0.60 - 0.70	16/08/2017
16119714	TPD03	B	0.40 - 0.50	16/08/2017
16119716	TPD05	B	0.50 - 0.60	16/08/2017
16119719	TPD06	D	0.40 - 0.60	16/08/2017
16119721	TPE01	B	0.60 - 0.70	16/08/2017
16119723	TPE02	D	0.50 - 0.60	16/08/2017
16119725	TPE03	D	0.40 - 0.50	17/08/2017
16119729	TPE04	B	0.60 - 0.70	17/08/2017
16119731	TPE05	B	0.60 - 0.70	17/08/2017
16119733	TPE06	B	0.40 - 0.50	16/08/2017
16119735	TPE07	B	1.10 - 1.20	16/08/2017

Maximum Sample/Coolbox Temperature (°C) :

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 170904-31
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

Report Number: 425622
Superseded Report:

Results Legend



Test



No Determination
Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Geotechnical Testing*

Lab Sample No(s)

Customer
Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

All

NDPs: 0
Tests: 9

16119729	TPe04	B	0.60 - 0.70	Geolabs container	S	X
16119725	TPe03	D	0.40 - 0.50	Geolabs container	S	X
16119716	TPD05	B	0.50 - 0.60	Geolabs container	S	X
16119714	TPD03	B	0.40 - 0.50	Geolabs container	S	X
16119710	TPD02	D	0.60 - 0.70	Geolabs container	S	X
16119708	TPD01	B	0.60 - 0.70	Geolabs container	S	X
16119706	TPA11	B	1.00 - 1.20	Geolabs container	S	X
16119704	TPA10	B	0.50 - 0.60	Geolabs container	S	X
16119750	TPA09	D	3.20 - 3.30	Geolabs container	S	X



CERTIFICATE OF ANALYSIS

Validated

SDG:	170904-31	Client Reference:	70035780	Report Number:	425622
Location:	Fenay Bridge	Order Number:	70035780-S01	Superseded Report:	

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
SUB		Subcontracted Test		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 170904-31
Location: Fenay Bridge

Client Reference: 70035780
Order Number: 70035780-S01

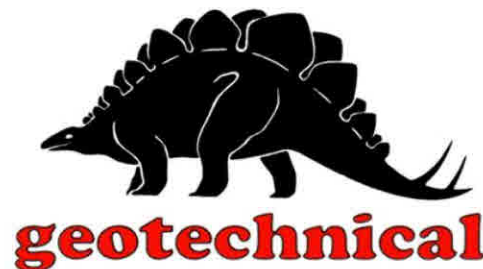
Report Number: 425622
Superseded Report:

Test Completion Dates

Lab Sample No(s)	16119750	16119704	16119706	16119708	16119710	16119714	16119716	16119725	16119729
Customer Sample Ref.	TPA09	TPA10	TPA11	TPD01	TPD02	TPD03	TPD05	TPE03	TPE04
AGS Ref.	D	B	B	B	D	B	B	D	B
Depth	3.20 - 3.30	0.50 - 0.60	1.00 - 1.20	0.60 - 0.70	0.60 - 0.70	0.40 - 0.50	0.50 - 0.60	0.40 - 0.50	0.60 - 0.70
Type	GeoTech Soils	GeoTech Soils	GeoTech Soils	GeoTech Soils	GeoTech Soils	GeoTech Soils	GeoTech Soils	GeoTech Soils	GeoTech Soils
Geotechnical Testing*	26-Sep-2017	26-Sep-2017	26-Sep-2017	26-Sep-2017	26-Sep-2017	26-Sep-2017	26-Sep-2017	26-Sep-2017	26-Sep-2017



2718



Hawarden Subcontractors WSP
Units 7-8 Hawarden Business Park
Manor Lane
Hawarden
Deeside
CH% 3US

For the attention of Carrie Foster

Version No. 1

Page No. 1 of 3

Date of Issue 15/09/2017

TEST REPORT

PROJECT/SITE	Fenny Bridge	Samples received	05/09/2017
GEL REPORT NUMBER	33454	Schedule received	05/09/2017
Your ref/PO:	170904-31	Testing commenced	05/09/2017
Test report refers to	Schedule 1	Status	Final

SUMMARY OF RESULTS ATTACHED

TEST METHOD & DESCRIPTION	QUANTITY	ACCREDITED TEST
BS EN ISO 17892-1: 2014:5. Water Content	9	YES
BS1377: Part 2: 1990:4.2-4.4&5.2-5.4, Liquid & Plastic Limits	9	YES

Remarks

This report may not be partially reproduced without written permission from this laboratory.

Approved Signatories:

S Robinson (Client Manager) **C Andrew (Laboratory Consultant)**
W Jones (Technical Support) J Hanson (Director) N Parry (Director)

Doc TR01

Rev No. 19

Revision date 10/03/17

DC:JH

Geotechnical Engineering Ltd

Centurion House
Olympus Park, Quedgeley
Gloucester GL2 4NF

Registered number: 00700739

VAT Number: 682 5857 89

www.geoeng.co.uk

geotech@geoeng.co.uk

TEL: 01452 527743

Fax: 01452 729314

Payments: Geotechnical Engineering Limited

Sort code: 30-15-99 Bank account: 00072116

LIQUID AND PLASTIC LIMITS

BS.1377 : PART 2 : 1990 : 4 and 5



CLIENT HAWARDEN SUBCONTRACTORS WSP

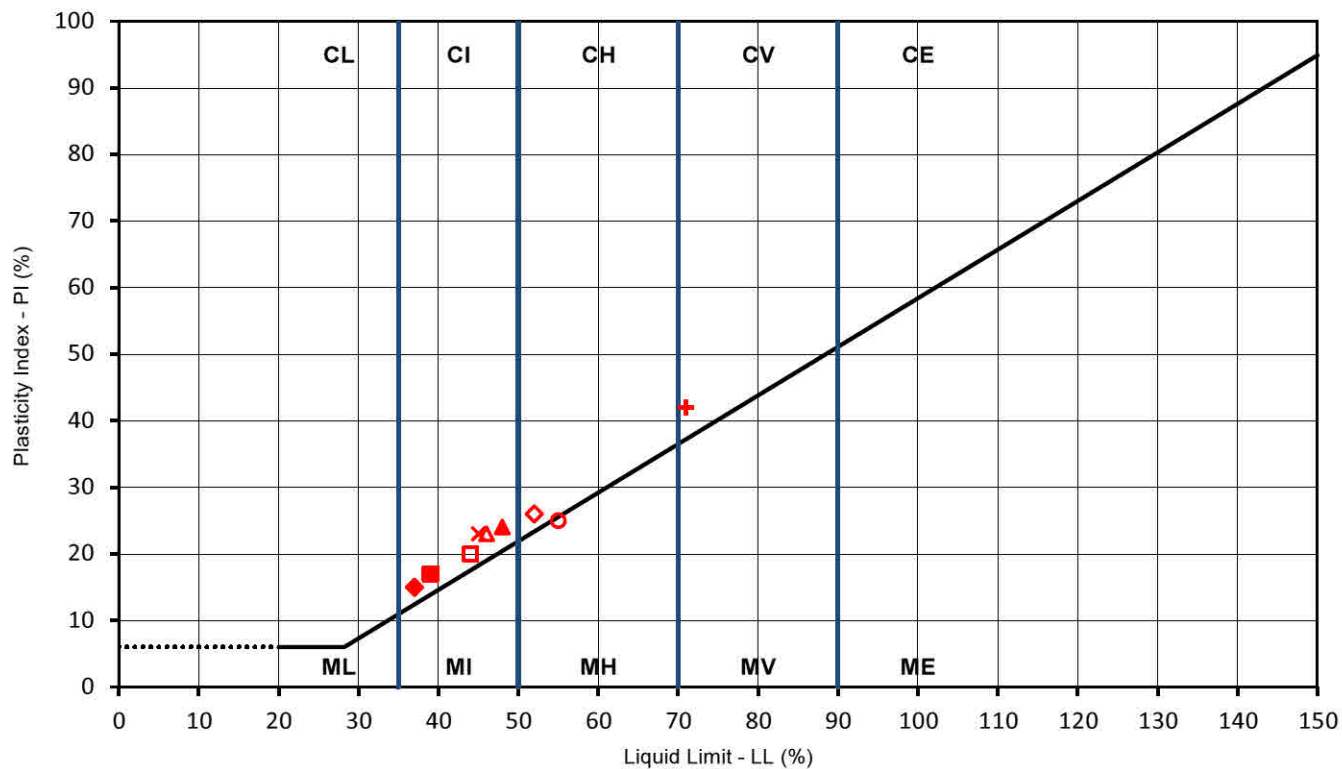
SITE FENNY BRIDGE

borehole /trial pit no.	sample		specimen depth (m)	natural water content (%)	specimen preparation and test method	fraction >0.425 mm (%)	liquid limit (%)	plastic limit (%)	plasticity index (%)	description and remarks		
	no./type	depth (m)										
TPA09	D	3.20	3.20	28.2	BXE	11	44	24	20	Orangish brown slightly gravelly slightly sandy silty CLAY		
TPA10	B	0.50	0.50	11.7	BXE	17	52	26	26	Orangish brown mottled grey slightly sandy slightly gravelly silty CLAY		
TPA11	B	1.00	1.00	26.8	BXE	30	46	23	23	Brown mottled orange slightly sandy slightly gravelly silty CLAY		
TPD01	B	0.60	0.60	20.9	BXE	8	45	22	23	Orangish brown mottled grey slightly sandy slightly gravelly silty CLAY		
TPD02	D	0.60	0.60	26.8	BXE	3	71	29	42	Orangish brown mottled grey slightly gravelly slightly sandy silty CLAY		
TPD03	B	0.40	0.40	25.8	BXE	5	55	30	25	Brown slightly gravelly slightly sandy silty CLAY		
TPD05	B	0.50	0.50	14.8	BXE	43	39	22	17	Brown slightly sandy slightly gravelly clayey SILT		
TPE03	D	0.40	0.40	11.4	BXE	43	37	22	15	Orangish brown slightly sandy slightly gravelly silty CLAY		
TPE04	B	0.60	0.60	17.4	BXE	33	48	24	24	Orangish brown slightly sandy slightly gravelly silty CLAY		
general remarks natural water content determined in accordance with BS EN ISO 17892 - 1 : 2014 (unless specified) NP denotes non plastic # denotes sample tested is smaller than that which is recommended in accordance with BS1377 or BS EN ISO 17892												
specimen preparation A - as received B - washed on 0.425mm sieve C - air dried							test method X - cone penetrometer (test 4.3) Y - cone penetrometer (test 4.4) Z - casagrande apparatus (test 4.5)				CONTRACT 33454	CHECKED CA



CLIENT HAWARDEN SUBCONTRACTORS WSP

SITE FENNY BRIDGE



BH/TP No.	depth (m)	LL	PL	PI	remarks
□ TPA09	3.20	44	24	20	
◇ TPA10	0.50	52	26	26	
△ TPA11	1.00	46	23	23	
× TPD01	0.60	45	22	23	
+ TPD02	0.60	71	29	42	
○ TPD03	0.40	55	30	25	
■ TPD05	0.50	39	22	17	
◆ TPE03	0.40	37	22	15	
▲ TPE04	0.60	48	24	24	

CONTRACT

33454

CHECKED

CA



CERTIFICATE OF ANALYSIS

SDG:	170904-31	Client Reference:	70035780	Report Number:	425622
Location:	Fenay Bridge	Order Number:	70035780-S01	Superseded Report:	

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Astos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Appendix F

FIELD RECORDS



Land at Fenay Bridge



Key:

Depth to water			Methane	Carbon Dioxide	Gas Flow
	Response zone <i>fully</i> flooded during sampling		> 1% v/v	> 5% v/v	> 70 l/hr
	Response zone <i>significantly</i> flooded during sampling				
	Datum or response zone information missing. Response zone flooding cannot be calculated				

Visit 1, Event: Monitoring Round 1, Date: 05/09/2017

Sheet 1 of 1

Engineer	Charley Wainwright	Equipment	SerialNo	Calibrated	Comments and Ground Conditions:
Start/End Time	12:23 - 15:28	Dipmeter		No	
Pressure Start/End (mB)	1013 - 1014	Gas Analyser		Yes	
Temperature (Deg C)					
Weather Conditions	Overcast				

Borehole	Response Zone (m)		Gas Flow (l/hr)		Borehole Differential Pressure	Methane (% v/v)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		Other Gases (ppmV)			Depth to Water	Depth to Base	Thickness of product	Sampled ?
	Top	Base	Initial	Steady		Initial	Steady	Initial	Steady	Initial	Steady	PID	H2S	CO	m	m	mm	Y/N
BHA1	10	15	0.00	0.00		0.00	0.00	3.00	2.80	12.70	13.30	24.10	0.00	39.00	9.88	14.82	N/A	No
BHA2	2.5	5	0.00	0.00		0.00	0.00	1.70	1.40	17.10	17.70	2.30	0.00	0.00	4.02	7.49	N/A	No
BHA3	4	9	0.00	0.00		0.00	0.00	3.90	3.70	9.40	9.80	2.60	0.00	0.00	5.92	9.25	N/A	No
BHA4	6	11	0.00	0.00		0.00	0.00	0.80	0.80	18.60	18.70	1.70	0.00	0.00	8.94	14.22	N/A	No
BHD1	1	10	0.00	0.00		0.00	0.00	2.50	2.90	17.60	17.30	4.10	0.00	0.00	7.41	9.92	N/A	No
BHD2	16	21	0.00	0.00		0.00	0.00	0.50	0.50	20.00	20.30	1.00	0.00	0.00	15.89	20.15	N/A	No
BHD3	18	24	0.00	0.00		0.00	0.00	1.90	2.00	18.00	17.60	4.80	0.00	0.00	16.75	23.92	N/A	No
BHE1	1	6	0.00	0.00		0.00	0.00	1.90	1.80	18.70	18.80	1.60	0.00	0.00		5.91	N/A	No
BHE2	11	21	0.00	0.00		0.00	2.50	2.20	2.30	2.60	1.00	0.70	0.00	0.00	17.61	18.82	N/A	No
BHE3	15	21	0.00	0.00		0.00	0.00	2.20	2.30	15.40	16.00	6.30	0.00	0.00	17.90	21.05	N/A	No

Land at Fenay Bridge



Key:

Depth to water			Methane	Carbon Dioxide	Gas Flow
	Response zone <i>fully</i> flooded during sampling		> 1% v/v	> 5% v/v	> 70 l/hr
	Response zone <i>significantly</i> flooded during sampling				
	Datum or response zone information missing. Response zone flooding cannot be calculated				

Visit 2, Event: Monitoring Round 2, Date: 25/09/2017

Sheet 1 of 1

Engineer	Charley Wainwright	Equipment	SerialNo	Calibrated	Comments and Ground Conditions:
Start/End Time	09:22 - 16:09	Dipmeter		No	
Pressure Start/End (mB)	1010 - 1008	Gas		Yes	
Temperature (Deg C)					
Weather Conditions	Rain				

Borehole	Response Zone (m)		Gas Flow (l/hr)		Borehole Differential Pressure	Methane (% v/v)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		Other Gases (ppmV)			Depth to Water	Depth to Base	Thickness of product	Sampled ?
	Top	Base	Initial	Steady		Initial	Steady	Initial	Steady	Initial	Steady	PID	H2S	CO	m	m	mm	Y/N
BHA1	10	15	0.00	0.00		0.00	0.00	1.70	1.20	17.40	17.80		0.00	10.00	9.45	14.80	N/A	No
BHA2	2.5	5	0.00	0.00		0.00	0.00	2.70	2.70	17.80	17.60		0.00	0.00	4.14	7.49	N/A	Yes
BHA3	4	9	0.00	0.00		0.00	0.00	3.50	3.70	10.30	11.30		0.00	0.00	6.36	9.23	N/A	Yes
BHA4	6	11	0.00	0.00		0.00	0.00	0.80	0.40	18.70	19.60		0.00	0.00	8.68	13.69	N/A	Yes
BHD1	1	10	0.20	0.00		0.00	0.00	2.90	2.90	15.90	15.70		0.00	0.00	7.30	9.92	N/A	No
BHD2	16	21	0.00	0.00		0.00	0.00	0.00	0.00	20.70	20.60		0.00	0.00	16.11	20.15	N/A	No
BHD3	18	24	0.00	0.00		0.00	0.00	2.10	2.10	17.60	17.20		0.00	0.00	16.11	23.65	N/A	No
BHE1	1	6	0.00	0.00		0.00	0.00	0.60	0.40	19.40	19.80		0.00	0.00		5.92	N/A	No
BHE2	11	21	0.00	0.00		0.00	0.00	0.00	0.00	20.50	20.50		0.00	0.00	17.23	18.84	N/A	No
BHE3	15	21	0.00	0.00		0.00	0.00	4.20	4.20	14.50	14.40		0.00	0.00	17.89	20.73	N/A	No

Appendix G

GAC METHODOLOGY



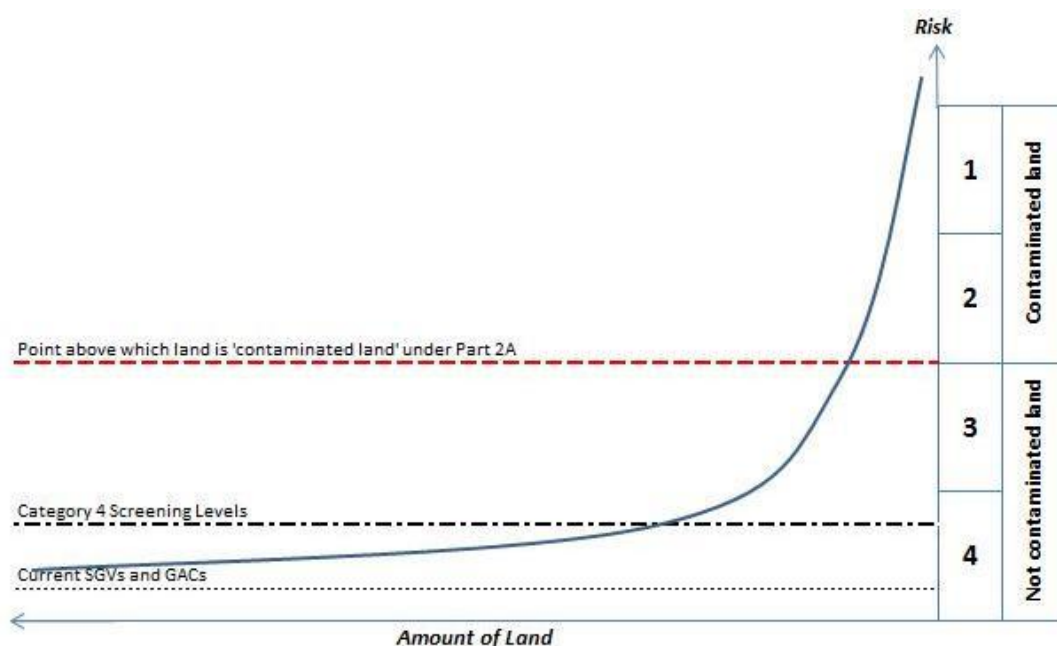
UK APPROACH

In the UK, the potential risks to human health from contamination in the ground are usually evaluated through a generic quantitative risk assessment (GQRA) approach. This allows generic and conservative exposure assumptions to be readily applied to risk assessments and can be a useful tool for rapidly screening data and to identify those contaminants or scenarios that could benefit from further investigation and/or site-specific detailed quantitative risk assessment (DQRA).

Current industry good practice is to use the approach presented in the Environment Agency (EA) publications SR2¹ and SR3². This approach allows the derivation of Generic Assessment Criteria (GACs), primarily for chronic exposure. The Environment Agency's published Soil Guideline Values (SGVs) follow the same approach, but are limited to a small number of substances.

In April 2012, the Department of Environment, Food and Rural Affairs (Defra) published updated statutory guidance³ which introduced a four category approach to determining whether land in England and Wales is contaminated or not on the grounds of significant possibility of significant harm (SPOSH). **Figure 1** presents a graphical representation of the categories.

Figure 1: Four Categories for Determining if Land Represent a SPOSH



Cases classified as Category 1 are considered to be SPOSH based on actual evidence or an unacceptably high probability of harm existing. Category 4 cases are those where there is no risk, or a low risk of SPOSH.

¹ Environment Agency 'Human Health Toxicological Assessment of Contaminants in Soil', Report SC050021/SR2. January 2009.

² Environment Agency 'Updated Technical Background to the CLEA Model,' Report SC050021/SR3. January 2009.

³ Defra 'Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance'. April 2012.

GACs and SGVs represent a minimal risk level, well within Category 4. A 2014 publication by Contaminated Land: Applications in Real Environments (CL:AIRE), SP1010⁴ and endorsed by Defra⁵ provided an approach to determine Category 4 Screening Levels (C4SLs) which are higher than the GACs whilst being “more pragmatic but still strongly precautionary”. It also provided C4SLs for six contaminants of concern.

Although the C4SLs were designed to support Part 2A assessments to determine ‘contaminated land’ they are specifically mentioned, along with reference to the Part 2A statutory guidance, by the Department for Communities and Local Government (DCLG) for use in a planning context⁶.

The SGVs were derived using the Contaminated Land Exposure Assessment (CLEA) Workbook v1.06. An updated version (v1.071) was released by the EA in September 2015 to take into account the publication of SP1010. The updates comprised: additional toxicity data for the six chemicals for which C4SLs were derived; two new public open space land use scenarios; updated exposure parameters; options to run the model using C4SL exposure assumptions; and increased functionality. There were no changes to algorithms, so it is still possible to replicate the SGVs using the input parameters held within v1.071.

It should be noted that the four category approach has not been adopted in Scotland either under Part 2A or the planning regime. The Part 2A statutory guidance applicable in Scotland (Paper SE/2006/44 dated May 2006) does not reflect the changes introduced by Defra in April 2012 which allow for the use of C4SLs within Part 2A risk assessments. Additionally, it is considered that the principal of ‘minimal risk’ should still apply under planning in Scotland, based on current guidance.

WSP | PARSONS BRINCKERHOFF APPROACH

In the absence of a comprehensive set of SGVs it is down to individual practitioners to derive their own GACs. WSP | Parsons Brinckerhoff has used the approach provided within SR2, SR3, SP1010, CLEA Workbook v1.071 and SR4⁷ to produce a set of minimal risk GACs. The chemical-specific data within two key publications were considered during their production: CL:AIRE 2010⁸ and LQM 2015⁹. Both documents provide comprehensive sets of GACs for different contaminants of concern.

The LQM Suitable For Use Levels (S4ULs) have selected exposure parameters somewhere between those of the SR3 land uses and the C4SL exposure scenarios. This approach was rejected by WSP | Parsons Brinckerhoff as not representing minimal risk, however, the LQM S4UL document was critically reviewed and the approach and chemical input parameters were utilised where considered to be appropriate.

⁴ CL:AIRE ‘Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination’ SP1010, Final Project Report (Revision 2). September 2014.

⁵ Defra ‘SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document’. December 2014.

⁶ DCLG Planning Practice Guidance ‘Land Affected by Contamination’, particularly Paragraphs 001 and 007. Ref IDs: 33-001-20140306 & 33-007-20140612.

⁷ Environment Agency ‘CLEA Software (Version 1.05) Handbook (and Software)’, Report SC050021/SR4. September 2009.

⁸ CL:AIRE ‘The EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment’. ISBN 978-1-05046-20-1. January 2010.

⁹ Nathanail et al ‘The LQM/CIEH S4ULs for Human Health Risk Assessment’, Land Quality Press, ISBN 978-0-9931084-0-2. 2015.

An industry-led C4SL Working Group is planning to derive a larger set of C4SLs in the near future, and it is understood that this will include a critical review of the chemical input data for all selected substances. This may lead to further amendments to the chemical input data used in the WSP | Parsons Brinckerhoff in-house screening values. It is considered likely that the contaminant list will crossover with the current CL:AIRE GACs. As such, this document was not critically reviewed by WSP | Parsons Brinckerhoff.

WSP | Parsons Brinckerhoff's current approach to the assessment of risks to human health is to continue to evaluate minimal risk through the use of SGVs and in-house derived GACs, and to use the published C4SLs as a secondary tier of assessment until such time as additional suitable C4SLs are published and/or in-house values are derived.

EXPOSURE MODELS

LAND USES

WSP | Parsons Brinckerhoff has largely adopted the exposure assumptions of the generic land use scenarios included within SR3 with two additional public open space scenarios included within SP1010:

- Residential with homegrown produce consumption
- Residential without homegrown produce consumption
- Allotments
- Commercial
- Public open space near residential housing (POS_{resi})
- Public park (POS_{park})

Exceptions are described in the following Sections.

SOIL PROPERTIES

SR3 assumes a sandy loam soil with a pH of 7 and Soil Organic Matter (SOM) content of 6% for its generic land uses, based on the geographical spread of topsoils in the UK. WSP | Parsons Brinckerhoff has adopted these default values. In addition, GACs based on SOM of 1% and 2.5% have also been derived based on common experience of the nature of Made Ground and lack of topsoil on many brownfield sites.

RECEPTOR CHARACTERISTICS AND BEHAVIOURS

SP1010 provides some updated exposure parameters for long-term inhalation rates¹⁰ and the consumption rates for homegrown produce¹¹ compared to those provided in SR3. This data was used to derive WSP | Parsons Brinckerhoff's GACs. The changes in inhalation rates do not apply to the allotment generic land use scenario. These are based on the breathing rates for short-term exposure of light to moderate intensity activity which were derived from a study that was not updated in USEPA 2011, so the SR3 rates were retained.

¹⁰ USEPA, National Centre for Environmental Assessment 'Exposure Factors Handbook: 2011 Edition' EPA/600/R-09/052F. September 2011.

¹¹ National Diet and Nutrition Survey 2008/2009 to 2010/2011.

CHEMICAL DATA

PHYSICO-CHEMICAL PARAMETERS

Physico-chemical properties for the contaminants for which GACs have been derived have been obtained following critical review of the following hierarchy of data sources:

1. Environment Agency/Defra SGV reports where available.
2. Environment Agency '*Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values*', Report SC050021/SR7, November 2008.
3. Published fate and transport reviews within Nathanail et. al 2015 and CL:AIRE 2010.

Where appropriate, and where sufficient data is available, values were adjusted to reflect a UK soil temperature of 10°C (e.g. K_{aw}).

TOXICOLOGICAL DATA

Toxicological data for the derivation of minimal risk Health Criteria Values (HCV) for each contaminant was selected with due regard to the approach presented in SR2. Where appropriate, the following hierarchy of data sources was used:

1. UK toxicity reviews published by authoritative bodies including:
 - EA
 - Public Health England (PHE)
 - Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT)
 - Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC)
2. Authoritative European sources such as European Food Standards Agency (EFSA)
3. International organisations including:
 - World Health Organisation (WHO)
 - Joint FAO/WHO Expert Committee on Food Additives (JECFA)
4. Authoritative country-specific sources including:
 - United States Environmental Protection Agency (USEPA)
 - US Agency for Toxic Substances and Disease Registry (ATSDR)
 - US Integrated Risk Information System (IRIS)
 - Netherlands National Institute for Public Health and the Environment (RIVM)

Factors such as the applicability of the data to human health (e.g. epidemiological vs. animal studies), the quality of the data, the level of uncertainty in the results and the age of the data were also taken into account in the final selection. Details for specific substances are available on request.

MEAN DAILY INTAKES

Estimations of background exposure for each threshold substance have been updated. In line with the SR2 approach, the exposure from non-threshold substances in the soil does not take into account

exposure from other sources, and as such GACs were derived without consideration of the Mean Daily Intakes (MDI) for those substances.

The data published by the EA in its series of TOX reports between 2002 and 2009 was evaluated to determine whether the values were considered to remain valid today. Values from these current UK published sources were not amended unless they were considered to be significantly different so that the GACs remained as comparable as possible with the still commonly used SGVs.

ORAL MEAN DAILY INTAKES

Oral MDI were generally estimated as the sum of exposure via the ingestion of food and drinking water using the default adult physiological parameters presented in Table 3.3 of SR2.

Data on the exposure of substances from food ingestion was generally obtained from UK Total Diet Studies (TDS) published by the Food Standards Agency (FSA) and its predecessor the Ministry of Agriculture, Fisheries and Food (MAFF) and from studies commissioned by COT. Where no UK-specific data was available, MDI were derived from the European Food Safety Authority (EFSA), Health Canada and US sources. This was a rare occurrence, and in these instances, the data was evaluated to determine its applicability to the UK.

Data on the concentrations of substances in tap water was obtained from a variety of sources. UK data was used where available, with preference given to Drinking Water Inspectorate (DWI) 2014 data from water company tap water testing (LOD, 1st and 99th percentile data is available). Where the substance was not included in tap water testing, other UK sources of information were considered including:

- DWI data from water company tap water testing from previous years;
- COT; and
- FSA.

Where UK data was not available, a number of other data sources were considered, largely WHO International Programme on Chemical Safety (IPCS) Concise International Chemical Assessment Documents (CICADs) and background documents for the development of Guidelines for Drinking Water Quality, using professional judgement on the relevance of the data to the UK. The final decision on the MDI from drinking water was made using professional judgement on the balance of relevance and probability, taking into account the detection limit where not detected, Koc and solubility, reduction in use of the substance, banned substances, tight controls (e.g. on explosives) and with due consideration to the SR2 instruction that “if no data or information in background exposure are available, background exposure should be assumed to be negligible and the MDI set to zero....”.

Data from other countries was generally not used because it was considered that the hydrogeology of these countries along with industrial practices were unlikely to be reflective of the UK.

INHALATION MEAN DAILY INTAKES

Inhalation MDIs were based on estimates of average daily exposure by the inhalation pathway and calculated using the default adult physiological parameters presented in Table 3.3 of SR2.

The inhalation MDIs were generally estimated using background exposure data from the UK, derived from Defra's UK-AIR: Air Information Resource¹², which provides ambient air quality data from a number of sites forming a UK-wide monitoring network. The MDIs for heavy metals were based on rolling annual average metal mass concentration data from Defra's UK Heavy Metals Monitoring Network from the period October 2009 to September 2010¹³.

Information for some substances was obtained from UK sources including Environment Agency TOX reports and data from the UK Expert Panel on Air Quality Standards (EPAQS). Where recent UK data was not available, data was sourced from the International Programme on Chemical Safety (IPCS), the World Health Organisation (WHO), the Agency for Toxic Substances and Diseases Registry (ATSDR), Health Canada, and various other peer-reviewed sources summarised by LQM/CIEH¹⁴.

For other substances, where no data or information on background exposure was available, background exposure was assumed to be negligible and the MDI set at 0.5*TDI in accordance with guidance in SR2.

PLANT UPTAKE

Soil to plant concentration factors are available in CLEA v1.071 for arsenic, cadmium, hexavalent chromium, lead, mercury, nickel and selenium. For all remaining inorganic chemicals, concentration factors were obtained using the PRISM model. Substance-specific correction factors have been selected in accordance with the guidance established within SR3. This is consistent to the approach utilised in the derivation of the LQM S4UL values and the EIC/AGS/CL:AIRE GAC.

Where there is a lack of appropriate data to enable the derivation of specific soil to plant concentrations factors for organic chemicals, plant uptake was modelled within CLEA v1.071 using the generic equations recommended within SR3, as follows:

- Green Vegetables – Ryan et al. (1988);
- Root Vegetables – Trapp (2002);
- Tuber Vegetables – Trapp et al. (2007); and
- Tree Fruit – Trapp et al. (2003).

There are no suitable models available for modelling uptake for herbaceous fruit or shrub fruit. Exposure is considered negligible.

SOIL SATURATION LIMITS

GACs are not limited to their theoretical soil saturation within CLEA, although where either the aqueous or the vapour-based saturation is exceeded, this is highlighted within the Workbook (compared with the lower of the two values). This affects pathways which depend on partitioning calculations so in reality this only affects the vapour pathways and is relevant to organic substances

¹² Crown 2016 copyright Defra via uk-air.defra.gov.uk, licenced under the Open Government Licence (OGL).

¹³ Defra, 2013 Spreadsheet of historic data for multiple years for the Metals network. Available online at: <http://uk-air.defra.gov.uk/data/metals-data>. [Accessed 13/03/2016].

¹⁴ LQM/CIEH, 2015. The LQM/CIEH S4ULs for Human Health Risk Assessment.

and other substances, such as elemental mercury, that have a significant volatile component. However, the Workbook highlights saturation for direct contact pathways to indicate to the user where further qualitative consideration of free phase contamination at surface may be required.

Where the lower of the two saturation limits is exceeded and the vapour pathway is the only exposure route being considered, the chronic risks to human health are likely to be negligible. Further evaluation could be undertaken using an alternative model suitable for evaluating non-aqueous phase liquids (NAPLs), such as the Johnson & Ettinger (J&E) approach described in USEPA 2003. However, WSP | Parsons Brinckerhoff considers that if NAPLs are suspected, given the known limitations and over-simplifications of J&E, soil vapour monitoring is a more accurate way of assessing potential risks.

Where the lower saturation limit is exceeded for the vapour pathway and a number of exposure routes are being considered, then the contribution from the NAPL via vapour inhalation to the overall exposure can be evaluated using the procedure provided in SR4. WSP | Parsons Brinckerhoff would evaluate this as part of a DQRA process or through soil vapour monitoring on-site to determine site-specific soil vapour concentrations.

CHEMICAL SPECIFIC ASSUMPTIONS

CYANIDES

Cyanide has high acute toxicity, and short term exposure is an important consideration when assessing the risks from soils contaminated with cyanide. The primary risk to human receptors from free cyanide in soils is an acute risk.

There is no current UK guidance available for calculating acute risks from free cyanide. Consequently, GAC for acute exposure were derived using the algorithms presented in MADEP 1992¹⁵ and assuming a one-off ingestion of 10g of soil (this conservative value has been taken as an upper bound estimate for pica amongst children). Receptor body weights have been selected according to the critical receptor for each exposure scenario.

The lowest of the chronic and acute GAC for each land use scenario were adopted by WSP | Parsons Brinckerhoff.

LEAD

The SGV for lead was withdrawn by the EA in 2009, and in 2011 the EA withdrew their published TOX report in light of new scientific evidence. The C4SL for lead was derived using the latest scientific evidence from a large human dataset. As such, no chemical-specific margin was applied in the derivation of the C4SL for lead. It may be possible for WSP | Parsons Brinckerhoff to derive a GAC for lead using the same dataset and applying a chemical-specific margin, but the value is likely to be lower than UK natural background concentrations. Therefore, WSP | Parsons Brinckerhoff has adopted the toxicological data used to derive the C4SLs in deriving the GAC for lead until such time as alternative GACs are published by an authoritative body. The relative bioavailability was set at 100% in line with the approach taken for other GACs, whereas the C4SL assumes 60% for soil and 64% for airborne dust. Thus, the WSP | Parsons Brinckerhoff GAC are lower than the C4SLs.

¹⁵ MADEP 'Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration' 1992. http://www.mass.gov/dep/toxics/cn_soil.htm

POLYCYCLIC AROMATIC HYDROCARBONS

WSP | Parsons Brinckerhoff's approach to the assessment of polycyclic aromatic hydrocarbons (PAHs) uses the surrogate marker approach. BaP was used as a surrogate marker for all genotoxic PAHs in line with the Health Protection Agency 2010¹⁶ recommendations and SP1010. This assumes that the PAH profile of the data is similar to that of the coal tars used in the Culp *et al* oral carcinogenicity study from which the toxicity data for BaP was produced. In reality, this profile has been shown by HPA to be applicable on the majority of contaminated sites based on assessment of sites across the country.

The alternative is the Toxic Equivalency Factor (TEF) approach which uses a reference compound and assigns TEFs for other compounds based on estimates of potency. Key uncertainties with this approach include the assumption that all compounds have the same toxic mechanism of action within the body and that no compounds with a greater potency than the reference compound are present. It is considered by the HPA that the TEF approach is likely to under predict the true carcinogenicity of PAHs and therefore favours the surrogate marker approach.

For these reasons, WSP | Parsons Brinckerhoff considers that the adoption of BaP as a surrogate marker for genotoxic PAHs as opposed to the TEF approach is reasonable, even in cases where the PAH profile may differ from that of the Culp *et al* study. In addition, WSP | Parsons Brinckerhoff has derived a GAC for naphthalene, which is commonly a risk driver due to its high volatility, relative to other PAH compounds, as an indicator compound for threshold PAHs.

CHEMICAL GROUPS

For a number of chemical groups, the available toxicity data is for combinations of chemicals. Given that the physico-chemical parameters may differ between the chemicals, the GACs for the chemicals within the groups has been calculated and then the lowest GAC selected to represent the entire group. This was the approach taken by the EA for m-, o- and p-xylenes, and has also been adopted by WSP | Parsons Brinckerhoff for:

- 2-chlorophenol, 2,4-dichlorophenol, 2,4,6-trichlorophenol and 2,3,4,6-tetrachlorophenol;
- 2-, 3- and 4-methylphenol (total cresols);
- aldrin and dieldrin; and
- α - and β -endosulphan.

EXPOSURE TO VAPOURS

INHALATION OF MEASURED VAPOURS

WSP | Parsons Brinckerhoff has derived a set of soil vapour GACs (GAC_{sv}) that allow for the assessment of measured site soil vapour concentrations, using J&E, in order to establish potential risks via indoor inhalation of vapours. This methodology enables a more robust assessment of exposure via the inhalation of soil vapours indoors than using CLEA-derived soil GAC, as it is based upon measured soil vapour concentrations beneath the site. It also allows for the assessment of vapours from all source terms (i.e. groundwater, soil or NAPL). Outdoor inhalation was not included. WSP | Parsons Brinckerhoff considers that the indoor inhalation pathway is the significantly dominant risk-driver.

¹⁶ HPA Contaminated Land Information Sheet 'Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs) 2010

The generic land use scenarios within CLEA (residential and commercial) that were used to derive the soil GAC were used to define the receptor and building characteristics for the soil vapour GAC. Only residential and commercial generic land use scenarios include the indoor inhalation of vapours pathway.

The GAC_{sv} were derived for three different soil types; sand, sandy loam and clay, reflecting the importance of this parameter within the J&E model. A depth to contamination of 0.85m below the base of the building foundation was assumed (i.e. 1m below ground level). This differs from the depth assumed for the soil GAC (0.5m bgl), but was selected by WSP | Parsons Brinckerhoff as a reasonable worst case scenario. It is acknowledged that the J&E commonly over-predicts indoor vapour concentrations. In particular, it will significantly over-predict vapour concentrations for suspended floor slabs, which many new builds are constructed with, it does not take into account lateral migration and assumes an infinite source of contamination at steady state conditions. In addition, it is common for soil gas/vapour wells to be installed with at least 1m of plain riser at the surface and this equates to a total depth of 0.85m below the building foundation plus a 0.15m thick foundation, and so is more representative of the depth that samples will be taken from.

The TDSIs and IDs for each substance were converted from $\mu g kg^{-1} bw day^{-1}$ to $\mu g m^{-3}$ using the standard conversions quoted in Table 3.3 of SR2, thereby replacing the need to model C_{air} in the equation:

$$C_{air} = \alpha \cdot C_{vap} \cdot 1,000,000 cm^3 m^{-3}$$

Where:

C_{air} is the concentration of vapours within the building, mg^{-3}

α is the steady state attenuation coefficient between soil and indoor air, dimensionless

C_{vap} is the soil vapour concentration, $mg cm^{-3}$

The target concentrations within indoor air for each substance (C_{air}) are a function of receptor inhalation rates and occupancy periods, as defined by the site conceptual exposure model (assuming standard CLEA occupancy periods and receptors).

The attenuation factor was calculated using J&E (Equation 10.4 in SR3) and the resulting C_{vap} is equivalent to the GAC_{sv} for the modelled exposure scenario.

Where the calculated GAC_{sv} for a substance exceeds the vapour saturation limit, no GAC_{sv} has been proposed.

INHALATION OF GROUNDWATER-DERIVED VAPOURS

The CLEA model does not have the capacity to derive GACs to assess vapours derived from dissolved phase contamination. WSP | Parsons Brinckerhoff has derived a set of groundwater GACs (GAC_{gw}) to evaluate the potential risks through the indoor inhalation of groundwater-derived vapours by first applying the approach described above for the derivation of the WSP | Parsons Brinckerhoff GAC_{sv} to determine the acceptable concentration in soil vapour directly above the water table.

The depth to groundwater was assumed to be 1m bgl (i.e. 0.85m below the base of the building foundation). This depth was considered to be more representative of commonly encountered groundwater conditions than the 0.5m below the base of the building foundation (i.e. 0.65m bgl) that is used by CLEA for an unsaturated source present in the overlying soil.

The GAC_{gw} was then back-calculated from the GAC_{sv} using the air-water partition coefficient (K_{aw}) for each substance.

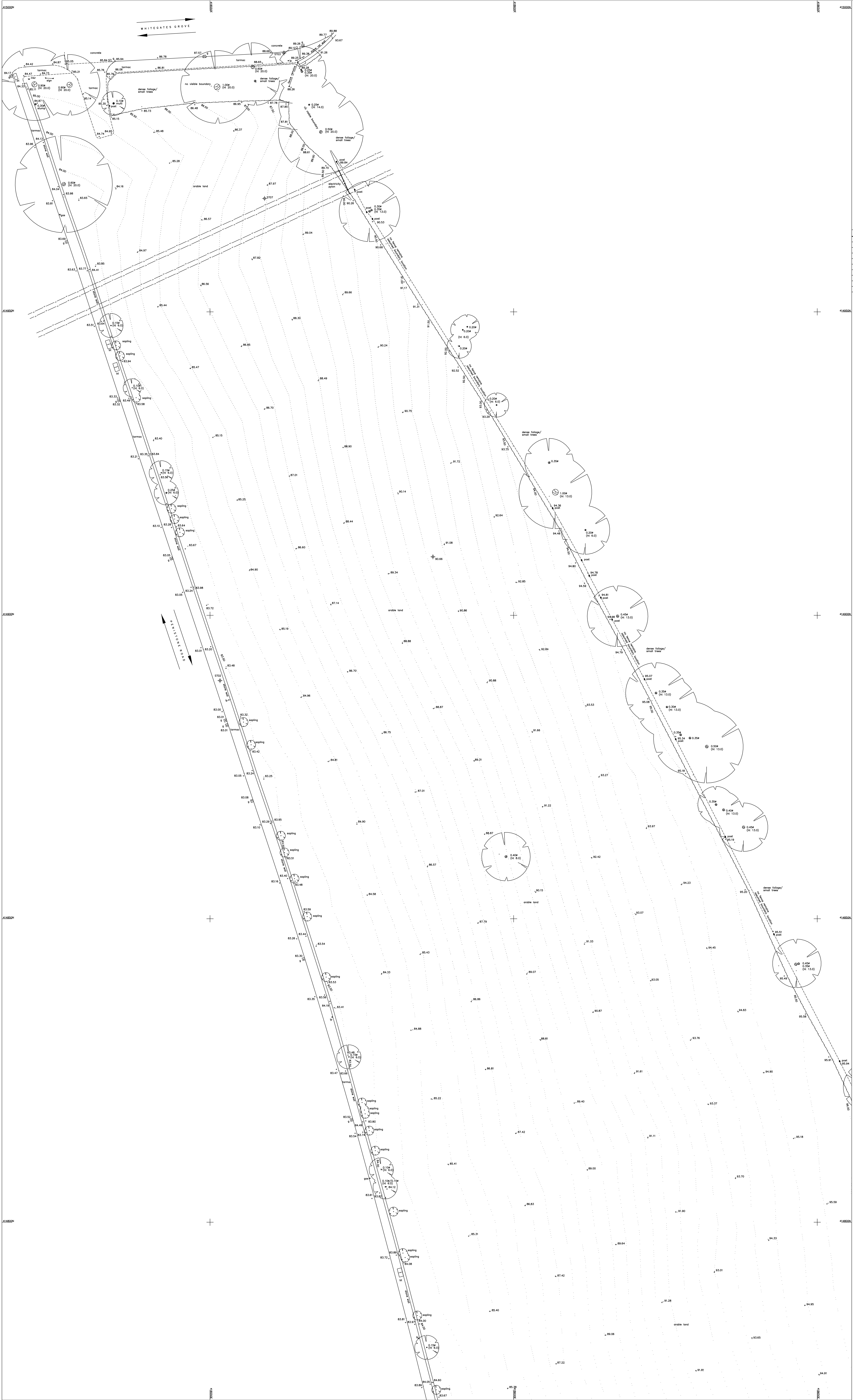
Where the calculated GAC_{gw} for a substance exceeds the solubility limit, no GAC_{gw} has been proposed.

Appendix H

TOPOGRAPHICAL SURVEY

DRAWINGS

wsp



NOTES

GENERAL NOTES: —

ALL LEVELS ARE IN METS DERIVED FROM GPS TRANSFORMATION.
GRID COORDINATES ARE ORANCE SURVEY NATIONAL GRID DERIVED FROM GPS TRANSFORMATION
GPS COORDINATES AND LEVELS SET AT ST01 (NO SCALE FACTOR APPLIED)
THIS DRAWING HAS BEEN PRODUCED WITH A PLOT SCALE ACCURACY OF 1:200
SERVICE COVERS INDICATED WHERE VISIBLE. PIPE INVERTS / DETAILS SURVEYED FROM SURFACE
INSPECTION ONLY. GENERALLY DAMAGED COVERS AND COVERS WITH HIGH-RISE WILL NOT BE LIFTED
THREE SPECIES SHOULD BE CONFIRMED BY THREE SPECIALIST IF CRITICAL.

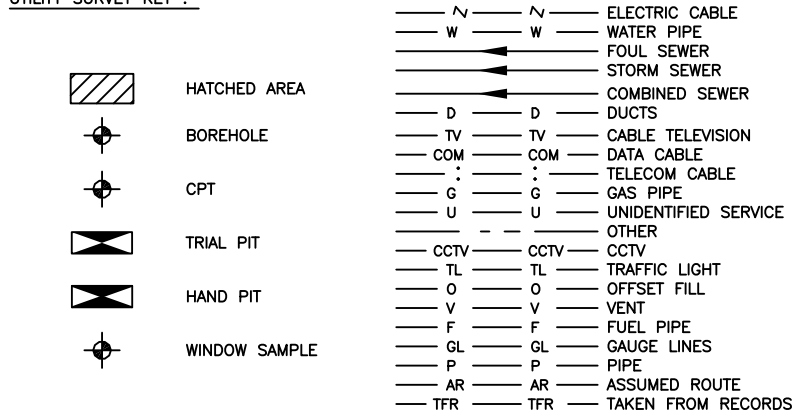
TOPOGRAPHICAL SURVEY/UTILITY KEY :

[illegible]

SURVEY CONTROL :-

STATION	EASTINGS	NORTHINGS	LEVEL
ST01	418505.882	414993.271	84.245
ST02	418551.845	414889.244	83.184
ST03	418562.166	414902.658	89.057
ST04	418568.709	414909.843	90.651
ST05	418603.286	414682.546	84.822
ST06	418555.555	414178.253	93.966
ST07	418558.985	414507.696	NR 1.50

LIABILITY SURETY KEY: —



DISCLAIMER :-

Electromagnetic techniques have been used in the location of underground services and structures. The use of these techniques should not be carried out to confirm service identification, positions and particularly depths, where the use of other methods is available. The use of these techniques should be performed with the understanding that the completeness of the underground services and structures cannot be guaranteed.

This method of survey does not differentiate between live and dead services, and as such it should be used to locate services in the vicinity of public services that may be exposed to the surface. Therefore the relevant service drawings should be used to confirm the approximate utility, compare and use in conjunction with this drawing.

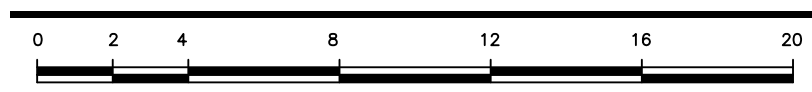
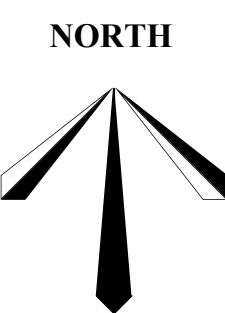
Private service pipes and cables in highways are not shown, but there presence should be anticipated.

Additional below ground structures or obstructions not shown on this drawing may be present. The presence should be anticipated. The presence of these structures should be anticipated. Excavations in the vicinity of services should be carried out with due diligence. Rf. HIGGART drawing details (from underground) services.

It should be noted that factors such as ground conditions, soil types, material and method of construction have an influence on the quality of the data obtained.

104. Structures is, "On a reconnaissance and nondestructively examined means may not be

UTILITY NOTES



MIDLAND SURVEY LTD

HEAD OFFICE
Cromwell House, Westfield Road, Southam, Warwickshire, CV47 0JH.
Tel: 01926 810811 Fax 01926 810812
E-Mail: mail@midlandsurvey.co.uk
www.midlandsurvey.co.uk

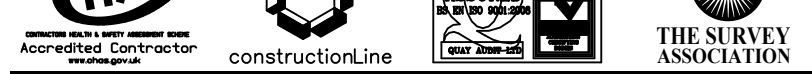
Client	WSP
--------	-----

1709601	PEANSTONE ROAD, FENAY BRIDGE, HUDDERSFIELD.
Title	TOPOGRAPHICAL SURVEY

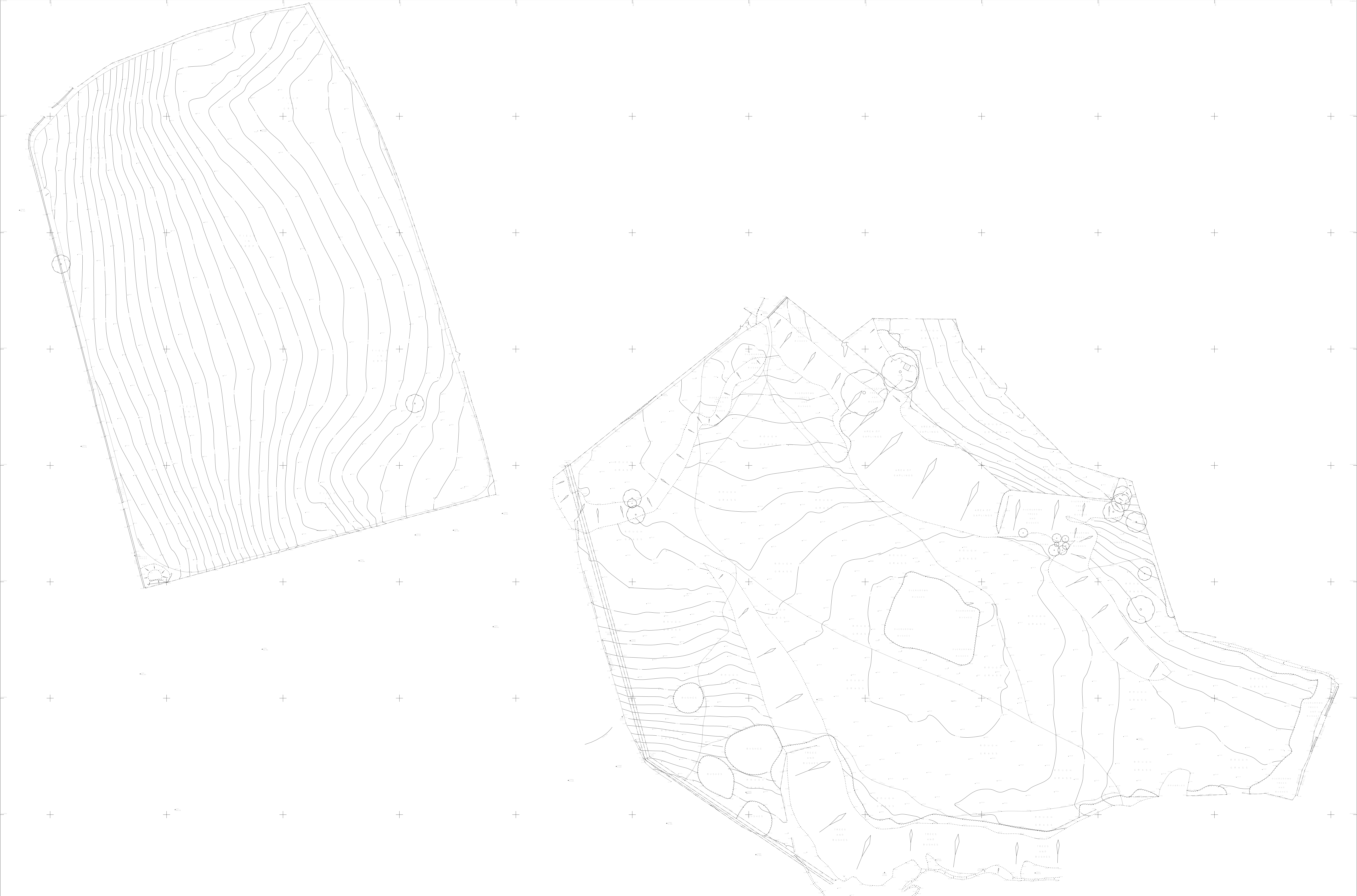
Date	AUGUST 2017	Revisions
------	-------------	-----------

Org No U00164 /1

Surveyor K.N

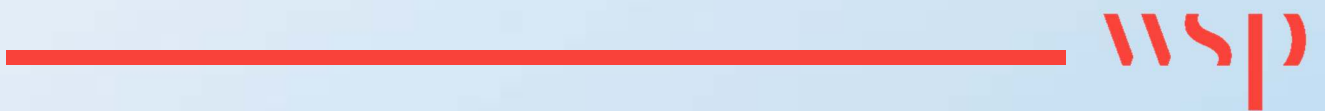
TOPOGRAPHICAL (LAND) SURVEYORS / UTILITY SURVEYORS

© Copyright Millard Survey Ltd. Reproduction of this information is prohibited without written authorisation from Millard Survey Ltd.



Appendix I

COAL MINING PLANS



PIAN NO 11 187
 1871. 1871. 1871.
 1871. 1871. 1871.
 1871. 1871. 1871.

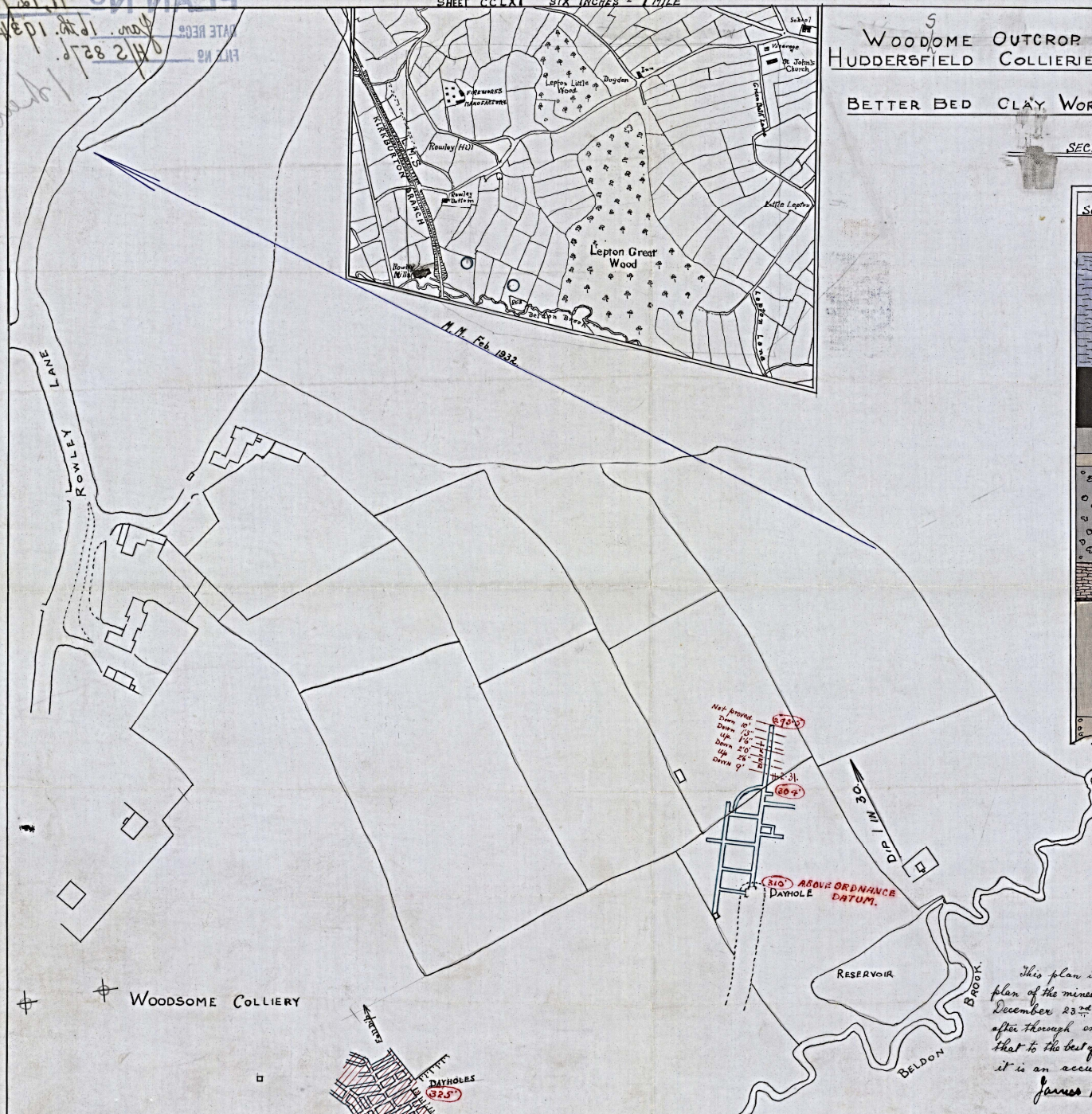
N.W. SHEET CCLXI SIX INCHES = 1 MILE

WOODSOME OUTCROP
 HUDDERSFIELD COLLIERIES LTD.

BETTER BED CLAY WORKINGS.

SECTION NEAR OUTCROP.

Section	ft	Ins	Remarks
	1	0	Soil
	3	0	Soft Shale
	1	6	Better Bed Coal
	8		Dark Clay
	4		Light Clay
	2	6	Inferior Clay with Iron Balls
	1	0	Ironstone
			SEAM WORKED
	3	0	Good Clay
			Rough Sandstone



This plan is a true copy of the working plan of the mines as completed up to December 23rd 1933 and I certify after thorough examination and enquiry that to the best of my knowledge and belief it is an accurate plan of the mines.
 James Wm. Rushforth
 Cert. No 3944.

Dec. 28th 1933.

1939

Scale 2 chains to an Inch.



Three White Rose Office Park
Millshaw Park Lane
Leeds
LS11 0DL

wsp.com

This page has been left intentionally blank.

Appendix 3: Chemical Analyses

Exploratory Hole	Arsenic	Cadmium	Chromium (total)	Copper	Lead	Mercury	Nickel	Selenium	Zinc		pH		Asbestos
TPD01, 0.10 m, 16/08/17	-	-	-	-	-	-	-	-	-		-		None Detected
TPD02, 0.20 m, 16/08/17	-	-	-	-	-	-	-	-	-		-		None Detected
TPD03, 0.10 m, 16/08/17	-	-	-	-	-	-	-	-	-		-		None Detected
TPD04, 0.10 m, 16/08/17	41.9	-	-	-	-	-	-	-	-		6.45		None Detected
TPD04, 0.50 m, 16/08/17	-	-	-	-	-	-	-	-	-		5.47		None Detected
TPD05, 0.20 m, 16/08/17	-	-	-	-	-	2.2	-	-	-		-		None Detected
TPD05, 0.70 m, 16/08/17	-	-	-	-	-	-	-	-	-		7.32		None Detected
TPD06, 0.40 m, 16/08/17	-	-	-	-	-	-	-	-	-		-		None Detected
BHD03, 0.30 m, 23/08/17	42.4	-	-	-	-	-	-	-	-		-		None Detected
GQRA Threshold Value (mg/kg)	37	11	910	2400	200	1.2	130	250	3700		N/A		0.0001 %
Maximum (mg/kg)	42.4	0.513	40	52.5	108	2.2	47.5	5.4	121		7.32		None Detected
Minimum (mg/kg)	5.2	<0.02	<0.9	36.9	21.2	0.368	20.5	<1.0	91.7		5.47		None Detected

 ENVIRONMENTAL CONSULTANTS Brook Holt, 3 Blackburn Road, Sheffield S61 2DW Tel: 0114 266 92 92 contactus@ecusltd.co.uk	NOTES: 1. All values are given in mg/kg unless otherwise stated. 2. All chemical levels below relevant GQRA threshold values shown as “-“ 3. For actual chemical results refer to laboratory testing certificates in Appendix 2.	CHEMICAL ASSESSMENT TABLE (METALS): RESIDENTIAL WITH HOMEGROWN PRODUCE SITE: Land east of Penistone Road, Fenay Bridge, Huddersfield CONTRACT: 12358 CLIENT: Engie Regeneration Ltd
		APPENDIX 3, TABLE A

Exploratory Hole	Naphthalene	Acenaphthalene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3,-cd)pyrene	Dibenz(a,h)anthracene	Benzo(g,h,i)perylene		Soil Organic Matter (%)
TPD01, 0.10 m, 16/08/17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		7.05
TPD02, 0.20 m, 16/08/17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
TPD03, 0.10 m, 16/08/17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		5.67
TPD04, 0.10 m, 16/08/17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		6.67
TPD04, 0.50 m, 16/08/17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
TPD05, 0.20 m, 16/08/17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
TPD05, 0.70 m, 16/08/17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		1.11
TPD06, 0.40 m, 16/08/17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
BHD03, 0.30 m, 23/08/17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
GQRA Threshold Value (mg/kg)	2.3	170	210	170	95	2400	280	620	7.2	15	2.6	77	2.2	27	0.24	320		-
Maximum (mg/kg)	0.335	0.017	0.0104	<0.01	0.473	0.142	0.359	0.308	0.171	0.235	0.293	0.098	0.185	0.113	0.0378	0.145		7.05
Minimum (mg/kg)	<0.009	<0.012	<0.008	<0.01	<0.015	<0.016	<0.017	<0.015	<0.014	<0.01	<0.015	<0.014	<0.015	<0.018	<0.023	<0.024		1.11
 ENVIRONMENTAL CONSULTANTS Brook Holt, 3 Blackburn Road, Sheffield S61 2DW Tel: 0114 266 92 92 contactus@ecusltd.co.uk				NOTES: 1. All values are given in mg/kg unless otherwise stated. 2. All chemical levels below relevant GQRA threshold values shown as "-" 3. For actual chemical results refer to laboratory testing certificates in Appendix 2. 4. GQRA values assume 1% Soil Organic Matter (SOM) unless specified otherwise.							CHEMICAL ASSESSMENT TABLE (SPECIATED PAH): RESIDENTIAL WITH HOMEGROWN PRODUCE							
											SITE: Land east of Penistone Road, Fenay Bridge, Huddersfield CONTRACT: 12358 CLIENT: Engie Regeneration Ltd							
											APPENDIX 3, TABLE B							

Client/client ref	Engie Regeneration Ltd
Project ref	12358
Site ref	Land east of Penistone Road, Fenay Bridge, Huddersfield
Data description	Soil chemical testing exceedances
Contaminant(s)	Arsenic, Mercury
Test scenario	Planning: is true mean lower than critical concentration ($\mu < C_c$)? ▼
Date	20 December 2018
User details	MMcD

Statistics calculator (version 1)



Input data

This spreadsheet has been produced based on the document 'Guidance on Comparing Soil Contamination Data with a Critical Concentration (CIEH/CL:AIRE, 2008)'. Users of this spreadsheet should always refer to this guidance, the User Manual and to relevant guidance on UK legislation and policy, in order to understand how the procedure should be applied in an appropriate context.

ESI Ltd (ESI) do not promise that the spreadsheet will provide any particular facilities or functions. The user must ensure that the spreadsheet meets their needs and they remain solely responsible for the competent use of the spreadsheet. Users are entirely responsible for the consequences of any use of the spreadsheet, ESI do not provide any warranty about the fitness for purpose or performance of any part of the spreadsheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the spreadsheet will be uninterrupted or error free. The user should carry out all necessary virus checks prior to installing on their computing system.

[Go to summary](#)

Data sheet

Project details

[illegible]

Client/client ref: Engie Regeneration Ltd
 Project ref: 12358
 Site ref: Land east of Penistone Road, Fenay
 Bridge, Huddersfield
 Data description: Soil chemical testing
 exceedances
 Contaminant(s): Arsenic, Mercury
 Test scenario: Planning
 Date: 20 December 2018

Critical concentration, C_c	37	1.2	1.2							
Notes										
Sample size, n	9	8	1	0	0	0	0	0	0	0
Sample mean, $\bar{x}$	21.7533333	0.736125	2.2	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Standard deviation, s	15.1062098	0.18161925	0							
Number of non-detects	0	0	0							
Set non-detect values to:	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit
Outliers?	No	No	N/A (n<3)							
Distribution	Normal	Non-normal	Single value							
Statistical approach	Auto: One-sample t-	Auto: Chebychev	Auto: Chebychev	Auto	Auto	Auto	Auto	Auto	Auto	Auto

Test scenario:	Planning: is true mean lower than critical concentration ($\mu < C_c$)?			Evidence level required: 95%			Use Normal distribution to test for outliers			
t statistic, t_0 (or k_0)	-3.027893863	-7.224105378	N/A							
Upper confidence limit (on true mean concentration, μ)	31.1169076	1.01601907	2.2							
Evidence level	99%	98%	0%							
Base decision on:	evidence level	evidence level	evidence level							
Result	$\mu < C_c$	$\mu < C_c$	$\mu \geq C_c$							
Select dataset	☐ Y	☐ Y	☒ Y	☐ Y	☐ Y	☐ Y	☐ Y	☐ Y	☐ Y	☐ Y

Back to data	Go to outlier test	Go to normality test	Show individual summary
--------------	--------------------	----------------------	-------------------------

This page has been left intentionally blank.