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Geotechnical & Environmental Engineers

# INTRUSIVE INVESTIGATION & ASSESSMENT
# ELSENHAM GOLF & LEISURE

**Carried Out For:** **ELSENHAM GOLF & LEISURE**

**October 2017** **Report Reference: 17090J-01**

Discovery
Geotechnical & Environmental Engineers

# INTRUSIVE INVESTIGATION & ASSESSMENT
# ELSENHAM GOLF & LEISURE

Carried Out For: **ELSENHAM GOLF & LEISURE**

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# REPORT
# INTRUSIVE INVESTIGATION & ASSESSMENT
# ELSENHAM GOLF & LEISURE

## EXECUTIVE SUMMARY


**INTRODUCTION**
Discovery CE Limited (DCE) was instructed by ELSENHAM GOLF & LEISURE (EGL) to carry out a Ground Investigation at a site known as ELSENHAM GOLF & LEISURE. The offer to carry out the works is contained in DCE proposal reference 17090J, dated 29th June 2017. The instruction to proceed with the work was contained in from Jason Seed (12th July 2017) on behalf of EGL.

**BACKGROUND**
Planning permission was granted for the site with conditions. This was based on the outcomes of a Phase 1 Desk Study undertaken by Pam Brown Associates. Planning Condition 9 relates to the potential for contamination at the site to impact on human health (site users) and controlled waters receptors (Drain at the north of the site and the Stansted Brook to the west) and by implication groundwater beneath and near the site. In order to discharge Condition 9 the risks to human health and controlled waters must be assessed following an intrusive investigation.

**OBJECTIVES**
The key objectives were to confirm the presence of the cover capping across the former landfill and recover samples of near surface landfill materials for chemical laboratory testing and allow assessment of risks with respect to end users; to drill of boreholes around the landfill perimeter for the purposes of installing groundwater monitoring wells to allow measurement of groundwater levels and recovery of water samples for chemical testing and allow up-dating of the conceptual model for the site; to recover samples from the surface water brook (Stansted Brook) and the drain along the northern boundary for chemical testing; and to carry out monitoring and sampling of wells understood to be present at the site.

**SITE DESCRIPTION**
The site is currently part of a Golf Course off Hall Road in Elsenham, Essex CM22 6FL and occupies an area of approximately 5 ha. The topography of the site and its general area has a shallow 10m rise in level towards the north east over approximately 450m. The site is on land which was previously used for sand & gravel extraction (Elsenham Quarry) and later as a landfill. The landfilling operations finished in 1994. The golf course and clubhouse were in operation by 2002. In the surrounding area there is an active landfilling operation to the north and north-east. The land to the south of the development area comprises more of the wider golf course which is on the former Elsenham Quarry land. Further south are open agricultural fields and patches of woodland. To the east are additional fields and to the west is the small town of Elsenham.

**DEVELOPMENT PROPOSAL**
It is understood that the proposals for redevelopment at the site include the construction of a new adventure golf facility, improvements to the driving range and construction of a new lake for sustainable irrigation. The layout is shown on Figure 1. The development will include no excavation but will require importation of approximately 58 000 m3 of clean soils for reprofiling purposes.

**GEOLOGY, HYDROLOGY & HYDROGEOLOGY**
Reference to the British Geological Survey map for the site indicates that the superficial geology includes the Kesgrave Catchment Subgroup in the west of the site and the Kesgrave Sand and Gravel deposits originally beneath most of the site. Head Deposits are anticipated in the south and east of the investigation area.

The underlying bedrock geology is indicated on the geological mapping as Thanet and Lambeth Group beneath the west of the site with London Clay beneath the majority of the landfill. It is understood that the Kesgrave Sand and Gravel deposits were quarried pre-1950s and the site was subsequently used as a landfill site between about 1973 and 1994.

Both the Superficial and Bedrock strata underlying the site are classified as Secondary A aquifers.

The nearest surface water course identified is the drain to the immediate north of the site boundary which feeds into the Stansted Brook to the west.

**FIELDWORK**
The fieldwork included the installation of 5 No. cable tool boreholes BH101, BH102, BH103, BH104 and BH105 with combined groundwater and ground gas monitoring installations. Drilling of 15 No dynamic sampler holes (DS201 to DS 215). Collection of surface water samples from locations SW302 and SW303 and associated ground gas and groundwater monitoring. Note that SW301 (the drain) was dry throughout the fieldworks and subsequent monitoring visits therefore could not be sampled. Attempts were made to sample existing installations. 3 No. were identified but were found to be shallow and dry, hence these were not sampled.

Soil and groundwater samples were collected and sent to a suitably accredited laboratory for chemical testing. Chemical testing included metals & metalloids, speciated PAHs, TPH and BTEX. SVOCs and VOCs testing were also undertaken on selected samples.

**GROUND & GROUNDATER CONDITIONS**
The ground conditions at the site where in general accordance with those anticipated from the geological mapping and the PBA desk study work.

The investigation locations covered two distinct areas geologically. The dynamic sample holes and BH102 covered the former landfill area and the boreholes (BH101, BH 103, BH104 and BH105) covered the surrounding natural strata close to the boundary of the former landfill footprint.

The natural strata included Topsoil overlying the Head Deposits or Kesgrave Catchment Subgroup in turn overlying the Thanet & Lambeth Group.

Over the landfill footprint topsoil overlying a Clay based cap (soft to stiff grey and brown gravelly CLAY - gravel of chalk) was found to overly the main waste mass of the former landfill. The waste mass comprised soft and firm grey, brown and black sandy and gravelly clays with various quantities of brick, concrete, ceramic, plastic, wood, wire, textiles, etc. In BH102 the base liner was encountered at 5.8 m bgl as a firm to stiff slightly gravelly CLAY. The liner was not penetrated - the base of BH102 was plugged with a bentonite seal.

Groundwater was found in all five borehole installations. Groundwater levels were measured and groundwater contour plots were created to provide an indication of groundwater flow at the site.

**CONTAMINATION ASSESSMENT**

The previous desk study identified potential moderate risks to the drain to the north of the site and the Stansted Brook to the west, and a moderate risk to groundwater beneath the site. The desk study concluded that the risks to human health were low.

The soils collected from the boreholes were chemically tested and screened against human health criteria for a public open space (parks) end use. None of the determinands tested for were at concentrations which exceeded the screening values and therefore the site soils present a negligible risk to current or future site users. A double check was undertaken using more stringent screening criteria for a residential without home grown produce end use. There were some exceedences but these were in the deeper waste mass – any current or future users are and will be protected by the landfill cap which is acting as a barrier to exposure. Therefore, risks to users overall is negligible.

Groundwater and surface water samples were collected from boreholes in the natural strata (BH101, BH103, BH104 and BH105) and samples were taken from BH102 (in the waste mass). In addition, samples were taken from the Stansted Brook.

Results of chemical testing showed that he waters tested from the waste mass had some contaminants, but not all, which exceeded the screening criteria used. Consideration of the testing from samples from natural strata and the Stansted Brook showed that the waters were of good quality and were not being impacted by the waste in the former landfill beneath the site.

An assessment of gas concentrations in the wells at the site close to the proposed development suggest characteristic situation 1 for the gas regime for new occupied structures at the site. The monitoring was limited in nature. However, the modernisation proposal does not include any new buildings or extensions with only ornamental structures being placed on the proposed adventure golf area. As such Uttlesford District Council do not require gas protection measures.

**PROPOSED IMPORTED SOILS**

It is recommended that the residential without home grown produce criteria are used as the main soil acceptance criteria for imported clean soils. If any slight exceedences are noted then an additional screen against the POS (Parks) criteria should be used. Exceedences of the POS (Parks) criteria means the import soils will be rejected and not used at the site.

These acceptance criteria and rates of testing should be agreed with the local planning authority as an acceptable quality protocol prior to any import taking place.

**OVERALL**

The site as it currently stands poses a negligible risk to human health currently and will pose a negligible risk to future site users. Similarly, groundwater in the natural strata around the site and surface waters in the nearby Stansted Brook are not being impacted showing that he site is posing a negligible risk to controlled waters.

As such it is recommended that Condition 9 of planning can now be discharged.

# REPORT
# INTRUSIVE INVESTIGATION & ASSESSMENT
# ELSENHAM GOLF & LEISURE

## C O N T E N T S

**EXECUTIVE SUMMARY** ..... **iii**

**1 INTRODUCTION** ..... **1**
1.1 Engagement of Discovery CE Limited ..... 1
1.2 Objectives and Limitations ..... 1
1.3 Sources of Information ..... 4

**2 SITE DESCRIPTION** ..... **5**
2.1 The Site ..... 5
2.2 Surrounding Area ..... 5
2.3 Development Proposal ..... 5

**3 GEOLOGY, HYDROLOGY & HYDROGEOLOGY** ..... **7**
3.1 Geology ..... 7
3.2 Hydrology ..... 7
3.3 Hydrogeology ..... 7

**4 FIELDWORK & LABORATORY TESTING** ..... **8**
4.1 Fieldwork ..... 8
4.2 Chemical Laboratory Testing ..... 9

**5 GROUND AND GROUNDWATER CONDITIONS** ..... **10**
5.1 Ground Conditions and Material Properties ..... 10
5.2 Groundwater Conditions ..... 11

**6 CONTAMINATED LAND ASSESSMENT** ..... **13**
6.1 Legislation and Approach ..... 13
6.2 Conceptual Site Model ..... 15
6.2.1 Sources ..... 16
6.2.2 Receptors ..... 16
6.2.3 Pathways ..... 16
6.3 Generic Human Health Quantitative Risk Assessment ..... 17
6.3.1 Human Health ..... 17
6.3.2 Generic Human Health Assessment Discussion and Conclusions ..... 18
6.4 Generic Controlled Waters Quantitative Risk Assessment ..... 19
6.4.1 Controlled Waters ..... 19
6.5 Generic Controlled Waters Assessment Discussion and Conclusions ..... 20
6.6 Imported Soils Acceptance Criteria ..... 21
6.7 Gas Assessment ..... 21
6.8 Overall Conclusions ..... 22

## T A B L E S

Table 1 Phase 1 Desk Study Key Risk Findings ..... 2
Table 2 Fieldwork Objectives ..... 8
Table 3 Existing Locations ..... 8
Table 4 Summary of Ground Conditions (Natural Strata) ..... 10
Table 5 Summary of Ground Conditions (Landfill Strata) ..... 10
Table 6 Summary of groundwater strikes during fieldworks ..... 11
Table 7 Key Risks Identified in the Phase 1 Desk Study ..... 15
Table 8 Exceedences of the RwoHGP Criteria ..... 18
Table 9 Summary of Gas Monitoring ..... 21
Table 10 Summary of Gas Assessment ..... 22

**REPORT**
**INTRUSIVE INVESTIGATION & ASSESSMENT**
**ELSENHAM GOLF & LEISURE**

## F I G U R E S

Figure 1 Redevelopment Proposal.....6

## P L A T E S

Plate 1 Typical view of "Y".....9
Plate 2 View down "Y" from top.....9

## A P P E N D I C E S

**APPENDIX A - FIGURES**
**APPENDIX B - DRAWINGS**
**APPENDIX C - FIELDWORK METHODOLOGY**
**APPENDIX D - CHEMICAL TEST RESULTS**
**APPENDIX E - EXPLORATORY HOLE LOGS**
**APPENDIX F - MONITORING DATA**
**APPENDIX G - CHEMICAL SCREENING EXERCISE**
**APPENDIX H - CORRESPONDENCE WITH THE ENVIRONMENTAL HEALTH OFFICER**

**REPORT**
**INTRUSIVE INVESTIGATION & ASSESSMENT**
**ELSENHAM GOLF & LEISURE**

# 1 INTRODUCTION

## 1.1 Engagement of Discovery CE Limited

Discovery CE Limited (DCE) was instructed by ELSENHAM GOLF & LEISURE (EGL) to carry out a Ground Investigation at a site known as ELSENHAM GOLF & LEISURE.

The offer to carry out the works is contained in DCE proposal reference: 17090J, dated 29th June 2017. The instruction to proceed with the work was contained in from Jason Seed (12th July 2017) on behalf of EGL.

## 1.2 Objectives and Limitations

Planning conditions have been granted for the site including conditions. Planning conditions 9 to 12 relate to contamination issues. The key objective of the works reported herein is to address Condition 9 only at this stage:

*Condition 9*

*"No development including groundworks shall take place until a site investigation of the extent of contamination has been submitted to and approved in writing by the Local Planning Authority. This investigation must be undertaken by a competent person and be based on the findings of the phase 1 desk study submitted with the application and must include:*

*(i) a survey of the extent, scale and nature of contamination;*
*(ii) a conceptual model of the site indicating sources, pathways and receptors*
*(iii) an assessment of the potential risks to: human health, property (existing or proposed), service lines and pipes, adjoining land, the water environment and ecological receptors.This must include a detailed hydrogeological risk assessment using site-specific groundwater level and quality data to assess the risks to controlled waters, proposed waste inputs and potential leachate expulsion effect to groundwater*.

*Reason: To ensure that the proposed development does not cause harm to human health, the water environment and other receptors in accordance with policies GEN2, ENV12 and ENV14 of the Uttlesford Local Plan (adopted 2005)".*

A Phase 1 desk study and preliminary risk assessment was carried out for the site (Pam Brown Associates). The conceptual site model presented identified the likely presence of contamination within the landfill materials but for end users it identified only a low risk of such contamination having an impact on users of the proposed development/facility. The risks to controlled waters (groundwater and surface water, particularly the drain immediately to the north and the Stansted Brook to the west) was assessed as being moderate and it is this risk that will form the focus of the works undertaken.

Ultimately in the context of the proposed modernisation of the site, Phase 1 report identified the following as being key to understanding the risks at the site:

**Table 1 Phase 1 Desk Study Key Risk Findings**

| |
|---|
| *It is considered there is 'low likelihood' for future site users to be exposed to contamination arising from the landfill via ingestion, inhalation or dermal contact to contaminated dust/soil/materials as it is understood an impermeable clay capping layer was laid across the landfill. This layer will help to limit to a lesser extent infiltration of rainfall and mitigate potential for contaminative leachate generation and vertical migration. It is considered 'likely' for construction workers to be exposed to contamination during any earthworks operations or re-profiling if excavations are made on site, however, this could be limited with the use of adequate protective equipment and by following good working practices.*<br><br>*It is deemed to be 'likely' for the 'drain' and 'Stansted Brook' to be affected by contaminative issues arising on site (if any) via lateral migration as these features are in close proximity to the site at 2m north and 96m west respectively.*<br><br>*It is deemed there is a 'low likelihood' for the Secondary A aquifer to be affected by potential contamination via vertical migration as infiltration will be highly limited by the presence of an impermeable clay capping layer on top of the landfill. This will therefore limit leachate generation and mobilisation of potential contaminants.*<br><br>*It is therefore regarded as a 'Moderate risk' that harm could arise, if contamination has been originated by the materials disposed in both on and off site landfills.* |

In order to meet the objectives, the following key work items were proposed:

1. Confirm the presence of the cover capping across the former landfill (understood to be composed of 1 m of Glacial Clay materials) and recover samples of near surface landfill materials for chemical laboratory testing and allow quantitative assessment of risks with respect to end users;

2. Drilling of boreholes around the landfill perimeter for the purposes of installing groundwater monitoring wells to allow measurement of groundwater levels and recovery of water samples for chemical testing and allow up-dating of the conceptual model for the site;

3. Recover samples from the surface water brook (Stansted Brook) and the drain along the northern boundary for chemical testing; and

4. Carry out monitoring and sampling of wells understood to be present at the site.

More specifically our proposals included the following items.

1. 5 No. cable percussion boreholes. (wherever possible these will be positioned on the site perimeter or outside the development area to avoid penetrating the base of the former landfill waste area);

2. 15 No. dynamic continuous sampling boreholes installed to a depth of between 2 and 3 m bgl;

3. Survey of borehole locations on completion of works;

4. Recovery of 3 No. samples from the drain/brook for chemical testing;

5. Return visit to site on two occasions to monitor gas and groundwater levels and recover samples for chemical testing;

6. Allowance for testing of up to 4 No. samples from existing boreholes if viable;

7. Chemical testing of selected soil and groundwater samples recovered from the exploratory holes. Details of chemical testing will be refined during the fieldwork but is likely to comprise testing for metals, speciated PAH, speciated TPH and locally selected testing for VOC and/or SVOC compounds; and

8. Undertake an assessment of the potential impacts and risks on human health for future users of the proposed development at the site (revise and update the conceptual site model);

9. Undertake an assessment of impacts and risks to controlled waters at and near the site (revise and update the conceptual site model);

10. Assess whether Condition 9 of the planning consent can be discharged as a result of this assessment; and

11. Present recommendations for additional investigation and assessment if necessary.

It should be noted that the clause, Condition 9(iii) refers to "*proposed waste inputs and potential leachate expulsion effect to groundwater*". This usually refers to licensed or permitted waste disposal operations/landfills. It should be noted that the modernisation area boundary submitted under planning is not a landfilling business and will have no waste inputs and no effect on leachate generation. In this regard it should be noted there will be limited upfilling of the site and leachate is at depth. Where the greatest upfilling is proposed (in the area of the proposed sustainable irrigation storage pond/lake) the increase in pore water pressure resulting from the upfilling will result in slight drainage into the unsaturated waste mass (given its composition and relatively high permeability) in

preference to drainage through the very low permeability clay liner. Therefore, the risk of leachate being expelled from the landfill into surrounding natural strata is **LOW**.

Waste disposal operations at the site were finished in 1994. The current Elsenham Golf and Leisure facility was up and running by 2002 by which time the landfill waste licence/permit had been surrendered.

The conclusions and recommendations provided in this report are based on the conditions encountered at the exploratory hole locations and intrusive work has been restricted to the level of detail considered necessary to achieve the stated objectives. The possibility of significant variations occurring between exploratory holes cannot be discounted and additional assessment may be necessary should such variation be revealed subsequent to preparation of this report.

## 1.3 Sources of Information

The following sources of information have been used in the preparation of this report.

Pam Brown Associates, Ref: 1608-16 / AT/ MM, “Phase I Desk Study, Elsenham Golf and Leisure, Bishops Stortford, Essex, CM22 6DH”, August 2016 [**PBA 2016**].

# 2 SITE DESCRIPTION

## 2.1 The Site

The site is currently part of a Golf Course off Hall Road in Elsenham, Essex CM22 6FL and occupies an area of approximately 5 ha. The site location is shown on Site Key Plan A1 in Appendix A.

The topography of the site and its general area has a shallow 10 m rise in level from just south of the existing car park towards the north east (just east of the proposed location of sustainable irrigation pond/lake) over a distance of approximately 450m.

The site is on land which was previously used for sand & gravel extraction (Elsenham Quarry) and later as a landfill. The landfilling operations finished in 1994. The golf course and clubhouse were in operation by 2002.

## 2.2 Surrounding Area

There is an active landfilling operation to the north and north-east of the subject area. The land to the south of the development area comprises more of the wider golf course which is on the former Elsenham Quarry land. Further south are open agricultural fields and patches of woodland. To the east are additional fields and to the west is the small town of Elsenham.

## 2.3 Development Proposal

It is understood that the proposals for redevelopment (modernisation) at the site include the construction of a new adventure golf facility, improvements to the driving range and construction of a new pond/lake for sustainable irrigation. The layout is shown on Figure 1. The development will include no excavation but will require importation of approximately 58 000 $m^3$ of clean soils for reprofiling purposes.

Planning conditions have been granted for the site including in particular conditions 9 to 12 dealing with contamination issues. This proposal aims to address Condition 9 only at this stage:

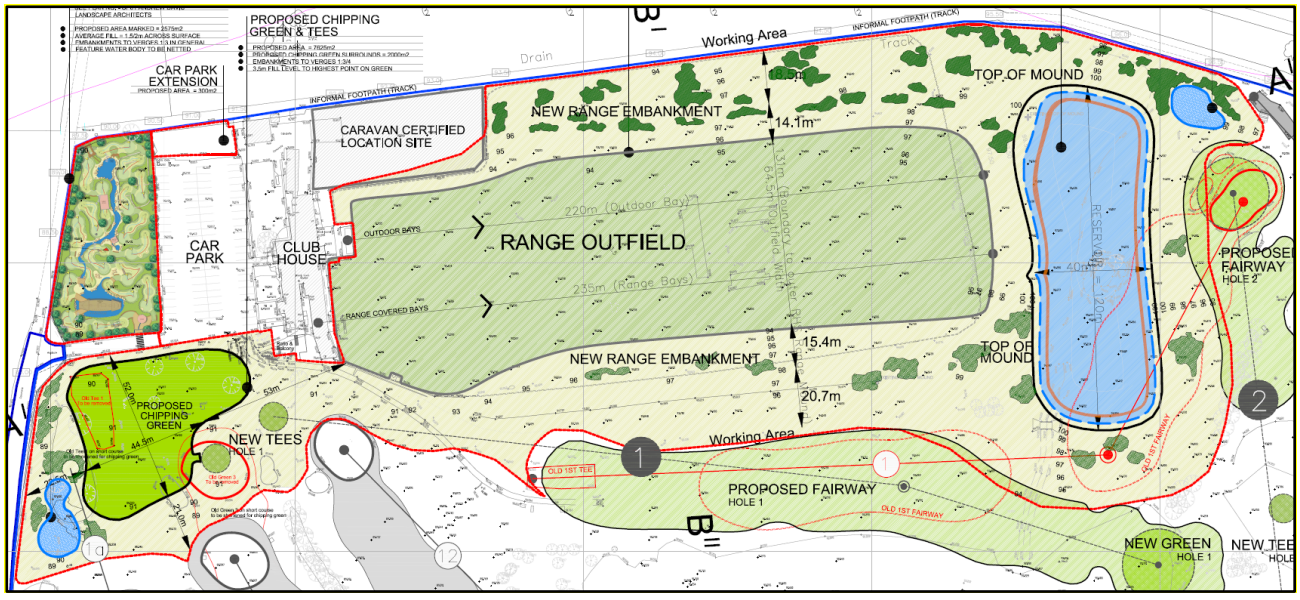
> *"No development including groundworks shall take place until a site investigation of the extent of contamination has been submitted to and approved in writing by the Local Planning Authority. This investigation must be undertaken by a competent person and be based on the findings of the phase 1 desk study submitted with the application and must include:*
> *(i) a survey of the extent, scale and nature of contamination;*
> *(ii) a conceptual model of the site indicating sources, pathways and receptors*
> *(iii) an assessment of the potential risks to: human health, property (existing or proposed), service lines and pipes, adjoining land, the water environment and ecological receptors.This must include a detailed hydrogeological risk assessment using site-specific groundwater level and quality data to assess the risks to*

*controlled waters, proposed* waste inputs and potential leachate expulsion effect to groundwater.

*Reason: To ensure that the proposed development does not cause harm to human health, the water environment and other receptors in accordance with policies GEN2, ENV12 and ENV14 of the Uttlesford Local Plan (adopted 2005)".*

A Phase 1 desk study and preliminary risk assessment has been carried out for the site (Pam Brown Associates). The conceptual site model presented identified the likely presence of contamination within the landfill materials but for end users it identified only a low risk of such contamination having an impact on users of the proposed development/facility. The risks to controlled waters (groundwater and surface water, particularly the drain immediately to the north and the Stansted Brook to the west) was assessed as being moderate and it is this risk that will form the main focus of the proposed investigation work.

**Figure 1 Redevelopment Proposal**



# 3 GEOLOGY, HYDROLOGY & HYDROGEOLOGY

## 3.1 Geology

Reference to the British Geological Survey map for the site indicates that the superficial geology includes the Kesgrave Catchment Subgroup in the west of the site. Kesgrave Sand and Gravel deposits are indicated beneath much of the site and Head Deposits are anticipated in the south and east of the investigation area (note beyond the site boundary).

The underlying bedrock geology is indicated as Thanet and Lambeth Group with London Clay to the south and east.

It is understood that the Kesgrave Sand and Gravel deposits were quarried pre-1950s and the site was subsequently used as a landfill site between about 1973 and 1994.

## 3.2 Hydrology

The nearest surface water course identified is the drain to the immediate north of the site boundary which feeds into the Stansted Brook to the west.

## 3.3 Hydrogeology

Both the Superficial and Bedrock strata underlying the site are classified as Secondary A aquifers. These units are defined as permeable layers capable of supporting water supplies at a local rather than strategic range. In some cases, forming an important source of base flow to rivers. No active groundwater abstraction consents are noted in the area. The site is not within a groundwater source protection zone.

It should be noted that much if not all of the sand and gravel based geology beneath the site will have been removed as part of the Elsenham Quarry workings and so will be absent beneath the site.

# 4 FIELDWORK & LABORATORY TESTING

## 4.1 Fieldwork

The fieldwork was carried out in general accordance with BS5930 (1999) and comprised the following works. The exploratory hole locations are shown in context on DCE drawing 17090J-01 in Appendix B. Details of the fieldworks methodology is presented in Appendix C.

**Table 2 Fieldwork Objectives**

| Works | Objectives |
|---|---|
| Installation of 5 No. cable tool boreholes BH101, BH102, BH103, BH104 and BH105 – all with combined groundwater and ground gas monitoring installations. | To provide soil descriptions to aid the hydrogeological understanding of the site in terms of groundwater levels and flow directions. Also, to allow soils and groundwater sampling for chemical testing. |
| Drilling of 15 No dynamic sampler holes (DS201 to DS 215). | To provide soil descriptions and allow soils sampling of the landfill cap for chemical testing. |
| Collection of surface water samples from locations SW301, SW302 and SW303. | To allow chemical testing in order to ascertain possible impacts from the site. |
| Gas and Groundwater monitoring | Monitoring of boreholes 2 No. rounds to provide data to characterise contaminant status and its variation over time and spatially and allow gas conditions to be characterised. |

Originally there was an intention to monitor and sample from existing installations at the site. Only three existing installations could be found. They were all dry during the investigation works and so no water samples could be collected for testing. The approximate positions of these (labelled as X, Y and Z) are shown on DCE drawing 17090J-01 in Appendix B. The typical construction is shown on Plate 1 & Plate 2.

The height of the pipe in each location was approximately 1.5 m with 200 mm diameter. There were no headworks visible within the pipes concerned and no water present. The dimensions and depths are given in Table 3.

**Table 3 Existing Locations**

| Existing Location | Height of Pipe (m) | Depth From Top Of Pipe (m) | Depth (m bgl) |
|---|---|---|---|
| X | 1.55 | 2.78 | 1.23 |
| Y | 1.52 | 3.80 | 2.28 |
| Z | 1.48 | 3.54 | 2.06 |

**Plate 1** **Typical view of "Y"**

**Plate 2** **View down "Y" from top**

## 4.2 Chemical Laboratory Testing

A total of 38 No. soil and14 No. water samples were analysed as part of this investigation, the results of which are presented in Appendix D.

The chemical testing suite was chosen to be sufficiently broad to cover contaminants which would allow assessments of risks to human health and controlled waters at the site in order to address Condition 9 of the planning application.

The testing included:

Metals & metalloids, speciated PAHs, TPH and BTEX. SVOCs and VOCs testing were also undertaken on selected samples.

# 5 GROUND AND GROUNDWATER CONDITIONS

## 5.1 Ground Conditions and Material Properties

The ground conditions at the site where in general accordance with those anticipated from the geological mapping and the PBA desk study work.

The investigation locations covered two distinct areas geologically. The dynamic sample holes and BH102 covered the former landfill area and the boreholes (BH101, BH 103, BH104 and BH105) covered the surrounding natural strata outside the former landfill footprint.

Therefore, summary ground conditions have been separated in to natural strata (Table 4) and Landfill Strata (Table 5). The detailed descriptions, depths and thicknesses are shown on the detailed logs presented in Appendix E.

**Table 4 Summary of Ground Conditions (Natural Strata)**

| Strata & General Description | Depth Encountered (m bgl) | Thickness Range (m) |
|---|---|---|
| **1 MADE GROUND/TOPSOIL**<br>Turf over brown clayey slightly gravelly SAND or Turf over very soft brown slightly sandy gravelly CLAY. | **Ground Level** | **0.3 to 1.0** |
| **2a KESGRAVE CATCHMENT GROUP**<br>Orangish brown slightly gravelly slightly clayey medium to coarse SAND with occasional rootlets. Gravel is angular to rounded fine to coarse of quartzite and flint.<br><br>Yellow slightly clayey fine to coarse SAND. Also, Yellow fine to medium SAND. | **Absent or 0.3** | **2.8 to 3.9** where present<br><br>Encountered in BH101 & BH105. |
| **2b HEAD DEPOSITS**<br>(Cohesive) Brown, grey and orange-brown slightly sandy and/or gravelly CLAY. Gravel subangular to rounded of fine to coarse quartzite and flint; &<br><br>(Granular) light grey, cream, orange-brown slightly clayey slightly gravelly medium to coarse SAND; Yellow-brown medium to coarse SAND. | **Absent or 0.3** | **2.7to >3** where present<br><br>Encountered in BH103 & BH104. |
| **3 THANET & LAMBETH GROUP**<br>Brown locally orange-brown locally grey CLAY. | **3.0 to 4.0** | **>1.0 to >3.0** |

**Table 5 Summary of Ground Conditions (Landfill Strata)**

| Strata & General Description | Depth Encountered (m bgl) | Thickness Range (m) |
|---|---|---|
| **1 MADE GROUND (TOPSOIL)**<br>Turf over firm locally soft brown, light brown occasionally grey slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded of flint and chalk. Occasional brick fragments. | **Ground level**<br>Absent in DS201 and DS202 | **0.0 to 0.3** |
| **2 MADE GROUND (LANDFILL CAP)**<br>Turf over firm locally soft brown, light brown occasionally grey slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded of flint and chalk. Occasional brick fragments. | **Ground Level to 0.35** | **0.8 to 3.7**<br><br>On average is approximately 1.3 m thick |
| **3 MADE GROUND (LANDFILL WASTE MASS)**<br>Soft occasionally firm grey, occasionally brown reddish-brown dark-grey black slightly sandy slightly gravelly CLAY. Gravel subangular | **0.8 to >4.0** | **>0.2 to 4.2**<br>Waste only fully penetrated in BH102 |

| Strata & General Description | Depth Encountered (m bgl) | Thickness Range (m) |
|---|---|---|
| to subrounded of fine to coarse, brick, concrete, wood, plastic, metal, glass, cardboard, flint and quartzite.<br><br>**In BH102**<br>Very soft black and dark grey very gravelly CLAY. Gravel is angular to rounded fine to coarse of flint, chalk and quartzite. Frequent metal and plastic fragments. Occasional wire and brick. Strong degrading waste odour; and<br><br>Very soft black and dark grey gravelly CLAY. Gravel is angular to rounded fine to coarse of flint, chalk, quartzite, brick and cement. Frequent textiles, wood, metal and plastic fragments. Occasional wire and brick. Strong degrading waste odour. Damp between 4.0 and 5.0 m bgl. (LANDFILL WASTE MASS) | | |
| **4 MADE GROUND (LANDFILL BASE LINER)**<br>Firm to stiff brown locally dark brown slightly gravelly CLAY. Gravel is angular to subrounded of fine to medium chalk and flint. | **5.8**<br>(BH102 only) | **>0.2**<br>(BH102 only) |

## 5.2 Groundwater Conditions

Groundwater was encountered in all the cable tool boreholes at the site. In the case of BH102 leachate was encountered at the bottom of the waste mass of the former landfill. The leachate thickness recorded was less than 0.5 m on both monitoring rounds.

**Table 6 Summary of groundwater strikes during fieldworks**

| Hole Ref | Depth to GW Strike (m bgl) | Depth GW rose to (m bgl) (Rate) | Strata |
|---|---|---|---|
| BH101 | 5 | 2.7 (20 minutes) | THANET & LAMBETH GROUP |
| BH102 | DRY/DAMP | DRY/DAMP | Waste Mass |
| BH103 | DRY | NR | HEAD DEPOSITS |
| BH104 | 4 | 3.4 (20 minutes) | THANET & LAMBETH GROUP |
| BH105 | 3.8 | 3.1 | KESGRAVE CATCHMENT SUBGROUP |

Groundwater monitoring wells were installed in all the cable percussive boreholes.

Two return groundwater and ground gas monitoring and sampling visits were carried out on 16th August 2017 and 24th August 2017. In addition, surface water samples were taken from the Stansted Brook. It should be noted that he ditch/drain at the northern edge of the site was dry throughout the investigation and during the subsequent visits.

Anecdotally the site owner has never witnessed water in the ditch. DCE staff followed the ditch from the site to its confluence with the Stansted Brook in the west. Its full length from the site to the confluence was dry. Therefore, water could not be samples from the ditch – although samples were taken from its confluence with the Stansted Brook (SW302).

The groundwater elevations from the two monitoring rounds have been plotted as groundwater surface contours which are presented in DCE Drawing 17090J-02, in Appendix B. The contours were based on groundwater level monitoring data presented in Appendix F.

It was noted that with the exception of BH102, the water bearing granular layers appeared to form a single groundwater unit. These were used in plotting the groundwater contours.

The groundwater flow direction is shown generally to be from the east (or east-north-east) to the west (or west-south-west).

# 6 CONTAMINATED LAND ASSESSMENT

## 6.1 Legislation and Approach

Contaminated Land is defined in Part 2A of the Environmental Protection Act 1990 as "any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or

(b) pollution of controlled waters is being, or is likely to be, caused".

It should be noted that under the Water Act 2003, part (b) of the above definition is to be amended to also include the word "significant".

Land contamination and its risk to human health is a material consideration under the planning regime as it applies to the intended use of a site which requires that risk assessment for planning purposes should be consistent with the requirements under Part 2A and that as a minimum, after carrying out the development and commencement of its use, the land should not be capable of being determined as Contaminated Land under Part 2A of the EPA 1990.

The National Planning Policy Framework (NPPF - 2012) puts the onus on local planning authorities to develop their own guidance and processes for dealing with potentially contaminated land under planning.

The key paragraphs from NPPF - 2012 relating to planning and dealing with land contamination are listed below.

120. To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.

121. Planning policies and decisions should also ensure that:
- the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;
- after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and
- adequate site investigation information, prepared by a competent person, is presented.

| | |
|---|---|
| 122. | In doing so, local planning authorities should focus on whether the development itself is an acceptable use of the land, and the impact of the use, rather than the control of processes or emissions themselves where these are subject to approval under pollution control regimes. Local planning authorities should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities. |

Therefore, early engagement with the local authority and their environmental health/pollution control staff is advised.

A risk based approached is taken in the assessment of contaminated land which takes account of the proposed (or existing) use of a site. The key stages are as follows:

1. **Development of a Site Conceptual Model –** This is key to the establishment of viable pollutant linkages from a hazardous source (e.g. hydrocarbon contamination) to a sensitive receptor (e.g. a river) through a viable pathway (e.g., groundwater flow) which allows the hazard to reach the receptor. On some occasions the lack of a viable pollutant linkage will result in no further assessment being necessary

2. **Generic Quantitative Risk Assessment –** This comprises a screening exercise comparing measured chemical data against published data which are based on numerous assumptions regarding the nature of the source, pathway and receptor which are valid or err on the side of safety for the current site in question. Typically for human health risk assessment this involves comparing chemical data with published Generic Assessment Criteria. For controlled waters assessment this typically comprises the direct comparison of chemical tests on leachate or groundwater with Environmental Quality Standards (EQS) or other suitable assessment criteria.

3. **Detailed Quantitative Risk Assessment –** Should contaminants of concern be present at the site at concentrations exceeding the Generic Assessment Criteria, further detailed quantitative assessment can be carried out which accounts for the specific exposure conditions at the site (with respect to human health assessment) or models the degradation, dilution and attenuation of contaminants during transport from source to receptors.

4. **Risk Evaluation –** The final stage in the process is to appraise the findings of the Risk Assessment and determine the need or otherwise for additional assessment or remediation.

## 6.2 Conceptual Site Model

The Phase 1 Desk Study [PBA 2016] included the development of a conceptual site model (CSM) and an associated preliminary assessment of risks. The key risk linkages for the proposed modernisation works are summarised in Table 7 below.

**Table 7 Key Risks Identified in the Phase 1 Desk Study**

| SOURCE | PATHWAY | RECEPTOR | RISK RATING |
|---|---|---|---|
| Contamination within landfill materials | Ingestion<br>Inhalation<br>Dermal Exposure | Future users of the proposed development/facility | **LOW** |
| Contamination within landfill materials | Lateral migration in leachate | Drain to the north & Stansted Brook to the west. | **MODERATE** |
| Contamination within landfill materials | Lateral migration in leachate | Groundwater | **MODERATE** |

The site geology, landfill and groundwater interactions are shown schematically on DCE drawing 17090J-03 in Appendix B. The landfill void was created through the quarrying of sands from the ground. The void was then progressively filled with wastes and eventually capped. The proposed development and modernisation area covers only part of the former landfill.

Key factors of note are:

- Groundwater in the Kesgrave strata is in continuity with groundwater in the granular Head Deposits;
- Groundwater flow is generally from east to west with an approximate gradient of 0.008 towards the Stansted Brook; and
- The Lambeth Group to the west and the London Clay to the east beneath the Kesgrave strata acting as an effective aquiclude.

It should be noted that the landfill, during its operation, was designed and used as a containment landfill with clay based liners in each waste cell with a final clay cap put in place.

The intrusive works were designed to determine the concentration of potential contaminants in near surface soils and whether they may impact future users and to determine whether the quality of groundwater and water in the ditch to the north and the Stansted Brook to the west outside the former landfill waste mass are being impacted.

### 6.2.1 Sources

From the Phase 1 Desk Study, it was considered that the infill materials of the landfill constituted the primary potential source of contamination at the site. Similarly, other landfill activities which took place to the north of the site, were considered to potentially contribute to site contamination. It was considered that contamination at the subject site would likely include: metals and metalloids, asbestos, chlorinated aliphatic and aromatic hydrocarbons, oil/fuel hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), VOCs, SVOCs, etc.

Currently, the site is used for recreational purposes as a golf course with an associated clubhouse, which are all situated on top of the former landfill cap. The potential harm that could arise to sensitive receptors from contaminants originated by the current site use as a golf course and driving range was considered to be '**MINOR**'.

### 6.2.2 Receptors

The site will be redeveloped to produce new surface levels for the driving range, an adventure golf area and extension t othe existing car park. Potential receptors identified during through the desk study and ground investigation included:

Human Health;

1. Current and future site users;
2. Site development and maintenance workers;

In terms of the human receptors the current and future site users were identified as the most sensitive.

Environmental;

3. Groundwater directly beneath the site; and
4. The drain to the north and Stansted Brook to the west.

### 6.2.3 Pathways

The following pathways have been identified and are considered viable for the site

Human Health;

1. Ingestion;

2. Inhalation;

3. Direct skin exposure (dermal contact);

Environmental;

4. On-site vertical leaching of contaminants to shallow groundwater; and

5. Lateral migration of impacted groundwater towards the ditch to the north and/or the Stansted Brook to the west.

The presence of the impermeable landfill cap will restrict infiltration into the former landfill materials, therefore limiting movement of contamination into deeper strata. It should be noted that the proposed import of clean greenfield soils to reprofile the ground will actually thicken the cap slightly, thus restricting infiltration further.

Similarly, the existing cap will act as an effective barrier for human exposure to the contamination (in the waste mass of the former landfill). The proposed soil import will thicken the cap, further restricting any exposure pathway for human health.

The base of the former landfill is lined which will also limit migration of contamination into deeper natural strata/groundwater.

## 6.3 Generic Human Health Quantitative Risk Assessment

### 6.3.1 Human Health

The results of the chemical testing on soils were compared with published Generic Assessment Criteria (GAC) as an initial screen to determine if more detailed assessment is required. For the current assessment screening criteria for public open space - parks (POS) at 1 % soil organic matter content was used and considered protective of future users of the site. As a double check and to add a greater level of conservatism a screen of the data against residential without homegrown produce (RwoHGP) end-use at 1% SOM was also undertaken.

It should be noted that screening criteria (S4UL) were generated to represent a level at which there is negligible risk for threshold substances and minimal risk for non-threshold substances.

Full details of the screening exercise are presented in Appendix G.

None of the results exceeded their relevant POS screening criteria.

None of the results exceeded their relevant RwoHGP screening criteria except for the following.

**Table 8 Exceedences of the RwoHGP Criteria**

| Sample Location | Determinand | Concentration | Screening Criterion | Units |
|---|---|---|---|---|
| BH102 at 4 m bgl | Lead | 530 | 310 | mg/kg |
| DS201 at 2 m bgl | Lead | 480 | 310 | mg/kg |
| DS209 at 1.4 m bgl | Lead | 640 | 310 | mg/kg |
| DS210 at 1.6 m bgl | Lead | 500 | 310 | mg/kg |
| DS214 at 0.9 m bgl | Lead | 450 | 310 | mg/kg |
| BH102 at 4 m bgl | Methyl Naphthalene | 2.9 | 2.3 | mg/kg |
| BH102 at 4 m bgl | TPH (C10 - C20) | 510 | 27 | mg/kg |
| BH102 at 4 m bgl | TPH (C20 - C30) | 640 | 27 | mg/kg |
| BH102 at 4 m bgl | TPH (C30 - C40) | 280 | 27 | mg/kg |

LEAD

It should be noted that the lead exceedences are all from samples taken from below the landfill cap and are therefore from the waste mass beneath. All other shallow lead concentrations from within the cap itself did not exceed the screening criterion. As such the cap is acting as an effective barrier to human exposure and therefore the risk to human health from lead at the site is negligible.

METHYL NAPHTHALENE

The recorded exceedence for methyl naphthalene is slight and deep within the underlying waste mass. As such the cap is acting as an effective barrier to human exposure and therefore the risk to human health from methyl naphthalene at the site is negligible.

TPH (C10 - C20), TPH (C20 – C30) & TPH (C30 – C40)

The recorded exceedences for TPH (C10 - C20), TPH (C20 – C30) & TPH (C30 – C40) is a result of using a much overly stringent surrogate screening criterion for these TPH band. As such it should be noted that these exceedences were for soils deep within the underlying waste mass. As such the cap is acting as an effective barrier to human exposure and therefore the risk to human health from TPH (C10 - C20), TPH (C20 – C30) & TPH (C30 – C40) at the site is negligible.

### 6.3.2 Generic Human Health Assessment Discussion and Conclusions

Based on all the soils testing data from boreholes and shallow dynamic sample holes at the site the risk to human health for the proposed end use is **NEGLIGIBLE**. No specific remediation or risk mitigation measures are required for the site.

The landfill cap is acting as an effective barrier to human exposure to the waste mass materials and therefore any risks are mitigated.

It should be noted that the modernisation proposal requires the import of clean natural soils to re-profile the site. No cut operations will be undertaken and the current cap will not be damaged and will remain intact at all times.

## 6.4 Generic Controlled Waters Quantitative Risk Assessment

As stated previously the site geology, landfill and groundwater interactions are shown schematically on DCE drawing 17090J-03 in Appendix B.

Key factors of note are:

- Groundwater in the Kesgrave strata is in continuity with groundwater in the granular Head Deposits;
- Groundwater flow is generally from east to west with a gradient of approximately 0.008 towards the Stansted Brook; and
- The Lambeth Group to the west and the London Clay to the east beneath the Kesgrave strata acting as an effective aquiclude.

### 6.4.1 Controlled Waters

The results of the chemical testing on groundwater and surface water samples were compared with published Environmental Quality Standards (EQS) or UK Drinking Water Standards (DWS) as an initial screen to determine if more detailed assessment is required. Full details of the screening exercise are presented in Appendix G. None of the contaminants exceeded their relevant screening criteria with the exception of the following.

| Location | Date | Determinand | Value | Screen | Unit |
|---|---|---|---|---|---|
| **FIRST ROUND** | | | | | |
| BH101 | 16/08/2017 | Selenium | 20 | 10 | µg/l |
| BH102 | 16/08/2017 | Acenaphthene | 1.24 | 0.1 | µg/l |
| BH102 | 16/08/2017 | Fluorene | 0.61 | 0.1 | µg/l |
| BH102 | 16/08/2017 | Phenanthrene | 0.76 | 0.1 | µg/l |
| BH102 | 16/08/2017 | Anthracene | 0.28 | 0.1 | µg/l |
| BH102 | 16/08/2017 | Fluoranthene | 0.26 | 0.1 | µg/l |
| BH102 | 16/08/2017 | Pyrene | 0.34 | 0.1 | µg/l |
| BH102 | 16/08/2017 | Boron | 2400 | 2000 | µg/l |
| BH102 | 16/08/2017 | Chromium | 10 | 5 | µg/l |
| BH102 | 16/08/2017 | Lead | 10 | 4 | µg/l |
| BH102 | 16/08/2017 | Nickel | 66 | 50 | µg/l |
| BH102 | 16/08/2017 | Selenium | 14 | 10 | µg/l |
| BH102 | 16/08/2017 | Ethylbenzene | 487 | 300 | µg/l |
| BH102 | 16/08/2017 | p & m-xylene | 941 | 30 | µg/l |
| BH102 | 16/08/2017 | o-xylene | 260 | 30 | µg/l |
| BH102 | 16/08/2017 | TPH-CWG - Aromatic >C7 - C8 | 360 | 10 | µg/l |
| BH102 | 16/08/2017 | TPH-CWG - Aromatic >C8 - C10 | 1700 | 10 | µg/l |
| BH102 | 16/08/2017 | Ethylbenzene | 487 | 300 | µg/l |
| BH102 | 16/08/2017 | p & m-Xylene | 941 | 30 | µg/l |
| BH102 | 16/08/2017 | o-Xylene | 260 | 30 | µg/l |

| Location | Date | Determinand | Value | Screen | Unit |
|---|---|---|---|---|---|
| BH104 | 16/08/2017 | Selenium | 28 | 10 | µg/l |
| **SECOND ROUND** | | | | | |
| BH102 | 24/08/2017 | Acenaphthylene | 0.13 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Acenaphthene | 1.15 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Fluorene | 0.69 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Phenanthrene | 1.66 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Anthracene | 0.25 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Fluoranthene | 0.83 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Pyrene | 0.78 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Benzo(a)anthracene | 0.4 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Chrysene | 0.33 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Benzo(b)fluoranthene | 0.22 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Benzo(a)pyrene | 0.13 | 0.01 | µg/l |
| BH102 | 24/08/2017 | Boron | 2500 | 2000 | µg/l |
| BH102 | 24/08/2017 | Chromium | 6.3 | 5 | µg/l |
| BH102 | 24/08/2017 | Lead | 14 | 4 | µg/l |
| BH102 | 24/08/2017 | p & m-xylene | 780 | 30 | µg/l |
| BH102 | 24/08/2017 | o-xylene | 106 | 30 | µg/l |
| BH102 | 24/08/2017 | TPH-CWG - Aromatic >C7 - C8 | 310 | 10 | µg/l |
| BH102 | 24/08/2017 | TPH-CWG - Aromatic >C8 - C10 | 1100 | 10 | µg/l |
| BH102 | 24/08/2017 | Trichlorofluoromethane | 17.7 | 12 | µg/l |
| BH102 | 24/08/2017 | p & m-Xylene | 780 | 30 | µg/l |
| BH102 | 24/08/2017 | o-Xylene | 106 | 30 | µg/l |

Exceedences were noted predominantly in samples from BH102 which was situated in the waste mass. This is as expected as the groundwater with the waste mass will be essentially landfill leachate.

During the first-round slight exceedences for selenium were noted in BH101, BH102 and BH104. These were not repeated in the second round. It should be noted that screening criterion available for selenium is the drinking water standard and there are no groundwater abstractions for drinking purposes near the site as gleaned from the Phase 1 Desk Study.

None of the surface water samples yielded any exceedences of any of the contaminants from either round.

## 6.5 Generic Controlled Waters Assessment Discussion and Conclusions

From Section 5.2, the direction of flow of groundwater is likely from east to west or east-north-east to west-south-west.

The worst exceedences of the groundwater quality screening criteria were in samples taken from BH102 in the waste mass of the former landfill. If the waters in the landfill waste mass were in continuity with the surrounding groundwater and surface waters similar contamination would have been identified. In fact, the concentration of most determinands from the other locations (BH101, BH103, BH104, BH105, SW302 and SW303) were either at the laboratory reporting limits or at concentrations which were less than the screening criteria.

The landfill cap is acting as an effective barrier to infiltration to the waste mass materials. Also, the landfill liner appears to be intact (BH102) and therefore any risks to controlled waters are being mitigated.

It is evident, that the site is having no measurable effect on controlled waters around the site. Therefore, risks to controlled waters from materials in the ground at the site (soils, groundwater and leachate) are **LOW** and no risk mitigation or remediation is necessary.

It should be noted that the modernisation proposal requires the import of clean natural soils to re-profile the site. No cut operations will be undertaken and the current cap will not be damaged and will remain intact at all times. This will mean that there will be no increase in any infiltration through the existing cap and that no additional pollutant load will be added by importing the clean soils.

## 6.6 Imported Soils Acceptance Criteria

It is recommended that the RwoHGP criteria are used as the main soil acceptance criteria for imported clean soils. If any slight exceedences are noted then an additional screen against the POS (Parks) criteria should be used. Exceedences of the POS (Parks) criteria means the import soils will be rejected and not used at the site.

These acceptance criteria and rates of testing should be agreed with the local planning authority as an acceptable quality protocol prior to any import taking place.

## 6.7 Gas Assessment

A ground gas assessment has been undertaken to assess likely risks associated with carbon dioxide and methane to new buildings and their users. 2 No. gas monitoring visits were undertaken on 16th August 2017 and 24th August 2017.

Atmospheric pressures recorded over the duration the monitoring visits were recorded to range between 1007 mb and 1014 mb. The results of the gas monitoring are summarised in Table 9 below and full details are presented in Appendix F.

**Table 9 Summary of Gas Monitoring**

| .Well | Range of Measurements Recorded | | | |
|---|---|---|---|---|
| | **Methane ($CH_4$) % v/v** | **Carbon Dioxide ($CO_2$) % v/v** | **Oxygen ($O_2$) %v/v** | **Flow Rate l/hr** |
| **BH101** | 0.0 | 1.2 to 1.4 | 19.4 to 19.5 | 0 |
| **BH102** | 39.5 to 40.0 | 24.1 to 25.7 | 3.6 to 3.9 | 0 |
| **BH103** | 0.0 | 0.7 to 2.2 | 18.2 to 18.9 | 0 |
| **BH104** | 0.0 | 0.4 to 0.6 | 20.4 to 21 | 0 |
| **BH105** | 0.0 | 1.9 to 2.7 | 18.5 to 18.6 | 0 |

Interpretation of gas monitoring has been carried out in accordance with the recommendations contained within CIRIA 665 (2007) '*Assessing risks posed by hazardous ground gases to buildings*'. This guidance includes the calculation of volumetric flow rates of ground based on maximum recorded gas concentrations and maximum recorded gas flow rates. Limiting factors are applied to the gas monitoring results and a characteristic situation is then applied to the site. The worst case volumetric flow rates are presented in Table 10 below.

**Table 10 Summary of Gas Assessment**

| Well | Maximum $CH_4$ %v/v | Maximum $CO_2$ %v/v | Maximum Flow Rate (l/hr) | Volumetric Flow Rate (l/hr) |
|---|---|---|---|---|
| **BH102** | 40 | 25.7 | 0.1* | 0.04 ($CH_4$)<br>0.026 ($CO_2$) |

* Actual maximum flow rate recorded was 0.0 l/hr. Accuracy of monitoring equipment is to +/- 0.1 l/hr

The gas monitoring indicates that the site may be classified as Characteristic Situation 1 using a modified Wilson and Card classification scheme defined in CIRIA C665. The guidance suggests that if methane and/or carbon dioxide concentrations or greater than 1% and 5% respectively that a higher rating should be considered. Similarly, if the number of monitoring rounds is fewer than the guidance recommends then the rating should be increased.

Gas protection has been discussed with Building Control and the Environmental Health Officer at Uttlesford District Council. A record of the conversation with the Environment Health Officer is provided in Appendix H. In summary, it was agreed that all build work at the proposed modernisation was ornamental with no, human occupied structures being put on the site. As such there will not be a receptor (building or building extension) nor will there be a viable pathway through the clay cap of the former landfill. It was agreed that no gas protection measures are necessary for the current modernisation proposal.

## 6.8 Overall Conclusions

The site as it currently stands poses a negligible risk to human health currently and will pose a negligible risk to future site users. Similarly, groundwater in the natural strata around the site and surface waters in the nearby Stansted Brook are not being impacted showing that the site is posing

a negligible risk to controlled waters. As such it is recommended that Condition 9 of planning can now be discharged.

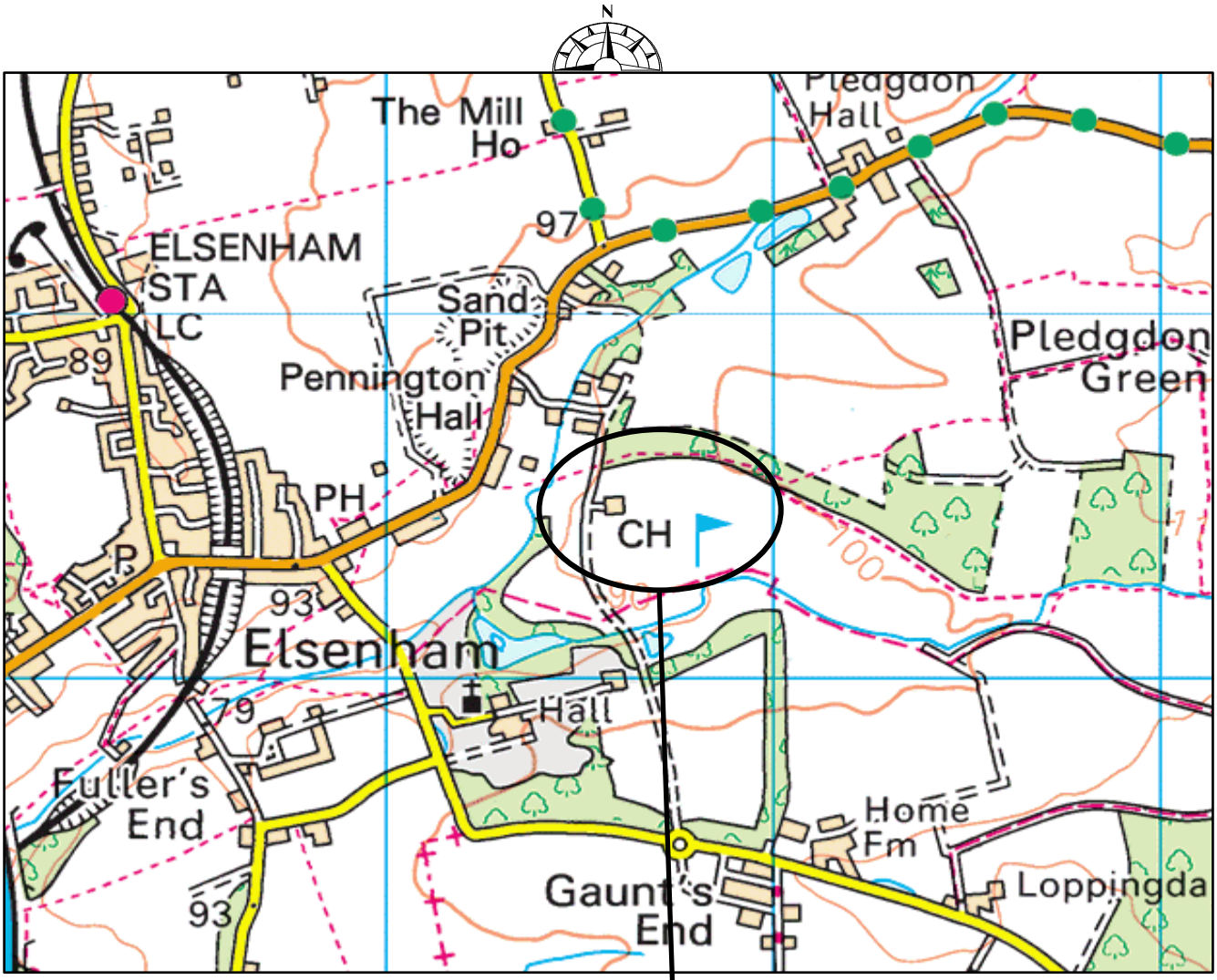
For **Discovery CE Limited**

James D Nelson
BSc (Hons) MSc CSci CChem FRSC SiLC
Associate

Cathal Gillespie
BEng (Hons) MSc (Eng)
Director

# APPENDIX A - FIGURES

| | | |
|---|---|---|
| **Discovery** Geotechnical & Environmental Engineers<br>The Granary, Broadwell House Farm<br>Broadwell, Rugby CV238HF<br>www.dce-services.co.uk | **Project** SITE DEVELOPMENT & MODERNISATION ELSENHAM GOLF & LEISURE<br>**Title** KEY PLAN<br>**Client** ELSENHAM GOLF & LEISURE | **Project Number** 15038J<br>**Sheet No** 1 of 1<br>**Date** 10/08/2017 |

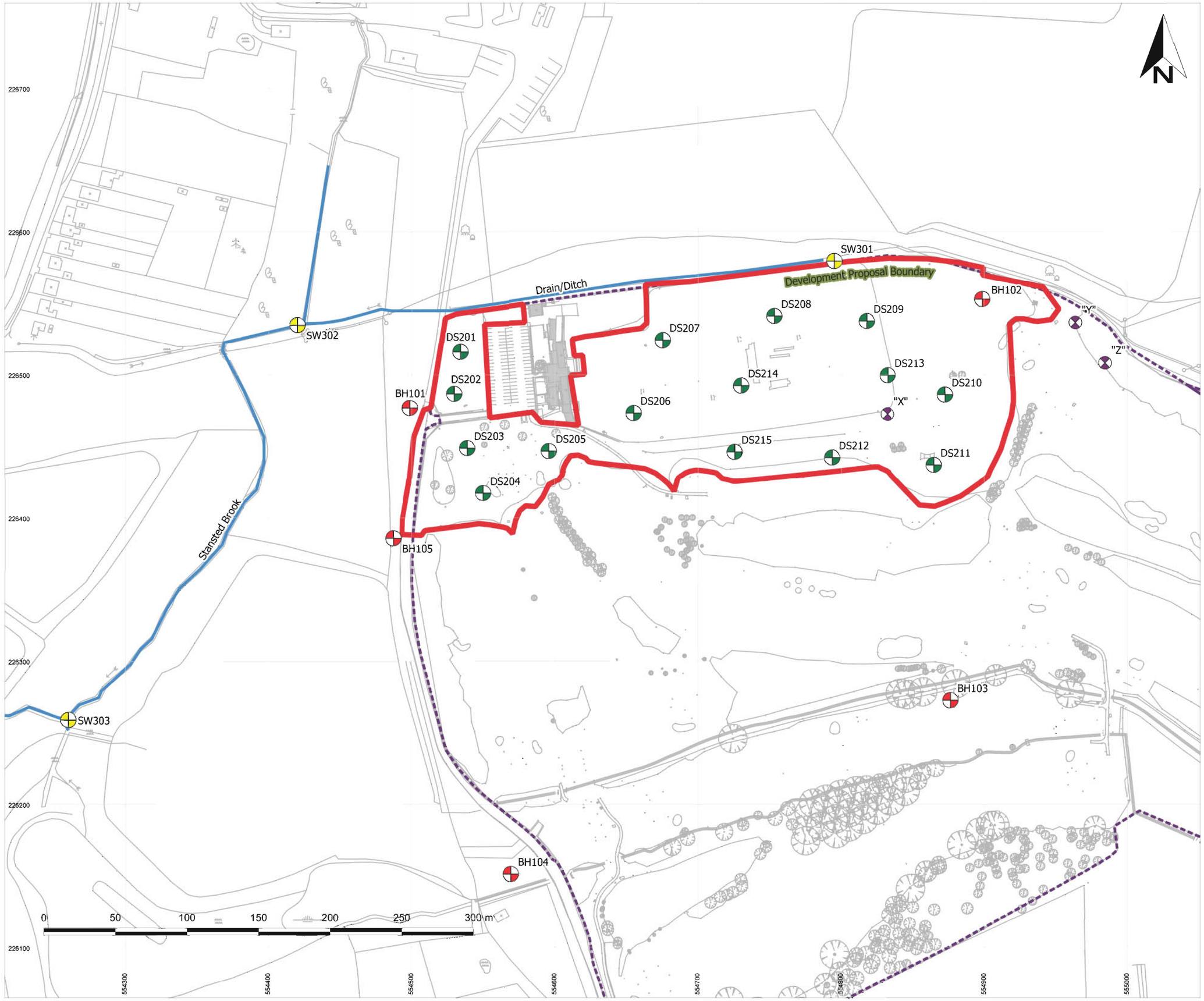



**Notes**

Reproduced from the Ordnance Survey 1:50,000 scale Landranger with the permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office,
© Crown Copyright, Discovery CE Limited, Licence No. 100044548.

**Figure** **A1**

# APPENDIX B - DRAWINGS




General Notes

Based on original Drawing from:
EDWARDS DESIGN INTERNATIONAL
DWG No. : 03.02-3.2
Date: 24/03/2016

Legend to Symbols

Exploratory Locations

- Cable Percussion Borehole
- Dynamic Sampler Borehole
- Surface Water Sample
- Existing Location
- Development Area Boundary (Planning)
- Brook & Ditch
- Elsenham Golf & Leisure Boundary

Title: EXPLORATORY LOCATIONS

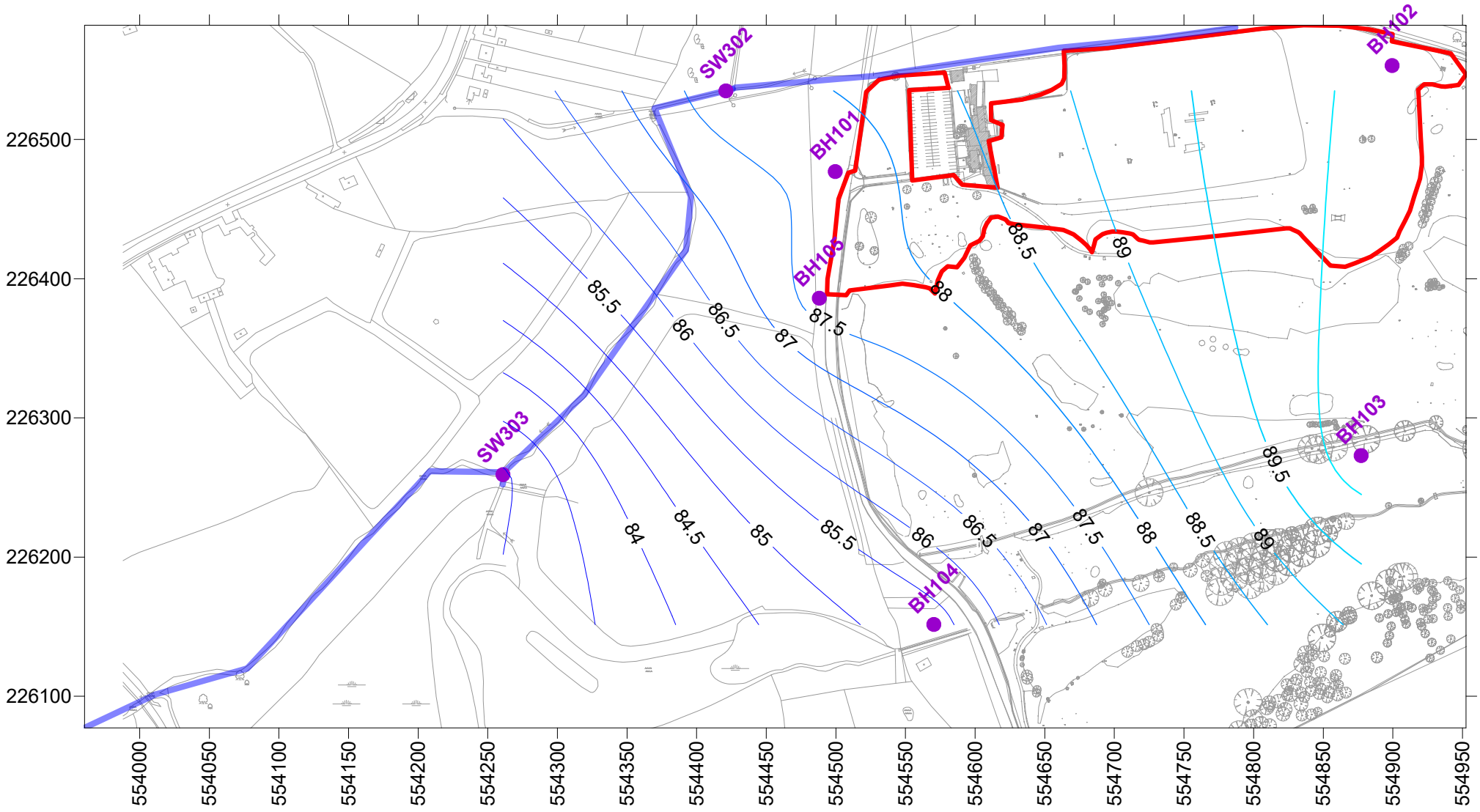
Site: ELSENHAM GOLF & LEISURE MODERNISATION WORKS

Client: ELSENHAM GOLF & LEISURE

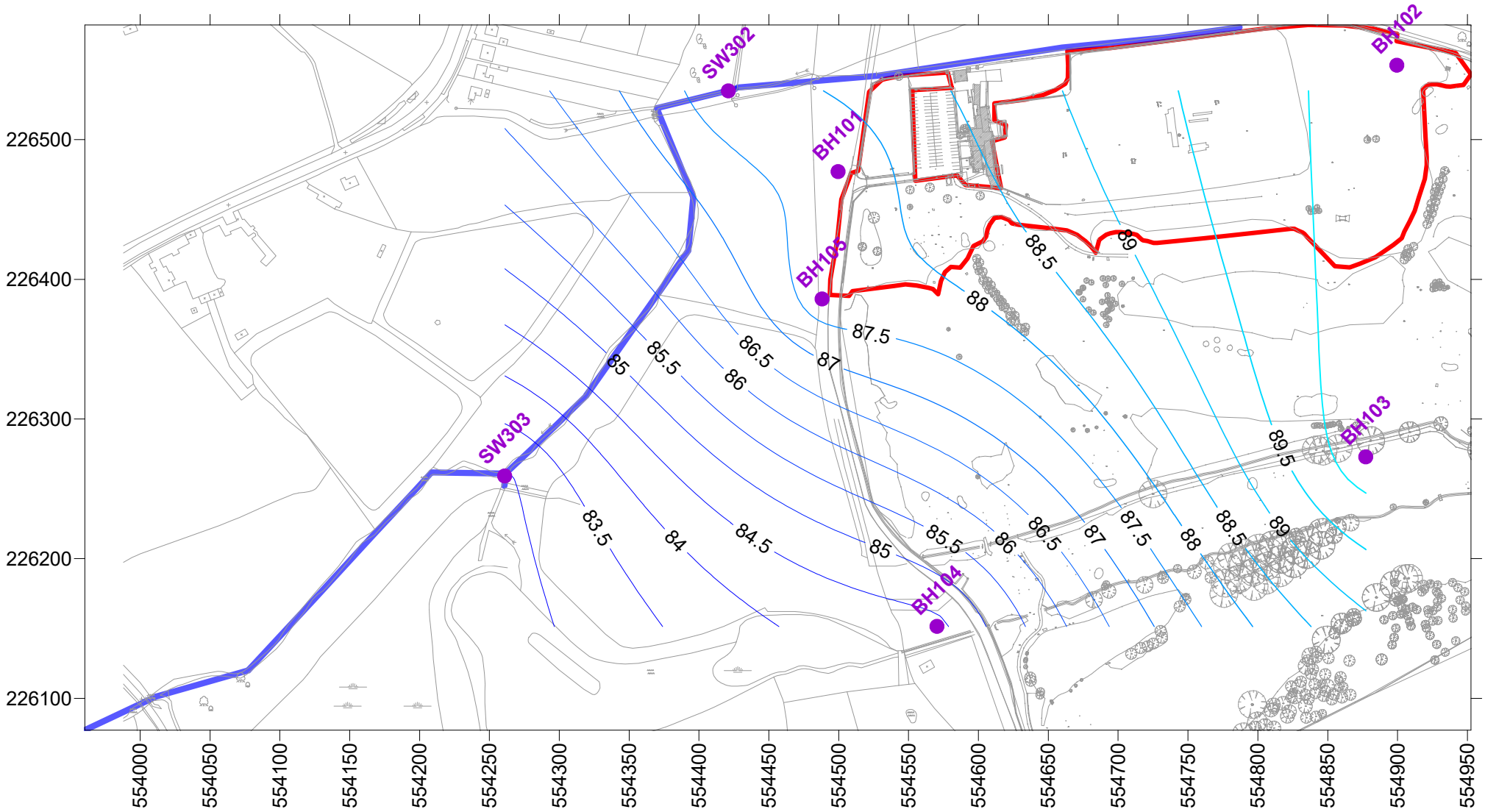
Discovery
Geotechnical & Environmental Engineers

| Date: | Drawing No.: | Scale: |
|---|---|---|
| 04/10/2017 | 17090J-01 | 1:2,500 |
| Drawn By: | Checked By: | Sheet Size: |
| JDN | CG | A3 |

## Groundwater Contours 16-08-2017
## (All Surface Water Levels & Boreholes except BH102)




## Groundwater Contours 24-08-2017
## (All Surface Water Levels & Boreholes except BH102)

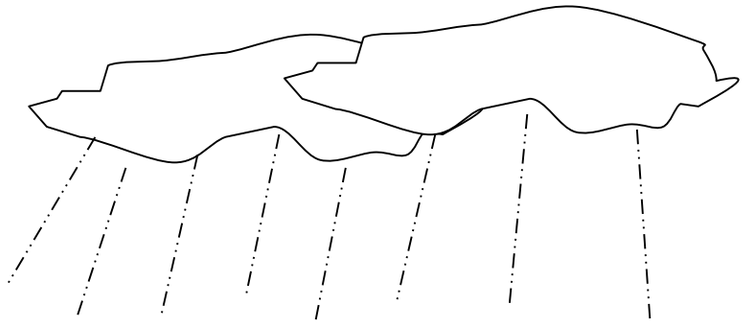


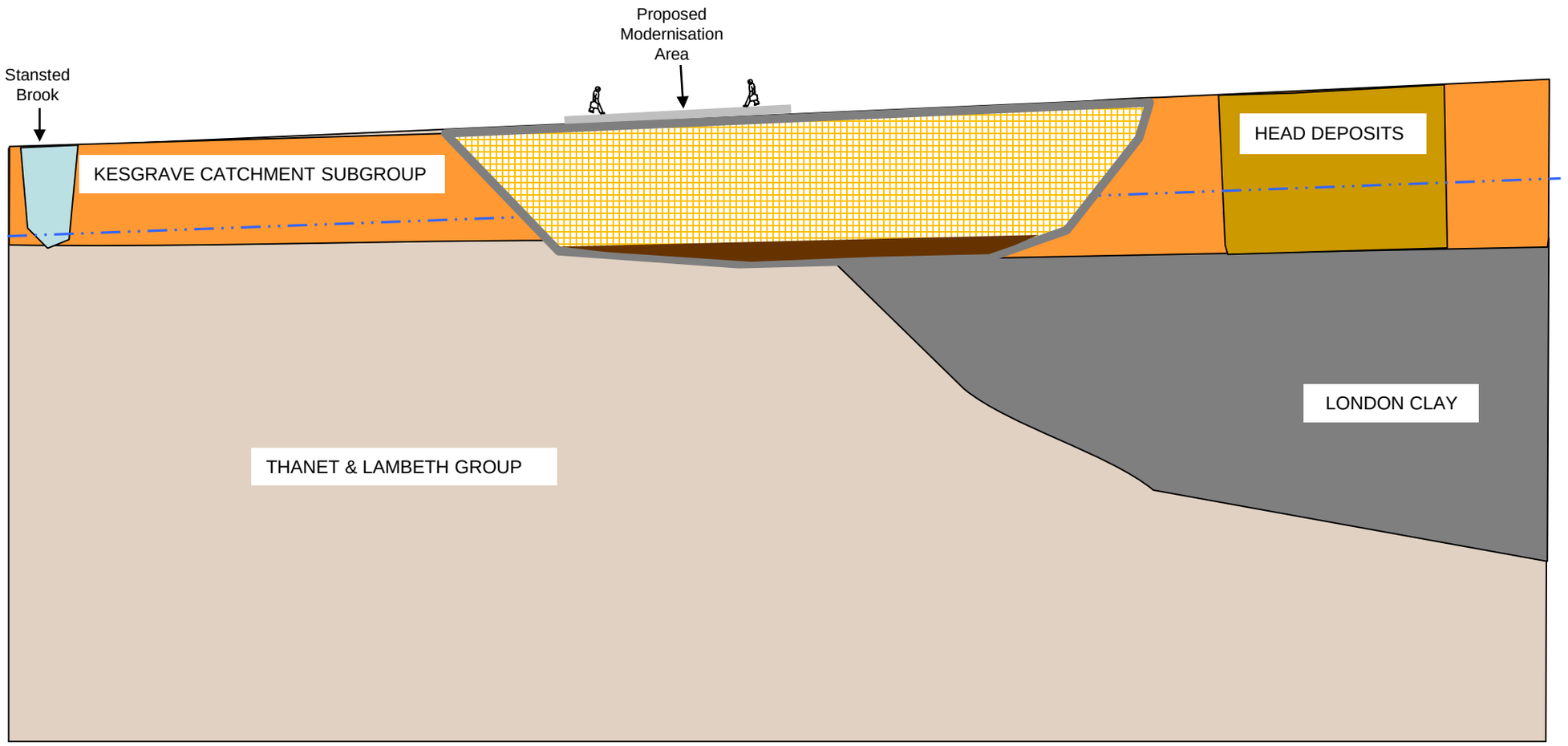

**COMMENTS:**

| | | | |
|---|---|---|---|
| **Title:** Estimated Groundwater Contours | | Discovery Geotechnical & Environmental Engineers | |
| **Project:** ELSENHAM GOLF & LEISURE | **Date:** 04/10/2017 | **Drawing No.:** 17090J-02 | **Scale:** Not To Scale |
| **Client:** ELSENHAM GOLF & LEISURE | **Drawn By:** JDN | **Checked By:** CG | **Sheet Size:** A3 |

NORTH-WEST

SOUTH-EAST






**General Notes**

Vertical scale has been exaggerated to allow visualisation of the subsurface.

**Legend**

- Capped & lined landfill waste mass (leachate dark brown)
- THANET SAND & LAMBETH GROUP
- HEAD DEPOSITS
- LONDON CLAY
- KESGRAVE CATCHMENT SUBGROUP
- Existing Groundwater Level

| Revision | Description |
|---|---|
| | |

**Title** CONCEPTUAL SITE MODEL SCHEMATIC (GROUNDWATER)

**Project**
ELSENHAM GOLF & LEISURE MODERNISATION

**Client**
ELSENHAM GOLF & LEISURE

Discovery
Geotechnical & Environmental Engineers

| Date | Drawing No. | Scale. |
|---|---|---|
| 17/10/2017 | 17090J-03 | NTS |

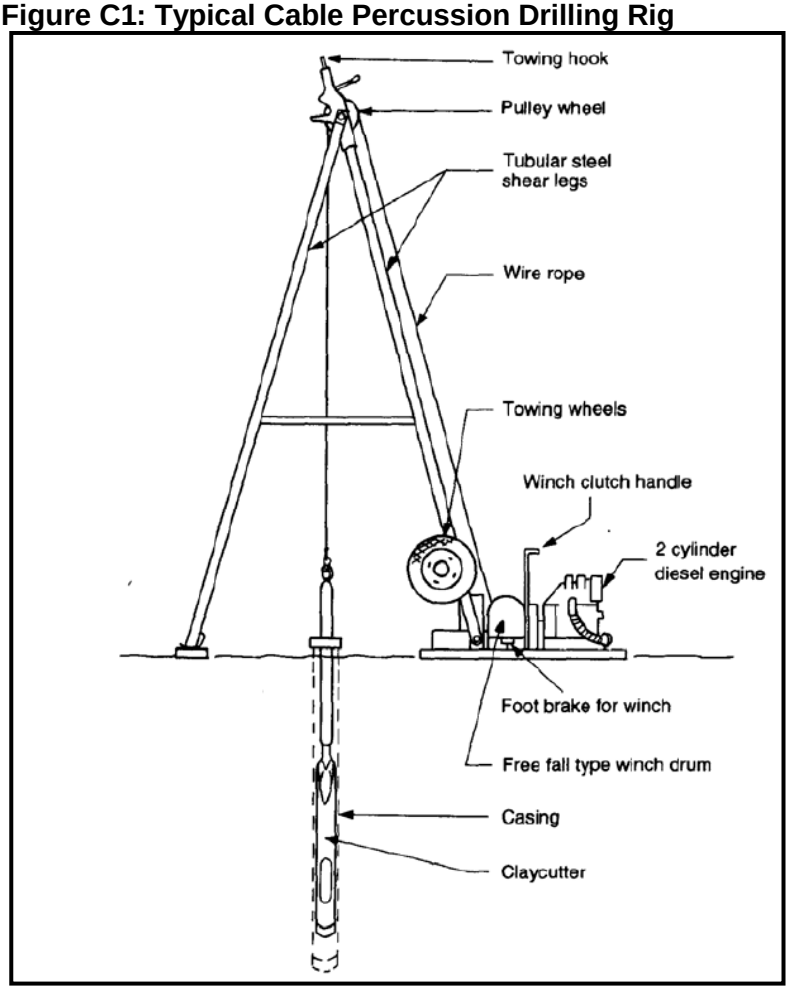
| Drawn By | Checked By | Sheet Size |
|---|---|---|
| JDN | CG | A3 |

# APPENDIX C - FIELDWORK METHODOLOGY

## Cable Percussion Boreholes

If carried out, cable percussion boreholes were put down at the locations shown on the exploratory hole location plan (Appendix B) using a standard cable percussion drilling rig (Figure C1). Details of the Cable percussion drilling method is described in the following sections.

**Figure C1: Typical Cable Percussion Drilling Rig**




The boreholes are formed in 150 mm diameter using conventional light cable percussion techniques. In cohesive soils a clay cutter is used which involves dropping the tool into the clay and recovering the sample wedged inside the tool. In granular deposits a “shell” is used to advance the borehole. This operates efficiently only in the presence of water which is added to the borehole if the ground is dry. The shell is then “surged” by moving up and down by around 300 mm which has the effect of loosening the bottom of the borehole and causing the soil to go into suspension. Dropping the shell on the bottom of the borehole then forces the loosened soil up the tube of the shell, past a non return valve (or clack valve) allowing the sample to be recovered. The casing is advanced with the borehole in granular soils under its own weight or by driving.

Standard penetration testing is carried out in accordance with BS5930: 1999 using a split spoon sampler in cohesive soils and a solid 60 degree cone in granular materials. The tests are carried out generally at 1 m intervals in granular materials and generally at 2 m intervals in cohesive materials with occasional variations at the direction of the supervising engineer. The results of the standard penetration tests are presented as uncorrected "N" values on the borehole logs.

102 mm diameter "undisturbed" (U100) samples are recovered at 2 m intervals in cohesive deposits to allow detailed description and or laboratory testing to be carried out although the sampling frequency can vary. The samples are sealed with wax shortly after recovery to prevent moisture loss and stored at a temperature of greater than 4 degrees (to avoid freeze thaw effects) until despatch to the laboratory for testing. Records of U100 samples are presented on the borehole logs.

Small and bulk disturbed samples are recovered at regular intervals in each of the boreholes for logging and testing purposes as noted on the exploratory hole logs.

On completion of the boring 50 mm internal diameter groundwater monitoring wells may be installed in selected boreholes as detailed on the exploratory hole logs which are typically completed with a lockable stop cock cover concreted into place.

Full details of the borehole including soil descriptions to BS 5930, SPT test results and samples recovered are presented on the exploratory hole logs.

## Dynamic Continuous Sampling Boreholes

If carried out the locations of the Dynamic continuous sampling boreholes are shown on the exploratory hole location plan. They are put down using a Competitor Dart Drilling rig (Figure C2).

**Figure C2: Competitor Dart Rig**

The sampling is progressed by driving a hollow steel tube with a plastic inner liner into the ground. Both cohesive and granular soils are “wedged” into the tubing, relying on the friction between the soil and liner to retain the sample on withdrawal of the tubing. Sample can be lost, particularly in loose granular soils if frictional resistance is not sufficient. The technique can be used in the absence of casing in cohesive soils, although the diameter of tubing is progressively reduced from 101 mm, through 92, 79, 70, 57 and 47 mm dia to ensure that frictional resistance on the sides of the sampling tubing does not exceed the capacity of the equipment to pull the tubing from the hole. Small diameter 115 mm diameter casing can be driven simultaneously with the sampling tube in soft or loose soils to a maximum depth of around 7 m. Standard penetration testing and recovery of “undisturbed” samples is possible in the correct conditions.

Full details of the dynamic continuous sampling holes including soil descriptions to BS 5930, SPT test results and samples recovered are presented on the exploratory hole location plan.

## Dynamic Probing

Dynamic Probing holes are carried out using a Competitor Dart Drilling rig (Figure C2). Two variants of dynamic probing are commonly carried out as detailed in BS1377 Part 9 section 3.2, 1998

including Dynamic Probing Heavy (DPH) and Dynamic Probing Super Heavy (DPSH), details are given in Table C1 below.

**Table C1: Dynamic Probing Summary**

| Part | Heavy (DPH) | Super Heavy(DPSH) |
|---|---|---|
| Drive Weight (kg) | 50 ± 0.5 | 63.5 ± 0.5 |
| Drop Height (mm) | 500 ± 10 | 750 ± 20 |
| Nom. Cone Area (cm2) | 15 | 20 |
| Cone Diameter (mm) | 43.7 ± 0.3 | 50.5 ± 0.5 |
| Cone Mantle Length (mm) | 43.7 ± 1 | 50.5 ± 2 |
| Cone Tip Length (mm) | 21.9 ± 0.1 | 55.3 ± 0.4 |
| Drive Rod Diameter (mm) | 35 | 35 |
| Drive Rod Mass (kg/m) | 6 | 8 |

The test is carried out by driving 1 m long drive rods, marked up with 100 mm graduations into the ground and counting the number of blow required for each 100 mm of penetration. Where very soft or loose deposits are encountered, the rods can penetrate more than 100 mm for a single blow in which case the penetration for that blow (to the nearest 100 mm) is recorded on the results sheet.

If dynamic probing was carried out for this project, full details will be included in Appendix D.

## Trial Pitting

Trial pits are typically machine excavated using a JCB 3CX type mechanical excavator. Where hard surfacing is present at the trial pit locations, a hydraulic breaker attachment is used to penetrate the layer and allow subsequent excavation using either a 600 mm or 900 mm wide toothed excavator bucket. Excavation is progressed slowly to allow inspection of the geology revealed and samples were recovered at the discretion of the supervising engineer for subsequent laboratory analysis.

Excavations are typically taken to a maximum depth of 4 m bgl or in the event of obstructions or shallow groundwater being present, excavations are terminated at shallower depth. On completion, the trial pits are backfilled with lightly compacted arisings, tamped into place using the knuckle of the excavator bucket.

Full details of the trial pitting including soil descriptions to BS 5930 including details of samples recovered are presented in Appendix E.

## Gas and Groundwater Monitoring

Gas monitoring iss carried out using a Gas Data GFM430 infra red gas analyser to record concentrations of Carbon Dioxide, Oxygen, Methane and record atmospheric and downhole pressures together with borehole gas flow rates.

Details of any gas and groundwater monitoring or permeability testing is presented in Appendix F.

## Topographical Survey

On completion of the fieldwork a topographical survey is usually carried out to determine the location and elevation of the boreholes and trial pits. Exploratory holes are surveyed to a Local Grid/ Ordnance Survey National Grid and the details are presented on the exploratory hole log drawing and on the exploratory hole logs.

# APPENDIX D - CHEMICAL TEST RESULTS

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# Analytical Report Number : 17-57281

| | | | |
|---|---|---|---|
| **Project / Site name:** | Elsenham | **Samples received on:** | 14/08/2017 |
| **Your job number:** | 17090J | **Samples instructed on:** | 14/08/2017 |
| **Your order number:** | | **Analysis completed by:** | 21/08/2017 |
| **Report Issue Number:** | 1 | **Report issued on:** | 21/08/2017 |
| **Samples Analysed:** | 3 soil samples | | |

**Signed:**

Emma Winter
Assistant Reporting Manager
**For & on behalf of i2 Analytical Ltd.**

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

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

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

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

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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-57281**

**Project / Site name: Elsenham**

| **Lab Sample Number** | | | | 798701 | 798702 | 798703 | | |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | BH105 | BH105 | BH105 | | |
| **Sample Number** | | | | 1 | 1 | 1 | | |
| **Depth (m)** | | | | 0.50 | 2.50 | 4.75 | | |
| **Date Sampled** | | | | 14/08/2017 | 14/08/2017 | 14/08/2017 | | |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied | | |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| Stone Content | % | 0.1 | NONE | < 0.1 | < 0.1 | < 0.1 | | |
| Moisture Content | % | N/A | NONE | 12 | 18 | 19 | | |
| Total mass of sample received | kg | 0.001 | NONE | 0.55 | 0.61 | 0.54 | | |
| **General Inorganics** | | | | | | | | |
| pH - Automated | pH Units | N/A | MCERTS | 8.2 | 8.4 | 8.2 | | |
| Total Organic Carbon (TOC) | % | 0.1 | MCERTS | - | < 0.1 | - | | |
| **Speciated PAHs** | | | | | | | | |
| Naphthalene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Acenaphthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Fluorene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Phenanthrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Chrysene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| **Total PAH** | | | | | | | | |
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | < 0.80 | < 0.80 | < 0.80 | | |
| **Heavy Metals / Metalloids** | | | | | | | | |
| Arsenic (aqua regia extractable) | mg/kg | 1 | MCERTS | 11 | 6.6 | 17 | | |
| Boron (water soluble) | mg/kg | 0.2 | MCERTS | < 0.2 | 0.5 | 1.1 | | |
| Cadmium (aqua regia extractable) | mg/kg | 0.2 | MCERTS | < 0.2 | < 0.2 | < 0.2 | | |
| Chromium (hexavalent) | mg/kg | 4 | MCERTS | < 4.0 | < 4.0 | < 4.0 | | |
| Chromium (aqua regia extractable) | mg/kg | 1 | MCERTS | 16 | 8.7 | 44 | | |
| Copper (aqua regia extractable) | mg/kg | 1 | MCERTS | 7.9 | 6.7 | 27 | | |
| Lead (aqua regia extractable) | mg/kg | 1 | MCERTS | 5.8 | 3.4 | 8.7 | | |
| Mercury (aqua regia extractable) | mg/kg | 0.3 | MCERTS | < 0.3 | < 0.3 | < 0.3 | | |
| Nickel (aqua regia extractable) | mg/kg | 1 | MCERTS | 8.8 | 7.3 | 19 | | |
| Selenium (aqua regia extractable) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | | |
| Vanadium (aqua regia extractable) | mg/kg | 1 | MCERTS | 24 | 18 | 78 | | |
| Zinc (aqua regia extractable) | mg/kg | 1 | MCERTS | 24 | 17 | 55 | | |
| **Petroleum Hydrocarbons** | | | | | | | | |
| TPH4 (C10 - C20) | mg/kg | 10 | MCERTS | < 10 | < 10 | < 10 | | |
| TPH4 (C20 - C30) | mg/kg | 10 | NONE | < 10 | < 10 | < 10 | | |
| TPH4 (C30 - C40) | mg/kg | 10 | NONE | < 10 | < 10 | < 10 | | |
| **TPH4 (C10 - C40)** | mg/kg | 10 | MCERTS | < 10 | < 10 | < 10 | | |



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**Analytical Report Number : 17-57281**

**Project / Site name: Elsenham**

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

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

| Lab Sample Number | Sample Reference | Sample Number | Depth (m) | Sample Description * |
|---|---|---|---|---|
| 798701 | BH105 | 1 | 0.50 | Light brown sand. |
| 798702 | BH105 | 1 | 2.50 | Light brown sand. |
| 798703 | BH105 | 1 | 4.75 | Brown sandy clay. |



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**Analytical Report Number : 17-57281**

**Project / Site name: Elsenham**

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

| Analytical Test Name | Analytical Method Description | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|---|---|---|---|---|---|
| Boron, water soluble, in soil | Determination of water soluble boron in soil by hot water extract followed by ICP-OES. | In-house method based on Second Site Properties version 3 | L038-PL | D | MCERTS |
| Hexavalent chromium in soil | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry. | In-house method | L080-PL | W | MCERTS |
| Metals in soil by ICP-OES | Determination of metals in soil by aqua-regia digestion followed by ICP-OES. | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil. | L038-PL | D | MCERTS |
| Moisture Content | Moisture content, determined gravimetrically. | In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests | L019-UK/PL | W | NONE |
| pH in soil (automated) | Determination of pH in soil by addition of water followed by automated electrometric measurement. | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests | L099-PL | D | MCERTS |
| Speciated EPA-16 PAHs in soil | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards. | In-house method based on USEPA 8270 | L064-PL | D | MCERTS |
| Stones content of soil | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight. | In-house method based on British Standard Methods and MCERTS requirements. | L019-UK/PL | D | NONE |
| Total organic carbon (Automated) in soil | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate. | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests"" | L009-PL | D | MCERTS |
| TPH4 (Soil) | Determination of TPH bands by HS-GC-MS/GC-FID | In-house method | L076-PL | D | MCERTS |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**
**For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.**
**Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.**



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# Analytical Report Number : 17-57281

| | | | |
|---|---|---|---|
| **Project / Site name:** | Elsenham | **Samples received on:** | 14/08/2017 |
| **Your job number:** | 17090J | **Samples instructed on:** | 14/08/2017 |
| **Your order number:** | | **Analysis completed by:** | 21/08/2017 |
| **Report Issue Number:** | 1 | **Report issued on:** | 21/08/2017 |
| **Samples Analysed:** | 3 soil samples | | |

**Signed:**

Emma Winter
Assistant Reporting Manager
**For & on behalf of i2 Analytical Ltd.**

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

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

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

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

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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-57281**

**Project / Site name: Elsenham**

| **Lab Sample Number** | | | | 798701 | 798702 | 798703 | | |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | BH105 | BH105 | BH105 | | |
| **Sample Number** | | | | 1 | 1 | 1 | | |
| **Depth (m)** | | | | 0.50 | 2.50 | 4.75 | | |
| **Date Sampled** | | | | 14/08/2017 | 14/08/2017 | 14/08/2017 | | |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied | | |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| Stone Content | % | 0.1 | NONE | < 0.1 | < 0.1 | < 0.1 | | |
| Moisture Content | % | N/A | NONE | 12 | 18 | 19 | | |
| Total mass of sample received | kg | 0.001 | NONE | 0.55 | 0.61 | 0.54 | | |
| **General Inorganics** | | | | | | | | |
| pH - Automated | pH Units | N/A | MCERTS | 8.2 | 8.4 | 8.2 | | |
| Total Organic Carbon (TOC) | % | 0.1 | MCERTS | - | < 0.1 | - | | |
| **Speciated PAHs** | | | | | | | | |
| Naphthalene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Acenaphthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Fluorene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Phenanthrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Chrysene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | | |
| **Total PAH** | | | | | | | | |
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | < 0.80 | < 0.80 | < 0.80 | | |
| **Heavy Metals / Metalloids** | | | | | | | | |
| Arsenic (aqua regia extractable) | mg/kg | 1 | MCERTS | 11 | 6.6 | 17 | | |
| Boron (water soluble) | mg/kg | 0.2 | MCERTS | < 0.2 | 0.5 | 1.1 | | |
| Cadmium (aqua regia extractable) | mg/kg | 0.2 | MCERTS | < 0.2 | < 0.2 | < 0.2 | | |
| Chromium (hexavalent) | mg/kg | 4 | MCERTS | < 4.0 | < 4.0 | < 4.0 | | |
| Chromium (aqua regia extractable) | mg/kg | 1 | MCERTS | 16 | 8.7 | 44 | | |
| Copper (aqua regia extractable) | mg/kg | 1 | MCERTS | 7.9 | 6.7 | 27 | | |
| Lead (aqua regia extractable) | mg/kg | 1 | MCERTS | 5.8 | 3.4 | 8.7 | | |
| Mercury (aqua regia extractable) | mg/kg | 0.3 | MCERTS | < 0.3 | < 0.3 | < 0.3 | | |
| Nickel (aqua regia extractable) | mg/kg | 1 | MCERTS | 8.8 | 7.3 | 19 | | |
| Selenium (aqua regia extractable) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | | |
| Vanadium (aqua regia extractable) | mg/kg | 1 | MCERTS | 24 | 18 | 78 | | |
| Zinc (aqua regia extractable) | mg/kg | 1 | MCERTS | 24 | 17 | 55 | | |
| **Petroleum Hydrocarbons** | | | | | | | | |
| TPH4 (C10 - C20) | mg/kg | 10 | MCERTS | < 10 | < 10 | < 10 | | |
| TPH4 (C20 - C30) | mg/kg | 10 | NONE | < 10 | < 10 | < 10 | | |
| TPH4 (C30 - C40) | mg/kg | 10 | NONE | < 10 | < 10 | < 10 | | |
| **TPH4 (C10 - C40)** | mg/kg | 10 | MCERTS | < 10 | < 10 | < 10 | | |



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number : 17-57281**

**Project / Site name: Elsenham**

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

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

| Lab Sample Number | Sample Reference | Sample Number | Depth (m) | Sample Description * |
|---|---|---|---|---|
| 798701 | BH105 | 1 | 0.50 | Light brown sand. |
| 798702 | BH105 | 1 | 2.50 | Light brown sand. |
| 798703 | BH105 | 1 | 4.75 | Brown sandy clay. |



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**Analytical Report Number : 17-57281**

**Project / Site name: Elsenham**

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

| Analytical Test Name | Analytical Method Description | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|---|---|---|---|---|---|
| Boron, water soluble, in soil | Determination of water soluble boron in soil by hot water extract followed by ICP-OES. | In-house method based on Second Site Properties version 3 | L038-PL | D | MCERTS |
| Hexavalent chromium in soil | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry. | In-house method | L080-PL | W | MCERTS |
| Metals in soil by ICP-OES | Determination of metals in soil by aqua-regia digestion followed by ICP-OES. | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil. | L038-PL | D | MCERTS |
| Moisture Content | Moisture content, determined gravimetrically. | In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests | L019-UK/PL | W | NONE |
| pH in soil (automated) | Determination of pH in soil by addition of water followed by automated electrometric measurement. | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests | L099-PL | D | MCERTS |
| Speciated EPA-16 PAHs in soil | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards. | In-house method based on USEPA 8270 | L064-PL | D | MCERTS |
| Stones content of soil | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight. | In-house method based on British Standard Methods and MCERTS requirements. | L019-UK/PL | D | NONE |
| Total organic carbon (Automated) in soil | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate. | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests"" | L009-PL | D | MCERTS |
| TPH4 (Soil) | Determination of TPH bands by HS-GC-MS/GC-FID | In-house method | L076-PL | D | MCERTS |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**
**For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.**
**Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.**



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The results included within the report are representative of the samples submitted for analysis.

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# Analytical Report Number : 17-57817

| | | | |
|---|---|---|---|
| **Project / Site name:** | Elsenham | **Samples received on:** | 18/08/2017 |
| **Your job number:** | 17090J | **Samples instructed on:** | 18/08/2017 |
| **Your order number:** | | **Analysis completed by:** | 25/08/2017 |
| **Report Issue Number:** | 1 | **Report issued on:** | 25/08/2017 |
| **Samples Analysed:** | 32 soil samples | | |

**Signed:**

Dr Irma Doyle
Senior Account Manager
**For & on behalf of i2 Analytical Ltd.**

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

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

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

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

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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801736 | 801737 | 801738 | 801739 | 801740 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | BH104 | BH104 | BH104 | BH103 | BH103 |
| Sample Number | | | | 1 | 1 | 1 | 1 | 1 |
| Depth (m) | | | | 1.00 | 2.20 | 3.50 | 1.50 | 2.00 |
| Date Sampled | | | | 14/08/2017 | 14/08/2017 | 14/08/2017 | 15/08/2017 | 15/08/2017 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| Stone Content | % | 0.1 | NONE | < 0.1 | < 0.1 | < 0.1 | < 0.1 | 14 |
| Moisture Content | % | N/A | NONE | 29 | 23 | 21 | 6.8 | 13 |
| Total mass of sample received | kg | 0.001 | NONE | 0.46 | 0.51 | 0.51 | 0.47 | 0.61 |
| **General Inorganics** | | | | | | | | |
| pH - Automated | pH Units | N/A | MCERTS | 7.7 | 7.7 | 7.9 | 8.0 | 7.4 |
| Total Organic Carbon (TOC) | % | 0.1 | MCERTS | - | 0.8 | - | - | < 0.1 |
| **Speciated PAHs** | | | | | | | | |
| Naphthalene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Acenaphthene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Fluorene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Phenanthrene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Anthracene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Fluoranthene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Pyrene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Chrysene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| **Total PAH** | | | | | | | | |
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | - | - | < 0.80 | - | - |
| **Heavy Metals / Metalloids** | | | | | | | | |
| Arsenic (aqua regia extractable) | mg/kg | 1 | MCERTS | 16 | 4.0 | 8.0 | 4.2 | 13 |
| Boron (water soluble) | mg/kg | 0.2 | MCERTS | 2.4 | 0.6 | 0.5 | 0.2 | < 0.2 |
| Cadmium (aqua regia extractable) | mg/kg | 0.2 | MCERTS | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| Chromium (hexavalent) | mg/kg | 4 | MCERTS | < 4.0 | < 4.0 | < 4.0 | < 4.0 | < 4.0 |
| Chromium (aqua regia extractable) | mg/kg | 1 | MCERTS | 38 | 33 | 37 | 19 | 19 |
| Copper (aqua regia extractable) | mg/kg | 1 | MCERTS | 28 | 32 | 54 | 13 | 10 |
| Lead (aqua regia extractable) | mg/kg | 1 | MCERTS | 32 | 6.0 | 5.7 | 9.2 | 8.0 |
| Mercury (aqua regia extractable) | mg/kg | 0.3 | MCERTS | < 0.3 | < 0.3 | < 0.3 | < 0.3 | < 0.3 |
| Nickel (aqua regia extractable) | mg/kg | 1 | MCERTS | 30 | 19 | 20 | 18 | 15 |
| Selenium (aqua regia extractable) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Vanadium (aqua regia extractable) | mg/kg | 1 | MCERTS | 58 | 69 | 85 | 22 | 31 |
| Zinc (aqua regia extractable) | mg/kg | 1 | MCERTS | 85 | 51 | 55 | 33 | 25 |



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**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801736 | 801737 | 801738 | 801739 | 801740 |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | BH104 | BH104 | BH104 | BH103 | BH103 |
| **Sample Number** | | | | 1 | 1 | 1 | 1 | 1 |
| **Depth (m)** | | | | 1.00 | 2.20 | 3.50 | 1.50 | 2.00 |
| **Date Sampled** | | | | 14/08/2017 | 14/08/2017 | 14/08/2017 | 15/08/2017 | 15/08/2017 |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **Monoaromatics** | | | | | | | | |
| Benzene | ug/kg | 1 | MCERTS | - | - | < 1.0 | - | - |
| Toluene | µg/kg | 1 | MCERTS | - | - | < 1.0 | - | - |
| Ethylbenzene | µg/kg | 1 | MCERTS | - | - | < 1.0 | - | - |
| p & m-xylene | µg/kg | 1 | MCERTS | - | - | < 1.0 | - | - |
| o-xylene | µg/kg | 1 | MCERTS | - | - | < 1.0 | - | - |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | - | - | < 1.0 | - | - |
| **Petroleum Hydrocarbons** | | | | | | | | |
| TPH4 (C10 - C20) | mg/kg | 10 | MCERTS | - | - | - | - | - |
| TPH4 (C20 - C30) | mg/kg | 10 | NONE | - | - | - | - | - |
| TPH4 (C30 - C40) | mg/kg | 10 | NONE | - | - | - | - | - |
| **TPH4 (C10 - C40)** | mg/kg | 10 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC5 - EC6 | mg/kg | 0.001 | MCERTS | - | - | < 0.001 | - | - |
| TPH-CWG - Aliphatic >EC6 - EC8 | mg/kg | 0.001 | MCERTS | - | - | < 0.001 | - | - |
| TPH-CWG - Aliphatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | - | - | < 0.001 | - | - |
| TPH-CWG - Aliphatic >EC10 - EC12 | mg/kg | 1 | MCERTS | - | - | < 1.0 | - | - |
| TPH-CWG - Aliphatic >EC12 - EC16 | mg/kg | 2 | MCERTS | - | - | < 2.0 | - | - |
| TPH-CWG - Aliphatic >EC16 - EC21 | mg/kg | 8 | MCERTS | - | - | < 8.0 | - | - |
| TPH-CWG - Aliphatic >EC21 - EC35 | mg/kg | 8 | MCERTS | - | - | < 8.0 | - | - |
| **TPH-CWG - Aliphatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | - | - | < 10 | - | - |
| TPH-CWG - Aromatic >EC5 - EC7 | mg/kg | 0.001 | MCERTS | - | - | < 0.001 | - | - |
| TPH-CWG - Aromatic >EC7 - EC8 | mg/kg | 0.001 | MCERTS | - | - | < 0.001 | - | - |
| TPH-CWG - Aromatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | - | - | < 0.001 | - | - |
| TPH-CWG - Aromatic >EC10 - EC12 | mg/kg | 1 | MCERTS | - | - | < 1.0 | - | - |
| TPH-CWG - Aromatic >EC12 - EC16 | mg/kg | 2 | MCERTS | - | - | < 2.0 | - | - |
| TPH-CWG - Aromatic >EC16 - EC21 | mg/kg | 10 | MCERTS | - | - | < 10 | - | - |
| TPH-CWG - Aromatic >EC21 - EC35 | mg/kg | 10 | MCERTS | - | - | < 10 | - | - |
| **TPH-CWG - Aromatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | - | - | < 10 | - | - |



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**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801736 | 801737 | 801738 | 801739 | 801740 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | BH104 | BH104 | BH104 | BH103 | BH103 |
| Sample Number | | | | 1 | 1 | 1 | 1 | 1 |
| Depth (m) | | | | 1.00 | 2.20 | 3.50 | 1.50 | 2.00 |
| Date Sampled | | | | 14/08/2017 | 14/08/2017 | 14/08/2017 | 15/08/2017 | 15/08/2017 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **SVOCs** | | | | | | | | |
| Aniline | mg/kg | 0.1 | NONE | - | - | - | - | - |
| Phenol | mg/kg | 0.2 | ISO 17025 | - | - | - | - | - |
| 2-Chlorophenol | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| Bis(2-chloroethyl)ether | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 1,3-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 1,2-Dichlorobenzene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 1,4-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Bis(2-chloroisopropyl)ether | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 2-Methylphenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Hexachloroethane | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Nitrobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 4-Methylphenol | mg/kg | 0.2 | NONE | - | - | - | - | - |
| Isophorone | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 2-Nitrophenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 2,4-Dimethylphenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Bis(2-chloroethoxy)methane | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 1,2,4-Trichlorobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Naphthalene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| 2,4-Dichlorophenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 4-Chloroaniline | mg/kg | 0.1 | NONE | - | - | - | - | - |
| Hexachlorobutadiene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 4-Chloro-3-methylphenol | mg/kg | 0.1 | NONE | - | - | - | - | - |
| 2,4,6-Trichlorophenol | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 2,4,5-Trichlorophenol | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 2-Methylnaphthalene | mg/kg | 0.1 | NONE | - | - | - | - | - |
| 2-Chloronaphthalene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| Dimethylphthalate | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 2,6-Dinitrotoluene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Acenaphthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| 2,4-Dinitrotoluene | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Dibenzofuran | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 4-Chlorophenyl phenyl ether | mg/kg | 0.3 | ISO 17025 | - | - | - | - | - |
| Diethyl phthalate | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 4-Nitroaniline | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Fluorene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Azobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Bromophenyl phenyl ether | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Hexachlorobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Phenanthrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Anthracene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Carbazole | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Dibutyl phthalate | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Anthraquinone | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Fluoranthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Pyrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Butyl benzyl phthalate | mg/kg | 0.3 | ISO 17025 | - | - | - | - | - |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Chrysene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801741 | 801742 | 801743 | 801744 | 801745 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | BH103 | BH102 | BH102 | BH102 | BH102 |
| Sample Number | | | | 1 | 1 | 1 | 1 | 1 |
| Depth (m) | | | | 3.20 | 1.00 | 1.45 | 1.80 | 4.00 |
| Date Sampled | | | | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| Stone Content | % | 0.1 | NONE | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Moisture Content | % | N/A | NONE | 24 | 11 | 12 | 21 | 29 |
| Total mass of sample received | kg | 0.001 | NONE | 0.46 | 0.42 | 0.41 | 0.39 | 0.29 |
| **General Inorganics** | | | | | | | | |
| pH - Automated | pH Units | N/A | MCERTS | 7.8 | 8.1 | 8.2 | 7.7 | 7.9 |
| Total Organic Carbon (TOC) | % | 0.1 | MCERTS | - | - | 0.5 | - | 4.5 |
| **Speciated PAHs** | | | | | | | | |
| Naphthalene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | - | - |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | - | - |
| Acenaphthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | - | - |
| Fluorene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | - | - |
| Phenanthrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | - | - |
| Anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | - | - |
| Fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | - | - |
| Pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | - | - |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | - | - |
| Chrysene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | - | - |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | - | - |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | - | - |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | - | - |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | - | - |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | - | - |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | - | - |
| **Total PAH** | | | | | | | | |
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | < 0.80 | < 0.80 | - | - | - |
| **Heavy Metals / Metalloids** | | | | | | | | |
| Arsenic (aqua regia extractable) | mg/kg | 1 | MCERTS | 11 | 6.9 | 6.2 | 15 | 15 |
| Boron (water soluble) | mg/kg | 0.2 | MCERTS | 0.6 | 0.5 | 1.4 | 2.6 | 7.2 |
| Cadmium (aqua regia extractable) | mg/kg | 0.2 | MCERTS | < 0.2 | < 0.2 | 0.2 | 1.9 | 0.7 |
| Chromium (hexavalent) | mg/kg | 4 | MCERTS | < 4.0 | < 4.0 | < 4.0 | < 4.0 | < 4.0 |
| Chromium (aqua regia extractable) | mg/kg | 1 | MCERTS | 29 | 14 | 17 | 30 | 25 |
| Copper (aqua regia extractable) | mg/kg | 1 | MCERTS | 32 | 14 | 18 | 74 | 240 |
| Lead (aqua regia extractable) | mg/kg | 1 | MCERTS | 14 | 10 | 18 | 170 | 530 |
| Mercury (aqua regia extractable) | mg/kg | 0.3 | MCERTS | < 0.3 | < 0.3 | < 0.3 | < 0.3 | < 0.3 |
| Nickel (aqua regia extractable) | mg/kg | 1 | MCERTS | 39 | 18 | 17 | 29 | 18 |
| Selenium (aqua regia extractable) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Vanadium (aqua regia extractable) | mg/kg | 1 | MCERTS | 41 | 22 | 25 | 29 | 31 |
| Zinc (aqua regia extractable) | mg/kg | 1 | MCERTS | 78 | 35 | 46 | 170 | 480 |



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801741 | 801742 | 801743 | 801744 | 801745 |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | BH103 | BH102 | BH102 | BH102 | BH102 |
| **Sample Number** | | | | 1 | 1 | 1 | 1 | 1 |
| **Depth (m)** | | | | 3.20 | 1.00 | 1.45 | 1.80 | 4.00 |
| **Date Sampled** | | | | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **Monoaromatics** | | | | | | | | |
| Benzene | ug/kg | 1 | MCERTS | < 1.0 | - | - | - | - |
| Toluene | µg/kg | 1 | MCERTS | < 1.0 | - | - | - | - |
| Ethylbenzene | µg/kg | 1 | MCERTS | < 1.0 | - | - | - | - |
| p & m-xylene | µg/kg | 1 | MCERTS | < 1.0 | - | - | - | - |
| o-xylene | µg/kg | 1 | MCERTS | < 1.0 | - | - | - | - |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | < 1.0 | - | - | - | - |

**Petroleum Hydrocarbons**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TPH4 (C10 - C20) | mg/kg | 10 | MCERTS | - | < 10 | < 10 | - | 510 |
| TPH4 (C20 - C30) | mg/kg | 10 | NONE | - | < 10 | < 10 | - | 640 |
| TPH4 (C30 - C40) | mg/kg | 10 | NONE | - | < 10 | < 10 | - | 280 |
| **TPH4 (C10 - C40)** | mg/kg | 10 | MCERTS | - | < 10 | < 10 | - | 1400 |
| TPH-CWG - Aliphatic >EC5 - EC6 | mg/kg | 0.001 | MCERTS | < 0.001 | - | - | - | - |
| TPH-CWG - Aliphatic >EC6 - EC8 | mg/kg | 0.001 | MCERTS | < 0.001 | - | - | - | - |
| TPH-CWG - Aliphatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | < 0.001 | - | - | - | - |
| TPH-CWG - Aliphatic >EC10 - EC12 | mg/kg | 1 | MCERTS | 4.7 | - | - | - | - |
| TPH-CWG - Aliphatic >EC12 - EC16 | mg/kg | 2 | MCERTS | 8.3 | - | - | - | - |
| TPH-CWG - Aliphatic >EC16 - EC21 | mg/kg | 8 | MCERTS | < 8.0 | - | - | - | - |
| TPH-CWG - Aliphatic >EC21 - EC35 | mg/kg | 8 | MCERTS | < 8.0 | - | - | - | - |
| **TPH-CWG - Aliphatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | 20 | - | - | - | - |
| TPH-CWG - Aromatic >EC5 - EC7 | mg/kg | 0.001 | MCERTS | < 0.001 | - | - | - | - |
| TPH-CWG - Aromatic >EC7 - EC8 | mg/kg | 0.001 | MCERTS | < 0.001 | - | - | - | - |
| TPH-CWG - Aromatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | < 0.001 | - | - | - | - |
| TPH-CWG - Aromatic >EC10 - EC12 | mg/kg | 1 | MCERTS | < 1.0 | - | - | - | - |
| TPH-CWG - Aromatic >EC12 - EC16 | mg/kg | 2 | MCERTS | < 2.0 | - | - | - | - |
| TPH-CWG - Aromatic >EC16 - EC21 | mg/kg | 10 | MCERTS | < 10 | - | - | - | - |
| TPH-CWG - Aromatic >EC21 - EC35 | mg/kg | 10 | MCERTS | < 10 | - | - | - | - |
| **TPH-CWG - Aromatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | < 10 | - | - | - | - |



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801741 | 801742 | 801743 | 801744 | 801745 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | BH103 | BH102 | BH102 | BH102 | BH102 |
| Sample Number | | | | 1 | 1 | 1 | 1 | 1 |
| Depth (m) | | | | 3.20 | 1.00 | 1.45 | 1.80 | 4.00 |
| Date Sampled | | | | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **SVOCs** | | | | | | | | |
| Aniline | mg/kg | 0.1 | NONE | - | - | < 0.1 | - | 4.3 |
| Phenol | mg/kg | 0.2 | ISO 17025 | - | - | < 0.2 | - | < 0.2 |
| 2-Chlorophenol | mg/kg | 0.1 | MCERTS | - | - | < 0.1 | - | < 0.1 |
| Bis(2-chloroethyl)ether | mg/kg | 0.2 | MCERTS | - | - | < 0.2 | - | < 0.2 |
| 1,3-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - | - | < 0.2 | - | < 0.2 |
| 1,2-Dichlorobenzene | mg/kg | 0.1 | MCERTS | - | - | < 0.1 | - | < 0.1 |
| 1,4-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - | - | < 0.2 | - | < 0.2 |
| Bis(2-chloroisopropyl)ether | mg/kg | 0.1 | MCERTS | - | - | < 0.1 | - | < 0.1 |
| 2-Methylphenol | mg/kg | 0.3 | MCERTS | - | - | < 0.3 | - | 0.5 |
| Hexachloroethane | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | < 0.05 |
| Nitrobenzene | mg/kg | 0.3 | MCERTS | - | - | < 0.3 | - | < 0.3 |
| 4-Methylphenol | mg/kg | 0.2 | NONE | - | - | < 0.2 | - | 0.4 |
| Isophorone | mg/kg | 0.2 | MCERTS | - | - | < 0.2 | - | < 0.2 |
| 2-Nitrophenol | mg/kg | 0.3 | MCERTS | - | - | < 0.3 | - | < 0.3 |
| 2,4-Dimethylphenol | mg/kg | 0.3 | MCERTS | - | - | < 0.3 | - | < 0.3 |
| Bis(2-chloroethoxy)methane | mg/kg | 0.3 | MCERTS | - | - | < 0.3 | - | < 0.3 |
| 1,2,4-Trichlorobenzene | mg/kg | 0.3 | MCERTS | - | - | < 0.3 | - | < 0.3 |
| Naphthalene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | 0.75 |
| 2,4-Dichlorophenol | mg/kg | 0.3 | MCERTS | - | - | < 0.3 | - | < 0.3 |
| 4-Chloroaniline | mg/kg | 0.1 | NONE | - | - | < 0.1 | - | < 0.1 |
| Hexachlorobutadiene | mg/kg | 0.1 | MCERTS | - | - | < 0.1 | - | < 0.1 |
| 4-Chloro-3-methylphenol | mg/kg | 0.1 | NONE | - | - | < 0.1 | - | < 0.1 |
| 2,4,6-Trichlorophenol | mg/kg | 0.1 | MCERTS | - | - | < 0.1 | - | < 0.1 |
| 2,4,5-Trichlorophenol | mg/kg | 0.2 | MCERTS | - | - | < 0.2 | - | < 0.2 |
| 2-Methylnaphthalene | mg/kg | 0.1 | NONE | - | - | < 0.1 | - | 2.9 |
| 2-Chloronaphthalene | mg/kg | 0.1 | MCERTS | - | - | < 0.1 | - | < 0.1 |
| Dimethylphthalate | mg/kg | 0.1 | MCERTS | - | - | < 0.1 | - | < 0.1 |
| 2,6-Dinitrotoluene | mg/kg | 0.1 | MCERTS | - | - | < 0.1 | - | < 0.1 |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | 0.17 |
| Acenaphthene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | 0.59 |
| 2,4-Dinitrotoluene | mg/kg | 0.2 | MCERTS | - | - | < 0.2 | - | < 0.2 |
| Dibenzofuran | mg/kg | 0.2 | MCERTS | - | - | < 0.2 | - | 0.4 |
| 4-Chlorophenyl phenyl ether | mg/kg | 0.3 | ISO 17025 | - | - | < 0.3 | - | < 0.3 |
| Diethyl phthalate | mg/kg | 0.2 | MCERTS | - | - | < 0.2 | - | < 0.2 |
| 4-Nitroaniline | mg/kg | 0.2 | MCERTS | - | - | < 0.2 | - | < 0.2 |
| Fluorene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | 0.90 |
| Azobenzene | mg/kg | 0.3 | MCERTS | - | - | < 0.3 | - | < 0.3 |
| Bromophenyl phenyl ether | mg/kg | 0.2 | MCERTS | - | - | < 0.2 | - | < 0.2 |
| Hexachlorobenzene | mg/kg | 0.3 | MCERTS | - | - | < 0.3 | - | < 0.3 |
| Phenanthrene | mg/kg | 0.05 | MCERTS | - | - | 0.12 | - | 5.0 |
| Anthracene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | 0.63 |
| Carbazole | mg/kg | 0.3 | MCERTS | - | - | < 0.3 | - | 0.8 |
| Dibutyl phthalate | mg/kg | 0.2 | MCERTS | - | - | < 0.2 | - | 3.3 |
| Anthraquinone | mg/kg | 0.3 | MCERTS | - | - | < 0.3 | - | 1.1 |
| Fluoranthene | mg/kg | 0.05 | MCERTS | - | - | 0.14 | - | 5.3 |
| Pyrene | mg/kg | 0.05 | MCERTS | - | - | 0.16 | - | 4.4 |
| Butyl benzyl phthalate | mg/kg | 0.3 | ISO 17025 | - | - | < 0.3 | - | 1.8 |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | - | - | 0.15 | - | 2.7 |
| Chrysene | mg/kg | 0.05 | MCERTS | - | - | 0.10 | - | 1.6 |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | 2.2 |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | 1.3 |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | 2.4 |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | 0.79 |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | 0.16 |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | 0.91 |



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801746 | 801747 | 801748 | 801749 | 801750 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | BH102 | DS201 | DS201 | DS202 | DS203 |
| Sample Number | | | | 1 | 1 | 1 | 1 | 1 |
| Depth (m) | | | | 5.90 | 1.00 | 2.00 | 0.20 | 1.00 |
| Date Sampled | | | | 15/08/2017 | 16/08/2017 | 16/08/2017 | 16/08/2017 | 15/08/2017 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| Stone Content | % | 0.1 | NONE | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Moisture Content | % | N/A | NONE | 14 | 11 | 13 | 11 | 16 |
| Total mass of sample received | kg | 0.001 | NONE | 0.43 | 0.40 | 0.40 | 0.38 | 0.40 |
| **General Inorganics** | | | | | | | | |
| pH - Automated | pH Units | N/A | MCERTS | 8.5 | 7.8 | 8.1 | 8.6 | 8.2 |
| Total Organic Carbon (TOC) | % | 0.1 | MCERTS | - | 0.3 | - | - | - |
| **Speciated PAHs** | | | | | | | | |
| Naphthalene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | < 0.05 | < 0.05 |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | < 0.05 | < 0.05 |
| Acenaphthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | < 0.05 | < 0.05 |
| Fluorene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | < 0.05 | < 0.05 |
| Phenanthrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | 0.10 | < 0.05 |
| Anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | < 0.05 | < 0.05 |
| Fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | 0.24 | < 0.05 |
| Pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | 0.23 | < 0.05 |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | 0.20 | < 0.05 |
| Chrysene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | 0.18 | < 0.05 |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | 0.16 | < 0.05 |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | 0.15 | < 0.05 |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | 0.16 | < 0.05 |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | < 0.05 | < 0.05 |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | < 0.05 | < 0.05 |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | - | < 0.05 | < 0.05 |
| **Total PAH** | | | | | | | | |
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | < 0.80 | < 0.80 | - | 1.42 | < 0.80 |
| **Heavy Metals / Metalloids** | | | | | | | | |
| Arsenic (aqua regia extractable) | mg/kg | 1 | MCERTS | 12 | 26 | 28 | 10 | 7.9 |
| Boron (water soluble) | mg/kg | 0.2 | MCERTS | 2.6 | 0.5 | 3.8 | 0.8 | 0.5 |
| Cadmium (aqua regia extractable) | mg/kg | 0.2 | MCERTS | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| Chromium (hexavalent) | mg/kg | 4 | MCERTS | < 4.0 | < 4.0 | < 4.0 | < 4.0 | < 4.0 |
| Chromium (aqua regia extractable) | mg/kg | 1 | MCERTS | 23 | 20 | 19 | 27 | 19 |
| Copper (aqua regia extractable) | mg/kg | 1 | MCERTS | 20 | 18 | 230 | 25 | 17 |
| Lead (aqua regia extractable) | mg/kg | 1 | MCERTS | 28 | 17 | 480 | 42 | 9.3 |
| Mercury (aqua regia extractable) | mg/kg | 0.3 | MCERTS | < 0.3 | < 0.3 | 2.3 | < 0.3 | < 0.3 |
| Nickel (aqua regia extractable) | mg/kg | 1 | MCERTS | 22 | 22 | 27 | 26 | 21 |
| Selenium (aqua regia extractable) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Vanadium (aqua regia extractable) | mg/kg | 1 | MCERTS | 33 | 31 | 53 | 44 | 29 |
| Zinc (aqua regia extractable) | mg/kg | 1 | MCERTS | 53 | 64 | 270 | 79 | 43 |



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**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801746 | 801747 | 801748 | 801749 | 801750 |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | BH102 | DS201 | DS201 | DS202 | DS203 |
| **Sample Number** | | | | 1 | 1 | 1 | 1 | 1 |
| **Depth (m)** | | | | 5.90 | 1.00 | 2.00 | 0.20 | 1.00 |
| **Date Sampled** | | | | 15/08/2017 | 16/08/2017 | 16/08/2017 | 16/08/2017 | 15/08/2017 |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **Monoaromatics** | | | | | | | | |
| Benzene | ug/kg | 1 | MCERTS | < 1.0 | - | - | - | - |
| Toluene | µg/kg | 1 | MCERTS | < 1.0 | - | - | - | - |
| Ethylbenzene | µg/kg | 1 | MCERTS | < 1.0 | - | - | - | - |
| p & m-xylene | µg/kg | 1 | MCERTS | < 1.0 | - | - | - | - |
| o-xylene | µg/kg | 1 | MCERTS | < 1.0 | - | - | - | - |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | < 1.0 | - | - | - | - |
| **Petroleum Hydrocarbons** | | | | | | | | |
| TPH4 (C10 - C20) | mg/kg | 10 | MCERTS | - | < 10 | - | < 10 | < 10 |
| TPH4 (C20 - C30) | mg/kg | 10 | NONE | - | < 10 | - | < 10 | < 10 |
| TPH4 (C30 - C40) | mg/kg | 10 | NONE | - | < 10 | - | < 10 | < 10 |
| **TPH4 (C10 - C40)** | mg/kg | 10 | MCERTS | - | < 10 | - | < 10 | < 10 |
| TPH-CWG - Aliphatic >EC5 - EC6 | mg/kg | 0.001 | MCERTS | < 0.001 | - | - | - | - |
| TPH-CWG - Aliphatic >EC6 - EC8 | mg/kg | 0.001 | MCERTS | < 0.001 | - | - | - | - |
| TPH-CWG - Aliphatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | < 0.001 | - | - | - | - |
| TPH-CWG - Aliphatic >EC10 - EC12 | mg/kg | 1 | MCERTS | < 1.0 | - | - | - | - |
| TPH-CWG - Aliphatic >EC12 - EC16 | mg/kg | 2 | MCERTS | < 2.0 | - | - | - | - |
| TPH-CWG - Aliphatic >EC16 - EC21 | mg/kg | 8 | MCERTS | < 8.0 | - | - | - | - |
| TPH-CWG - Aliphatic >EC21 - EC35 | mg/kg | 8 | MCERTS | < 8.0 | - | - | - | - |
| **TPH-CWG - Aliphatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | < 10 | - | - | - | - |
| TPH-CWG - Aromatic >EC5 - EC7 | mg/kg | 0.001 | MCERTS | < 0.001 | - | - | - | - |
| TPH-CWG - Aromatic >EC7 - EC8 | mg/kg | 0.001 | MCERTS | < 0.001 | - | - | - | - |
| TPH-CWG - Aromatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | < 0.001 | - | - | - | - |
| TPH-CWG - Aromatic >EC10 - EC12 | mg/kg | 1 | MCERTS | < 1.0 | - | - | - | - |
| TPH-CWG - Aromatic >EC12 - EC16 | mg/kg | 2 | MCERTS | < 2.0 | - | - | - | - |
| TPH-CWG - Aromatic >EC16 - EC21 | mg/kg | 10 | MCERTS | < 10 | - | - | - | - |
| TPH-CWG - Aromatic >EC21 - EC35 | mg/kg | 10 | MCERTS | < 10 | - | - | - | - |
| **TPH-CWG - Aromatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | < 10 | - | - | - | - |



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**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801746 | 801747 | 801748 | 801749 | 801750 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | BH102 | DS201 | DS201 | DS202 | DS203 |
| Sample Number | | | | 1 | 1 | 1 | 1 | 1 |
| Depth (m) | | | | 5.90 | 1.00 | 2.00 | 0.20 | 1.00 |
| Date Sampled | | | | 15/08/2017 | 16/08/2017 | 16/08/2017 | 16/08/2017 | 15/08/2017 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **SVOCs** | | | | | | | | |
| Aniline | mg/kg | 0.1 | NONE | - | - | - | - | - |
| Phenol | mg/kg | 0.2 | ISO 17025 | - | - | - | - | - |
| 2-Chlorophenol | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| Bis(2-chloroethyl)ether | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 1,3-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 1,2-Dichlorobenzene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 1,4-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Bis(2-chloroisopropyl)ether | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 2-Methylphenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Hexachloroethane | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Nitrobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 4-Methylphenol | mg/kg | 0.2 | NONE | - | - | - | - | - |
| Isophorone | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 2-Nitrophenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 2,4-Dimethylphenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Bis(2-chloroethoxy)methane | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 1,2,4-Trichlorobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Naphthalene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| 2,4-Dichlorophenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 4-Chloroaniline | mg/kg | 0.1 | NONE | - | - | - | - | - |
| Hexachlorobutadiene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 4-Chloro-3-methylphenol | mg/kg | 0.1 | NONE | - | - | - | - | - |
| 2,4,6-Trichlorophenol | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 2,4,5-Trichlorophenol | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 2-Methylnaphthalene | mg/kg | 0.1 | NONE | - | - | - | - | - |
| 2-Chloronaphthalene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| Dimethylphthalate | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 2,6-Dinitrotoluene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Acenaphthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| 2,4-Dinitrotoluene | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Dibenzofuran | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 4-Chlorophenyl phenyl ether | mg/kg | 0.3 | ISO 17025 | - | - | - | - | - |
| Diethyl phthalate | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 4-Nitroaniline | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Fluorene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Azobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Bromophenyl phenyl ether | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Hexachlorobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Phenanthrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Anthracene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Carbazole | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Dibutyl phthalate | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Anthraquinone | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Fluoranthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Pyrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Butyl benzyl phthalate | mg/kg | 0.3 | ISO 17025 | - | - | - | - | - |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Chrysene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801751 | 801752 | 801753 | 801754 | 801755 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | DS203 | DS204 | DS205 | DS206 | DS207 |
| Sample Number | | | | 1 | 1 | 1 | 1 | 1 |
| Depth (m) | | | | 1.80 | 0.50 | 1.00 | 1.00 | 0.90 |
| Date Sampled | | | | 16/08/2017 | 16/08/2017 | 16/08/2017 | 15/08/2017 | 15/08/2017 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| Stone Content | % | 0.1 | NONE | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Moisture Content | % | N/A | NONE | 19 | 13 | 14 | 13 | 10 |
| Total mass of sample received | kg | 0.001 | NONE | 0.31 | 0.38 | 0.43 | 0.37 | 0.34 |
| **General Inorganics** | | | | | | | | |
| pH - Automated | pH Units | N/A | MCERTS | 9.1 | 8.3 | 8.3 | 8.3 | 8.4 |
| Total Organic Carbon (TOC) | % | 0.1 | MCERTS | - | - | 0.2 | - | - |
| **Speciated PAHs** | | | | | | | | |
| Naphthalene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Acenaphthene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Fluorene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Phenanthrene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Anthracene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Fluoranthene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Pyrene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Chrysene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | - | - | < 0.05 | - | - |
| **Total PAH** | | | | | | | | |
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | - | - | < 0.80 | - | - |
| **Heavy Metals / Metalloids** | | | | | | | | |
| Arsenic (aqua regia extractable) | mg/kg | 1 | MCERTS | 18 | 7.5 | 11 | 6.8 | 12 |
| Boron (water soluble) | mg/kg | 0.2 | MCERTS | 3.8 | 0.6 | 0.5 | 0.6 | 0.6 |
| Cadmium (aqua regia extractable) | mg/kg | 0.2 | MCERTS | 1.5 | < 0.2 | < 0.2 | 0.3 | < 0.2 |
| Chromium (hexavalent) | mg/kg | 4 | MCERTS | < 4.0 | < 4.0 | < 4.0 | < 4.0 | < 4.0 |
| Chromium (aqua regia extractable) | mg/kg | 1 | MCERTS | 48 | 16 | 13 | 11 | 21 |
| Copper (aqua regia extractable) | mg/kg | 1 | MCERTS | 58 | 17 | 14 | 13 | 15 |
| Lead (aqua regia extractable) | mg/kg | 1 | MCERTS | 250 | 6.1 | 6.7 | 5.8 | 17 |
| Mercury (aqua regia extractable) | mg/kg | 0.3 | MCERTS | < 0.3 | < 0.3 | < 0.3 | < 0.3 | < 0.3 |
| Nickel (aqua regia extractable) | mg/kg | 1 | MCERTS | 30 | 17 | 19 | 14 | 19 |
| Selenium (aqua regia extractable) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Vanadium (aqua regia extractable) | mg/kg | 1 | MCERTS | 29 | 22 | 20 | 18 | 33 |
| Zinc (aqua regia extractable) | mg/kg | 1 | MCERTS | 980 | 30 | 35 | 34 | 45 |



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**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801751 | 801752 | 801753 | 801754 | 801755 |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | DS203 | DS204 | DS205 | DS206 | DS207 |
| **Sample Number** | | | | 1 | 1 | 1 | 1 | 1 |
| **Depth (m)** | | | | 1.80 | 0.50 | 1.00 | 1.00 | 0.90 |
| **Date Sampled** | | | | 16/08/2017 | 16/08/2017 | 16/08/2017 | 15/08/2017 | 15/08/2017 |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **Monoaromatics** | | | | | | | | |
| Benzene | ug/kg | 1 | MCERTS | - | - | - | - | - |
| Toluene | µg/kg | 1 | MCERTS | - | - | - | - | - |
| Ethylbenzene | µg/kg | 1 | MCERTS | - | - | - | - | - |
| p & m-xylene | µg/kg | 1 | MCERTS | - | - | - | - | - |
| o-xylene | µg/kg | 1 | MCERTS | - | - | - | - | - |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | - | - | - | - | - |
| **Petroleum Hydrocarbons** | | | | | | | | |
| TPH4 (C10 - C20) | mg/kg | 10 | MCERTS | - | - | < 10 | - | - |
| TPH4 (C20 - C30) | mg/kg | 10 | NONE | - | - | < 10 | - | - |
| TPH4 (C30 - C40) | mg/kg | 10 | NONE | - | - | < 10 | - | - |
| **TPH4 (C10 - C40)** | mg/kg | 10 | MCERTS | - | - | < 10 | - | - |
| TPH-CWG - Aliphatic >EC5 - EC6 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC6 - EC8 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC10 - EC12 | mg/kg | 1 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC12 - EC16 | mg/kg | 2 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC16 - EC21 | mg/kg | 8 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC21 - EC35 | mg/kg | 8 | MCERTS | - | - | - | - | - |
| **TPH-CWG - Aliphatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC5 - EC7 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC7 - EC8 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC10 - EC12 | mg/kg | 1 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC12 - EC16 | mg/kg | 2 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC16 - EC21 | mg/kg | 10 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC21 - EC35 | mg/kg | 10 | MCERTS | - | - | - | - | - |
| **TPH-CWG - Aromatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | - | - | - | - | - |



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**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801751 | 801752 | 801753 | 801754 | 801755 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | DS203 | DS204 | DS205 | DS206 | DS207 |
| Sample Number | | | | 1 | 1 | 1 | 1 | 1 |
| Depth (m) | | | | 1.80 | 0.50 | 1.00 | 1.00 | 0.90 |
| Date Sampled | | | | 16/08/2017 | 16/08/2017 | 16/08/2017 | 15/08/2017 | 15/08/2017 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **SVOCs** | | | | | | | | |
| Aniline | mg/kg | 0.1 | NONE | - | - | - | - | - |
| Phenol | mg/kg | 0.2 | ISO 17025 | - | - | - | - | - |
| 2-Chlorophenol | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| Bis(2-chloroethyl)ether | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 1,3-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 1,2-Dichlorobenzene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 1,4-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Bis(2-chloroisopropyl)ether | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 2-Methylphenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Hexachloroethane | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Nitrobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 4-Methylphenol | mg/kg | 0.2 | NONE | - | - | - | - | - |
| Isophorone | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 2-Nitrophenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 2,4-Dimethylphenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Bis(2-chloroethoxy)methane | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 1,2,4-Trichlorobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Naphthalene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| 2,4-Dichlorophenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 4-Chloroaniline | mg/kg | 0.1 | NONE | - | - | - | - | - |
| Hexachlorobutadiene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 4-Chloro-3-methylphenol | mg/kg | 0.1 | NONE | - | - | - | - | - |
| 2,4,6-Trichlorophenol | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 2,4,5-Trichlorophenol | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 2-Methylnaphthalene | mg/kg | 0.1 | NONE | - | - | - | - | - |
| 2-Chloronaphthalene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| Dimethylphthalate | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 2,6-Dinitrotoluene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Acenaphthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| 2,4-Dinitrotoluene | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Dibenzofuran | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 4-Chlorophenyl phenyl ether | mg/kg | 0.3 | ISO 17025 | - | - | - | - | - |
| Diethyl phthalate | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 4-Nitroaniline | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Fluorene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Azobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Bromophenyl phenyl ether | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Hexachlorobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Phenanthrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Anthracene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Carbazole | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Dibutyl phthalate | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Anthraquinone | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Fluoranthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Pyrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Butyl benzyl phthalate | mg/kg | 0.3 | ISO 17025 | - | - | - | - | - |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Chrysene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801756 | 801757 | 801758 | 801759 | 801760 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | DS208 | DS209 | DS209 | DS210 | DS210 |
| Sample Number | | | | 1 | 1 | 1 | 1 | 1 |
| Depth (m) | | | | 1.00 | 1.00 | 1.40 | 1.00 | 1.60 |
| Date Sampled | | | | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| Stone Content | % | 0.1 | NONE | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Moisture Content | % | N/A | NONE | 10 | 14 | 22 | 13 | 17 |
| Total mass of sample received | kg | 0.001 | NONE | 0.37 | 0.40 | 0.28 | 0.37 | 0.40 |
| **General Inorganics** | | | | | | | | |
| pH - Automated | pH Units | N/A | MCERTS | 8.1 | 8.1 | 8.2 | 8.3 | 8.1 |
| Total Organic Carbon (TOC) | % | 0.1 | MCERTS | - | - | - | 0.3 | - |
| **Speciated PAHs** | | | | | | | | |
| Naphthalene | mg/kg | 0.05 | MCERTS | - | < 0.05 | - | < 0.05 | - |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | - | < 0.05 | - | < 0.05 | - |
| Acenaphthene | mg/kg | 0.05 | MCERTS | - | < 0.05 | - | < 0.05 | - |
| Fluorene | mg/kg | 0.05 | MCERTS | - | < 0.05 | - | < 0.05 | - |
| Phenanthrene | mg/kg | 0.05 | MCERTS | - | < 0.05 | - | < 0.05 | - |
| Anthracene | mg/kg | 0.05 | MCERTS | - | < 0.05 | - | < 0.05 | - |
| Fluoranthene | mg/kg | 0.05 | MCERTS | - | < 0.05 | - | < 0.05 | - |
| Pyrene | mg/kg | 0.05 | MCERTS | - | < 0.05 | - | < 0.05 | - |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | - | < 0.05 | - | < 0.05 | - |
| Chrysene | mg/kg | 0.05 | MCERTS | - | < 0.05 | - | < 0.05 | - |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | - | < 0.05 | - | < 0.05 | - |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | - | < 0.05 | - | < 0.05 | - |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | - | < 0.05 | - | < 0.05 | - |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | - | < 0.05 | - | < 0.05 | - |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | - | < 0.05 | - | < 0.05 | - |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | - | < 0.05 | - | < 0.05 | - |
| **Total PAH** | | | | | | | | |
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | - | < 0.80 | - | < 0.80 | - |
| **Heavy Metals / Metalloids** | | | | | | | | |
| Arsenic (aqua regia extractable) | mg/kg | 1 | MCERTS | 7.5 | 6.6 | 13 | 2.5 | 18 |
| Boron (water soluble) | mg/kg | 0.2 | MCERTS | 0.4 | 0.6 | 8.1 | 0.4 | 5.2 |
| Cadmium (aqua regia extractable) | mg/kg | 0.2 | MCERTS | < 0.2 | < 0.2 | 1.1 | 0.2 | 0.4 |
| Chromium (hexavalent) | mg/kg | 4 | MCERTS | < 4.0 | < 4.0 | < 4.0 | < 4.0 | < 4.0 |
| Chromium (aqua regia extractable) | mg/kg | 1 | MCERTS | 8.9 | 17 | 26 | 12 | 24 |
| Copper (aqua regia extractable) | mg/kg | 1 | MCERTS | 14 | 19 | 210 | 13 | 22 |
| Lead (aqua regia extractable) | mg/kg | 1 | MCERTS | 34 | 10 | 640 | 9.2 | 500 |
| Mercury (aqua regia extractable) | mg/kg | 0.3 | MCERTS | < 0.3 | < 0.3 | < 0.3 | < 0.3 | 0.4 |
| Nickel (aqua regia extractable) | mg/kg | 1 | MCERTS | 11 | 23 | 23 | 15 | 22 |
| Selenium (aqua regia extractable) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Vanadium (aqua regia extractable) | mg/kg | 1 | MCERTS | 14 | 24 | 30 | 17 | 40 |
| Zinc (aqua regia extractable) | mg/kg | 1 | MCERTS | 27 | 45 | 500 | 25 | 120 |



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**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801756 | 801757 | 801758 | 801759 | 801760 |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | DS208 | DS209 | DS209 | DS210 | DS210 |
| **Sample Number** | | | | 1 | 1 | 1 | 1 | 1 |
| **Depth (m)** | | | | 1.00 | 1.00 | 1.40 | 1.00 | 1.60 |
| **Date Sampled** | | | | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **Monoaromatics** | | | | | | | | |
| Benzene | ug/kg | 1 | MCERTS | - | - | - | - | - |
| Toluene | µg/kg | 1 | MCERTS | - | - | - | - | - |
| Ethylbenzene | µg/kg | 1 | MCERTS | - | - | - | - | - |
| p & m-xylene | µg/kg | 1 | MCERTS | - | - | - | - | - |
| o-xylene | µg/kg | 1 | MCERTS | - | - | - | - | - |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | - | - | - | - | - |
| **Petroleum Hydrocarbons** | | | | | | | | |
| TPH4 (C10 - C20) | mg/kg | 10 | MCERTS | - | < 10 | - | < 10 | - |
| TPH4 (C20 - C30) | mg/kg | 10 | NONE | - | < 10 | - | < 10 | - |
| TPH4 (C30 - C40) | mg/kg | 10 | NONE | - | < 10 | - | < 10 | - |
| **TPH4 (C10 - C40)** | mg/kg | 10 | MCERTS | - | < 10 | - | < 10 | - |
| TPH-CWG - Aliphatic >EC5 - EC6 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC6 - EC8 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC10 - EC12 | mg/kg | 1 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC12 - EC16 | mg/kg | 2 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC16 - EC21 | mg/kg | 8 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC21 - EC35 | mg/kg | 8 | MCERTS | - | - | - | - | - |
| **TPH-CWG - Aliphatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC5 - EC7 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC7 - EC8 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC10 - EC12 | mg/kg | 1 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC12 - EC16 | mg/kg | 2 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC16 - EC21 | mg/kg | 10 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC21 - EC35 | mg/kg | 10 | MCERTS | - | - | - | - | - |
| **TPH-CWG - Aromatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | - | - | - | - | - |



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**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801756 | 801757 | 801758 | 801759 | 801760 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | DS208 | DS209 | DS209 | DS210 | DS210 |
| Sample Number | | | | 1 | 1 | 1 | 1 | 1 |
| Depth (m) | | | | 1.00 | 1.00 | 1.40 | 1.00 | 1.60 |
| Date Sampled | | | | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **SVOCs** | | | | | | | | |
| Aniline | mg/kg | 0.1 | NONE | - | - | - | - | - |
| Phenol | mg/kg | 0.2 | ISO 17025 | - | - | - | - | - |
| 2-Chlorophenol | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| Bis(2-chloroethyl)ether | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 1,3-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 1,2-Dichlorobenzene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 1,4-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Bis(2-chloroisopropyl)ether | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 2-Methylphenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Hexachloroethane | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Nitrobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 4-Methylphenol | mg/kg | 0.2 | NONE | - | - | - | - | - |
| Isophorone | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 2-Nitrophenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 2,4-Dimethylphenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Bis(2-chloroethoxy)methane | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 1,2,4-Trichlorobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Naphthalene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| 2,4-Dichlorophenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 4-Chloroaniline | mg/kg | 0.1 | NONE | - | - | - | - | - |
| Hexachlorobutadiene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 4-Chloro-3-methylphenol | mg/kg | 0.1 | NONE | - | - | - | - | - |
| 2,4,6-Trichlorophenol | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 2,4,5-Trichlorophenol | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 2-Methylnaphthalene | mg/kg | 0.1 | NONE | - | - | - | - | - |
| 2-Chloronaphthalene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| Dimethylphthalate | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 2,6-Dinitrotoluene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Acenaphthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| 2,4-Dinitrotoluene | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Dibenzofuran | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 4-Chlorophenyl phenyl ether | mg/kg | 0.3 | ISO 17025 | - | - | - | - | - |
| Diethyl phthalate | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 4-Nitroaniline | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Fluorene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Azobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Bromophenyl phenyl ether | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Hexachlorobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Phenanthrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Anthracene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Carbazole | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Dibutyl phthalate | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Anthraquinone | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Fluoranthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Pyrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Butyl benzyl phthalate | mg/kg | 0.3 | ISO 17025 | - | - | - | - | - |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Chrysene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801761 | 801762 | 801763 | 801764 | 801765 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | DS211 | DS211 | DS212 | DS213 | DS214 |
| Sample Number | | | | 1 | 1 | 1 | 1 | 1 |
| Depth (m) | | | | 0.60 | 4.20 | 0.50 | 1.00 | 0.50 |
| Date Sampled | | | | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| Stone Content | % | 0.1 | NONE | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Moisture Content | % | N/A | NONE | 13 | 17 | 15 | 13 | 11 |
| Total mass of sample received | kg | 0.001 | NONE | 0.39 | 0.48 | 0.42 | 0.38 | 0.35 |
| **General Inorganics** | | | | | | | | |
| pH - Automated | pH Units | N/A | MCERTS | 8.4 | 8.4 | 8.3 | 8.3 | 8.2 |
| Total Organic Carbon (TOC) | % | 0.1 | MCERTS | - | - | - | - | - |
| **Speciated PAHs** | | | | | | | | |
| Naphthalene | mg/kg | 0.05 | MCERTS | < 0.05 | - | - | - | - |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | < 0.05 | - | - | - | - |
| Acenaphthene | mg/kg | 0.05 | MCERTS | < 0.05 | - | - | - | - |
| Fluorene | mg/kg | 0.05 | MCERTS | < 0.05 | - | - | - | - |
| Phenanthrene | mg/kg | 0.05 | MCERTS | < 0.05 | - | - | - | - |
| Anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | - | - | - | - |
| Fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | - | - | - | - |
| Pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | - | - | - | - |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | - | - | - | - |
| Chrysene | mg/kg | 0.05 | MCERTS | < 0.05 | - | - | - | - |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | - | - | - | - |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | - | - | - | - |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | - | - | - | - |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | - | - | - | - |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | - | - | - | - |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | < 0.05 | - | - | - | - |
| **Total PAH** | | | | | | | | |
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | < 0.80 | - | - | - | - |
| **Heavy Metals / Metalloids** | | | | | | | | |
| Arsenic (aqua regia extractable) | mg/kg | 1 | MCERTS | 5.2 | 3.5 | 27 | 8.6 | 4.0 |
| Boron (water soluble) | mg/kg | 0.2 | MCERTS | 0.5 | 0.4 | 0.3 | 0.4 | 0.8 |
| Cadmium (aqua regia extractable) | mg/kg | 0.2 | MCERTS | < 0.2 | < 0.2 | < 0.2 | < 0.2 | 0.3 |
| Chromium (hexavalent) | mg/kg | 4 | MCERTS | < 4.0 | < 4.0 | < 4.0 | < 4.0 | < 4.0 |
| Chromium (aqua regia extractable) | mg/kg | 1 | MCERTS | 11 | 6.8 | 9.3 | 7.8 | 11 |
| Copper (aqua regia extractable) | mg/kg | 1 | MCERTS | 12 | 8.4 | 10 | 13 | 17 |
| Lead (aqua regia extractable) | mg/kg | 1 | MCERTS | 6.4 | 5.3 | 4.6 | 6.3 | 10 |
| Mercury (aqua regia extractable) | mg/kg | 0.3 | MCERTS | < 0.3 | < 0.3 | < 0.3 | < 0.3 | 0.3 |
| Nickel (aqua regia extractable) | mg/kg | 1 | MCERTS | 12 | 8.6 | 10 | 11 | 15 |
| Selenium (aqua regia extractable) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | 1.2 | < 1.0 |
| Vanadium (aqua regia extractable) | mg/kg | 1 | MCERTS | 14 | 9.6 | 16 | 13 | 15 |
| Zinc (aqua regia extractable) | mg/kg | 1 | MCERTS | 26 | 18 | 20 | 21 | 30 |



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**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801761 | 801762 | 801763 | 801764 | 801765 |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | DS211 | DS211 | DS212 | DS213 | DS214 |
| **Sample Number** | | | | 1 | 1 | 1 | 1 | 1 |
| **Depth (m)** | | | | 0.60 | 4.20 | 0.50 | 1.00 | 0.50 |
| **Date Sampled** | | | | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **Monoaromatics** | | | | | | | | |
| Benzene | ug/kg | 1 | MCERTS | - | - | - | - | - |
| Toluene | µg/kg | 1 | MCERTS | - | - | - | - | - |
| Ethylbenzene | µg/kg | 1 | MCERTS | - | - | - | - | - |
| p & m-xylene | µg/kg | 1 | MCERTS | - | - | - | - | - |
| o-xylene | µg/kg | 1 | MCERTS | - | - | - | - | - |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | - | - | - | - | - |
| **Petroleum Hydrocarbons** | | | | | | | | |
| TPH4 (C10 - C20) | mg/kg | 10 | MCERTS | < 10 | - | - | - | - |
| TPH4 (C20 - C30) | mg/kg | 10 | NONE | < 10 | - | - | - | - |
| TPH4 (C30 - C40) | mg/kg | 10 | NONE | < 10 | - | - | - | - |
| **TPH4 (C10 - C40)** | mg/kg | 10 | MCERTS | < 10 | - | - | - | - |
| TPH-CWG - Aliphatic >EC5 - EC6 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC6 - EC8 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC10 - EC12 | mg/kg | 1 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC12 - EC16 | mg/kg | 2 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC16 - EC21 | mg/kg | 8 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aliphatic >EC21 - EC35 | mg/kg | 8 | MCERTS | - | - | - | - | - |
| **TPH-CWG - Aliphatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC5 - EC7 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC7 - EC8 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC10 - EC12 | mg/kg | 1 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC12 - EC16 | mg/kg | 2 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC16 - EC21 | mg/kg | 10 | MCERTS | - | - | - | - | - |
| TPH-CWG - Aromatic >EC21 - EC35 | mg/kg | 10 | MCERTS | - | - | - | - | - |
| **TPH-CWG - Aromatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | - | - | - | - | - |



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**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801761 | 801762 | 801763 | 801764 | 801765 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | DS211 | DS211 | DS212 | DS213 | DS214 |
| Sample Number | | | | 1 | 1 | 1 | 1 | 1 |
| Depth (m) | | | | 0.60 | 4.20 | 0.50 | 1.00 | 0.50 |
| Date Sampled | | | | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 | 15/08/2017 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **SVOCs** | | | | | | | | |
| Aniline | mg/kg | 0.1 | NONE | - | - | - | - | - |
| Phenol | mg/kg | 0.2 | ISO 17025 | - | - | - | - | - |
| 2-Chlorophenol | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| Bis(2-chloroethyl)ether | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 1,3-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 1,2-Dichlorobenzene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 1,4-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Bis(2-chloroisopropyl)ether | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 2-Methylphenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Hexachloroethane | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Nitrobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 4-Methylphenol | mg/kg | 0.2 | NONE | - | - | - | - | - |
| Isophorone | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 2-Nitrophenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 2,4-Dimethylphenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Bis(2-chloroethoxy)methane | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 1,2,4-Trichlorobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Naphthalene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| 2,4-Dichlorophenol | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| 4-Chloroaniline | mg/kg | 0.1 | NONE | - | - | - | - | - |
| Hexachlorobutadiene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 4-Chloro-3-methylphenol | mg/kg | 0.1 | NONE | - | - | - | - | - |
| 2,4,6-Trichlorophenol | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 2,4,5-Trichlorophenol | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 2-Methylnaphthalene | mg/kg | 0.1 | NONE | - | - | - | - | - |
| 2-Chloronaphthalene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| Dimethylphthalate | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| 2,6-Dinitrotoluene | mg/kg | 0.1 | MCERTS | - | - | - | - | - |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Acenaphthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| 2,4-Dinitrotoluene | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Dibenzofuran | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 4-Chlorophenyl phenyl ether | mg/kg | 0.3 | ISO 17025 | - | - | - | - | - |
| Diethyl phthalate | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| 4-Nitroaniline | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Fluorene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Azobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Bromophenyl phenyl ether | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Hexachlorobenzene | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Phenanthrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Anthracene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Carbazole | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Dibutyl phthalate | mg/kg | 0.2 | MCERTS | - | - | - | - | - |
| Anthraquinone | mg/kg | 0.3 | MCERTS | - | - | - | - | - |
| Fluoranthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Pyrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Butyl benzyl phthalate | mg/kg | 0.3 | ISO 17025 | - | - | - | - | - |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Chrysene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | - | - | - | - | - |



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801766 | 801767 | | | |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | DS214 | DS215 | | | |
| Sample Number | | | | 1 | 1 | | | |
| Depth (m) | | | | 0.90 | 1.00 | | | |
| Date Sampled | | | | 15/08/2017 | 15/08/2017 | | | |
| Time Taken | | | | None Supplied | None Supplied | | | |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| Stone Content | % | 0.1 | NONE | < 0.1 | < 0.1 | | | |
| Moisture Content | % | N/A | NONE | 12 | 13 | | | |
| Total mass of sample received | kg | 0.001 | NONE | 0.31 | 0.39 | | | |
| **General Inorganics** | | | | | | | | |
| pH - Automated | pH Units | N/A | MCERTS | 7.9 | 8.4 | | | |
| Total Organic Carbon (TOC) | % | 0.1 | MCERTS | 2.4 | - | | | |
| **Speciated PAHs** | | | | | | | | |
| Naphthalene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Acenaphthene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Fluorene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Phenanthrene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Anthracene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Fluoranthene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Pyrene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Chrysene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | - | - | | | |
| **Total PAH** | | | | | | | | |
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | - | - | | | |
| **Heavy Metals / Metalloids** | | | | | | | | |
| Arsenic (aqua regia extractable) | mg/kg | 1 | MCERTS | 14 | 5.8 | | | |
| Boron (water soluble) | mg/kg | 0.2 | MCERTS | 2.9 | 0.7 | | | |
| Cadmium (aqua regia extractable) | mg/kg | 0.2 | MCERTS | 1.5 | < 0.2 | | | |
| Chromium (hexavalent) | mg/kg | 4 | MCERTS | < 4.0 | < 4.0 | | | |
| Chromium (aqua regia extractable) | mg/kg | 1 | MCERTS | 25 | 16 | | | |
| Copper (aqua regia extractable) | mg/kg | 1 | MCERTS | 240 | 14 | | | |
| Lead (aqua regia extractable) | mg/kg | 1 | MCERTS | 450 | 8.7 | | | |
| Mercury (aqua regia extractable) | mg/kg | 0.3 | MCERTS | 0.5 | < 0.3 | | | |
| Nickel (aqua regia extractable) | mg/kg | 1 | MCERTS | 67 | 19 | | | |
| Selenium (aqua regia extractable) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | | | |
| Vanadium (aqua regia extractable) | mg/kg | 1 | MCERTS | 21 | 23 | | | |
| Zinc (aqua regia extractable) | mg/kg | 1 | MCERTS | 210 | 46 | | | |



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**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| **Lab Sample Number** | | | | 801766 | 801767 | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | DS214 | DS215 | | | |
| **Sample Number** | | | | 1 | 1 | | | |
| **Depth (m)** | | | | 0.90 | 1.00 | | | |
| **Date Sampled** | | | | 15/08/2017 | 15/08/2017 | | | |
| **Time Taken** | | | | None Supplied | None Supplied | | | |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **Monoaromatics** | | | | | | | | |
| Benzene | ug/kg | 1 | MCERTS | - | - | | | |
| Toluene | µg/kg | 1 | MCERTS | - | - | | | |
| Ethylbenzene | µg/kg | 1 | MCERTS | - | - | | | |
| p & m-xylene | µg/kg | 1 | MCERTS | - | - | | | |
| o-xylene | µg/kg | 1 | MCERTS | - | - | | | |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | - | - | | | |

**Petroleum Hydrocarbons**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TPH4 (C10 - C20) | mg/kg | 10 | MCERTS | - | - | | | |
| TPH4 (C20 - C30) | mg/kg | 10 | NONE | - | - | | | |
| TPH4 (C30 - C40) | mg/kg | 10 | NONE | - | - | | | |
| **TPH4 (C10 - C40)** | mg/kg | 10 | MCERTS | - | - | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TPH-CWG - Aliphatic >EC5 - EC6 | mg/kg | 0.001 | MCERTS | - | - | | | |
| TPH-CWG - Aliphatic >EC6 - EC8 | mg/kg | 0.001 | MCERTS | - | - | | | |
| TPH-CWG - Aliphatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | - | - | | | |
| TPH-CWG - Aliphatic >EC10 - EC12 | mg/kg | 1 | MCERTS | - | - | | | |
| TPH-CWG - Aliphatic >EC12 - EC16 | mg/kg | 2 | MCERTS | - | - | | | |
| TPH-CWG - Aliphatic >EC16 - EC21 | mg/kg | 8 | MCERTS | - | - | | | |
| TPH-CWG - Aliphatic >EC21 - EC35 | mg/kg | 8 | MCERTS | - | - | | | |
| **TPH-CWG - Aliphatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | - | - | | | |

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



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**Analytical Report Number: 17-57817**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 801766 | 801767 | | | |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | DS214 | DS215 | | | |
| Sample Number | | | | 1 | 1 | | | |
| Depth (m) | | | | 0.90 | 1.00 | | | |
| Date Sampled | | | | 15/08/2017 | 15/08/2017 | | | |
| Time Taken | | | | None Supplied | None Supplied | | | |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **SVOCs** | | | | | | | | |
| Aniline | mg/kg | 0.1 | NONE | - | - | | | |
| Phenol | mg/kg | 0.2 | ISO 17025 | - | - | | | |
| 2-Chlorophenol | mg/kg | 0.1 | MCERTS | - | - | | | |
| Bis(2-chloroethyl)ether | mg/kg | 0.2 | MCERTS | - | - | | | |
| 1,3-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - | - | | | |
| 1,2-Dichlorobenzene | mg/kg | 0.1 | MCERTS | - | - | | | |
| 1,4-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - | - | | | |
| Bis(2-chloroisopropyl)ether | mg/kg | 0.1 | MCERTS | - | - | | | |
| 2-Methylphenol | mg/kg | 0.3 | MCERTS | - | - | | | |
| Hexachloroethane | mg/kg | 0.05 | MCERTS | - | - | | | |
| Nitrobenzene | mg/kg | 0.3 | MCERTS | - | - | | | |
| 4-Methylphenol | mg/kg | 0.2 | NONE | - | - | | | |
| Isophorone | mg/kg | 0.2 | MCERTS | - | - | | | |
| 2-Nitrophenol | mg/kg | 0.3 | MCERTS | - | - | | | |
| 2,4-Dimethylphenol | mg/kg | 0.3 | MCERTS | - | - | | | |
| Bis(2-chloroethoxy)methane | mg/kg | 0.3 | MCERTS | - | - | | | |
| 1,2,4-Trichlorobenzene | mg/kg | 0.3 | MCERTS | - | - | | | |
| Naphthalene | mg/kg | 0.05 | MCERTS | - | - | | | |
| 2,4-Dichlorophenol | mg/kg | 0.3 | MCERTS | - | - | | | |
| 4-Chloroaniline | mg/kg | 0.1 | NONE | - | - | | | |
| Hexachlorobutadiene | mg/kg | 0.1 | MCERTS | - | - | | | |
| 4-Chloro-3-methylphenol | mg/kg | 0.1 | NONE | - | - | | | |
| 2,4,6-Trichlorophenol | mg/kg | 0.1 | MCERTS | - | - | | | |
| 2,4,5-Trichlorophenol | mg/kg | 0.2 | MCERTS | - | - | | | |
| 2-Methylnaphthalene | mg/kg | 0.1 | NONE | - | - | | | |
| 2-Chloronaphthalene | mg/kg | 0.1 | MCERTS | - | - | | | |
| Dimethylphthalate | mg/kg | 0.1 | MCERTS | - | - | | | |
| 2,6-Dinitrotoluene | mg/kg | 0.1 | MCERTS | - | - | | | |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Acenaphthene | mg/kg | 0.05 | MCERTS | - | - | | | |
| 2,4-Dinitrotoluene | mg/kg | 0.2 | MCERTS | - | - | | | |
| Dibenzofuran | mg/kg | 0.2 | MCERTS | - | - | | | |
| 4-Chlorophenyl phenyl ether | mg/kg | 0.3 | ISO 17025 | - | - | | | |
| Diethyl phthalate | mg/kg | 0.2 | MCERTS | - | - | | | |
| 4-Nitroaniline | mg/kg | 0.2 | MCERTS | - | - | | | |
| Fluorene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Azobenzene | mg/kg | 0.3 | MCERTS | - | - | | | |
| Bromophenyl phenyl ether | mg/kg | 0.2 | MCERTS | - | - | | | |
| Hexachlorobenzene | mg/kg | 0.3 | MCERTS | - | - | | | |
| Phenanthrene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Anthracene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Carbazole | mg/kg | 0.3 | MCERTS | - | - | | | |
| Dibutyl phthalate | mg/kg | 0.2 | MCERTS | - | - | | | |
| Anthraquinone | mg/kg | 0.3 | MCERTS | - | - | | | |
| Fluoranthene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Pyrene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Butyl benzyl phthalate | mg/kg | 0.3 | ISO 17025 | - | - | | | |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Chrysene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | - | - | | | |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | - | - | | | |



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**Analytical Report Number : 17-57817**

**Project / Site name: Elsenham**

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

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

| Lab Sample Number | Sample Reference | Sample Number | Depth (m) | Sample Description * |
|---|---|---|---|---|
| 801736 | BH104 | 1 | 1.00 | Brown clay with gravel and vegetation. |
| 801737 | BH104 | 1 | 2.20 | Grey sandy clay. |
| 801738 | BH104 | 1 | 3.50 | Grey sandy clay. |
| 801739 | BH103 | 1 | 1.50 | Light brown sandy clay with gravel. |
| 801740 | BH103 | 1 | 2.00 | Light brown sand with gravel and stones. |
| 801741 | BH103 | 1 | 3.20 | Brown clay. |
| 801742 | BH102 | 1 | 1.00 | Light brown clay and sand with chalk and gravel. |
| 801743 | BH102 | 1 | 1.45 | Light brown clay and sand with chalk and gravel. |
| 801744 | BH102 | 1 | 1.80 | Brown clay and sand with gravel and paper. |
| 801745 | BH102 | 1 | 4.00 | Brown loam and sand with vegetation and brick. |
| 801746 | BH102 | 1 | 5.90 | Light brown clay and sand with chalk and gravel. |
| 801747 | DS201 | 1 | 1.00 | Light brown clay and sand with gravel. |
| 801748 | DS201 | 1 | 2.00 | Brown clay and sand with gravel. |
| 801749 | DS202 | 1 | 0.20 | Light brown clay and sand with gravel. |
| 801750 | DS203 | 1 | 1.00 | Light brown clay and sand with chalk and gravel. |
| 801751 | DS203 | 1 | 1.80 | Brown clay and sand with rubble and plastic. |
| 801752 | DS204 | 1 | 0.50 | Beige clay and sand with chalk and gravel. |
| 801753 | DS205 | 1 | 1.00 | Light brown clay and sand with chalk and gravel. |
| 801754 | DS206 | 1 | 1.00 | Light brown clay and sand with chalk and gravel. |
| 801755 | DS207 | 1 | 0.90 | Light brown clay and sand with chalk and gravel. |
| 801756 | DS208 | 1 | 1.00 | Beige clay and sand with chalk and gravel. |
| 801757 | DS209 | 1 | 1.00 | Light brown clay and sand with chalk and gravel. |
| 801758 | DS209 | 1 | 1.40 | Brown clay and sand with vegetation and brick. |
| 801759 | DS210 | 1 | 1.00 | Light brown clay and sand with chalk and gravel. |
| 801760 | DS210 | 1 | 1.60 | Brown clay and sand with gravel and brick. |
| 801761 | DS211 | 1 | 0.60 | Light brown clay and sand with chalk and gravel. |
| 801762 | DS211 | 1 | 4.20 | Beige sandy clay with chalk and gravel. |
| 801763 | DS212 | 1 | 0.50 | Beige clay and sand with chalk and gravel. |
| 801764 | DS213 | 1 | 1.00 | Beige clay and sand with chalk and vegetation. |
| 801765 | DS214 | 1 | 0.50 | Grey clay and sand with chalk and vegetation. |
| 801766 | DS214 | 1 | 0.90 | Brown clay and sand with brick and plastic. |
| 801767 | DS215 | 1 | 1.00 | Light brown clay and sand with chalk and gravel. |



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**Analytical Report Number : 17-57817**

**Project / Site name: Elsenham**

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

| Analytical Test Name | Analytical Method Description | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|---|---|---|---|---|---|
| Boron, water soluble, in soil | Determination of water soluble boron in soil by hot water extract followed by ICP-OES. | In-house method based on Second Site Properties version 3 | L038-PL | D | MCERTS |
| BTEX and MTBE in soil (Monoaromatics) | Determination of BTEX in soil by headspace GC-MS. | In-house method based on USEPA8260 | L073B-PL | W | MCERTS |
| Hexavalent chromium in soil | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry. | In-house method | L080-PL | W | MCERTS |
| Metals in soil by ICP-OES | Determination of metals in soil by aqua-regia digestion followed by ICP-OES. | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil. | L038-PL | D | MCERTS |
| Moisture Content | Moisture content, determined gravimetrically. | In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests | L019-UK/PL | W | NONE |
| pH in soil (automated) | Determination of pH in soil by addition of water followed by automated electrometric measurement. | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests | L099-PL | D | MCERTS |
| Semi-volatile organic compounds in soil | Determination of semi-volatile organic compounds in soil by extraction in dichloromethane and hexane followed by GC-MS. | In-house method based on USEPA 8270 | L064-PL | D | MCERTS |
| Speciated EPA-16 PAHs in soil | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards. | In-house method based on USEPA 8270 | L064-PL | D | MCERTS |
| Stones content of soil | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight. | In-house method based on British Standard Methods and MCERTS requirements. | L019-UK/PL | D | NONE |
| Total organic carbon (Automated) in soil | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate. | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests"" | L009-PL | D | MCERTS |
| TPH4 (Soil) | Determination of TPH bands by HS-GC-MS/GC-FID | In-house method | L076-PL | D | MCERTS |
| TPHCWG (Soil) | Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID. | In-house method | L088/76-PL | W | MCERTS |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**
**For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.**
**Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.**


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# Analytical Report Number : 17-57566

| | | | |
|---|---|---|---|
| **Project / Site name:** | Elsenham | **Samples received on:** | 15/08/2017 |
| **Your job number:** | 17090J | **Samples instructed on:** | 17/08/2017 |
| **Your order number:** | | **Analysis completed by:** | 23/08/2017 |
| **Report Issue Number:** | 1 | **Report issued on:** | 23/08/2017 |
| **Samples Analysed:** | 7 water samples | | |

**Signed:**

Dr Irma Doyle
Senior Account Manager
**For & on behalf of i2 Analytical Ltd.**

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

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

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

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

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**Analytical Report Number: 17-57566**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 800339 | 800340 | 800341 | 800342 | 800343 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | BH101 | BH102 | BH103 | BH104 | BH105 |
| Sample Number | | | | 1 | 1 | 1 | 1 | 1 |
| Depth (m) | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Date Sampled | | | | 16/08/2017 | 16/08/2017 | 16/08/2017 | 16/08/2017 | 16/08/2017 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Water Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **General Inorganics** | | | | | | | | |
| pH | pH Units | N/A | ISO 17025 | 6.9 | 7.2 | 7.0 | 6.9 | 7.1 |
| **Speciated PAHs** | | | | | | | | |
| Naphthalene | µg/l | 0.01 | ISO 17025 | < 0.01 | 3.57 | < 0.01 | < 0.01 | < 0.01 |
| Acenaphthylene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Acenaphthene | µg/l | 0.01 | ISO 17025 | < 0.01 | 1.24 | < 0.01 | < 0.01 | < 0.01 |
| Fluorene | µg/l | 0.01 | ISO 17025 | < 0.01 | 0.61 | < 0.01 | < 0.01 | < 0.01 |
| Phenanthrene | µg/l | 0.01 | ISO 17025 | < 0.01 | 0.76 | < 0.01 | < 0.01 | < 0.01 |
| Anthracene | µg/l | 0.01 | ISO 17025 | < 0.01 | 0.28 | < 0.01 | < 0.01 | < 0.01 |
| Fluoranthene | µg/l | 0.01 | ISO 17025 | < 0.01 | 0.26 | < 0.01 | < 0.01 | < 0.01 |
| Pyrene | µg/l | 0.01 | ISO 17025 | < 0.01 | 0.34 | < 0.01 | < 0.01 | < 0.01 |
| Benzo(a)anthracene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Chrysene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Benzo(b)fluoranthene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Benzo(k)fluoranthene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Benzo(a)pyrene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Indeno(1,2,3-cd)pyrene | µg/l | 0.01 | NONE | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Dibenz(a,h)anthracene | µg/l | 0.01 | NONE | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Benzo(ghi)perylene | µg/l | 0.01 | NONE | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| **Total PAH** | | | | | | | | |
| Total EPA-16 PAHs | µg/l | 0.16 | NONE | < 0.16 | 7.06 | < 0.16 | < 0.16 | < 0.16 |
| **Heavy Metals / Metalloids** | | | | | | | | |
| Arsenic (dissolved) | µg/l | 0.15 | ISO 17025 | 0.83 | 9.63 | 0.89 | 9.70 | 6.18 |
| Boron (dissolved) | µg/l | 10 | ISO 17025 | 13 | 2400 | 48 | 120 | 360 |
| Cadmium (dissolved) | µg/l | 0.02 | ISO 17025 | 0.06 | 0.03 | 0.03 | < 0.02 | 0.02 |
| Chromium (hexavalent) | µg/l | 5 | ISO 17025 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Chromium (dissolved) | µg/l | 0.2 | ISO 17025 | 0.3 | 10 | 0.2 | 0.2 | 0.4 |
| Copper (dissolved) | µg/l | 0.5 | ISO 17025 | 3.7 | 7.5 | 5.7 | 5.0 | 5.8 |
| Lead (dissolved) | µg/l | 0.2 | ISO 17025 | 0.5 | 10 | < 0.2 | < 0.2 | 0.4 |
| Mercury (dissolved) | µg/l | 0.05 | ISO 17025 | < 0.05 | 0.09 | 0.10 | 0.18 | 0.05 |
| Nickel (dissolved) | µg/l | 0.5 | ISO 17025 | 15 | 66 | 9.1 | 8.4 | 21 |
| Selenium (dissolved) | µg/l | 0.6 | ISO 17025 | 20 | 14 | < 0.6 | 28 | 5.5 |
| Vanadium (dissolved) | µg/l | 0.2 | ISO 17025 | 0.6 | 3.4 | 0.3 | 1.2 | 0.7 |
| Zinc (dissolved) | µg/l | 0.5 | ISO 17025 | 8.7 | 25 | 4.8 | 5.5 | 9.4 |



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**Analytical Report Number: 17-57566**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 800339 | 800340 | 800341 | 800342 | 800343 |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | BH101 | BH102 | BH103 | BH104 | BH105 |
| **Sample Number** | | | | 1 | 1 | 1 | 1 | 1 |
| **Depth (m)** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Date Sampled** | | | | 16/08/2017 | 16/08/2017 | 16/08/2017 | 16/08/2017 | 16/08/2017 |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Water Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **Monoaromatics** | | | | | | | | |
| Benzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Toluene | µg/l | 1 | ISO 17025 | < 1.0 | 365 | < 1.0 | < 1.0 | < 1.0 |
| Ethylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | 487 | < 1.0 | < 1.0 | < 1.0 |
| p & m-xylene | µg/l | 1 | ISO 17025 | < 1.0 | 941 | < 1.0 | < 1.0 | < 1.0 |
| o-xylene | µg/l | 1 | ISO 17025 | < 1.0 | 260 | < 1.0 | < 1.0 | < 1.0 |
| MTBE (Methyl Tertiary Butyl Ether) | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| **Petroleum Hydrocarbons** | | | | | | | | |
| TPH-CWG - Aliphatic >C5 - C6 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| TPH-CWG - Aliphatic >C6 - C8 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| TPH-CWG - Aliphatic >C8 - C10 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| TPH-CWG - Aliphatic >C10 - C12 | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aliphatic >C12 - C16 | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aliphatic >C16 - C21 | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aliphatic >C21 - C35 | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| **TPH-CWG - Aliphatic (C5 - C35)** | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aromatic >C5 - C7 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| TPH-CWG - Aromatic >C7 - C8 | µg/l | 1 | ISO 17025 | < 1.0 | 360 | < 1.0 | < 1.0 | < 1.0 |
| TPH-CWG - Aromatic >C8 - C10 | µg/l | 1 | ISO 17025 | < 1.0 | 1700 | < 1.0 | < 1.0 | < 1.0 |
| TPH-CWG - Aromatic >C10 - C12 | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aromatic >C12 - C16 | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aromatic >C16 - C21 | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aromatic >C21 - C35 | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| **TPH-CWG - Aromatic (C5 - C35)** | µg/l | 10 | NONE | < 10 | 2100 | < 10 | < 10 | < 10 |



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-57566**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 800339 | 800340 | 800341 | 800342 | 800343 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | BH101 | BH102 | BH103 | BH104 | BH105 |
| Sample Number | | | | 1 | 1 | 1 | 1 | 1 |
| Depth (m) | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Date Sampled | | | | 16/08/2017 | 16/08/2017 | 16/08/2017 | 16/08/2017 | 16/08/2017 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Water Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **VOCs** | | | | | | | | |
| Chloromethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Chloroethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Bromomethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Vinyl Chloride | µg/l | 1 | NONE | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Trichlorofluoromethane | µg/l | 1 | NONE | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,1-Dichloroethene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Cis-1,2-dichloroethene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| MTBE (Methyl Tertiary Butyl Ether) | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,1-Dichloroethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 2,2-Dichloropropane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Trichloromethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,1,1-Trichloroethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,2-Dichloroethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,1-Dichloropropene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Trans-1,2-dichloroethene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Benzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Tetrachloromethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,2-Dichloropropane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Trichloroethene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Dibromomethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Bromodichloromethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Cis-1,3-dichloropropene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Trans-1,3-dichloropropene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Toluene | µg/l | 1 | ISO 17025 | < 1.0 | 365 | < 1.0 | < 1.0 | < 1.0 |
| 1,1,2-Trichloroethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,3-Dichloropropane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Dibromochloromethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Tetrachloroethene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,2-Dibromoethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Chlorobenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,1,1,2-Tetrachloroethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Ethylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | 487 | < 1.0 | < 1.0 | < 1.0 |
| p & m-Xylene | µg/l | 1 | ISO 17025 | < 1.0 | 941 | < 1.0 | < 1.0 | < 1.0 |
| Styrene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Tribromomethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| o-Xylene | µg/l | 1 | ISO 17025 | < 1.0 | 260 | < 1.0 | < 1.0 | < 1.0 |
| 1,1,2,2-Tetrachloroethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Isopropylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Bromobenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| n-Propylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 2-Chlorotoluene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 4-Chlorotoluene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,3,5-Trimethylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| tert-Butylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,2,4-Trimethylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| sec-Butylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,3-Dichlorobenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| p-Isopropyltoluene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,2-Dichlorobenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,4-Dichlorobenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Butylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,2-Dibromo-3-chloropropane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,2,4-Trichlorobenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Hexachlorobutadiene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,2,3-Trichlorobenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |

U/S = Unsuitable Sample  I/S = Insufficient Sample



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-57566**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 800344 | 800345 | | | |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | SW302 | SW303 | | | |
| Sample Number | | | | 1 | 1 | | | |
| Depth (m) | | | | None Supplied | None Supplied | | | |
| Date Sampled | | | | 15/08/2017 | 15/08/2017 | | | |
| Time Taken | | | | None Supplied | None Supplied | | | |
| **Analytical Parameter (Water Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **General Inorganics** | | | | | | | | |
| pH | pH Units | N/A | ISO 17025 | 8.0 | 8.1 | | | |
| **Speciated PAHs** | | | | | | | | |
| Naphthalene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Acenaphthylene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Acenaphthene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Fluorene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Phenanthrene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Anthracene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Fluoranthene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Pyrene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Benzo(a)anthracene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Chrysene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Benzo(b)fluoranthene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Benzo(k)fluoranthene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Benzo(a)pyrene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Indeno(1,2,3-cd)pyrene | µg/l | 0.01 | NONE | < 0.01 | < 0.01 | | | |
| Dibenz(a,h)anthracene | µg/l | 0.01 | NONE | < 0.01 | < 0.01 | | | |
| Benzo(ghi)perylene | µg/l | 0.01 | NONE | < 0.01 | < 0.01 | | | |
| **Total PAH** | | | | | | | | |
| Total EPA-16 PAHs | µg/l | 0.16 | NONE | < 0.16 | < 0.16 | | | |
| **Heavy Metals / Metalloids** | | | | | | | | |
| Arsenic (dissolved) | µg/l | 0.15 | ISO 17025 | 0.79 | 0.87 | | | |
| Boron (dissolved) | µg/l | 10 | ISO 17025 | 180 | 170 | | | |
| Cadmium (dissolved) | µg/l | 0.02 | ISO 17025 | < 0.02 | < 0.02 | | | |
| Chromium (hexavalent) | µg/l | 5 | ISO 17025 | < 5.0 | < 5.0 | | | |
| Chromium (dissolved) | µg/l | 0.2 | ISO 17025 | 0.4 | 0.3 | | | |
| Copper (dissolved) | µg/l | 0.5 | ISO 17025 | 3.9 | 5.6 | | | |
| Lead (dissolved) | µg/l | 0.2 | ISO 17025 | 0.3 | < 0.2 | | | |
| Mercury (dissolved) | µg/l | 0.05 | ISO 17025 | < 0.05 | < 0.05 | | | |
| Nickel (dissolved) | µg/l | 0.5 | ISO 17025 | 5.9 | 4.2 | | | |
| Selenium (dissolved) | µg/l | 0.6 | ISO 17025 | 4.1 | 3.8 | | | |
| Vanadium (dissolved) | µg/l | 0.2 | ISO 17025 | 0.6 | 0.7 | | | |
| Zinc (dissolved) | µg/l | 0.5 | ISO 17025 | 6.0 | 2.9 | | | |



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-57566**

**Project / Site name: Elsenham**

| **Lab Sample Number** | | | | 800344 | 800345 | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | SW302 | SW303 | | | |
| **Sample Number** | | | | 1 | 1 | | | |
| **Depth (m)** | | | | None Supplied | None Supplied | | | |
| **Date Sampled** | | | | 15/08/2017 | 15/08/2017 | | | |
| **Time Taken** | | | | None Supplied | None Supplied | | | |
| **Analytical Parameter (Water Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **Monoaromatics** | | | | | | | | |
| Benzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Toluene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Ethylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| p & m-xylene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| o-xylene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| MTBE (Methyl Tertiary Butyl Ether) | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| **Petroleum Hydrocarbons** | | | | | | | | |
| TPH-CWG - Aliphatic >C5 - C6 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| TPH-CWG - Aliphatic >C6 - C8 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| TPH-CWG - Aliphatic >C8 - C10 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| TPH-CWG - Aliphatic >C10 - C12 | µg/l | 10 | NONE | < 10 | < 10 | | | |
| TPH-CWG - Aliphatic >C12 - C16 | µg/l | 10 | NONE | < 10 | < 10 | | | |
| TPH-CWG - Aliphatic >C16 - C21 | µg/l | 10 | NONE | < 10 | < 10 | | | |
| TPH-CWG - Aliphatic >C21 - C35 | µg/l | 10 | NONE | < 10 | < 10 | | | |
| **TPH-CWG - Aliphatic (C5 - C35)** | µg/l | 10 | NONE | < 10 | < 10 | | | |
| TPH-CWG - Aromatic >C5 - C7 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| TPH-CWG - Aromatic >C7 - C8 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| TPH-CWG - Aromatic >C8 - C10 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| TPH-CWG - Aromatic >C10 - C12 | µg/l | 10 | NONE | < 10 | < 10 | | | |
| TPH-CWG - Aromatic >C12 - C16 | µg/l | 10 | NONE | < 10 | < 10 | | | |
| TPH-CWG - Aromatic >C16 - C21 | µg/l | 10 | NONE | < 10 | < 10 | | | |
| TPH-CWG - Aromatic >C21 - C35 | µg/l | 10 | NONE | < 10 | < 10 | | | |
| **TPH-CWG - Aromatic (C5 - C35)** | µg/l | 10 | NONE | < 10 | < 10 | | | |



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-57566**

**Project / Site name: Elsenham**

| **Lab Sample Number** | | | | 800344 | 800345 | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | SW302 | SW303 | | | |
| **Sample Number** | | | | 1 | 1 | | | |
| **Depth (m)** | | | | None Supplied | None Supplied | | | |
| **Date Sampled** | | | | 15/08/2017 | 15/08/2017 | | | |
| **Time Taken** | | | | None Supplied | None Supplied | | | |
| **Analytical Parameter (Water Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **VOCs** | | | | | | | | |
| Chloromethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Chloroethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Bromomethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Vinyl Chloride | µg/l | 1 | NONE | < 1.0 | < 1.0 | | | |
| Trichlorofluoromethane | µg/l | 1 | NONE | < 1.0 | < 1.0 | | | |
| 1,1-Dichloroethene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Cis-1,2-dichloroethene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| MTBE (Methyl Tertiary Butyl Ether) | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,1-Dichloroethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 2,2-Dichloropropane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Trichloromethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,1,1-Trichloroethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,2-Dichloroethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,1-Dichloropropene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Trans-1,2-dichloroethene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Benzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Tetrachloromethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,2-Dichloropropane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Trichloroethene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Dibromomethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Bromodichloromethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Cis-1,3-dichloropropene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Trans-1,3-dichloropropene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Toluene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,1,2-Trichloroethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,3-Dichloropropane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Dibromochloromethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Tetrachloroethene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,2-Dibromoethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Chlorobenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,1,1,2-Tetrachloroethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Ethylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| p & m-Xylene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Styrene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Tribromomethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| o-Xylene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,1,2,2-Tetrachloroethane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Isopropylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Bromobenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| n-Propylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 2-Chlorotoluene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 4-Chlorotoluene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,3,5-Trimethylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| tert-Butylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,2,4-Trimethylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| sec-Butylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,3-Dichlorobenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| p-Isopropyltoluene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,2-Dichlorobenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,4-Dichlorobenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Butylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,2-Dibromo-3-chloropropane | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,2,4-Trichlorobenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Hexachlorobutadiene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| 1,2,3-Trichlorobenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |

U/S = Unsuitable Sample  I/S = Insufficient Sample



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number : 17-57566**

**Project / Site name: Elsenham**

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

| Analytical Test Name | Analytical Method Description | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|---|---|---|---|---|---|
| Boron in water | Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW | In-house method based on MEWAM | L039-PL | W | ISO 17025 |
| BTEX and MTBE in water (Monoaromatics) | Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW | In-house method based on USEPA8260 | L073B-PL | W | ISO 17025 |
| Hexavalent chromium in water | Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry. | In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW. | L080-PL | W | ISO 17025 |
| Metals in water by ICP-MS (dissolved) | Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW. | In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS. | L012-PL | W | ISO 17025 |
| pH at 20oC in water (automated) | Determination of pH in water followed by electrometric measurement. | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests | L099-PL | W | ISO 17025 |
| Speciated EPA-16 PAHs in water | Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW | In-house method based on USEPA 8270 | L0102B-PL | W | NONE |
| TPHCWG (Waters) | Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation. | In-house method | L070-PL | W | NONE |
| Volatile organic compounds in water | Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW | In-house method based on USEPA8260 | L073B-PL | W | ISO 17025 |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**
**For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.**
**Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.**



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# Analytical Report Number : 17-58586

| | | | |
|---|---|---|---|
| **Project / Site name:** | Elsenham | **Samples received on:** | 24/08/2017 |
| **Your job number:** | 17090J | **Samples instructed on:** | 29/08/2017 |
| **Your order number:** | | **Analysis completed by:** | 04/09/2017 |
| **Report Issue Number:** | 1 | **Report issued on:** | 04/09/2017 |
| **Samples Analysed:** | 7 water samples | | |

**Signed:**

Dr Irma Doyle
Senior Account Manager
**For & on behalf of i2 Analytical Ltd.**

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

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

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

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

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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-58586**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 806513 | 806514 | 806515 | 806516 | 806517 |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | BH101 | BH102 | BH103 | BH104 | BH105 |
| **Sample Number** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Depth (m)** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Date Sampled** | | | | 24/08/2017 | 24/08/2017 | 24/08/2017 | 24/08/2017 | 24/08/2017 |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Water Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **General Inorganics** | | | | | | | | |
| pH | pH Units | N/A | ISO 17025 | 6.9 | 7.0 | 6.9 | 6.9 | 7.1 |
| **Speciated PAHs** | | | | | | | | |
| Naphthalene | µg/l | 0.01 | ISO 17025 | < 0.01 | 4.28 | < 0.01 | < 0.01 | < 0.01 |
| Acenaphthylene | µg/l | 0.01 | ISO 17025 | < 0.01 | 0.13 | < 0.01 | < 0.01 | < 0.01 |
| Acenaphthene | µg/l | 0.01 | ISO 17025 | < 0.01 | 1.15 | < 0.01 | < 0.01 | < 0.01 |
| Fluorene | µg/l | 0.01 | ISO 17025 | < 0.01 | 0.69 | < 0.01 | < 0.01 | < 0.01 |
| Phenanthrene | µg/l | 0.01 | ISO 17025 | < 0.01 | 1.66 | < 0.01 | < 0.01 | < 0.01 |
| Anthracene | µg/l | 0.01 | ISO 17025 | < 0.01 | 0.25 | < 0.01 | < 0.01 | < 0.01 |
| Fluoranthene | µg/l | 0.01 | ISO 17025 | < 0.01 | 0.83 | < 0.01 | < 0.01 | < 0.01 |
| Pyrene | µg/l | 0.01 | ISO 17025 | < 0.01 | 0.78 | < 0.01 | < 0.01 | < 0.01 |
| Benzo(a)anthracene | µg/l | 0.01 | ISO 17025 | < 0.01 | 0.40 | < 0.01 | < 0.01 | < 0.01 |
| Chrysene | µg/l | 0.01 | ISO 17025 | < 0.01 | 0.33 | < 0.01 | < 0.01 | < 0.01 |
| Benzo(b)fluoranthene | µg/l | 0.01 | ISO 17025 | < 0.01 | 0.22 | < 0.01 | < 0.01 | < 0.01 |
| Benzo(k)fluoranthene | µg/l | 0.01 | ISO 17025 | < 0.01 | 0.09 | < 0.01 | < 0.01 | < 0.01 |
| Benzo(a)pyrene | µg/l | 0.01 | ISO 17025 | < 0.01 | 0.13 | < 0.01 | < 0.01 | < 0.01 |
| Indeno(1,2,3-cd)pyrene | µg/l | 0.01 | NONE | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Dibenz(a,h)anthracene | µg/l | 0.01 | NONE | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Benzo(ghi)perylene | µg/l | 0.01 | NONE | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| **Total PAH** | | | | | | | | |
| Total EPA-16 PAHs | µg/l | 0.16 | NONE | < 0.16 | 10.9 | < 0.16 | < 0.16 | < 0.16 |
| **Heavy Metals / Metalloids** | | | | | | | | |
| Arsenic (dissolved) | µg/l | 0.15 | ISO 17025 | 0.54 | 33.5 | 1.81 | 3.59 | 2.52 |
| Boron (dissolved) | µg/l | 10 | ISO 17025 | 58 | 2500 | 130 | 150 | 480 |
| Cadmium (dissolved) | µg/l | 0.02 | ISO 17025 | 0.06 | < 0.02 | 0.07 | < 0.02 | 0.03 |
| Chromium (hexavalent) | µg/l | 5 | ISO 17025 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Chromium (dissolved) | µg/l | 0.2 | ISO 17025 | 0.3 | 6.3 | 0.6 | 0.6 | 0.5 |
| Copper (dissolved) | µg/l | 0.5 | ISO 17025 | 2.6 | 1.0 | 5.6 | 3.2 | 4.2 |
| Lead (dissolved) | µg/l | 0.2 | ISO 17025 | 0.8 | 14 | 0.2 | < 0.2 | < 0.2 |
| Mercury (dissolved) | µg/l | 0.05 | ISO 17025 | < 0.05 | < 0.05 | 0.11 | 0.06 | 0.07 |
| Nickel (dissolved) | µg/l | 0.5 | ISO 17025 | 11 | 28 | 8.9 | 4.2 | 12 |
| Selenium (dissolved) | µg/l | 0.6 | ISO 17025 | 6.6 | < 0.6 | 0.8 | < 0.6 | 1.1 |
| Vanadium (dissolved) | mg/l | 0.0002 | ISO 17025 | 0.0004 | 0.0026 | 0.0004 | 0.0010 | 0.0025 |
| Zinc (dissolved) | µg/l | 0.5 | ISO 17025 | 5.3 | 5.0 | 2.7 | 2.9 | 3.4 |



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**Analytical Report Number: 17-58586**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 806513 | 806514 | 806515 | 806516 | 806517 |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | BH101 | BH102 | BH103 | BH104 | BH105 |
| **Sample Number** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Depth (m)** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Date Sampled** | | | | 24/08/2017 | 24/08/2017 | 24/08/2017 | 24/08/2017 | 24/08/2017 |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Water Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **Monoaromatics** | | | | | | | | |
| Benzene | µg/l | 1 | ISO 17025 | < 1.0 | 5.2 | < 1.0 | < 1.0 | < 1.0 |
| Toluene | µg/l | 1 | ISO 17025 | < 1.0 | 307 | < 1.0 | < 1.0 | < 1.0 |
| Ethylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | 224 | < 1.0 | < 1.0 | < 1.0 |
| p & m-xylene | µg/l | 1 | ISO 17025 | < 1.0 | 780 | < 1.0 | < 1.0 | < 1.0 |
| o-xylene | µg/l | 1 | ISO 17025 | < 1.0 | 106 | < 1.0 | < 1.0 | < 1.0 |
| MTBE (Methyl Tertiary Butyl Ether) | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| **Petroleum Hydrocarbons** | | | | | | | | |
| TPH-CWG - Aliphatic >C5 - C6 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| TPH-CWG - Aliphatic >C6 - C8 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| TPH-CWG - Aliphatic >C8 - C10 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| TPH-CWG - Aliphatic >C10 - C12 | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aliphatic >C12 - C16 | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aliphatic >C16 - C21 | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aliphatic >C21 - C35 | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| **TPH-CWG - Aliphatic (C5 - C35)** | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aromatic >C5 - C7 | µg/l | 1 | ISO 17025 | < 1.0 | 5.2 | < 1.0 | < 1.0 | < 1.0 |
| TPH-CWG - Aromatic >C7 - C8 | µg/l | 1 | ISO 17025 | < 1.0 | 310 | < 1.0 | < 1.0 | < 1.0 |
| TPH-CWG - Aromatic >C8 - C10 | µg/l | 1 | ISO 17025 | < 1.0 | 1100 | < 1.0 | < 1.0 | < 1.0 |
| TPH-CWG - Aromatic >C10 - C12 | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aromatic >C12 - C16 | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aromatic >C16 - C21 | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aromatic >C21 - C35 | µg/l | 10 | NONE | < 10 | < 10 | < 10 | < 10 | < 10 |
| **TPH-CWG - Aromatic (C5 - C35)** | µg/l | 10 | NONE | < 10 | 1400 | < 10 | < 10 | < 10 |



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**Analytical Report Number: 17-58586**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 806513 | 806514 | 806515 | 806516 | 806517 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | BH101 | BH102 | BH103 | BH104 | BH105 |
| Sample Number | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Depth (m) | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Date Sampled | | | | 24/08/2017 | 24/08/2017 | 24/08/2017 | 24/08/2017 | 24/08/2017 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Water Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **VOCs** | | | | | | | | |
| Chloromethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Chloroethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Bromomethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Vinyl Chloride | µg/l | 1 | NONE | - | < 1.0 | - | - | - |
| Trichlorofluoromethane | µg/l | 1 | NONE | - | 17.7 | - | - | - |
| 1,1-Dichloroethene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Cis-1,2-dichloroethene | µg/l | 1 | ISO 17025 | - | 2.1 | - | - | - |
| MTBE (Methyl Tertiary Butyl Ether) | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,1-Dichloroethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 2,2-Dichloropropane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Trichloromethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,1,1-Trichloroethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,2-Dichloroethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,1-Dichloropropene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Trans-1,2-dichloroethene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Benzene | µg/l | 1 | ISO 17025 | - | 5.2 | - | - | - |
| Tetrachloromethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,2-Dichloropropane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Trichloroethene | µg/l | 1 | ISO 17025 | - | 1.8 | - | - | - |
| Dibromomethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Bromodichloromethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Cis-1,3-dichloropropene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Trans-1,3-dichloropropene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Toluene | µg/l | 1 | ISO 17025 | - | 307 | - | - | - |
| 1,1,2-Trichloroethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,3-Dichloropropane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Dibromochloromethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Tetrachloroethene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,2-Dibromoethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Chlorobenzene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,1,1,2-Tetrachloroethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Ethylbenzene | µg/l | 1 | ISO 17025 | - | 224 | - | - | - |
| p & m-Xylene | µg/l | 1 | ISO 17025 | - | 780 | - | - | - |
| Styrene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Tribromomethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| o-Xylene | µg/l | 1 | ISO 17025 | - | 106 | - | - | - |
| 1,1,2,2-Tetrachloroethane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Isopropylbenzene | µg/l | 1 | ISO 17025 | - | 2.8 | - | - | - |
| Bromobenzene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| n-Propylbenzene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 2-Chlorotoluene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 4-Chlorotoluene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,3,5-Trimethylbenzene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| tert-Butylbenzene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,2,4-Trimethylbenzene | µg/l | 1 | ISO 17025 | - | 2.6 | - | - | - |
| sec-Butylbenzene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,3-Dichlorobenzene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| p-Isopropyltoluene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,2-Dichlorobenzene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,4-Dichlorobenzene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Butylbenzene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,2-Dibromo-3-chloropropane | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,2,4-Trichlorobenzene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| Hexachlorobutadiene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |
| 1,2,3-Trichlorobenzene | µg/l | 1 | ISO 17025 | - | < 1.0 | - | - | - |

U/S = Unsuitable Sample  I/S = Insufficient Sample



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**Analytical Report Number: 17-58586**

**Project / Site name: Elsenham**

| **Lab Sample Number** | | | | 806518 | 806519 | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | SW302 | SW303 | | | |
| **Sample Number** | | | | None Supplied | None Supplied | | | |
| **Depth (m)** | | | | None Supplied | None Supplied | | | |
| **Date Sampled** | | | | 24/08/2017 | 24/08/2017 | | | |
| **Time Taken** | | | | None Supplied | None Supplied | | | |
| **Analytical Parameter (Water Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **General Inorganics** | | | | | | | | |
| pH | pH Units | N/A | ISO 17025 | 8.0 | 7.9 | | | |
| **Speciated PAHs** | | | | | | | | |
| Naphthalene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Acenaphthylene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Acenaphthene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Fluorene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Phenanthrene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Anthracene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Fluoranthene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Pyrene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Benzo(a)anthracene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Chrysene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Benzo(b)fluoranthene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Benzo(k)fluoranthene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Benzo(a)pyrene | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 | | | |
| Indeno(1,2,3-cd)pyrene | µg/l | 0.01 | NONE | < 0.01 | < 0.01 | | | |
| Dibenz(a,h)anthracene | µg/l | 0.01 | NONE | < 0.01 | < 0.01 | | | |
| Benzo(ghi)perylene | µg/l | 0.01 | NONE | < 0.01 | < 0.01 | | | |
| **Total PAH** | | | | | | | | |
| Total EPA-16 PAHs | µg/l | 0.16 | NONE | < 0.16 | < 0.16 | | | |
| **Heavy Metals / Metalloids** | | | | | | | | |
| Arsenic (dissolved) | µg/l | 0.15 | ISO 17025 | 0.74 | 0.84 | | | |
| Boron (dissolved) | µg/l | 10 | ISO 17025 | 180 | 180 | | | |
| Cadmium (dissolved) | µg/l | 0.02 | ISO 17025 | < 0.02 | < 0.02 | | | |
| Chromium (hexavalent) | µg/l | 5 | ISO 17025 | < 5.0 | < 5.0 | | | |
| Chromium (dissolved) | µg/l | 0.2 | ISO 17025 | 0.3 | 0.5 | | | |
| Copper (dissolved) | µg/l | 0.5 | ISO 17025 | 3.6 | 4.3 | | | |
| Lead (dissolved) | µg/l | 0.2 | ISO 17025 | 0.2 | 0.2 | | | |
| Mercury (dissolved) | µg/l | 0.05 | ISO 17025 | < 0.05 | < 0.05 | | | |
| Nickel (dissolved) | µg/l | 0.5 | ISO 17025 | 2.5 | 2.4 | | | |
| Selenium (dissolved) | µg/l | 0.6 | ISO 17025 | 0.9 | 1.0 | | | |
| Vanadium (dissolved) | mg/l | 0.0002 | ISO 17025 | 0.0006 | 0.0006 | | | |
| Zinc (dissolved) | µg/l | 0.5 | ISO 17025 | 1.6 | 2.3 | | | |



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**Analytical Report Number: 17-58586**

**Project / Site name: Elsenham**

| **Lab Sample Number** | | | | 806518 | 806519 | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | SW302 | SW303 | | | |
| **Sample Number** | | | | None Supplied | None Supplied | | | |
| **Depth (m)** | | | | None Supplied | None Supplied | | | |
| **Date Sampled** | | | | 24/08/2017 | 24/08/2017 | | | |
| **Time Taken** | | | | None Supplied | None Supplied | | | |
| **Analytical Parameter (Water Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **Monoaromatics** | | | | | | | | |
| Benzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Toluene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| Ethylbenzene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| p & m-xylene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| o-xylene | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| MTBE (Methyl Tertiary Butyl Ether) | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| **Petroleum Hydrocarbons** | | | | | | | | |
| TPH-CWG - Aliphatic >C5 - C6 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| TPH-CWG - Aliphatic >C6 - C8 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| TPH-CWG - Aliphatic >C8 - C10 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| TPH-CWG - Aliphatic >C10 - C12 | µg/l | 10 | NONE | < 10 | < 10 | | | |
| TPH-CWG - Aliphatic >C12 - C16 | µg/l | 10 | NONE | < 10 | < 10 | | | |
| TPH-CWG - Aliphatic >C16 - C21 | µg/l | 10 | NONE | < 10 | < 10 | | | |
| TPH-CWG - Aliphatic >C21 - C35 | µg/l | 10 | NONE | < 10 | < 10 | | | |
| **TPH-CWG - Aliphatic (C5 - C35)** | µg/l | 10 | NONE | < 10 | < 10 | | | |
| TPH-CWG - Aromatic >C5 - C7 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| TPH-CWG - Aromatic >C7 - C8 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| TPH-CWG - Aromatic >C8 - C10 | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 | | | |
| TPH-CWG - Aromatic >C10 - C12 | µg/l | 10 | NONE | < 10 | < 10 | | | |
| TPH-CWG - Aromatic >C12 - C16 | µg/l | 10 | NONE | < 10 | < 10 | | | |
| TPH-CWG - Aromatic >C16 - C21 | µg/l | 10 | NONE | < 10 | < 10 | | | |
| TPH-CWG - Aromatic >C21 - C35 | µg/l | 10 | NONE | < 10 | < 10 | | | |
| **TPH-CWG - Aromatic (C5 - C35)** | µg/l | 10 | NONE | < 10 | < 10 | | | |



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 17-58586**

**Project / Site name: Elsenham**

| Lab Sample Number | | | | 806518 | 806519 | | | |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | SW302 | SW303 | | | |
| Sample Number | | | | None Supplied | None Supplied | | | |
| Depth (m) | | | | None Supplied | None Supplied | | | |
| Date Sampled | | | | 24/08/2017 | 24/08/2017 | | | |
| Time Taken | | | | None Supplied | None Supplied | | | |
| **Analytical Parameter (Water Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **VOCs** | | | | | | | | |
| Chloromethane | µg/l | 1 | ISO 17025 | - | - | | | |
| Chloroethane | µg/l | 1 | ISO 17025 | - | - | | | |
| Bromomethane | µg/l | 1 | ISO 17025 | - | - | | | |
| Vinyl Chloride | µg/l | 1 | NONE | - | - | | | |
| Trichlorofluoromethane | µg/l | 1 | NONE | - | - | | | |
| 1,1-Dichloroethene | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | µg/l | 1 | ISO 17025 | - | - | | | |
| Cis-1,2-dichloroethene | µg/l | 1 | ISO 17025 | - | - | | | |
| MTBE (Methyl Tertiary Butyl Ether) | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,1-Dichloroethane | µg/l | 1 | ISO 17025 | - | - | | | |
| 2,2-Dichloropropane | µg/l | 1 | ISO 17025 | - | - | | | |
| Trichloromethane | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,1,1-Trichloroethane | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,2-Dichloroethane | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,1-Dichloropropene | µg/l | 1 | ISO 17025 | - | - | | | |
| Trans-1,2-dichloroethene | µg/l | 1 | ISO 17025 | - | - | | | |
| Benzene | µg/l | 1 | ISO 17025 | - | - | | | |
| Tetrachloromethane | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,2-Dichloropropane | µg/l | 1 | ISO 17025 | - | - | | | |
| Trichloroethene | µg/l | 1 | ISO 17025 | - | - | | | |
| Dibromomethane | µg/l | 1 | ISO 17025 | - | - | | | |
| Bromodichloromethane | µg/l | 1 | ISO 17025 | - | - | | | |
| Cis-1,3-dichloropropene | µg/l | 1 | ISO 17025 | - | - | | | |
| Trans-1,3-dichloropropene | µg/l | 1 | ISO 17025 | - | - | | | |
| Toluene | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,1,2-Trichloroethane | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,3-Dichloropropane | µg/l | 1 | ISO 17025 | - | - | | | |
| Dibromochloromethane | µg/l | 1 | ISO 17025 | - | - | | | |
| Tetrachloroethene | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,2-Dibromoethane | µg/l | 1 | ISO 17025 | - | - | | | |
| Chlorobenzene | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,1,1,2-Tetrachloroethane | µg/l | 1 | ISO 17025 | - | - | | | |
| Ethylbenzene | µg/l | 1 | ISO 17025 | - | - | | | |
| p & m-Xylene | µg/l | 1 | ISO 17025 | - | - | | | |
| Styrene | µg/l | 1 | ISO 17025 | - | - | | | |
| Tribromomethane | µg/l | 1 | ISO 17025 | - | - | | | |
| o-Xylene | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,1,2,2-Tetrachloroethane | µg/l | 1 | ISO 17025 | - | - | | | |
| Isopropylbenzene | µg/l | 1 | ISO 17025 | - | - | | | |
| Bromobenzene | µg/l | 1 | ISO 17025 | - | - | | | |
| n-Propylbenzene | µg/l | 1 | ISO 17025 | - | - | | | |
| 2-Chlorotoluene | µg/l | 1 | ISO 17025 | - | - | | | |
| 4-Chlorotoluene | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,3,5-Trimethylbenzene | µg/l | 1 | ISO 17025 | - | - | | | |
| tert-Butylbenzene | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,2,4-Trimethylbenzene | µg/l | 1 | ISO 17025 | - | - | | | |
| sec-Butylbenzene | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,3-Dichlorobenzene | µg/l | 1 | ISO 17025 | - | - | | | |
| p-Isopropyltoluene | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,2-Dichlorobenzene | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,4-Dichlorobenzene | µg/l | 1 | ISO 17025 | - | - | | | |
| Butylbenzene | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,2-Dibromo-3-chloropropane | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,2,4-Trichlorobenzene | µg/l | 1 | ISO 17025 | - | - | | | |
| Hexachlorobutadiene | µg/l | 1 | ISO 17025 | - | - | | | |
| 1,2,3-Trichlorobenzene | µg/l | 1 | ISO 17025 | - | - | | | |

U/S = Unsuitable Sample  I/S = Insufficient Sample



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number : 17-58586**

**Project / Site name: Elsenham**

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

| Analytical Test Name | Analytical Method Description | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|---|---|---|---|---|---|
| Boron in water | Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW | In-house method based on MEWAM | L039-PL | W | ISO 17025 |
| BTEX and MTBE in water (Monoaromatics) | Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW | In-house method based on USEPA8260 | L073B-PL | W | ISO 17025 |
| Hexavalent chromium in water | Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry. | In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW. | L080-PL | W | ISO 17025 |
| Metals in water by ICP-MS (dissolved) | Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW. | In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS. | L012-PL | W | ISO 17025 |
| pH at 20oC in water (automated) | Determination of pH in water followed by electrometric measurement. | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests | L099-PL | W | ISO 17025 |
| Speciated EPA-16 PAHs in water | Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW | In-house method based on USEPA 8270 | L0102B-PL | W | NONE |
| TPHCWG (Waters) | Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation. | In-house method | L070-PL | W | NONE |
| Volatile organic compounds in water | Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW | In-house method based on USEPA8260 | L073B-PL | W | ISO 17025 |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**
**For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.**
**Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.**


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The results included within the report are representative of the samples submitted for analysis.

# APPENDIX E - EXPLORATORY HOLE LOGS

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# BOREHOLE LOG

Discovery
Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | BH101 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 11-08-17<br>11-08-17 | 90.62 | E 554,499.6 N 226,477.0 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| | | | | 90.32 | | 0.30 | Grass over brown slightly gravelly clayey fine to medium SAND with frequent roots and rootlets. Gravel is subangular to rounded fine and medium of quartzite and flint. (TOPSOIL) | | |
| 0.30 | D1 | | | | | | | | |
| 0.50 | ES1 | | | 89.82 | | (0.50)<br>0.80 | Orangish brown slightly gravelly slightly clayey medium to coarse SAND with occasional rootlets. Gravel is angular to rounded fine to coarse of quartzite and flint. (KESGRAVE CATCHMENT SUBGROUP) | | |
| 0.80 | D2 | | | | | | Yellowish brown becoming slightly clayey below 1.5 m bgl fine to coarse SAND. (KESGRAVE CATCHMENT SUBGROUP) | | |
| 2.00 | ES2 | | | | | (2.30) | | | |
| 2.00 | D3 | | | | | | | | |
| | | | | 87.52 | | 3.10 | | | |
| 3.00 | D4 | | 1 | | | (0.90) | Brown locally orangish brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of quartzite. (THANET & LAMBETH GROUP) | | |
| | | | | 86.62 | | 4.00 | | | |
| 4.00 | D5 | | | | | | Grey slightly sandy CLAY. (THANET & LAMBETH GROUP) | | |
| 4.50 | ES3 | | | | | (1.00) | | | |
| | | | 1 | 85.62 | | 5.00 | | | |
| 5.00 | D6 | | | 85.52 | | 5.10 | Very weak grey SANDSTONE recovered as angular to subangular coarse gravel of very weak sandstone. (THANET & LAMBETH GROUP) | | |

## Boring Progress and Water Observations

| Date | Time | Depth | Casing Depth | Casing Dia. mm | Water Dpt |
|---|---|---|---|---|---|
| 11-08-17 | 00.00 | 5.10 | 5.00 | | 3.8 |
| 14-08-17 | 00.00 | 5.10 | 5.00 | | 2.7 |

## Chiselling

| From | To | Hours |
|---|---|---|
| 5 | 5.1 | 00:25:00 |

## Water Added

| From | To |
|---|---|
| 1.2 | 4 |

## GENERAL REMARKS

Cable percussive borehole advanced from ground level to 5.1 m bgl. No services encountered. Groundwater strike at 5.0 m bgl rising to 2.7 m bgl. 50 mm monitoring well installed on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Dando 2000 Mk2 | Logged By JDN |
|---|---|---|---|

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# BOREHOLE LOG

Discovery
Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | BH102 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 15-08-17<br>15-08-17 | 99.02 | E 554,899.6 N 226,553.2 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| | | | | 98.72 | | 0.30 | MADE GROUND: Grass over brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular to subrounded fine and medium of flint and quartzite. (TOPSOIL) | | |
| 0.30 | D1 | | | | | | | | |
| 0.50 | ES1 | | | 98.12 | | (0.60)<br>0.90 | MADE GROUND: brown gravelly sandy CLAY with frequent rootlets. Gravel is subangular to rounded fine to coarse of flint and chalk. (LANDFILL CAP) | | |
| 0.90 | D2 | | | 97.72 | | (0.40)<br>1.30 | | | |
| 1.30 | D3 | | | 97.42 | | 1.60 | MADE GROUND: Grey sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of flint and quartzite. (LANDFILL CAP) | | |
| 1.60 | D4 | | | 97.02 | | (0.40)<br>2.00 | MADE GROUND: Light brown and grey gravelly CLAY with rare plastic fragments. Gravel is subangular to rounded medium and coarse of chalk. (LANDFILL CAP) | | |
| 2.00 | ES2 | | | | | | | | |
| 2.00 | D5 | | | | | | MADE GROUND: Black and dark grey very gravelly CLAY with frequent fragments of metal and plastic and occasional fragments of wire. Gravel is angular to rounded fine to coarse of flint, chalk, brick and quartzite. (LANDFILL WASTE MASS)<br><br>Note: Strong degrading waste odour. | | |
| 3.00 | D6 | | | | | | | | |
| 4.00 | D7 | | | | | (3.80) | MADE GROUND: Black and dark grey gravelly CLAY with frequent fragments of textiles, wood, metal and plastic and occasional fragments of wire. Gravel is angular to rounded fine to coarse of flint, chalk, quartzite, brick and cement. (LANDFILL WASTE MASS)<br><br>Note: Strong degrading waste odour.<br>Note: Locally damp between 4.0 and 5.0 m bgl. | | |
| 4.50 | ES3 | | | | | | | | |
| 5.00 | D8 | | | | | | | | |
| | | | | 93.22 | | 5.80 | | | |
| | | | | 93.02 | | 6.00 | MADE GROUND: Brown locally dark brown slightly gravelly CLAY. Gravel is angular to subrounded fine and medium of chalk and flint. (LANDFILL BASE/LINER) | | |
| 6.00 | D9 | | | | | | | | |

| Boring Progress and Water Observations | | | | | |
|---|---|---|---|---|---|
| Date | Time | Depth | Casing Depth | Casing Dia. mm | Water Dpt |
| 15-08-17 | 00.00 | 6.00 | 6.00 | | |

| Chiselling | | | Water Added | |
|---|---|---|---|---|
| From | To | Hours | From | To |
| | | | 1.2 | 6 |

**GENERAL REMARKS**

Cable percussive borehole advanced from ground level to 5.9 m bgl. No services encountered. No groundwater encountered. 50 mm monitoring well installed on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Dando 2000 Mk2 | Logged By JDN |
|---|---|---|---|

AGS3 UK BH 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 18/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# BOREHOLE LOG

Discovery
Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | BH103 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 14-08-17<br>15-08-17 | 92.11 | E 554,877.3 N 226,272.8 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| 0.30 | D1 | | | | | (1.00) | MADE GROUND: Grass over brown slightly gravelly slightly sandy CLAY with frequent rootlets. Gravel is subangular to rounded fine to coarse of quartzite and rare brick. | | |
| 0.80 | D2 | | | 91.11 | | 1.00 | | | |
| 1.50 | ES1 | | | | | (0.70) | Light grey locally cream locally slightly gravelly slightly clayey SAND. Gravel is subangular to subrounded fine to coarse of flint and siltstone. (HEAD DEPOSITS) | | |
| 1.70 | D3 | | | 90.41 | | 1.70 | | | |
| 2.00 | ES2 | | | | | (0.70) | Yellowish orange slightly gravelly SAND with rare medium and coarse gravel sized pockets of soft grey clay. Gravel is angular to subrounded fine to coarse of flint. (HEAD DEPOSITS) | | |
| 2.40 | D4 | | | 89.71 | | 2.40 | | | |
| | | | | | | (0.60) | Orangish brown slightly gravelly CLAY. Gravel is angular to subrounded fine and medium of flint. (HEAD DEPOSITS) | | |
| 3.00 | D5 | | | 89.11 | | 3.00 | | | |
| 3.20 | ES3 | | | | | (0.40) | Brown slightly gravelly CLAY. Gravel is subangular and subrounded fine and medium of flint. (HEAD DEPOSITS) | | |
| 3.40 | D6 | | | 88.71 | | 3.40 | | | |
| | | | | | | (0.60) | Brown locally orangish brown and grey CLAY with rare medium gravel sized pockets of fine orange sand. (HEAD DEPOSITS) | | |
| 4.00 | D7 | | | 88.11 | | 4.00 | | | |

| Boring Progress and Water Observations | | | | | | Chiselling | | | Water Added | | GENERAL REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Time | Depth | Casing Depth | Casing Dia. mm | Water Dpt | From | To | Hours | From | To | |
| 14-08-17 | 00.00 | 1.40 | 1.40 | | | | | | 1.7 | 2.6 | Cable percussive borehole advanced from ground level to 4.0 m bgl. No services encountered. No groundwater encountered. 50 mm monitoring well installed on completion. |
| 15-08-17 | 00.00 | 4.00 | 4.00 | | | | | | | | |

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Dando 2000 Mk2 | Logged By JDN |
|---|---|---|---|

AGS3 UK BH 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 18/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# BOREHOLE LOG

Discovery
Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | BH104 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 14-08-17<br>14-08-17 | 86.98 | E 554,570.3 N 226,151.4 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| | | | | 86.68 | | 0.30 | Brown slightly sandy gravelly CLAY with frequent rootlets. Gravel is subangular to rounded fine to coarse of quartzite and flint. (TOPSOIL) | | |
| 0.30 | D1 | | | | | (1.00) | Brown locally orangish brown gravelly CLAY with occasional carbonaceous inclusions. Gravel is angular to subrounded fine and medium, locally coarse of quartzite and flint and occasional chalk. (HEAD DEPOSITS) | | |
| 1.00 | ES1 | | | | | | | | |
| 1.00 | D2 | | | 85.68 | | 1.30 | | | |
| 1.30 | D3 | | | | | (0.50) | Grey slightly sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of quartzite and flint. (HEAD DEPOSITS) | | |
| | | | | 85.18 | | 1.80 | | | |
| 1.80 | D4 | | | | | | Note: Slightly damp. | | |
| 2.20 | ES2 | | | | | (0.70) | Grey slightly gravelly slightly sandy CLAY. Gravel is angular to subrounded fine to coarse of flint. (HEAD DEPOSITS) | | |
| | | | | 84.48 | | 2.50 | | | |
| 2.50 | D5 | | | | | (0.50) | Grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine and medium of flint and quartzite. (HEAD DEPOSITS) | | |
| | | | | 83.98 | | 3.00 | | | |
| 3.00 | D6 | | | | | | Grey slightly sandy CLAY. Sand is fine and medium. (THANET & LAMBETH GROUP) | | |
| 3.50 | ES3 | | | | | (1.00) | | | |
| | | | | 82.98 | | 4.00 | | | |
| 4.00 | D7 | | | | | | | | |

| Boring Progress and Water Observations | | | | | |
|---|---|---|---|---|---|
| Date | Time | Depth | Casing Depth | Casing Dia. mm | Water Dpt |
| 14-08-17 | 00.00 | 4.00 | 3.00 | | 1.8 |

| Chiselling | | | Water Added | |
|---|---|---|---|---|
| From | To | Hours | From | To |
| | | | 1.2 | 4 |

**GENERAL REMARKS**

Cable percussive borehole advanced from ground level to 4.0 m bgl. No services encountered. Groundwater strike at 4.0 m bgl rising to 3.8 m bgl. 50 mm monitoring well installed on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Dando 2000 Mk2 | Logged By JDN |
|---|---|---|---|

AGS3 UK BH 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 18/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# BOREHOLE LOG

Discovery
Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | BH105 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 14-08-17<br>14-08-17 | 91.06 | E 554,488.1 N 226,385.9 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| 0.20 | D1 | | | 90.76 | | 0.30 | Brown slightly gravelly slightly sandy CLAY with frequent rootlets. Sand is fine and medium. Gravel is subangular to rounded fine and medium of quartzite and flint. (TOPSOIL). | | |
| 0.30 | D2 | | | | | | | | |
| 0.50 | ES1 | | | | | (0.70) | Yellow slightly clayey fine to coarse SAND. (KESGRAVE CATCHMENT SUBGROUP) | | |
| | | | | 90.06 | | 1.00 | | | |
| 1.00 | D3 | | | | | | Yellow fine and medium SAND. (KESGRAVE CATCHMENT SUBGROUP) | | |
| 2.00 | D4 | | | | | | | | |
| 2.50 | ES2 | | | | | (3.00) | | | |
| 3.00 | D5 | | 1 | | | | | | |
| | | | 1 | 87.06 | | 4.00 | | | |
| 4.00 | D6 | | | | | | Brown locally slightly gravelly slightly sandy CLAY. Sand is fine and medium. Gravel is subrounded and rounded fine and medium of quartzite. (THANET & LAMBETH GROUP) | | |
| 4.75 | ES3 | | | | | (1.70) | | | |
| 5.00 | D7 | | | | | | | | |
| | | | | 85.36 | | 5.70 | | | |
| 5.70 | D8 | | | | | | Grey slightly sandy CLAY. (THANET & LAMBETH GROUP) | | |
| | | | | | | (1.30) | | | |
| | | | | 84.06 | | 7.00 | | | |

| Boring Progress and Water Observations | | | | | |
|---|---|---|---|---|---|
| Date | Time | Depth | Casing Depth | Casing Dia. mm | Water Dpt |
| 14-08-17 | 00.00 | 7.00 | 7.00 | | 3.8 |

| Chiselling | | | Water Added | |
|---|---|---|---|---|
| From | To | Hours | From | To |
| | | | 1.2 | 4 |

**GENERAL REMARKS**

Cable percussive borehole advanced from ground level to 7.0 m bgl. No services encountered. Groundwater strike at 3.8 m bgl rising to 3.1 m bgl. 50 mm monitoring well installed on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Dando 2000 Mk2 | Logged By JDN |
|---|---|---|---|

AGS3 UK BH 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 18/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# DYNAMIC SAMPLING LOG

Discovery Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | DS201 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 16-08-17<br>16-08-17 | 93.46 | E 554,534.9 N 226,516.3 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| | | | | | | (1.80) | MADE GROUND: Firm light brown slightly gravelly slightly sandy CLAY. Gravel is angular and subangular fine to coarse of flint, brick and chalk.<br>(LANDFILL CAP) | | |
| 1.00<br>1.00 | D<br>ES | | | 91.66 | | 1.80 | | | |
| | | | | | | (2.00) | MADE GROUND: Stiff blackish grey slightly gravelly slightly sandy CLAY. Gravel is angular and subangular fine to coarse of brick, flint and chalk.<br>(WASTE MASS) | | |
| 2.00<br>2.00 | D<br>ES | | | 89.66 | | 3.80 | | | |
| | | | | 89.26 | | (0.40)<br>4.20 | MADE GROUND: Firm dark greyish brown slightly gravelly CLAY. Gravel is subangular and subrounded fine and medium of quartzite and flint.<br>(WASTE MASS) | | |
| 4.00<br>4.00 | D<br>ES | | | | | | | | |

## GENERAL REMARKS

Dynamic Sample borehole advanced from ground level to 4.20 m bgl. No services encountered. No groundwater encountered. Backfilled with arisings on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/<br>Plant Used Competitor Dart | Logged By<br>GH |
|---|---|---|---|

AGS3 UK DS 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 9/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# DYNAMIC SAMPLING LOG

Discovery Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | DS202 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 16-08-17<br>16-08-17 | 92.87 | E 554,530.6 N 226,486.8 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| 0.20<br>0.20 | D<br>ES | | | 91.17 | | (1.70)<br>1.70 | MADE GROUND: Soft light brown slightly gravelly slightly sandy CLAY. Gravel is angular to subrounded fine to coarse of brick, flint and chalk.<br>(LANDFILL CAP) | | |
| 1.85<br>1.85 | D<br>ES | | | 89.67 | | (1.50)<br>3.20 | MADE GROUND: Stiff black slightly gravelly slightly sandy CLAY with frequent fragments of metal, plastic and wood. Gravel is angular to subrounded fine to coarse of quartzite and brick.<br>(WASTE MASS) | | |
| 3.50<br>3.50 | D<br>ES | | | 88.67 | | (1.00)<br>4.20 | Dark grey becoming light brown below 4 m bgl slightly clayey coarse SAND.<br>(WASTE MASS) | | |

## GENERAL REMARKS

Dynamic Sample borehole advanced from ground level to 4.20 m bgl. No services encountered. No groundwater encountered. Backfilled with arisings on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Competitor Dart | Logged By GH |
|---|---|---|---|

AGS3 UK DS 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 9/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# DYNAMIC SAMPLING LOG

Discovery Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | DS203 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 15-08-17<br>15-08-17 | 92.04 | E 554,539.6 N 226,449.0 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| 0.10 | D | | | 91.81 | | 0.23 | MADE GROUND: Grass over soft dark brown slightly gravelly CLAY. Gravel is subangular and subrounded fine to coarse of quartzite and flint. (TOPSOIL) | | |
| 0.10 | ES | | | | | (1.09) | MADE GROUND: Soft dark brown becoming light brown below 0.51 m bgl slightly gravelly CLAY. Gravel is subangular and subrounded fine to coarse of chalk. (LANDFILL CAP) | | |
| 1.00 | D | | | | | | | | |
| 1.00 | ES | | | 90.72 | | 1.32 | | | |
| 1.40 | ES | | | 90.39 | | 1.65 | MADE GROUND: Firm reddish brown gravelly CLAY. Gravel is angular to subrounded fine to coarse of flint. (LANDFILL CAP) | | |
| 1.80 | D | | | 90.04 | | 2.00 | MADE GROUND: Firm dark brownish black slightly gravelly CLAY with frequent fragments of metal and wood. Gravel is subangular and subrounded fine and medium of flint and brick. (WASTE MASS) | | |
| 1.80 | ES | | | | | | | | |
| 2.10 | D | | | 89.74 | | 2.30 | MADE GROUND: Reddish brown slightly gravelly coarse SAND. Gravel is angular fine and medium of flint. (WASTE MASS) | | |
| 2.10 | ES | | | | | | | | |
| 2.40 | D | | | 89.44 | | 2.60 | Stiff reddish brown slightly sandy CLAY. (WASTE MASS) | | |
| 2.40 | ES | | | | | | | | |

## GENERAL REMARKS

Dynamic Sample borehole advanced from ground level to 2.60 m bgl. No services encountered. No groundwater encountered. Backfilled with arisings on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Competitor Dart | Logged By GH |
|---|---|---|---|

AGS3 UK DS 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 9/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# DYNAMIC SAMPLING LOG

Discovery Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | DS204 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 15-08-17<br>15-08-17 | 92.13 | E 554,551.0 N 226,417.3 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| | | | | 91.98 | | 0.15 | MADE GROUND: Grass over soft dark brown slightly gravelly CLAY. Gravel is angular medium and coarse of flint. (TOPSOIL) | | |
| 0.50 | D | | | | | (0.85) | MADE GROUND: Firm dark brown becoming creamish white below 0.5 m bgl slightly gravelly CLAY. Gravel is subangular and subrounded fine to coarse of flint. (LANDFILL CAP) | | |
| 0.50 | ES | | | | | | | | |
| 0.90 | D | | | 91.13 | | 1.00 | | | |
| 0.90 | ES | | | | | | | | |
| 1.20 | D | | | | | (0.50) | MADE GROUND: Firm dark brownish black slightly gravelly CLAY with frequent fragments of glass, wood and cardboard. Gravel is angular to subrounded fine to coarse of brick. (WASTE MASS) | | |
| 1.20 | ES | | | 90.63 | | 1.50 | | | |

## GENERAL REMARKS

Dynamic Sample borehole advanced from ground level to 1.5 m bgl. No services encountered. No groundwater encountered. Backfilled with arisings on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Competitor Dart | Logged By GH |
|---|---|---|---|

AGS3 UK DS 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 9/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# DYNAMIC SAMPLING LOG

Discovery Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | DS205 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 16-08-17<br>16-08-17 | | E 554,596.7 N 226,446.9 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| 0.20 | D | | | | | 0.35 | MADE GROUND: Grass over soft dark brown slightly gravelly slightly sandy CLAY. Gravel is subangular and subrounded fine to coarse of quartzite and flint. (TOPSOIL) | | |
| 0.20 | ES | | | | | | | | |
| 1.00 | D | | | | | (1.35) | MADE GROUND: Firm light brown slightly gravelly CLAY. Gravel is subangular and subrounded fine to coarse of chalk. (LANDFILL CAP) | | |
| 1.00 | ES | | | | | | | | |
| | | | | | | 1.70 | | | |
| 1.80 | D | | | | | 2.00 | MADE GROUND: Firm blackish grey slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of flint and brick. (WASTE MASS) | | |
| 1.80 | ES | | | | | | | | |

## GENERAL REMARKS

Dynamic Sample borehole advanced from ground level to 2.00 m bgl. No services encountered. No groundwater encountered. Backfilled with arisings on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Competitor Dart | Logged By GH |
|---|---|---|---|

AGS3 UK DS 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 9/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# DYNAMIC SAMPLING LOG

Discovery Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | DS206 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 15-08-17<br>15-08-17 | | E 554,656.0 N 226,473.5 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| 0.10 | D | | | | | 0.15 | MADE GROUND: Grass over soft light brown slightly gravelly CLAY. Gravel is subangular and subrounded fine to coarse of flint. (TOPSOIL) | | |
| 0.10 | ES | | | | | | | | |
| | | | | | | (1.30) | MADE GROUND: Very stiff light brown creamish white slightly gravelly CLAY. Gravel is subangular and subrounded fine to coarse of chalk and flint. (LANDFILL CAP) | | |
| 1.00 | D | | | | | | | | |
| 1.00 | ES | | | | | | | | |
| | | | | | | 1.45 | | | |
| | | | | | | (0.45) | MADE GROUND: Stiff dark brownish black slightly gravelly CLAY with frequent fragments of relict wood and plastic. Gravel is angular and subangular fine and medium of brick and concrete. (WASTE MASS) | | |
| 1.80 | D | | | | | 1.90 | | | |
| 1.80 | ES | | | | | | | | |

## GENERAL REMARKS

Dynamic Sample borehole advanced from ground level to 1.90 m bgl. No services encountered. No groundwater encountered. Backfilled with arisings on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/<br>Plant Used Competitor Dart | Logged By<br>GH |
|---|---|---|---|

AGS3 UK DS 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 9/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# DYNAMIC SAMPLING LOG

Discovery Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | DS207 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 15-08-17<br>15-08-17 | | E 554,676.3 N 226,524.3 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| 0.10 | D | | | | | 0.17 | MADE GROUND: Grass over soft dark brown slightly gravelly slightly sandy CLAY. Gravel is subangular and subrounded fine and medium of quartzite and flint. (TOPSOIL) | | |
| 0.10 | ES | | | | | | | | |
| | | | | | | (1.03) | MADE GROUND: Firm light brownish grey slightly gravelly CLAY. Gravel is subangular and subrounded fine to coarse of chalk and quartzite. (LANDFILL CAP) | | |
| 0.90 | D | | | | | | | | |
| 0.90 | ES | | | | | 1.20 | | | |
| | | | | | | (0.60) | MADE GROUND: Firm to stiff blackish grey slightly gravelly CLAY with occasional fragments of plastic and wood. Gravel is angular to subrounded fine to coarse of brick and concrete. (WASTE MASS) | | |
| 1.50 | D | | | | | | | | |
| 1.50 | ES | | | | | 1.80 | | | |

## GENERAL REMARKS

Dynamic Sample borehole advanced from ground level to 1.80 m bgl. No services encountered. No groundwater encountered. Backfilled with arisings on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Competitor Dart | Logged By GH |
|---|---|---|---|

AGS3 UK DS 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 9/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# DYNAMIC SAMPLING LOG

Discovery Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | DS208 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 15-08-17<br>15-08-17 | | E 554,754.2 N 226,541.2 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| 0.20 | D | | | | | 0.30 | MADE GROUND: Grass over soft dark brown slightly sandy CLAY with frequent roots and rootlets. (TOPSOIL) | | |
| 0.20 | ES | | | | | (0.90) | MADE GROUND: Firm creamish white becoming brown below 0.8 m bgl slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of chalk and flint. (LANDFILL CAP) | | |
| 1.00 | D | | | | | 1.20 | | | |
| 1.00 | ES | | | | | 1.40 | MADE GROUND: Firm dark brownish black slightly gravelly CLAY with occasional fragments of relict wood and cardboard. Gravel is subangular and subrounded fine and medium of quartzite, flint and brick. (WASTE MASS) | | |
| 1.30 | D | | | | | | | | |
| 1.30 | ES | | | | | | | | |

## GENERAL REMARKS

Dynamic Sample borehole advanced from ground level to 1.40 m bgl. No services encountered. No groundwater encountered. Backfilled with arisings on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Competitor Dart | Logged By GH |
|---|---|---|---|

AGS3 UK DS 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 9/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# DYNAMIC SAMPLING LOG

Discovery Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | DS209 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 15-08-17<br>15-08-17 | 98.18 | E 554,818.8 N 226,537.7 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| 0.10 | D | | | 97.98 | | 0.20 | MADE GROUND: Grass over soft dark brown slightly gravelly slightly sandy CLAY with frequent roots and rootlets. Gravel is angular fine and medium of quartzite. (TOPSOIL) | | |
| 0.10 | ES | | | | | (1.05) | MADE GROUND: Stiff creamish white slightly gravelly CLAY. Gravel is subangular and subrounded fine to coarse of chalk and flint. (LANDFILL CAP) | | |
| 1.00 | D | | | 96.93 | | 1.25 | | | |
| 1.00 | ES | | | | | | MADE GROUND: Firm blackish brown slightly gravelly CLAY with frequent fragments of wood, cardboard and plastic. Gravel is subangular and subrounded medium of quartzite and brick. (WASTE MASS) | | |
| 1.30 | D | | | | | (1.60) | Note: Decaying odour. | | |
| 1.40 | ES | | | 95.33 | | 2.85 | | | |

## GENERAL REMARKS

Dynamic Sample borehole advanced from ground level to 2.85 m bgl. No services encountered. No groundwater encountered. Backfilled with arisings on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Competitor Dart | Logged By GH |
|---|---|---|---|

AGS3 UK DS 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 9/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# DYNAMIC SAMPLING LOG

Discovery Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | DS210 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 15-08-17<br>15-08-17 | 98.62 | E 554,873.4 N 226,486.4 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| | | | | 98.42 | | 0.20 | MADE GROUND: Grass over soft light brown slightly gravelly CLAY. Gravel is angular and subangular fine to coarse of quartzite and brick. (TOPSOIL) | | |
| 0.20 | D | | | | | | | | |
| 0.20 | ES | | | | | (1.10) | MADE GROUND: Firm whiteish grey slightly gravelly CLAY. Gravel is subangular and subrounded medium and coarse of quartzite, flint and chalk. (LANDFILL CAP) | | |
| 1.00 | D | | | | | | | | |
| 1.10 | ES | | | 97.32 | | 1.30 | | | |
| | | | | 97.07 | | 1.55 | MADE GROUND: Firm light brownish grey slightly gravelly CLAY. Gravel is subangular and subrounded fine and medium of chalk and brick. (WASTE MASS) | | |
| 1.60 | D | | | 96.92 | | 1.70 | | | |
| 1.60 | ES | | | | | | MADE GROUND: Soft dark greyish black gravelly CLAY with frequent fragments of relict wood and plastic. Gravel is angular to subrounded fine and medium of quartzite, brick and chalk. (WASTE MASS) | | |

## GENERAL REMARKS

Dynamic Sample borehole advanced from ground level to 1.70 m bgl. No services encountered. No groundwater encountered. Backfilled with arisings on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Competitor Dart | Logged By GH |
|---|---|---|---|

AGS3 UK DS 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 9/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# DYNAMIC SAMPLING LOG

Discovery Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | DS211 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 15-08-17<br>15-08-17 | 98.23 | E 554,865.6 N 226,437.2 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| 0.10 | D | | | 97.93 | | 0.30 | MADE GROUND: Grass over soft dark brown slightly gravelly CLAY with frequent roots and rootlets. Gravel is subangular and subrounded fine of quartzite, chalk and flint. (TOPSOIL) | | |
| 0.10 | ES | | | | | (0.50) | | | |
| 0.60 | D | | | 97.43 | | 0.80 | MADE GROUND: Firm whiteish grey slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of flint and chalk. (LANDFILL CAP) | | |
| 0.60 | ES | | | | | | MADE GROUND: Soft becoming firm below 2 m bgl whiteish orangish brown becoming whitish cream below 0.9 m bgl slightly gravelly CLAY. Gravel is subangular and subrounded fine to coarse of chalk, flint and quartzite. (LANDFILL CAP) | | |
| | | | | | | (3.20) | | | |
| | | | | 94.23 | | 4.00 | | | |
| | | | | 94.03 | | 4.20 | Whiteish grey slightly clayey fine to coarse SAND. (WASTE MASS) | | |
| 4.20 | D | | | | | | | | |
| 4.20 | ES | | | | | | | | |

## GENERAL REMARKS

Dynamic Sample borehole advanced from ground level to 4.20 m bgl. No services encountered. No groundwater encountered. Backfilled with arisings on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Competitor Dart | Logged By GH |
|---|---|---|---|

AGS3 UK DS 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 9/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# DYNAMIC SAMPLING LOG

Discovery Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | DS212 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 15-08-17<br>15-08-17 | 96.94 | E 554,794.6 N 226,442.4 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| 0.10 | D | | | 96.79 | | 0.15 | MADE GROUND: Grass over soft dark brown CLAY with frequent roots and rootlets. (TOPSOIL) | | |
| 0.10 | ES | | | | | (0.65) | | | |
| 0.50 | D | | | | | | MADE GROUND: Soft whiteish light brown slightly gravelly CLAY. Gravel is subangular and subrounded of chalk. (LANDFILL CAP) | | |
| 0.60 | ES | | | 96.14 | | 0.80 | | | |
| 0.90 | D | | | 95.94 | | 1.00 | MADE GROUND: Firm dark brownish black slightly gravelly slightly sandy CLAY with occasional fragment of plastic. Gravel is angular and subangular fine to coarse of concrete and brick. (WASTE MASS) | | |
| 0.90 | ES | | | | | (0.40) | | | |
| | | | | 95.54 | | 1.40 | MADE GROUND: Firm creamish white mottled grey slightly gravelly CLAY. Gravel is subangular and subrounded fine to coarse of chalk and flint. (WASTE MASS)<br><br>Note: Possible buried capping material. | | |

## GENERAL REMARKS

Dynamic Sample borehole advanced from ground level to 1.40 m bgl. No services encountered. No groundwater encountered. Backfilled with arisings on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Competitor Dart | Logged By GH |
|---|---|---|---|

AGS3 UK DS 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 9/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# DYNAMIC SAMPLING LOG

Discovery Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | DS213 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 15-08-17<br>15-08-17 | 98.57 | E 554,833.5 N 226,499.9 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| 0.10 | D | | | 98.27 | | 0.30 | MADE GROUND: Grass over soft dark brown slightly sandy CLAY with frequent roots and rootlets. (TOPSOIL) | | |
| 0.10 | ES | | | | | (0.90) | MADE GROUND: Very stiff whiteish cream slightly gravelly CLAY. Gravel is subangular and subrounded fine to coarse of chalk. (LANDFILL CAP) | | |
| 0.90 | D | | | | | | | | |
| 1.00 | ES | | | 97.37 | | 1.20 | | | |
| 1.20 | D | | | | | (0.40) | MADE GROUND: Firm dark brownish black slightly gravelly CLAY with frequent relict wood fragments. Gravel is angular to subrounded fine to coarse of brick and flint. (WASTE MASS) | | |
| 1.30 | ES | | | 96.97 | | 1.60 | | | |

## GENERAL REMARKS

Dynamic Sample borehole advanced from ground level to 1.6 m bgl. No services encountered. No groundwater encountered. Backfilled with arisings on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Competitor Dart | Logged By GH |
|---|---|---|---|

AGS3 UK DS 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 9/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# DYNAMIC SAMPLING LOG

Discovery Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | DS214 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 15-08-17<br>15-08-17 | | E 554,731.1 N 226,492.7 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| 0.10 | D | | | | | 0.23 | MADE GROUND: Grass over soft dark brown slightly gravelly CLAY. Gravel is subangular and subrounded fine to coarse of quartzite and chalk. (TOPSOIL) | | |
| 0.10 | ES | | | | | (0.57) | | | |
| 0.50 | D | | | | | | | | |
| 0.50 | ES | | | | | 0.80 | MADE GROUND: Stiff light brownish white slightly gravelly CLAY. Gravel is subangular and subrounded fine to coarse of chalk and flint. (LANDFILL CAP) | | |
| 0.90 | D | | | | | 1.00 | MADE GROUND: Reddish brownish black angular and subangular fine to coarse GRAVEL of brick and concrete with occasional fragments of relict wood, cardboard and plastic. (WASTE MASS) | | |
| 0.90 | ES | | | | | | | | |

## GENERAL REMARKS

Dynamic Sample borehole advanced from ground level to 1.00 m bgl. No services encountered. No groundwater encountered. Backfilled with arisings on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/ Plant Used Competitor Dart | Logged By GH |
|---|---|---|---|

AGS3 UK DS 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 9/10/17

Discovery CE Limited
The Granary, Broadwell House Farm
Broadwell, Rugby, CV238HF

# DYNAMIC SAMPLING LOG

Discovery Geotechnical & Environmental Engineers

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| Elsenham Golf & Leisure, Intrusive Site Investigation | | | | DS215 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| 17090J | 15-08-17<br>15-08-17 | | E 554,726.5 N 226,446.4 | |
| Contractor | | | | Sheet |
| Discovery CE Ltd | | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | | |
| 0.10 | D | | | | | 0.20 | MADE GROUND: Soft light brown slightly gravelly slightly sandy CLAY with frequent roots and rootlets. Gravel is subangular fine and medium of flint. (TOPSOIL) | | |
| 0.10 | ES | | | | | | | | |
| | | | | | | (1.20) | MADE GROUND: Firm light brownish white slightly gravelly CLAY. Gravel is subangular and subrounded fine to coarse of chalk and flint. (LANDFILL CAP) | | |
| 1.00 | D | | | | | | | | |
| 1.00 | ES | | | | | 1.40 | | | |
| 1.50 | D | | | | | 1.60 | MADE GROUND: Firm to stiff blackish grey slightly gravelly slightly sandy CLAY with occasional fragments of plastic and glass. Gravel is angular to subrounded medium and coarse of brick and concrete. (WASTE MASS) | | |
| 1.50 | ES | | | | | | | | |

## GENERAL REMARKS

Dynamic Sample borehole advanced from ground level to 1.60 m bgl. No services encountered. No groundwater encountered. Backfilled with arisings on completion.

| All dimensions in metres<br>Scale 1:50 | Client Elsenham Golf & Leisure | Method/<br>Plant Used Competitor Dart | Logged By<br>GH |
|---|---|---|---|

AGS3 UK DS 17090J LOGS - UPDATED.GPJ GINT STD AGS 3_1.GDT 9/10/17

# APPENDIX F - MONITORING DATA

# GAS AND GROUNDWATER MONITORING DATA

Discovery
Geotechnical & Environmental Engineers

| | |
|---|---|
| **SITE** | Elsenham Golf Course |
| **PROJECT No.** | 17090 |
| **Carried Out by:** | GH |
| **Date:** | 16-Aug-17 |
| **Instrument Details** | GFM - 430 & Dip Meter |

**Atmospheric & Ground Conditions**

**Atmospheric Pressure Variations During Visit**: 1011 to 1014 mb

**Ground Surface Conditions**: Dry

**Atmospheric Pressure Trend Over Previous 24hrs**: 1014 to 1019 mb (Stansted Airport)

**Weather Conditions**: Warm and Sunny

| Well No. | Cover Height (m agl) | Well Diameter (mm) | CH4 (% v/v) | | CH4 Steady LEL (%) | CO2 (% v/v) | | O2 (% v/v) | | Duration (secs)^ | Flow Rate (l/hr) | Differential Pressure (Pa) | PID (ppm) | | Atmospheric Pressure (mb) | Water Level (m bgl) | Depth of Pipe (m bgl) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Peak | Steady | | Peak | Steady | Peak | Steady | | | | Peak | Steady | | | | |
| BH101 | 0.29 | 50 | 0.0 | 0.0 | 0.0 | 1.2 | 1.2 | 19.5 | 19.4 | 120 | 0.0 | 0.0 | NR | NR | 1012 | 3.00 | 3.33 | |
| BH102 | 0.30 | 50 | 40.0 | 39.9 | >>> | 24.1 | 24.1 | 3.9 | 3.9 | 120 | 0.0 | 0.0 | NR | NR | 1011 | 5.74 | 6.07 | |
| BH103 | 0.34 | 50 | 0.0 | 0.0 | 0.0 | 0.7 | 0.7 | 18.2 | 18.2 | 120 | 0.0 | 0.0 | NR | NR | 1011 | 1.77 | 3.09 | |
| BH104 | 0.36 | 50 | 0.0 | 0.0 | 0.0 | 0.5 | 0.4 | 21.0 | 21.0 | 120 | 0.0 | 0.0 | NR | NR | 1012 | 2.64 | 4.27 | |
| BH105 | 0.37 | 50 | 0.0 | 0.0 | 0.0 | 1.9 | 1.9 | 18.6 | 18.6 | 120 | 0.0 | 0.0 | NR | NR | 1014 | 3.25 | 4.25 | |

Notes: NR = Not Recorded ^ For measurement of gas concentrations > = Above LEL WST = Water Sample Taken GL = Ground Level

# GAS AND GROUNDWATER MONITORING DATA

Discovery
Geotechnical & Environmental Engineers

| | |
|---|---|
| **SITE** | Elsenham Golf Course |
| **PROJECT No.** | 17090 |
| **Carried Out by:** | CG |
| **Date:** | 24-Aug-17 |
| **Instrument Details** | GFM - 430 & Dip Meter |

**Atmospheric & Ground Conditions**

**Atmospheric Pressure Variations During Visit**: 1007 to 1014 mb

**Ground Surface Conditions**: Dry

**Atmospheric Pressure Trend Over Previous 24hrs**: 1015 mb (Stansted Airport)

**Weather Conditions**: Warm and Sunny

| Well No. | Cover Height (m agl) | Well Diameter (mm) | CH4 (% v/v) | | CH4 Steady LEL (%) | CO2 (% v/v) | | O2 (% v/v) | | Duration (secs)^ | Flow Rate (l/hr) | Differential Pressure (Pa) | PID (ppm) | | Atmospheric Pressure (mb) | Water Level (m bgl) | Depth of Pipe (m bgl) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Peak | Steady | | Peak | Steady | Peak | Steady | | | | Peak | Steady | | | | |
| BH101 | 0.29 | 50 | 0.0 | 0.0 | 0.0 | 1.4 | 1.4 | 19.5 | 19.5 | 120 | 0.0 | 0.0 | NR | NR | 1007 | 3.04 | 3.32 | |
| BH102 | 0.30 | 50 | 39.6 | 39.5 | >>> | 25.7 | 25.7 | 3.6 | 3.6 | 120 | 0.2 | 0.0 | NR | NR | 1011 | 5.73 | 6.08 | |
| BH103 | 0.34 | 50 | 0.0 | 0.0 | 0.0 | 2.2 | 2.2 | 18.9 | 18.9 | 120 | 0.0 | 0.0 | NR | NR | 1011 | 1.81 | 3.00 | |
| BH104 | 0.36 | 50 | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 20.4 | 20.4 | 120 | 0.0 | 0.0 | NR | NR | 1007 | 1.72 | 4.26 | |
| BH105 | 0.37 | 50 | 0.0 | 0.0 | 0.0 | 2.7 | 2.1 | 18.5 | 18.6 | 120 | 0.0 | 0.0 | NR | NR | 1014 | 3.30 | 4.06 | |

Notes: NR = Not Recorded ^ For measurement of gas concentrations > = Above LEL WST = Water Sample Taken GL = Ground Level

# APPENDIX G - CHEMICAL SCREENING EXERCISE

**CHEMICAL SCREENING CRITERIA**

**RATIONALE**

For the protection of human health, screening criteria were selected from published generic assessment criteria (GACs) as published by DEFRA/CL:AIRE, LQM/CIEH and/or EIC/AGS/CL:AIRE. Generic values are usually selected based on the soil organic matter (SOM) content of the soils concerned. Currently generic criteria are published for SOM of 1, 2.5 or 6 %. Based on the total organic carbon (TOC) results varied between 0.2 % and 4.5 % giving an SOM range of 0.34 to 7.8% with a mean value of 1.9%. Using these values and in order to add a level of conservatism a soil organic matter (SOM) value of 1 % was adopted for the generic screening assessment. The generic end use scenarios considered in the assessment of risks to long term human health were Public Open Space for parks (POS (Park)) and aas a more stringent test Residential without Home Grown Produce (RwoHGP)

The POS (Park) and RwoHGP scenarios are defined as a standard end use for GACs based on the Human Health Risk Assessment guidance developed in line with the CLEA model.

This assessment used Suitable for Use levels (S4ULs) as published by LQM/CIEH whenever possible as the most up to date GACs. The S4ULs were used under licence, (Copyright Land Quality Management Limited, reproduced with permission; publication number S4UL3396. All rights reserved). It should be noted that S4UL values calculated for threshold substances represent a concentration in soils below which the risk to human health is **NEGLIGIBLE**. For non-threshold substances concentrations in soil less than the S4UL values represent a **MINIMAL** risk.

Also Category 4 Screening Levels (C4SLs) were used as published by DEFRA/CL:AIRE, in this case for lead (Pb), other GACs as published by EIC/AGS/CL:AIRE were also used (EIC). In the absence of S4ULs, C4SLs or EIC values in house calculated values are used (using the CLEA spreadsheet). Occasionally values from the USEPA Region 9 criteria were used.

Concentrations of determinands in water samples were screened against UK environmental quality standards (EQS) or UK drinking water standards (DWS). In the absence of EQS or DWS, World Health Organisation (WHO) or USEPA Region 9 screening criteria were used.

It may become evident following further investigation and analysis that additional CoCs come to light that are not present in the current list which may require screening criteria to be applied. If this becomes the case additional criteria shall be selected/derived and submitted to the regulators for comment and agreement.

The screening criteria for human health assessment are presented below in Table G1 (POS (Park)) and Table G2 (RwoHGP). The Screening results are presented in Tables G3 and G4 respectively.

The screening criteria for controlled waters is presented in Table G5, with the respective summary in Table G6.

**Table G1: Human Health Soil Screening Criteria for a Public Open Space (Parks) (1 % SOM)**

| Determinand | Units | Screen (POS Park) at 1% SOM | Source |
|---|---|---|---|
| Naphthalene | mg/kg | 1200 | S4UL |
| Acenaphthylene | mg/kg | 29000 | S4UL |
| Acenaphthene | mg/kg | 29000 | S4UL |
| Fluorene | mg/kg | 20000 | S4UL |
| Phenanthrene | mg/kg | 6200 | S4UL |
| Anthracene | mg/kg | 150000 | S4UL |
| Fluoranthene | mg/kg | 6300 | S4UL |
| Pyrene | mg/kg | 15000 | S4UL |
| Benzo(a)anthracene | mg/kg | 49 | S4UL |
| Chrysene | mg/kg | 93 | S4UL |
| Benzo(b)fluoranthene | mg/kg | 13 | S4UL |
| Benzo(k)fluoranthene | mg/kg | 370 | S4UL |
| Benzo(a)pyrene | mg/kg | 11 | S4UL |
| Indeno(1,2,3-cd)pyrene | mg/kg | 150 | S4UL |
| Dibenz(a,h)anthracene | mg/kg | 1.1 | S4UL |
| Benzo(ghi)perylene | mg/kg | 1400 | S4UL |
| Arsenic | mg/kg | 170 | S4UL |
| Boron (water soluble) | mg/kg | 46000 | S4UL |
| Cadmium | mg/kg | 532 | S4UL |
| Chromium (hexavalent) | mg/kg | 220 | S4UL |
| Chromium | mg/kg | 33000 | S4UL |
| Copper | mg/kg | 44000 | S4UL |
| Lead | mg/kg | 1300 | C4SL |
| Mercury | mg/kg | 240 | S4UL |
| Nickel | mg/kg | 3400 | S4UL |
| Selenium | mg/kg | 1800 | S4UL |
| Vanadium | mg/kg | 5000 | S4UL |
| Zinc | mg/kg | 170000 | S4UL |
| Benzene | µg/kg | 90000 | S4UL |
| Toluene | µg/kg | 87000000 | S4UL |
| Ethylbenzene | µg/kg | 17000000 | S4UL |
| p & m-xylene | µg/kg | 17000000 | S4UL |
| o-xylene | µg/kg | 17000000 | S4UL |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 73000 | EIC/AGS (Resi without home grown produce) |
| TPH4 (C10 - C20) | mg/kg | 7200 | S4UL for Aromatic C8-C10 as stringent surrogate. |
| TPH4 (C20 - C30) | mg/kg | 7600 | S4UL for Aromatic C8-C10 as stringent surrogate. |
| TPH4 (C30 - C40) | mg/kg | 7600 | S4UL for Aromatic C8-C10 as stringent surrogate. |
| Aliphatic >EC5 - EC6 | mg/kg | 95000 | S4UL |
| Aliphatic >EC6 - EC8 | mg/kg | 150000 | S4UL |
| Aliphatic >EC8 - EC10 | mg/kg | 14000 | S4UL |
| Aliphatic >EC10 - EC12 | mg/kg | 21000 | S4UL |
| Aliphatic >EC12 - EC16 | mg/kg | 25000 | S4UL |
| Aliphatic >EC16 - EC21 | mg/kg | 450000 | S4UL |
| Aliphatic >EC21 - EC35 | mg/kg | 450000 | S4UL |
| Aromatic >EC5 - EC7 | mg/kg | 76000 | S4UL |
| Aromatic >EC7 - EC8 | mg/kg | 87000 | S4UL |
| Aromatic >EC8 - EC10 | mg/kg | 7200 | S4UL |
| Aromatic >EC10 - EC12 | mg/kg | 9200 | S4UL |
| Aromatic >EC12 - EC16 | mg/kg | 10000 | S4UL |
| Aromatic >EC16 - EC21 | mg/kg | 7600 | S4UL |
| Aromatic >EC21 - EC35 | mg/kg | 7800 | S4UL |
| Aniline | mg/kg | 85 | USEPA Region 9 Residential Soil |
| Phenol | mg/kg | 760 | S4UL |
| 2-Chlorophenol | mg/kg | 1100 | S4UL (chlorophenols) |
| Bis(2-chloroethyl)ether | mg/kg | 21 | USEPA Region 9 Residential Soil |
| 1,3-Dichlorobenzene | mg/kg | 390 | S4UL |
| 1,2-Dichlorobenzene | mg/kg | 24000 | S4UL |
| 1,4-Dichlorobenzene | mg/kg | 36000 | S4UL |
| Bis(2-chloroisopropyl)ether | mg/kg | 4.6 | USEPA Region 9 Residential Soil |
| 2-Methylphenol | mg/kg | 80 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) |
| Hexachloroethane | mg/kg | 14 | S4UL |
| Nitrobenzene | mg/kg | 4.8 | USEPA Region 9 Residential Soil |

| Determinand | Units | Screen (POS Park) at 1% SOM | Source |
|---|---|---|---|
| 4-Methylphenol | mg/kg | 80 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) |
| Isophorone | mg/kg | 51 | USEPA Region 9 Residential Soil |
| 2-Nitrophenol | mg/kg | 760 | S4UL (Phenol as surrogate) |
| 2,4-Dimethylphenol | mg/kg | 19 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) |
| Bis(2-chloroethoxy)methane | mg/kg | 180 | USEPA Region 9 Residential Soil |
| 1,2,4-Trichlorobenzene | mg/kg | 1700 | S4UL |
| 2,4-Dichlorophenol | mg/kg | 1100 | S4UL |
| 4-Chloroaniline | mg/kg | 2.4 | USEPA Region 9 Residential Soil |
| Hexachlorobutadiene | mg/kg | 48 | S4UL |
| 4-Chloro-3-methylphenol | mg/kg | 39 | USEPA Region 9 Residential Soil (2-chlorophenol as surrogate) |
| 2,4,6-Trichlorophenol | mg/kg | 1100 | S4UL (chlorophenols) |
| 2,4,5-Trichlorophenol | mg/kg | 1100 | S4UL (chlorophenols) |
| 2-Methylnaphthalene | mg/kg | 1200 | S4UL (naphthalene as surrogate) |
| 2-Chloronaphthalene | mg/kg | 1200 | S4UL (naphthalene as surrogate) |
| Dimethylphthalate | mg/kg | 120 | EIC/AGS/CL:AIRE (diethyl phthalate as surrogate - Residential with consumption of HGP) |
| 2,6-Dinitrotoluene | mg/kg | 260 | S4UL (TNT used as surrogate) |
| 2,4-Dinitrotoluene | mg/kg | 260 | S4UL (TNT used as surrogate) |
| Dibenzofuran | mg/kg | 78 | USEPA Region 9 Residential Soil |
| 4-Chlorophenyl phenyl ether | mg/kg | NA | NA |
| Diethyl phthalate | mg/kg | 120 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) |
| 4-Nitroaniline | mg/kg | 24 | USEPA Region 9 Residential Soil |
| Azobenzene | mg/kg | 5.1 | USEPA Region 9 Residential Soil |
| Bromophenyl phenyl ether | mg/kg | NA | NA |
| Hexachlorobenzene | mg/kg | 30 | USEPA Region 9 Residential Soil |
| Carbazole | mg/kg | NA | NA |
| Dibutyl phthalate | mg/kg | 13 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) |
| Anthraquinone | mg/kg | NA | NA |
| Butyl benzyl phthalate | mg/kg | 13 | EIC/AGS/CL:AIRE (dibutyl phthalate as surrogate - Residential with consumption of HGP) |

**Table G2: Human Health Soil Screening Criteria for a Residential without Home Grown Produce (1 % SOM)**

| Determinand | Units | Screen (Residential Without Homegrown Produce) at 1% SOM | Source |
|---|---|---|---|
| Naphthalene | mg/kg | 2.3 | S4UL |
| Acenaphthylene | mg/kg | 2900 | S4UL |
| Acenaphthene | mg/kg | 3000 | S4UL |
| Fluorene | mg/kg | 2800 | S4UL |
| Phenanthrene | mg/kg | 1300 | S4UL |
| Anthracene | mg/kg | 31000 | S4UL |
| Fluoranthene | mg/kg | 1500 | S4UL |
| Pyrene | mg/kg | 3700 | S4UL |
| Benzo(a)anthracene | mg/kg | 11 | S4UL |
| Chrysene | mg/kg | 30 | S4UL |
| Benzo(b)fluoranthene | mg/kg | 3.9 | S4UL |
| Benzo(k)fluoranthene | mg/kg | 110 | S4UL |
| Benzo(a)pyrene | mg/kg | 3.2 | S4UL |
| Indeno(1,2,3-cd)pyrene | mg/kg | 45 | S4UL |
| Dibenz(a,h)anthracene | mg/kg | 0.31 | S4UL |
| Benzo(ghi)perylene | mg/kg | 360 | S4UL |
| Arsenic | mg/kg | 40 | S4UL |
| Boron (water soluble) | mg/kg | 11000 | S4UL |
| Cadmium | mg/kg | 85 | S4UL |
| Chromium (hexavalent) | mg/kg | 6 | S4UL |
| Chromium | mg/kg | 910 | S4UL |
| Copper | mg/kg | 7100 | S4UL |
| Lead | mg/kg | 310 | C4SL |
| Mercury | mg/kg | 56 | S4UL |
| Nickel | mg/kg | 180 | S4UL |
| Selenium | mg/kg | 430 | S4UL |
| Vanadium | mg/kg | 1200 | S4UL |
| Zinc | mg/kg | 40000 | S4UL |
| Benzene | ug/kg | 380 | S4UL |

| Determinand | Units | Screen (Residential Without Homegrown Produce) at 1% SOM | Source |
|---|---|---|---|
| Toluene | µg/kg | 880000 | S4UL |
| Ethylbenzene | µg/kg | 83000 | S4UL |
| p & m-xylene | µg/kg | 79000 | S4UL |
| o-xylene | µg/kg | 88000 | S4UL |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 49000 | EIC/AGS (Resi without home grown produce) |
| TPH4 (C10 - C20) | mg/kg | 27 | S4UL for Aliphatic C8-C10 as stringent surrogate. |
| TPH4 (C20 - C30) | mg/kg | 27 | S4UL for Aliphatic C8-C10 as stringent surrogate. |
| TPH4 (C30 - C40) | mg/kg | 27 | S4UL for Aliphatic C8-C10 as stringent surrogate. |
| Aliphatic >EC5 - EC6 | mg/kg | 42 | S4UL |
| Aliphatic >EC6 - EC8 | mg/kg | 100 | S4UL |
| Aliphatic >EC8 - EC10 | mg/kg | 27 | S4UL |
| Aliphatic >EC10 - EC12 | mg/kg | 130 | S4UL |
| Aliphatic >EC12 - EC16 | mg/kg | 1100 | S4UL |
| Aliphatic >EC16 - EC21 | mg/kg | 65000 | S4UL |
| Aliphatic >EC21 - EC35 | mg/kg | 65000 | S4UL |
| Aromatic >EC5 - EC7 | mg/kg | 370 | S4UL |
| Aromatic >EC7 - EC8 | mg/kg | 860 | S4UL |
| Aromatic >EC8 - EC10 | mg/kg | 47 | S4UL |
| Aromatic >EC10 - EC12 | mg/kg | 250 | S4UL |
| Aromatic >EC12 - EC16 | mg/kg | 1800 | S4UL |
| Aromatic >EC16 - EC21 | mg/kg | 1900 | S4UL |
| Aromatic >EC21 - EC35 | mg/kg | 1900 | S4UL |
| Aniline | mg/kg | 85 | USEPA Region 9 Residential Soil |
| Phenol | mg/kg | 750 | S4UL |
| 2-Chlorophenol | mg/kg | 94 | S4UL (chlorophenols) |
| Bis(2-chloroethyl)ether | mg/kg | 21 | USEPA Region 9 Residential Soil |
| 1,3-Dichlorobenzene | mg/kg | 0.44 | S4UL |
| 1,2-Dichlorobenzene | mg/kg | 24 | S4UL |
| 1,4-Dichlorobenzene | mg/kg | 61 | S4UL |
| Bis(2-chloroisopropyl)ether | mg/kg | 4.6 | USEPA Region 9 Residential Soil |
| 2-Methylphenol | mg/kg | 80 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) |
| Hexachloroethane | mg/kg | 14 | S4UL |
| Nitrobenzene | mg/kg | 4.8 | USEPA Region 9 Residential Soil |
| 4-Methylphenol | mg/kg | 80 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) |
| Isophorone | mg/kg | 51 | USEPA Region 9 Residential Soil |
| 2-Nitrophenol | mg/kg | 750 | S4UL (Phenol as surrogate) |
| 2,4-Dimethylphenol | mg/kg | 19 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) |
| Bis(2-chloroethoxy)methane | mg/kg | 180 | USEPA Region 9 Residential Soil |
| 1,2,4-Trichlorobenzene | mg/kg | 2.6 | S4UL |
| 2,4-Dichlorophenol | mg/kg | 94 | S4UL (chlorophenols) |
| 4-Chloroaniline | mg/kg | 2.4 | USEPA Region 9 Residential Soil |
| Hexachlorobutadiene | mg/kg | 0.32 | S4UL |
| 4-Chloro-3-methylphenol | mg/kg | 39 | USEPA Region 9 Residential Soil (2-chlorophenol as surrogate) |
| 2,4,6-Trichlorophenol | mg/kg | 94 | S4UL (chlorophenols) |
| 2,4,5-Trichlorophenol | mg/kg | 94 | S4UL (chlorophenols) |
| 2-Methylnaphthalene | mg/kg | 2.3 | S4UL (naphthalene as surrogate) |
| 2-Chloronaphthalene | mg/kg | 2.3 | S4UL (naphthalene as surrogate) |
| Dimethylphthalate | mg/kg | 120 | EIC/AGS/CL:AIRE (diethyl phthalate as surrogate - Residential with consumption of HGP) |
| 2,6-Dinitrotoluene | mg/kg | 65 | S4UL (TNT used as surrogate) |
| 2,4-Dinitrotoluene | mg/kg | 65 | S4UL (TNT used as surrogate) |
| Dibenzofuran | mg/kg | 78 | USEPA Region 9 Residential Soil |
| 4-Chlorophenyl phenyl ether | mg/kg | NA | NA |
| Diethyl phthalate | mg/kg | 120 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) |
| 4-Nitroaniline | mg/kg | 24 | USEPA Region 9 Residential Soil |
| Azobenzene | mg/kg | 5.1 | USEPA Region 9 Residential Soil |
| Bromophenyl phenyl ether | mg/kg | NA | NA |
| Hexachlorobenzene | mg/kg | 30 | USEPA Region 9 Residential Soil |
| Carbazole | mg/kg | NA | NA |
| Dibutyl phthalate | mg/kg | 13 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) |
| Anthraquinone | mg/kg | NA | NA |
| Butyl benzyl phthalate | mg/kg | 13 | EIC/AGS/CL:AIRE (dibutyl phthalate as surrogate - Residential with consumption of HGP) |

**Table G3: Human Health Soil Screening Summary (Public Open Space (Park))**

| Determinand | Units | Minimum | Mean | Maximum | Count | Screen (POS Park) at 1% SOM | Source | Number of Exceedences |
|---|---|---|---|---|---|---|---|---|
| Naphthalene | mg/kg | < 0.05 | < 0.05 | < 0.05 | 17 | 1200 | S4UL | 0 |
| Acenaphthylene | mg/kg | < 0.05 | < 0.05 | < 0.05 | 17 | 29000 | S4UL | 0 |
| Acenaphthene | mg/kg | < 0.05 | < 0.05 | < 0.05 | 17 | 29000 | S4UL | 0 |
| Fluorene | mg/kg | < 0.05 | < 0.05 | < 0.05 | 17 | 20000 | S4UL | 0 |
| Phenanthrene | mg/kg | < 0.05 | 0.100 | 0.1 | 17 | 6200 | S4UL | 0 |
| Anthracene | mg/kg | < 0.05 | < 0.05 | < 0.05 | 17 | 150000 | S4UL | 0 |
| Fluoranthene | mg/kg | < 0.05 | 0.240 | 0.24 | 17 | 6300 | S4UL | 0 |
| Pyrene | mg/kg | < 0.05 | 0.230 | 0.23 | 17 | 15000 | S4UL | 0 |
| Benzo(a)anthracene | mg/kg | < 0.05 | 0.200 | 0.2 | 17 | 49 | S4UL | 0 |
| Chrysene | mg/kg | < 0.05 | 0.180 | 0.18 | 17 | 93 | S4UL | 0 |
| Benzo(b)fluoranthene | mg/kg | < 0.05 | 0.160 | 0.16 | 17 | 13 | S4UL | 0 |
| Benzo(k)fluoranthene | mg/kg | < 0.05 | 0.150 | 0.15 | 17 | 370 | S4UL | 0 |
| Benzo(a)pyrene | mg/kg | < 0.05 | 0.160 | 0.16 | 17 | 11 | S4UL | 0 |
| Indeno(1,2,3-cd)pyrene | mg/kg | < 0.05 | < 0.05 | < 0.05 | 17 | 150 | S4UL | 0 |
| Dibenz(a,h)anthracene | mg/kg | < 0.05 | < 0.05 | < 0.05 | 17 | 1.1 | S4UL | 0 |
| Benzo(ghi)perylene | mg/kg | < 0.05 | < 0.05 | < 0.05 | 17 | 1400 | S4UL | 0 |
| Speciated Total EPA-16 PAHs | mg/kg | 1.42 | 1.42 | 1.42 | 17 | See above | S4UL | 0 |
| Arsenic | mg/kg | 2.5 | 10.95 | 28 | 38 | 170 | S4UL | 0 |
| Boron (water soluble) | mg/kg | < 0.2 | 1.54 | 8.1 | 38 | 46000 | S4UL | 0 |
| Cadmium | mg/kg | < 0.2 | 0.810 | 1.9 | 38 | 532 | S4UL | 0 |
| Chromium (hexavalent) | mg/kg | < 4.0 | < 4.0 | < 4.0 | 38 | 220 | S4UL | 0 |
| Chromium | mg/kg | 6.8 | 20.9 | 48 | 38 | 33000 | S4UL | 0 |
| Copper | mg/kg | 6.7 | 42.8 | 240 | 38 | 44000 | S4UL | 0 |
| Lead | mg/kg | 3.4 | 89.3 | 640 | 38 | 1300 | C4SL | 0 |
| Mercury | mg/kg | < 0.3 | 0.875 | 2.3 | 38 | 240 | S4UL | 0 |
| Nickel | mg/kg | 7.3 | 19.8 | 67 | 38 | 3400 | S4UL | 0 |
| Selenium | mg/kg | < 1.0 | 1.20 | 1.2 | 38 | 1800 | S4UL | 0 |
| Vanadium | mg/kg | 9.6 | 31.7 | 85 | 38 | 5000 | S4UL | 0 |
| Zinc | mg/kg | 17 | 105 | 980 | 38 | 170000 | S4UL | 0 |
| Benzene | ug/kg | < 1.0 | < 1.0 | < 1.0 | 3 | 90000 | S4UL | 0 |
| Toluene | µg/kg | < 1.0 | < 1.0 | < 1.0 | 3 | 87000000 | S4UL | 0 |
| Ethylbenzene | µg/kg | < 1.0 | < 1.0 | < 1.0 | 3 | 17000000 | S4UL | 0 |
| p & m-xylene | µg/kg | < 1.0 | < 1.0 | < 1.0 | 3 | 17000000 | S4UL | 0 |
| o-xylene | µg/kg | < 1.0 | < 1.0 | < 1.0 | 3 | 17000000 | S4UL | 0 |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | < 1.0 | < 1.0 | < 1.0 | 3 | 73000 | EIC/AGS (Resi without home grown produce) | 0 |
| TPH4 (C10 - C20) | mg/kg | < 10 | 510 | 510 | 16 | 7200 | S4UL for Aromatic C8-C10 as stringent surrogate. | 0 |
| TPH4 (C20 - C30) | mg/kg | < 10 | 640 | 640 | 16 | 7600 | S4UL for Aromatic C8-C10 as stringent surrogate. | 0 |
| TPH4 (C30 - C40) | mg/kg | < 10 | 280 | 280 | 16 | 7600 | S4UL for Aromatic C8-C10 as stringent surrogate. | 0 |
| Aliphatic >EC5 - EC6 | mg/kg | < 0.001 | < 0.001 | < 0.001 | 3 | 95000 | S4UL | 0 |
| Aliphatic >EC6 - EC8 | mg/kg | < 0.001 | < 0.001 | < 0.001 | 3 | 150000 | S4UL | 0 |
| Aliphatic >EC8 - EC10 | mg/kg | < 0.001 | < 0.001 | < 0.001 | 3 | 14000 | S4UL | 0 |
| Aliphatic >EC10 - EC12 | mg/kg | < 1.0 | 4.70 | 4.7 | 3 | 21000 | S4UL | 0 |
| Aliphatic >EC12 - EC16 | mg/kg | < 2.0 | 8.30 | 8.3 | 3 | 25000 | S4UL | 0 |
| Aliphatic >EC16 - EC21 | mg/kg | < 8.0 | < 8.0 | < 8.0 | 3 | 450000 | S4UL | 0 |
| Aliphatic >EC21 - EC35 | mg/kg | < 8.0 | < 8.0 | < 8.0 | 3 | 450000 | S4UL | 0 |
| Aromatic >EC5 - EC7 | mg/kg | < 0.001 | < 0.001 | < 0.001 | 3 | 76000 | S4UL | 0 |
| Aromatic >EC7 - EC8 | mg/kg | < 0.001 | < 0.001 | < 0.001 | 3 | 87000 | S4UL | 0 |
| Aromatic >EC8 - EC10 | mg/kg | < 0.001 | < 0.001 | < 0.001 | 3 | 7200 | S4UL | 0 |
| Aromatic >EC10 - EC12 | mg/kg | < 1.0 | < 1.0 | < 1.0 | 3 | 9200 | S4UL | 0 |
| Aromatic >EC12 - EC16 | mg/kg | < 2.0 | < 2.0 | < 2.0 | 3 | 10000 | S4UL | 0 |
| Aromatic >EC16 - EC21 | mg/kg | < 10 | < 10 | < 10 | 3 | 7600 | S4UL | 0 |
| Aromatic >EC21 - EC35 | mg/kg | < 10 | < 10 | < 10 | 3 | 7800 | S4UL | 0 |
| Aniline | mg/kg | < 0.1 | 4.3 | 4.3 | 2 | 85 | USEPA Region 9 Residential Soil | 0 |
| Phenol | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 760 | S4UL | 0 |
| 2-Chlorophenol | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 1100 | S4UL (chlorophenols) | 0 |
| Bis(2-chloroethyl)ether | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 21 | USEPA Region 9 Residential Soil | 0 |
| 1,3-Dichlorobenzene | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 390 | S4UL | 0 |
| 1,2-Dichlorobenzene | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 24000 | S4UL | 0 |
| 1,4-Dichlorobenzene | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 36000 | S4UL | 0 |

| Determinand | Units | Minimum | Mean | Maximum | Count | Screen (POS Park) at 1% SOM | Source | Number of Exceedences |
|---|---|---|---|---|---|---|---|---|
| Bis(2-chloroisopropyl)ether | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 4.6 | USEPA Region 9 Residential Soil | 0 |
| 2-Methylphenol | mg/kg | < 0.3 | 0.5 | 0.5 | 2 | 80 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) | 0 |
| Hexachloroethane | mg/kg | < 0.05 | < 0.05 | < 0.05 | 2 | 14 | S4UL | 0 |
| Nitrobenzene | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | 4.8 | USEPA Region 9 Residential Soil | 0 |
| 4-Methylphenol | mg/kg | < 0.2 | 0.4 | 0.4 | 2 | 80 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) | 0 |
| Isophorone | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 51 | USEPA Region 9 Residential Soil | 0 |
| 2-Nitrophenol | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | 760 | S4UL (Phenol as surrogate) | 0 |
| 2,4-Dimethylphenol | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | 19 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) | 0 |
| Bis(2-chloroethoxy)methane | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | 180 | USEPA Region 9 Residential Soil | 0 |
| 1,2,4-Trichlorobenzene | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | 1700 | S4UL | 0 |
| 2,4-Dichlorophenol | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | 1100 | S4UL | 0 |
| 4-Chloroaniline | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 2.4 | USEPA Region 9 Residential Soil | 0 |
| Hexachlorobutadiene | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 48 | S4UL | 0 |
| 4-Chloro-3-methylphenol | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 39 | USEPA Region 9 Residential Soil (2-chlorophenol as surrogate) | 0 |
| 2,4,6-Trichlorophenol | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 1100 | S4UL (chlorophenols) | 0 |
| 2,4,5-Trichlorophenol | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 1100 | S4UL (chlorophenols) | 0 |
| 2-Methylnaphthalene | mg/kg | < 0.1 | 2.9 | 2.9 | 2 | 1200 | S4UL (naphthalene as surrogate) | 0 |
| 2-Chloronaphthalene | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 1200 | S4UL (naphthalene as surrogate) | 0 |
| Dimethylphthalate | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 120 | EIC/AGS/CL:AIRE (diethyl phthalate as surrogate - Residential with consumption of HGP) | 0 |
| 2,6-Dinitrotoluene | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 260 | S4UL (TNT used as surrogate) | 0 |
| 2,4-Dinitrotoluene | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 260 | S4UL (TNT used as surrogate) | 0 |
| Dibenzofuran | mg/kg | < 0.2 | 0.4 | 0.4 | 2 | 78 | USEPA Region 9 Residential Soil | 0 |
| 4-Chlorophenyl phenyl ether | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | NA | NA | 0 |
| Diethyl phthalate | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 120 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) | 0 |
| 4-Nitroaniline | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 24 | USEPA Region 9 Residential Soil | 0 |
| Azobenzene | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | 5.1 | USEPA Region 9 Residential Soil | 0 |
| Bromophenyl phenyl ether | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | NA | NA | 0 |
| Hexachlorobenzene | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | 30 | USEPA Region 9 Residential Soil | 0 |
| Carbazole | mg/kg | < 0.3 | 0.8 | 0.8 | 2 | NA | NA | 0 |
| Dibutyl phthalate | mg/kg | < 0.2 | 3.3 | 3.3 | 2 | 13 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) | 0 |
| Anthraquinone | mg/kg | < 0.3 | 1.1 | 1.1 | 2 | NA | NA | 0 |
| Butyl benzyl phthalate | mg/kg | < 0.3 | 1.8 | 1.8 | 2 | 13 | EIC/AGS/CL:AIRE (dibutyl phthalate as surrogate - Residential with consumption of HGP) | 0 |

Note: Exceedances highlighted in **red text on yellow fill**.

None of the samples tested exceeded their screening criteria.

**Table G4: Human Health Soil Screening Summary (Residential without Home Grown Produce)**

| Determinand | Units | Minimum | Mean | Maximum | Count | Screen (Residential Without Homegrown Produce) at 1% SOM | Source | Exceedences |
|---|---|---|---|---|---|---|---|---|
| Naphthalene | mg/kg | < 0.05 | < 0.05 | < 0.05 | 17 | 2.3 | S4UL | 0 |
| Acenaphthylene | mg/kg | < 0.05 | < 0.05 | < 0.05 | 17 | 2900 | S4UL | 0 |
| Acenaphthene | mg/kg | < 0.05 | < 0.05 | < 0.05 | 17 | 3000 | S4UL | 0 |
| Fluorene | mg/kg | < 0.05 | < 0.05 | < 0.05 | 17 | 2800 | S4UL | 0 |
| Phenanthrene | mg/kg | < 0.05 | 0.100 | 0.1 | 17 | 1300 | S4UL | 0 |
| Anthracene | mg/kg | < 0.05 | < 0.05 | < 0.05 | 17 | 31000 | S4UL | 0 |
| Fluoranthene | mg/kg | < 0.05 | 0.240 | 0.24 | 17 | 1500 | S4UL | 0 |
| Pyrene | mg/kg | < 0.05 | 0.230 | 0.23 | 17 | 3700 | S4UL | 0 |
| Benzo(a)anthracene | mg/kg | < 0.05 | 0.200 | 0.2 | 17 | 11 | S4UL | 0 |
| Chrysene | mg/kg | < 0.05 | 0.180 | 0.18 | 17 | 30 | S4UL | 0 |
| Benzo(b)fluoranthene | mg/kg | < 0.05 | 0.160 | 0.16 | 17 | 3.9 | S4UL | 0 |
| Benzo(k)fluoranthene | mg/kg | < 0.05 | 0.150 | 0.15 | 17 | 110 | S4UL | 0 |
| Benzo(a)pyrene | mg/kg | < 0.05 | 0.160 | 0.16 | 17 | 3.2 | S4UL | 0 |
| Indeno(1,2,3-cd)pyrene | mg/kg | < 0.05 | < 0.05 | < 0.05 | 17 | 45 | S4UL | 0 |
| Dibenz(a,h)anthracene | mg/kg | < 0.05 | < 0.05 | < 0.05 | 17 | 0.31 | S4UL | 0 |
| Benzo(ghi)perylene | mg/kg | < 0.05 | < 0.05 | < 0.05 | 17 | 360 | S4UL | 0 |
| Arsenic | mg/kg | 2.5 | 10.95 | 28 | 38 | 40 | S4UL | 0 |
| Boron (water soluble) | mg/kg | < 0.2 | 1.54 | 8.1 | 38 | 11000 | S4UL | 0 |
| Cadmium | mg/kg | < 0.2 | 0.810 | 1.9 | 38 | 85 | S4UL | 0 |
| Chromium (hexavalent) | mg/kg | < 4.0 | < 4.0 | < 4.0 | 38 | 6 | S4UL | 0 |
| Chromium | mg/kg | 6.8 | 20.9 | 48 | 38 | 910 | S4UL | 0 |
| Copper | mg/kg | 6.7 | 42.8 | 240 | 38 | 7100 | S4UL | 0 |
| Lead | mg/kg | 3.4 | 89.3 | 640 | 38 | 310 | C4SL | 5 |
| Mercury | mg/kg | < 0.3 | 0.875 | 2.3 | 38 | 56 | S4UL | 0 |
| Nickel | mg/kg | 7.3 | 19.8 | 67 | 38 | 180 | S4UL | 0 |
| Selenium | mg/kg | < 1.0 | 1.20 | 1.2 | 38 | 430 | S4UL | 0 |
| Vanadium | mg/kg | 9.6 | 31.7 | 85 | 38 | 1200 | S4UL | 0 |
| Zinc | mg/kg | 17 | 105 | 980 | 38 | 40000 | S4UL | 0 |
| Benzene | ug/kg | < 1.0 | < 1.0 | < 1.0 | 3 | 380 | S4UL | 0 |
| Toluene | µg/kg | < 1.0 | < 1.0 | < 1.0 | 3 | 880000 | S4UL | 0 |
| Ethylbenzene | µg/kg | < 1.0 | < 1.0 | < 1.0 | 3 | 83000 | S4UL | 0 |
| p & m-xylene | µg/kg | < 1.0 | < 1.0 | < 1.0 | 3 | 79000 | S4UL | 0 |
| o-xylene | µg/kg | < 1.0 | < 1.0 | < 1.0 | 3 | 88000 | S4UL | 0 |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | < 1.0 | < 1.0 | < 1.0 | 3 | 49000 | EIC/AGS (Resi without home grown produce) | 0 |
| TPH4 (C10 - C20) | mg/kg | < 10 | 510 | 510 | 16 | 27 | S4UL for Aliphatic C8-C10 as stringent surrogate. | 1 |
| TPH4 (C20 - C30) | mg/kg | < 10 | 640 | 640 | 16 | 27 | S4UL for Aliphatic C8-C10 as stringent surrogate. | 1 |
| TPH4 (C30 - C40) | mg/kg | < 10 | 280 | 280 | 16 | 27 | S4UL for Aliphatic C8-C10 as stringent surrogate. | 1 |
| Aliphatic >EC5 - EC6 | mg/kg | < 0.001 | < 0.001 | < 0.001 | 3 | 42 | S4UL | 0 |
| Aliphatic >EC6 - EC8 | mg/kg | < 0.001 | < 0.001 | < 0.001 | 3 | 100 | S4UL | 0 |
| Aliphatic >EC8 - EC10 | mg/kg | < 0.001 | < 0.001 | < 0.001 | 3 | 27 | S4UL | 0 |
| Aliphatic >EC10 - EC12 | mg/kg | < 1.0 | 4.70 | 4.7 | 3 | 130 | S4UL | 0 |
| Aliphatic >EC12 - EC16 | mg/kg | < 2.0 | 8.30 | 8.3 | 3 | 1100 | S4UL | 0 |
| Aliphatic >EC16 - EC21 | mg/kg | < 8.0 | < 8.0 | < 8.0 | 3 | 65000 | S4UL | 0 |
| Aliphatic >EC21 - EC35 | mg/kg | < 8.0 | < 8.0 | < 8.0 | 3 | 65000 | S4UL | 0 |
| Aromatic >EC5 - EC7 | mg/kg | < 0.001 | < 0.001 | < 0.001 | 3 | 370 | S4UL | 0 |
| Aromatic >EC7 - EC8 | mg/kg | < 0.001 | < 0.001 | < 0.001 | 3 | 860 | S4UL | 0 |
| Aromatic >EC8 - EC10 | mg/kg | < 0.001 | < 0.001 | < 0.001 | 3 | 47 | S4UL | 0 |
| Aromatic >EC10 - EC12 | mg/kg | < 1.0 | < 1.0 | < 1.0 | 3 | 250 | S4UL | 0 |
| Aromatic >EC12 - EC16 | mg/kg | < 2.0 | < 2.0 | < 2.0 | 3 | 1800 | S4UL | 0 |
| Aromatic >EC16 - EC21 | mg/kg | < 10 | < 10 | < 10 | 3 | 1900 | S4UL | 0 |
| Aromatic >EC21 - EC35 | mg/kg | < 10 | < 10 | < 10 | 3 | 1900 | S4UL | 0 |
| Aniline | mg/kg | < 0.1 | 4.3 | 4.3 | 2 | 85 | USEPA Region 9 Residential Soil | 0 |
| Phenol | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 750 | S4UL | 0 |
| 2-Chlorophenol | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 94 | S4UL (chlorophenols) | 0 |
| Bis(2-chloroethyl)ether | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 21 | USEPA Region 9 Residential Soil | 0 |
| 1,3-Dichlorobenzene | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 0.44 | S4UL | 0 |
| 1,2-Dichlorobenzene | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 24 | S4UL | 0 |
| 1,4-Dichlorobenzene | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 61 | S4UL | 0 |
| Bis(2-chloroisopropyl)ether | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 4.6 | USEPA Region 9 | 0 |

| Determinand | Units | Minimum | Mean | Maximum | Count | Screen (Residential Without Homegrown Produce) at 1% SOM | Source | Exceedences |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Residential Soil | |
| 2-Methylphenol | mg/kg | < 0.3 | 0.5 | 0.5 | 2 | 80 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) | 0 |
| Hexachloroethane | mg/kg | < 0.05 | < 0.05 | < 0.05 | 2 | 14 | S4UL | 0 |
| Nitrobenzene | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | 4.8 | USEPA Region 9 Residential Soil | 0 |
| 4-Methylphenol | mg/kg | < 0.2 | 0.4 | 0.4 | 2 | 80 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) | 0 |
| Isophorone | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 51 | USEPA Region 9 Residential Soil | 0 |
| 2-Nitrophenol | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | 750 | S4UL (Phenol as surrogate) | 0 |
| 2,4-Dimethylphenol | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | 19 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) | 0 |
| Bis(2-chloroethoxy)methane | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | 180 | USEPA Region 9 Residential Soil | 0 |
| 1,2,4-Trichlorobenzene | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | 2.6 | S4UL | 0 |
| 2,4-Dichlorophenol | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | 94 | S4UL (chlorophenols) | 0 |
| 4-Chloroaniline | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 2.4 | USEPA Region 9 Residential Soil | 0 |
| Hexachlorobutadiene | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 0.32 | S4UL | 0 |
| 4-Chloro-3-methylphenol | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 39 | USEPA Region 9 Residential Soil (2-chlorophenol as surrogate) | 0 |
| 2,4,6-Trichlorophenol | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 94 | S4UL (chlorophenols) | 0 |
| 2,4,5-Trichlorophenol | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 94 | S4UL (chlorophenols) | 0 |
| 2-Methylnaphthalene | mg/kg | < 0.1 | 2.9 | 2.9 | 2 | 2.3 | S4UL (naphthalene as surrogate) | **1** |
| 2-Chloronaphthalene | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 2.3 | S4UL (naphthalene as surrogate) | 0 |
| Dimethylphthalate | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 120 | EIC/AGS/CL:AIRE (diethyl phthalate as surrogate - Residential with consumption of HGP) | 0 |
| 2,6-Dinitrotoluene | mg/kg | < 0.1 | < 0.1 | < 0.1 | 2 | 65 | S4UL (TNT used as surrogate) | 0 |
| 2,4-Dinitrotoluene | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 65 | S4UL (TNT used as surrogate) | 0 |
| Dibenzofuran | mg/kg | < 0.2 | 0.4 | 0.4 | 2 | 78 | USEPA Region 9 Residential Soil | 0 |
| 4-Chlorophenyl phenyl ether | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | NA | NA | 0 |
| Diethyl phthalate | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 120 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) | 0 |
| 4-Nitroaniline | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | 24 | USEPA Region 9 Residential Soil | 0 |
| Azobenzene | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | 5.1 | USEPA Region 9 Residential Soil | 0 |
| Bromophenyl phenyl ether | mg/kg | < 0.2 | < 0.2 | < 0.2 | 2 | NA | NA | 0 |
| Hexachlorobenzene | mg/kg | < 0.3 | < 0.3 | < 0.3 | 2 | 30 | USEPA Region 9 Residential Soil | 0 |
| Carbazole | mg/kg | < 0.3 | 0.8 | 0.8 | 2 | NA | NA | 0 |
| Dibutyl phthalate | mg/kg | < 0.2 | 3.3 | 3.3 | 2 | 13 | EIC/AGS/CL:AIRE (Residential with consumption of HGP) | 0 |
| Anthraquinone | mg/kg | < 0.3 | 1.1 | 1.1 | 2 | NA | NA | 0 |
| Butyl benzyl phthalate | mg/kg | < 0.3 | 1.8 | 1.8 | 2 | 13 | EIC/AGS/CL:AIRE (dibutyl phthalate as surrogate - Residential with consumption of HGP) | 0 |

Note: Exceedances highlighted in **red text on yellow fill**.

Some of the samples exceeded the criteria for RwoHGP which are listed below.

| Sample Location | Determinand | Concentration | Screening Criterion | Units |
|---|---|---|---|---|
| BH102 at 4 m bgl | Lead | 530 | 310 | mg/kg |
| DS201 at 2 m bgl | Lead | 480 | 310 | mg/kg |
| DS209 at 1.4 m bgl | Lead | 640 | 310 | mg/kg |
| DS210 at 1.6 m bgl | Lead | 500 | 310 | mg/kg |
| DS214 at 0.9 m bgl | Lead | 450 | 310 | mg/kg |
| BH102 at 4 m bgl | Methyl Naphthalene | 2.9 | 2.3 | mg/kg |
| BH102 at 4 m bgl | TPH (C10 - C20) | 510 | 27 | mg/kg |
| BH102 at 4 m bgl | TPH (C20 - C30) | 640 | 27 | mg/kg |
| BH102 at 4 m bgl | TPH (C30 - C40) | 280 | 27 | mg/kg |

LEAD

It should be noted that the lead exceedences are all from samples taken from below the landfill cap and are therefore from the waste mass beneath. All other shallow lead concentrations from within the cap itself did not exceed the screening criterion. As such the cap is acting as an effective barrier to human exposure and therefore the risk to human health from lead at the site is negligible.

METHYL NAPHTHALENE

The recorded exceedence for methyl naphthalene is slight and deep within the underlying waste mass. As such the cap is acting as an effective barrier to human exposure and therefore the risk to human health from methyl naphthalene at the site is negligible.

TPH (C10 - C20), TPH (C20 – C30) & TPH (C30 – C40)

The recorded exceedences for TPH (C10 - C20), TPH (C20 – C30) & TPH (C30 – C40) is a result of using an overly stringent surrogate screening criterion for these TPH band. As such it should be noted that these exceedences were for soils deep within the underlying waste mass. As such the cap is acting as an effective barrier to human exposure and therefore the risk to human health from TPH (C10 - C20), TPH (C20 – C30) & TPH (C30 – C40) at the site is negligible.

## CONTROLLED WATERS

Groundwater was encountered during fieldwork and samples recovered during subsequent monitoring visits. The controlled waters risk assessment was carried out by screening chemical test data from groundwater samples recovered during return monitoring visits against environmental quality standards and / or drinking water standards. Tables G5 & G6 detail the screening assessment for the waters.

**Table G5: Controlled waters Screening Criteria**

| Determinand | Units | Screen Value | Screen Source |
|---|---|---|---|
| pH | pH Units | <5 or >9 | DWS |
| Naphthalene | µg/l | 10 | EQS |
| Acenaphthylene | µg/l | 0.1 | DWS |
| Acenaphthene | µg/l | 0.1 | DWS |
| Fluorene | µg/l | 0.1 | DWS |
| Phenanthrene | µg/l | 0.1 | DWS |
| Anthracene | µg/l | 0.1 | DWS |
| Fluoranthene | µg/l | 0.1 | DWS |
| Pyrene | µg/l | 0.1 | DWS |
| Benzo(a)anthracene | µg/l | 0.1 | DWS |
| Chrysene | µg/l | 0.1 | DWS |
| Benzo(b)fluoranthene | µg/l | 0.1 | DWS |
| Benzo(k)fluoranthene | µg/l | 0.1 | DWS |
| Benzo(a)pyrene | µg/l | 0.01 | DWS |
| Indeno(1,2,3-cd)pyrene | µg/l | 0.1 | DWS |
| Dibenz(a,h)anthracene | µg/l | 0.1 | DWS |
| Benzo(ghi)perylene | µg/l | 0.1 | DWS |
| Arsenic (dissolved) | µg/l | 50 | EQS |
| Boron (dissolved) | µg/l | 2000 | EQS |
| Cadmium (dissolved) | µg/l | 5 | EQS |
| Chromium (hexavalent) | µg/l | 5 | EQS |
| Chromium (dissolved) | µg/l | 5 | EQS |
| Copper (dissolved) | µg/l | 28 | EQS |
| Lead (dissolved) | µg/l | 4 | EQS |
| Mercury (dissolved) | µg/l | 1 | EQS |
| Nickel (dissolved) | µg/l | 50 | EQS |
| Selenium (dissolved) | µg/l | 10 | DWS |
| Vanadium (dissolved) | µg/l | 20 | EQS |
| Zinc (dissolved) | µg/l | 500 | EQS |
| Benzene | µg/l | 30 | EQS |
| Toluene | µg/l | 500 | EQS |
| Ethylbenzene | µg/l | 300 | WHO |
| p & m-xylene | µg/l | 30 | EQS |
| o-xylene | µg/l | 30 | EQS |
| MTBE (Methyl Tertiary Butyl Ether) | µg/l | 12 | USEPA Region 9 |
| Aliphatic >C5 - C6 | µg/l | 10 | DWS |
| Aliphatic >C6 - C8 | µg/l | 10 | DWS |
| Aliphatic >C8 - C10 | µg/l | 10 | DWS |
| Aliphatic >C10 - C12 | µg/l | 10 | DWS |
| Aliphatic >C12 - C16 | µg/l | 10 | DWS |
| Aliphatic >C16 - C21 | µg/l | 10 | DWS |
| Aliphatic >C21 - C35 | µg/l | 10 | DWS |
| Aromatic >C5 - C7 | µg/l | 10 | DWS |
| Aromatic >C7 - C8 | µg/l | 10 | DWS |
| Aromatic >C8 - C10 | µg/l | 10 | DWS |
| Aromatic >C10 - C12 | µg/l | 10 | DWS |
| Aromatic >C12 - C16 | µg/l | 10 | DWS |
| Aromatic >C16 - C21 | µg/l | 10 | DWS |
| Aromatic >C21 - C35 | µg/l | 10 | DWS |
| Trichlorofluoromethane | µg/l | 12 | EQS for carbon tetrachloride |
| Cis-1,2-dichloroethene | µg/l | 50 | WHO |
| Benzene | µg/l | 30 | EQS |
| Trichloroethene | µg/l | 10 | EQS |
| Toluene | µg/l | 500 | EQS |
| Ethylbenzene | µg/l | 300 | WHO |

| Determinand | Units | Screen Value | Screen Source |
|---|---|---|---|
| p & m-Xylene | µg/l | 30 | EQS |
| o-Xylene | µg/l | 30 | EQS |
| Isopropylbenzene | µg/l | 30 | EQS for benzene used as surrogate screen. |
| 1,2,4-Trimethylbenzene | µg/l | 30 | EQS for xylenes used as surrogate screen. |

**Table G6: Controlled Waters Screening Summary**

| Determinand | Units | Minimum | Mean | Maximum | Count | Screen Value | Screen Source | Number of Exceedences |
|---|---|---|---|---|---|---|---|---|
| pH | pH Units | 6.9 | 7.26 | 8.1 | 14 | <5 or >9 | DWS | 0 |
| Naphthalene | µg/l | < 0.01 | 3.925 | 4.28 | 14 | 10 | EQS | 0 |
| Acenaphthylene | µg/l | < 0.01 | 0.13 | 0.13 | 14 | 0.1 | DWS | 1 |
| Acenaphthene | µg/l | < 0.01 | 1.195 | 1.24 | 14 | 0.1 | DWS | 2 |
| Fluorene | µg/l | < 0.01 | 0.65 | 0.69 | 14 | 0.1 | DWS | 2 |
| Phenanthrene | µg/l | < 0.01 | 1.21 | 1.66 | 14 | 0.1 | DWS | 2 |
| Anthracene | µg/l | < 0.01 | 0.265 | 0.28 | 14 | 0.1 | DWS | 2 |
| Fluoranthene | µg/l | < 0.01 | 0.545 | 0.83 | 14 | 0.1 | DWS | 2 |
| Pyrene | µg/l | < 0.01 | 0.56 | 0.78 | 14 | 0.1 | DWS | 2 |
| Benzo(a)anthracene | µg/l | < 0.01 | 0.4 | 0.4 | 14 | 0.1 | DWS | 1 |
| Chrysene | µg/l | < 0.01 | 0.33 | 0.33 | 14 | 0.1 | DWS | 1 |
| Benzo(b)fluoranthene | µg/l | < 0.01 | 0.22 | 0.22 | 14 | 0.1 | DWS | 1 |
| Benzo(k)fluoranthene | µg/l | < 0.01 | 0.09 | 0.09 | 14 | 0.1 | DWS | 0 |
| Benzo(a)pyrene | µg/l | < 0.01 | 0.13 | 0.13 | 14 | 0.01 | DWS | 1 |
| Indeno(1,2,3-cd)pyrene | µg/l | < 0.01 | < 0.01 | < 0.01 | 14 | 0.1 | DWS | 0 |
| Dibenz(a,h)anthracene | µg/l | < 0.01 | < 0.01 | < 0.01 | 14 | 0.1 | DWS | 0 |
| Benzo(ghi)perylene | µg/l | < 0.01 | < 0.01 | < 0.01 | 14 | 0.1 | DWS | 0 |
| Arsenic (dissolved) | µg/l | 0.54 | 5.17 | 33.5 | 14 | 50 | EQS | 0 |
| Boron (dissolved) | µg/l | 13 | 498 | 2500 | 14 | 2000 | EQS | 2 |
| Cadmium (dissolved) | µg/l | < 0.02 | 0.0429 | 0.07 | 14 | 5 | EQS | 0 |
| Chromium (hexavalent) | µg/l | < 5.0 | < 5.0 | < 5.0 | 14 | 5 | EQS | 0 |
| Chromium (dissolved) | µg/l | 0.2 | 1.49 | 10 | 14 | 5 | EQS | 2 |
| Copper (dissolved) | µg/l | 1 | 4.41 | 7.5 | 14 | 28 | EQS | 0 |
| Lead (dissolved) | µg/l | < 0.2 | 2.96 | 14 | 14 | 4 | EQS | 2 |
| Mercury (dissolved) | µg/l | < 0.05 | 0.0943 | 0.18 | 14 | 1 | EQS | 0 |
| Nickel (dissolved) | µg/l | 2.4 | 14.2 | 66 | 14 | 50 | EQS | 1 |
| Selenium (dissolved) | µg/l | < 0.6 | 7.80 | 28 | 14 | 10 | DWS | 3 |
| Vanadium (dissolved) | µg/l | 0.3 | 1.11 | 3.4 | 14 | 20 | EQS | 0 |
| Zinc (dissolved) | µg/l | 1.6 | 6.11 | 25 | 14 | 500 | EQS | 0 |
| Benzene | µg/l | < 1.0 | 5.20 | 5.2 | 14 | 30 | EQS | 0 |
| Toluene | µg/l | < 1.0 | 336 | 365 | 14 | 500 | EQS | 0 |
| Ethylbenzene | µg/l | < 1.0 | 356 | 487 | 14 | 300 | WHO | 1 |
| p & m-xylene | µg/l | < 1.0 | 861 | 941 | 14 | 30 | EQS | 2 |
| o-xylene | µg/l | < 1.0 | 183 | 260 | 14 | 30 | EQS | 2 |
| MTBE (Methyl Tertiary Butyl Ether) | µg/l | < 1.0 | < 1.0 | < 1.0 | 14 | 12 | USEPA Region 9 | 0 |
| Aliphatic >C5 - C6 | µg/l | < 1.0 | < 1.0 | < 1.0 | 14 | 10 | DWS | 0 |
| Aliphatic >C6 - C8 | µg/l | < 1.0 | < 1.0 | < 1.0 | 14 | 10 | DWS | 0 |
| Aliphatic >C8 - C10 | µg/l | < 1.0 | < 1.0 | < 1.0 | 14 | 10 | DWS | 0 |
| Aliphatic >C10 - C12 | µg/l | < 10 | < 10 | < 10 | 14 | 10 | DWS | 0 |
| Aliphatic >C12 - C16 | µg/l | < 10 | < 10 | < 10 | 14 | 10 | DWS | 0 |
| Aliphatic >C16 - C21 | µg/l | < 10 | < 10 | < 10 | 14 | 10 | DWS | 0 |
| Aliphatic >C21 - C35 | µg/l | < 10 | < 10 | < 10 | 14 | 10 | DWS | 0 |
| Aromatic >C5 - C7 | µg/l | < 1.0 | 5.20 | 5.2 | 14 | 10 | DWS | 0 |
| Aromatic >C7 - C8 | µg/l | < 1.0 | 335 | 360 | 14 | 10 | DWS | 2 |
| Aromatic >C8 - C10 | µg/l | < 1.0 | 1400 | 1700 | 14 | 10 | DWS | 2 |
| Aromatic >C10 - C12 | µg/l | < 10 | < 10 | < 10 | 14 | 10 | DWS | 0 |
| Aromatic >C12 - C16 | µg/l | < 10 | < 10 | < 10 | 14 | 10 | DWS | 0 |
| Aromatic >C16 - C21 | µg/l | < 10 | < 10 | < 10 | 14 | 10 | DWS | 0 |
| Aromatic >C21 - C35 | µg/l | < 10 | < 10 | < 10 | 14 | 10 | DWS | 0 |
| Trichlorofluoromethane | µg/l | < 1.0 | 17.7 | 17.7 | 8 | 12 | EQS for carbon tetrachloride | 1 |
| Benzene | µg/l | < 1.0 | 5.2 | 5.2 | 8 | 30 | EQS | 0 |
| Toluene | µg/l | < 1.0 | 336 | 365 | 8 | 500 | EQS | 0 |
| Ethylbenzene | µg/l | < 1.0 | 355.5 | 487 | 8 | 300 | WHO | 1 |
| p & m-Xylene | µg/l | < 1.0 | 860.5 | 941 | 8 | 30 | EQS | 2 |
| o-Xylene | µg/l | < 1.0 | 183 | 260 | 8 | 30 | EQS | 2 |

| Determinand | Units | Minimum | Mean | Maximum | Count | Screen Value | Screen Source | Number of Exceedences |
|---|---|---|---|---|---|---|---|---|
| Isopropylbenzene | µg/l | < 1.0 | 2.8 | 2.8 | 8 | 30 | EQS for benzene used as surrogate screen. | 0 |
| 1,2,4-Trimethylbenzene | µg/l | < 1.0 | 2.6 | 2.6 | 8 | 30 | EQS for xylenes used as surrogate screen. | 0 |

Note: Exceedances highlighted in **red text on yellow fill**.

There were some exceedences which are summarised below.

| Location | Date | Determinand | Value | Screen | Unit |
|---|---|---|---|---|---|
| **FIRST ROUND** | | | | | |
| BH101 | 16/08/2017 | Selenium | 20 | 20 | µg/l |
| BH102 | 16/08/2017 | Acenaphthene | 1.24 | 0.1 | µg/l |
| BH102 | 16/08/2017 | Fluorene | 0.61 | 0.1 | µg/l |
| BH102 | 16/08/2017 | Phenanthrene | 0.76 | 0.1 | µg/l |
| BH102 | 16/08/2017 | Anthracene | 0.28 | 0.1 | µg/l |
| BH102 | 16/08/2017 | Fluoranthene | 0.26 | 0.1 | µg/l |
| BH102 | 16/08/2017 | Pyrene | 0.34 | 0.1 | µg/l |
| BH102 | 16/08/2017 | Boron | 2400 | 2000 | µg/l |
| BH102 | 16/08/2017 | Chromium | 10 | 5 | µg/l |
| BH102 | 16/08/2017 | Lead | 10 | 4 | µg/l |
| BH102 | 16/08/2017 | Nickel | 66 | 50 | µg/l |
| BH102 | 16/08/2017 | Selenium | 14 | 10 | µg/l |
| BH102 | 16/08/2017 | Ethylbenzene | 487 | 300 | µg/l |
| BH102 | 16/08/2017 | p & m-xylene | 941 | 30 | µg/l |
| BH102 | 16/08/2017 | o-xylene | 260 | 30 | µg/l |
| BH102 | 16/08/2017 | Aromatic >C7 - C8 | 360 | 10 | µg/l |
| BH102 | 16/08/2017 | Aromatic >C8 - C10 | 1700 | 10 | µg/l |
| BH102 | 16/08/2017 | Ethylbenzene | 487 | 300 | µg/l |
| BH102 | 16/08/2017 | p & m-Xylene | 941 | 30 | µg/l |
| BH102 | 16/08/2017 | o-Xylene | 260 | 30 | µg/l |
| BH104 | 16/08/2017 | Selenium | 28 | 10 | µg/l |
| **SECOND ROUND** | | | | | |
| BH102 | 24/08/2017 | Acenaphthylene | 0.13 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Acenaphthene | 1.15 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Fluorene | 0.69 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Phenanthrene | 1.66 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Anthracene | 0.25 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Fluoranthene | 0.83 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Pyrene | 0.78 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Benzo(a)anthracene | 0.4 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Chrysene | 0.33 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Benzo(b)fluoranthene | 0.22 | 0.1 | µg/l |
| BH102 | 24/08/2017 | Benzo(a)pyrene | 0.13 | 0.01 | µg/l |
| BH102 | 24/08/2017 | Boron | 2500 | 2000 | µg/l |
| BH102 | 24/08/2017 | Chromium | 6.3 | 5 | µg/l |
| BH102 | 24/08/2017 | Lead | 14 | 4 | µg/l |
| BH102 | 24/08/2017 | p & m-xylene | 780 | 30 | µg/l |
| BH102 | 24/08/2017 | o-xylene | 106 | 30 | µg/l |
| BH102 | 24/08/2017 | Aromatic >C7 - C8 | 310 | 10 | µg/l |
| BH102 | 24/08/2017 | Aromatic >C8 - C10 | 1100 | 10 | µg/l |
| BH102 | 24/08/2017 | Trichlorofluoromethane | 17.7 | 12 | µg/l |
| BH102 | 24/08/2017 | p & m-Xylene | 780 | 30 | µg/l |
| BH102 | 24/08/2017 | o-Xylene | 106 | 30 | µg/l |

Exceedences were noted predominantly in samples from BH102 which was situated in the waste mass. This was as expected as the groundwater within the waste mass will be essentially landfill leachate.

During the first-round slight exceedences for selenium were noted in BH101 and BH104. Selenium exceedences were not repeated in the second round. It should be noted that screening criterion

available for selenium is the drinking water standard and there are no groundwater abstractions for drinking purposes near the site as gleaned from the Phase 1 Desk Study.

None of the surface water samples yielded any exceedences of any of the contaminants from either round.

# APPENDIX H - CORRESPONDENCE WITH THE ENVIRONMENTAL HEALTH OFFICER

## James D Nelson

**From:** James D Nelson
**Sent:** 08 August 2017 10:27
**To:** aleemoore@uttlesford.gov.uk
**Cc:** ColinPharaoh; 'Jason Seed'
**Subject:** 17090J- Elsenham Golf & Leisure (Planning Ref: UTT/17/1673/FUL)

Hi Ann

Thank you very much for speaking with me this morning.

As discussed, we will be undertaking intrusive investigation works at the Elsenham Golf & Leisure site in order to address Condition 9 (Planning Ref: UTT/17/1673/FUL). This will include collection of near surface soil samples, proving the landfill cap thickness and materials and also to drill some deeper, water sampling boreholes just outside the area of the former landfill waste mass to determine groundwater quality and risks. We will also sample the ditch/stream to the north and west as well as any operational wells we might find at the site.

The nature of the development, is essentially a land reprofiling project using imported clean soils. No cut of the existing ground is proposed. There are no new buildings being built, save for ornamental features in the proposed Adventure Golf area. Building control are aware of these features and have not specified any special, protective measures.

In terms of ground gas risks in terms of source, pathway and receptor, there are no receptors. It should be noted that there will be a kiosk but this will be essentially a wooden shed construction on hardcore/breeze blocks (disguised as a Normal building) – therefore no pathway. We therefore conclude that the gas risk will be LOW and that no specific gas installations and/or monitoring will be necessary. Similarly, no gas protection measures will be required.

As agreed we will include this as a qualitative assessment of gas risks and that there is no need for specific, detailed assessment and no need for protective measures.

I hope this is representative of our conversation. Please feel free to email back with any clarifications you may have.

Best regards
**James D Nelson**
BSc MSc CSci CChem FRSC SiLC
**Associate**

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## James D Nelson

**From:** Ann Lee-Moore <aleemoore@uttlesford.gov.uk>
**Sent:** 17 October 2017 16:58
**To:** James D Nelson
**Subject:** RE: 17090J- Elsenham Golf & Leisure (Planning Ref: UTT/17/1673/FUL)

James

I confirm your proposals are acceptable.

Kind regards

*Ann Lee-Moore*
*Environmental Health Officer*

Uttlesford District Council
Council Offices
London Road
Saffron Walden
CB11 4ER

01799 510588
07976 071787

My usual working days are Tuesday, Wednesday and Friday

---

**From:** James D Nelson [mailto:j.nelson@dce-services.co.uk]
**Sent:** 16 October 2017 10:07
**To:** Ann Lee-Moore
**Cc:** Jason Seed; Colin Pharaoh
**Subject:** 17090J- Elsenham Golf & Leisure (Planning Ref: UTT/17/1673/FUL)
**Importance:** High

Hi Ann

We spoke in August 2017 about the need for gas protection at the proposed development at the Elsenham Golf & Leisure site. I sent an email to you describing our discussion (please see attached email).

We are in the process of finalising our report. Please would you let me know whether you are happy with our proposed way forward (attached email) or you wish to comment further.

I look forward to your response.

Best regards
**James D Nelson**
BSc MSc CSci CChem FRSC SiLC
**Associate**

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