

**A PHASE II CONTAMINATION REPORT TO SUPPORT A PLANNING APPLICATION FOR A
RESIDENTIAL DEVELOPMENT AT:**

LAND ADJACENT TO 72 STATION ROAD, SURFLEET



CLIENT: Mr J W & Mrs G M Needham

AGENT: Cooper Architectural Design Limited

REFERENCE: MSH/17.041/Phase II

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The logo consists of three stylized, overlapping geometric shapes: a triangle on the left, a square in the middle, and another triangle on the right. These shapes are arranged to form a larger, abstract triangular structure.

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1. INTRODUCTION

A F Howland Associates Limited was instructed by Mr J W & Mrs G M Needham to carry out a Phase II Contamination Survey at land adjacent to No. 72 Station Road, Surfleet, Lincolnshire (Fig. 17.041/PhaseII/1). This was required to support a planning application in relation to contamination risks associated with a proposed residential redevelopment.

This report was prepared for the use of the Client and its advisors. Other parties using the contained information do so at their own risk and any duty of care to those parties is specifically excluded. The report has been carried out in general accordance with accepted best practice and methodologies (BSI, 2013) (DEFRA and EA, 2004) (DCLG, 2010).



2. TERMS OF REFERENCE

This report has been prepared to support the proposed redevelopment and follows on from a Phase I Desk Study report (AFHA, 2017) which should be referred to for the background data pertinent to the scheme.

The Phase I Desk Study report identified a number of potential sources of contamination associated with agricultural/horticultural use of the site, as well as specific sources including diesel storage, degrading asbestos containing materials, former coal-fired boiler houses, and disposal of burnt material adjacent to the drainage ditch on the northern boundary.

This Phase II investigation was therefore intended to:

- Investigate the shallow ground conditions across the site and targeted at potential contamination sources and sample and analyse for contamination in the near surface soils.
- Assess the risks to human health, water supply pipes and surface water.
- Comment on appropriate mitigation and/or remediation strategies.

The comments and recommendations contained within this report are based on data acquired from relevant exploratory holes and associated laboratory testing. Extrapolation between and to other parts of the site is considered within the light of the geo-environmental setting as interpreted, but no responsibility can be accepted for conditions varying from those on which the report is based.



3. INTRUSIVE INVESTIGATION

3.1 FIELDWORK

The fieldwork was carried out on 23 March 2017 and comprised a single window sample hole and twenty-two trial pits.

The exploratory holes were set out to provide a broad coverage of the site and to target specific contamination sources. The locations are shown on Drawing 17.041/PhaselI/2. The National Grid references, and the elevation of the positions relative to Ordnance Datum, were measured using a Hemisphere S320 VRS GPS (RTK) system, where possible, or measured in by A F Howland Associates.

Sampling, soil descriptions and *in situ* tests were carried out in accordance with BS EN1997-2:2007 Eurocode 7 and its UK National Annex supported by BS 5930: 2015. Dedicated environmental samples were placed in suitable containers, stored temporarily in cool boxes and delivered to a UKAS accredited facility for analysis of potential contaminants.

The **window sample** hole, referenced WS01, was advanced to a depth of 6.0 m with a tracked window sampling rig to investigate if significant groundwater was present. The window sampling system utilises a 63.5 kg weight falling a distance of 750 mm to drive rods and sampling tubes into the ground, these are then extracted and the continuous samples described, with subsamples taken for possible laboratory testing.

The **trial pits**, referenced TP01 to TP22, were excavated by hand to a scheduled depth of 1.0 m. One pit, TP08, was terminated short of this depth at 0.7 m below ground level (bgl) following groundwater ingress. On completion, the pits were backfilled with arisings.

The exploratory holes were monitored for **groundwater** ingress during fieldwork, although, in this instance, groundwater was only encountered at one location.

Details of the strata encountered, the sampling and laboratory testing are shown on records appended to this report.



3.2 GROUND CONDITIONS

3.2.1 Soils

A broadly similar profile was found in each of the exploratory holes, which typically comprised topsoil or made ground underlain by natural silt and occasionally clay and sand. The findings were consistent with the general sequence mapped for the area by the BGS (2017) and the natural soil sequence was interpreted as superficial soils of the Tidal Flat Deposits. The underlying Oxford Clay Formation was not encountered.

The findings are discussed below and the site can be divided up into two areas:

Central, northern and eastern parts of the site

Made ground was found to depths of between 0.3 and the base of the trial pits at 1.0 m; mainly within the trial pits located along the drainage ditch in the north and within the storage area in the centre east. The made ground was highly variable in composition but frequently included ashy material, coal, clinker and brick gravel. Sometimes fragments of concrete, plastic, glass and metal were also found. Elsewhere in these parts of the site, topsoil was recorded to depths of between 0.25 and 0.69 m. This was found to comprise brown sandy silt or silty sand with subordinate quantities of clay and rare flint gravel.

Underlying the made ground or topsoil, the natural soils were mainly found to comprise light brown, yellow brown or brown silt with a variable clay and sand content. Occasionally sand or clay were found to underlie the topsoil and made ground.

Fields in the southern and western parts of the site

Made ground was generally not found within these areas, with the exception of TP05 and WS01 where rare brick and coal gravel was recorded suggesting the presence of made ground to depths of 0.39 and 0.48 m respectively. The topsoil, comprising silty clay or clayey silt, was found to extend to depths of between 0.47 and 0.82 m. The underlying natural soils in this area were mainly found to comprise light brown or yellow brown silt with a variable clay and sand content. Occasionally sand or clay was found directly below topsoil. With depth, the silt graded into a brown slightly clayey silty fine sand.

3.2.2 Groundwater

All of the exploratory holes remained dry during the fieldwork period except TP08 where fast inflow of water was recorded at approximately 0.6 m depth.



However, observations will have been affected by the permeability of the ground, the rate of progress of the hole and the techniques in operation. The general procedures used do not allow precise measurements of the groundwater conditions, but give only a general guide to the overall situation. Fluctuations in any groundwater table will also occur as a result of seasonal or climatic effects, as well as other outside influences. The groundwater encountered is considered to represent localised perched groundwater and not the regional groundwater table.



4. QUANTITATIVE RISK ASSESSMENT

4.1 PROPOSALS

It is understood that the proposed residential development will include removal and demolition of existing structures and construction of a number of dwellings, access roads, driveways, private gardens and public open spaces.

4.2 LABORATORY TESTING

The testing programme included analysis for a generic suite of contaminants for total concentrations in samples of soil from across the site as well as site specific contaminants in targeted soil following recommendations within the Phase 1 report (AFHA, 2017). In summary, soil samples were tested for the following:

- Heavy metals/metalloids (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium and zinc).
- Cyanide, phenol.
- Total and speciated PAHs (USEPA-16).
- BTEX¹, MTBE² and petroleum hydrocarbons (Criteria Working Group banding in soil).
- Organic matter content.

Targeted samples were also tested for:

- Organo-tin compounds, organochlorine insecticides, organophosphorus insecticides, triazines and phenoxy acid herbicides
- Asbestos fibres and bulk material screen.

The leachate from selected soils samples was also tested for heavy metals/metalloids, cyanide, phenol, total and speciated PAHs, BTEX, MTBE and petroleum hydrocarbons.

¹ Benzene, Toluene, Ethylbenzene, p and m-xylene and o-xylene

² Methyl Tertiary Butyl Ether



4.3 HUMAN HEALTH RISK ASSESSMENT

4.3.1 Assessment Methodology

The results for the samples of soil are presented in the Appendix as analytical report reference 643464-3. This also provides the stone and moisture content where applicable.

The soil results have been assessed against human health guideline values produced by Land Quality Management Limited in association with the Chartered Institute of Environmental Health (LQM, 2015) and which are referred to as 'suitable for use levels' (S4ULs). The S4ULs provide generic assessment criteria (GAC) values from a risk based approach to human exposure through the pathways of inhalation, ingestion and dermal contact which have been derived using the CLEA software version 1.06 and Environment Agency guidance (Environment Agency, 2009). In this case, the results are assessed against S4ULs for a 'residential with consumption of home-grown produce' setting and a soil organic matter of 6%.

When relevant S4ULs were unavailable, such as in the case of antimony, lead and cyanide, the results were compared to alternative 'soil screening values' (SSVs). For antimony and cyanide, the SSV was derived by WS Atkins Consultants Limited (W S Atkins, 2011), using the ATRISKsoil programme. In this case the 'residential with consumption of home-grown produce' scenario has been used with a soil organic matter of 6%. For lead, 'category 4 screening levels' (C4SLs) were used which have been developed by Contaminated Land: Applications in Real Environments (CL:AIRE, 2014) using a modified version of the CLEA model. The derivation of C4SLs uses the concept of a low level of toxicological concern (LLTC), which represents the estimated concentration of a contaminant that would pose an 'acceptably low' risk to human health. These allow a higher (though still 'acceptably low') level of risk than SGVs or SSVs while maintaining the precautionary approach.

4.3.2 Results

The results can be summarised as follows:

- The concentration of **lead** was above the C4SL lower threshold of 82 mg/kg within most of the samples tested from the central, northern and eastern parts of the site. Seven of the samples also exceeded the upper C4SL threshold criteria of 210 mg/kg.



- Concentrations of all other heavy metals/metalloids were below screening levels.
- Concentrations of phenol and cyanide were below the limit of detection.
- Concentrations of BTEX were low and below screening levels. Low concentrations of MTBE were found within twelve of the twenty three samples from across the site.
- Concentrations of **petroleum hydrocarbons (TPH)** were above screening levels within one sample (TP10). All other samples had low concentrations of petroleum hydrocarbons which were below screening levels.
- Concentrations of PAHs (USEPA-16) were low or below the limit of detection and below screening levels.
- Asbestos containing materials or fibres were not detected.
- Concentrations of tributyl tin compounds, organophosphorus insecticides triazanes were below the limit of detection
- Concentrations of organochlorine insecticides were mostly below the limit of detection. Low concentrations of **DDE, DDD and DDT** were detected.
- Concentrations of phenoxy acetic acid herbicides were below the limit of detection with one exception. A low concentration of fenoprop was recorded within one sample.

4.3.3 Discussion

The results have identified three potential contaminants for further discussion, namely: lead, petroleum hydrocarbons and insecticides and herbicides.

Lead

The C4SL values for lead are based on the LLTC values derived by CL:AIRE (2014) which are based on renal and cardiovascular effects of lead in adults and neuro-behavioural effects in children. The lower threshold represents a conservative screening value considering the toxicological effects of lead in soil. Values exceeding the upper threshold could be considered to pose a risk and action should be taken to remove or reduce the likelihood of exposure.

The samples of soil with concentrations of lead greater than lower threshold were all found within the northern, central and eastern parts of the site and were commonly, but



not exclusively, associated with the presence of made ground. Lead may have been introduced as a result of pesticide/herbicide application.

Petroleum hydrocarbons

A number of diesel tanks were present on site. However, no significant concentrations of petroleum hydrocarbons were found within these areas.

The sample with concentrations of TPH above screening levels, taken from TP10, was excavated adjacent to a diesel-powered fan heater for the greenhouse. This is likely to represent a localised hotspot.

Insecticides and herbicides

Low concentrations of DDE, DDD and DDT were detected within most of the samples selected for insecticide testing. DDT (dichlorodiphenyltrichloroethane) is a pesticide once widely used to control insects in agriculture but its use has since been banned in the UK. DDE and DDD are chemically similar to DDT and all three are commonly found together. They are persistent organic pollutants that are readily adsorbed onto the soil. The concentrations of DDD recorded were below the SSV published by WS Atkins (2011). In the absence of UK Guidance for DDT or DDE, concentrations were compared against Dutch Intervention Levels (Ministry of Housing, Spatial Planning and Environment, 2000)³ and were found not to exceed these.

A single sample had a low concentration of fenoprop. This is a banned herbicide for which there is no published soil screening level, although it is considered unlikely to be significant as the concentration is low and it does not appear to be widespread across the site.

4.4 CONTROLLED WATERS RISK ASSESSMENT

4.4.1 Assessment Methodology

The results of the analysis of six samples of soil leachate are presented in the appended report referenced 643464-3. These have been compared to screening values for groundwater and groundwater impacts on surface water as given in Schedule 5 of the Water Framework Directive (WFD) (DEFRA, 2015). Where chemical standards do not

³ The Dutch soil remediation intervention values indicate when the functional properties of the soil for humans, plants and animals is seriously impaired or threatened. They are representative of the level of contamination above which a serious case of soil contamination is deemed to exist.



exist in this document drinking water standards have been used, these are either UK Drinking Water Standards (UKDWS) (DWI, 2010) or World Health Organisation (WHO) Drinking Water Standards (WHO, 2011).

This assessment assumes that the concentrations of potential contaminants in soil leachate are representative of those entering controlled waters and that no natural attenuation or dilution occurs during transport and is intended as a preliminary assessment of the risk. A detailed quantitative risk assessment should be carried out if the risk is considered to be significant. Seepages of groundwater were encountered during the intrusive investigation at one location.

The site is located on Oxford Clay bedrock which is overlain by superficial cohesive deposits, both of which have a very low to low permeability and are classified as unproductive. The site is not within a groundwater source protection zone or a drinking water safeguard zone. Any groundwater present is considered to be of a negligible sensitivity.

The nearest surface water feature is the River Glen which lies on the opposite side of Station Road, approximately 10 m south of the site. There is also a drainage ditch running along the northern site boundary. There are no surface water abstractions licences within 500 m of the site. Surface water is considered to be of a moderate to high sensitivity.

4.4.2 Discussion

The results of the soil leachate analysis showed low or very low concentrations of the tested contaminants and are summarised below:

- Most inorganic contaminants were recorded below screening levels when considering standards for the general quality of a groundwater body or groundwater within a drinking water protected area (DEFRA, 2015). The exception was arsenic: most samples exceeded the screening level of 7.5 µg/l and the maximum recorded concentration was 19 µg/l. However, all arsenic concentrations were below screening levels when considering groundwater impacts on surface water (DEFRA, 2015).
- Concentrations of BTEX, MTBE, cyanide and phenol were below the limit of detection.



- PAHs were mostly below the limit of detection. Naphthalene was reported within most of the samples but at concentrations below the screening level when considering the general quality of a groundwater body (DEFRA, 2015). One sample reported other PAHs with a total PAH concentration of 0.14 µg/l. This is marginally above the UK drinking water standard for total PAH.
- Low concentrations of aliphatic and aromatic petroleum hydrocarbons in the C10 to C35 range were reported for each sample. The maximum total concentration was 0.23 mg/l

The concentration of petroleum hydrocarbons presents the greatest risk to surface water. Although, natural attenuation, and dilution at the receptor, would reduce the levels further. The ground conditions on site are silt, clay and fine sand and the low permeability of the natural soils coupled with the absence of significant groundwater means there is a very low likelihood of lateral migration into the nearby drain or river. Furthermore, dilution of any contaminant entering the river will take place further reducing the concentrations.

Low concentrations of MTBE were found within many soil samples across the site. It is an additive to petrol and therefore was possibly introduced to the soil by petrol-powered machinery. MTBE is undesirable in drinking water as small concentrations can give an unpleasant taste. However, given that no MTBE was detected within the leachate samples, the groundwater is of negligible sensitivity, lateral flow to the river is unlikely and neither receptor is abstracted for drinking purposes it is considered to represent an insignificant risk to controlled waters.

4.5 GROUND GAS RISK ASSESSMENT

No significant sources of ground gas have been identified on or off site.

4.6 REVISED CONCEPTUAL MODEL

The revised conceptual model is presented below and risk management and remediation measures are discussed in Section 5, where appropriate. Risk assessment classification is appended.



Source of Contamination	Pathway	Receptor	Probability and Reasoning	Consequence and Reasoning	Risk Classification
Soils (contaminated with lead and TPH)	Direct contact (inhalation/ ingestion)	Human end-users	Likely – concentrations of lead above screening levels found in made ground and natural soils, mainly within the north, east and central parts of the site. Localised TPH contamination in TP10.	Medium – residential development proposed. Chronic damage to human health	Moderate Risk
		Construction workers	Likely – made ground and natural soils impacted by lead. Localised TPH contamination in TP10.	Mild – appropriate PPE and hygiene measures recommended	Moderate to Low Risk
	Percolation of leachate / mobile contaminants	Groundwater	Unlikely – significant mobile contamination not found. Very low soil leachate concentrations. Low permeability natural soils. Significant groundwater not found during fieldwork.	Mild – groundwater is of negligible sensitivity	Very Low Risk
		Surface water		Medium – pollution of moderate to high sensitivity surface water	Low Risk
	Direct Contact	Water supply	Low likelihood – localised TPH contamination found in TP10. Proposed remedial works include removing hot spots and validating area of diesel tanks.	Medium – potable water supply pipes within a housing development	Moderate to low Risk
Radon Gas	Gas migration through permeable strata, ingress and accumulation into structures	Human end-users	Unlikely – site outside of radon affected area.	Medium – chronic risk to human end users	Low Risk
Hazardous ground gas (unidentified fill)	Gas migration through permeable strata, ingress and accumulation into structures	Human end-users	Unlikely – no significant on or off site sources identified within 500 m of the site.	Severe – acute risk to (human) end users and structures	Low Risk
		Structures			Low Risk

Table 1: Revised Conceptual Model

5. RISK MANAGEMENT AND MITIGATION MEASURES

5.1 INTRODUCTION

The review of risk and assessment of appropriate remediation is based on the presence of a “source-pathway-receptor”. In the absence of the linkage, the risk is eliminated. The discussion below is based on the findings of the investigation and is therefore limited to the areas investigated. If any suspected contamination is encountered during the construction phase then this should be evaluated and appropriate action taken.

5.2 CHEMICAL CONTAMINATION – HUMAN END-USERS

A moderate risk to human end-users from the concentration of lead and localised hydrocarbon contamination within the soil is concluded.

In the area of the **TPH** hot spot, around TP10, further sampling and testing is recommended following decommission of the diesel-powered greenhouse fan heater to determine the extent of the contamination. Once this is known, the most practical solution is likely to be the removal off-site of the diesel impacted soils. Existing diesel storage tanks are also present on site. Following decommissioning and removal of these tanks, further soil sampling and testing should be carried out within these areas to confirm the soil is free of hydrocarbon contamination.

Lead impacted soils at concentrations considered to present a risk to human end-users have been found mainly within the north, central and eastern parts of the site. At this stage, as the proposed development layout is unknown and, in the absence of further testing, a cover system is recommended for proposed garden areas across the entire site. The cover system thickness can be derived using guidance from BRE 465 (2004) and should be constructed from materials certified as ‘suitable for use’. The calculations are appended and based on the concentrations of lead recorded in the soils a cover thickness of at least 300 mm should be applied.

Consideration should be given to additional investigation once the proposed development layout is known. This may lead to a reduced area requiring remediation or justification for a reduced thickness of cover.



As with any remedial activities, this approach should be agreed with the Local Planning Authority through the submission of a Remediation Method Statement and be subject to appropriate validation after construction.

Asbestos was not found within the soils samples. Asbestos containing material (ACM) is suspected within the construction of some of the existing buildings on site. It is recommended that an asbestos survey is carried out by a specialist contractor to confirm the identification and to ensure appropriate measures are in place during demolition and removal of buildings so that the risk of releasing asbestos fibres is reduced.

5.3 CHEMICAL CONTAMINATION – CONSTRUCTION WORKERS

Soil analysis showed elevated concentrations of lead and a hydrocarbon hotspot. However, these do not necessarily pose a short-term risk to construction workers and the risk can normally be addressed by using standard personal protective equipment, including gloves, when handling soils and usual hygiene precautions such as washing hands before eating.

5.4 CHEMICAL CONTAMINATION – CONTROLLED WATERS

Except for lead and localised hydrocarbon contamination, soil contamination levels were found to be low. Soil leachate concentrations were also low and generally below screening levels. TPH was present within the leachate but a low likelihood of lateral migration off-site into the nearby drain and river was concluded.

Providing the recommendations outlined above within Section 5.2, regarding the existing diesel tanks and hydrocarbon hotspot are carried out, a low or very low risk to controlled waters is concluded.

5.5 CHEMICAL CONTAMINATION – WATER SUPPLY PIPES

Generally low levels of contaminants were identified. However, a hydrocarbon hotspot was identified in the vicinity of a diesel-powered fan heater and diesel storage tanks exist on site. Providing recommendations outlined above within Section 5.2 are executed, a low to moderate risk to water supply pipes from hydrocarbon contamination is concluded. The risk may be further reduced by providing a clean surround to the pipework or by using a hydrocarbon resistant construction.



5.6 GROUND GAS

No significant sources of ground gas have been identified or are expected.



6. SUMMARY

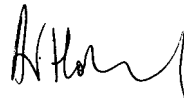
1. A Phase II investigation was carried out at land adjacent to 72 Station Road, Surfleet to support a planning application for a proposed residential development.
2. The site is a horticultural nursery. The Phase I report (AFHA, 2017) identified a number of potential sources of contamination associated with the agricultural/horticultural use of the site, as well as specific sources including diesel storage, degrading asbestos containing materials, coal-fired boiler houses, and disposal of burnt material adjacent to the drainage ditch on the northern boundary.
3. The investigation found a broadly similar profile in each of the exploratory holes, which typically comprised topsoil or made ground underlain by natural silt and occasionally sand and clay. The made ground was generally restricted to the northern, central and eastern parts of the site.
4. All of the exploratory holes remained dry during the fieldwork period except TP08 where fast inflow of perched water was recorded.
5. Chemical analysis revealed concentrations of lead above assessment criteria within soil samples from the northern, central and eastern parts of the site. A localised area of TPH contamination was found adjacent to a diesel-powered fan heater. These represent a moderate risk to end-users.
6. At this stage, a cover system of at least 300 mm is recommended for proposed garden areas across the entire site. This should be agreed with the Regulator before proceeding and validation will be necessary.
7. Once the proposed development layout is known, additional investigation may lead to a reduced area requiring remediation or justification for a reduced thickness of cover.
8. In the area of the TPH hot spot, further sampling and testing is recommended following decommissioning of the fan heater to determine the extent of the contamination. Once this is known, the most practical solution is likely to be the removal off-site of the diesel impacted soils.
9. Existing diesel storage tanks are also present on site. Following decommissioning and removal of these tanks, further soil sampling and testing should be carried out within these areas to confirm the soil is free of hydrocarbon contamination.
10. Soil leachate concentrations were also low and below screening levels. Hydrocarbons were present within the leachate but groundwater is of low sensitivity and a low likelihood of lateral migration off-site into the nearby drain and river was concluded resulting in a low or very low risk to controlled waters.



11. A low to moderate risk to water supply pipes from hydrocarbon contamination was concluded. The risk may be further reduced by providing a clean surround to the pipework or by using a hydrocarbon resistant construction.
12. Asbestos was not found within the soils samples. Asbestos containing material (ACM) is suspected within the construction of some of the existing buildings on site. It is recommended that an asbestos survey is carried out by a specialist contractor to ensure appropriate measures are in place during demolition and removal of buildings.



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APPENDIX A: REFERENCES

- A F HOWLAND ASSOCIATES. 2017. A Phase I Desk Study Report to address condition 4 of Planning Permission Reference H17-0798-15 for a residential development at: Land adjacent to 72 Station Road, Surfleet. Reference DJM/17.041/PhaseI. Dated 28 February 2017.
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APPENDIX B: EXPLORATORY HOLE RECORDS

Trial pit records - TP01 to TP22

Window sample record - WS01

D	Small disturbed sample
ES	Environmental sample
L	Plastic liner
U	Nominal 70 mm diameter undisturbed open tube sample
SPT	Standard penetration test using a split spoon sampler. N Value is uncorrected, but the hammer energy ratio is given where known (in remarks).
IP xx	Initial penetration during the SPT recorded in millimetres. If initial penetration equals or exceeds 450 mm the test is aborted.
S x,x	SPT seating drive blow count given by the summation of the blows 'X' required to drive the seating length
T x,x,x,x	SPT test drive blow count 'N' given by the summation of the blows 'X' required to drive the seating length (300 mm)
X*Y	Incomplete standard penetration test where the seating/test drive could not be completed. The blows 'X' represent the total blows for the given length of seating drive 'Y' (mm)
dd/mm/yy: 1.0	Date, water level at the window sample hole depth at the end of shift and the start of the following shift
dd/mm/yy: dry	



 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet			Trial Pit Number TP01			
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.32		Client Mr & Mrs Needham		Job Number 17.041			
		Location 525615 E 328552 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1			
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description			Legend	Water	
0.00-0.64	D1					TOPSOIL (Soft dark brown silty clay)					
0.10-0.20	ES1				(0.64)						
0.64-1.00	D2				2.68	0.64	Yellow brown sandy SILT with clayey pockets				
0.90	ES2				2.32	1.00					
						Complete at 1.00m					

	Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion		
	Scale (approx) 1:25	Logged By JDR	Figure No. 17.041.TP01

 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet			Trial Pit Number TP02	
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.31		Client Mr & Mrs Needham		Job Number 17.041	
		Location 525614 E 328591 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.00-0.47	D1			2.84		TOPSOIL (Dark brown clayey silt)			
0.10-0.20	ES1				(0.47)				
0.47-1.00	D2				0.47	Yellow brown clayey fine to medium SAND with bands of grey clay			
		(0.53)							
				2.31	1.00	Complete at 1.00m			
					Remarks				
					1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion				
					Scale (approx) 1:25		Logged By JDR		Figure No. 17.041.TP02



Land adjacent to 72 Station Road, Surfleet

**Trial Pit
Number**
TP03

Hand dug trial pit

Dimensions
L 0.3 m x W 0.3 m x D 1.0 m

3.45

Mr & Mrs Needham

Job Number
17.041

525640 E 328569 N

23/03/2017

Cooper Architectural Design Limited

Sheet
1/1

Sample / Tests

Field Records

Depth
(m)
(Thickness)

Description

Legend

Water

0.10-0.20

ES1

(0.59)

TOPSOIL (Dark brown clayey silt with rootlets)

0.59-1.00

D2

2.86

0.59
(0.41)

Soft to firm light yellow brown silty sandy CLAY

2.45

1.00

Complete at 1.00m

Remarks

1. Location CAT scanned prior to excavation.
2. No groundwater encountered
3. Pit remained open and sidewalls stable during excavation
4. Backfilled with arisings upon completion

No image available

Scale (approx)

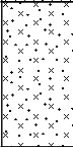
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Logged By

JDR

Figure No.

17.041.TP03

 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet		Trial Pit Number TP04		
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.90		Client Mr & Mrs Needham		Job Number 17.041	
		Location 525642 E 328531 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.00-0.52	D1					TOPSOIL (Dark brown clayey silt)			
0.10-0.20	ES1				(0.52)				
				3.38	0.52	Yellow brown sandy SILT			
0.52-1.00	D2				(0.48)				
				2.90	1.00	Complete at 1.00m			
No image available					Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion				
					Scale (approx) 1:25		Logged By JDR		Figure No. 17.041.TP04

 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet		Trial Pit Number TP05		
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 4.24		Client Mr & Mrs Needham		Job Number 17.041	
		Location 525663 E 328515 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.00-0.39	D1			3.85	(0.39) 0.39 (0.61) 1.00	MADE GROUND? (Dark brown clayey silt with rare subangular fine to medium brick gravel)			
0.10-0.20	ES1					Brown clayey slightly sandy SILT			
0.39-1.00	D2								
0.90	ES2					Complete at 1.00m			
No image available						Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion			
						Scale (approx) 1:25		Logged By JDR	

 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet		Trial Pit Number TP06	
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.84		Client Mr & Mrs Needham		Job Number 17.041
		Location 525660 E 328596 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10	D1			3.64	(0.20)	MADE GROUND (Dark brown slightly clayey slightly ashy sand)		
0.20	ES1				0.20			
0.30	D2			3.44	(0.20)	MADE GROUND (Layered black, orange brown, brown ashy slightly organic sand)		
					0.40			
						MADE GROUND (Dark brown clayey sand with ash pockets)		
0.60	D3				(0.60)			
				2.84	1.00	Complete at 1.00m		
						Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion		
						Scale (approx) 1:25	Logged By DJM	Figure No. 17.041.TP06



Land adjacent to 72 Station Road, Surfleet

**Trial Pit
Number**
TP07

Hand dug trial pit

L 0.3 m x W 0.3 m x D 1.0 m

3.35

Mr & Mrs Needham

Job Number
17.041

525670 E 328592 N

23/03/2017

Cooper Architectural Design Limited

Sheet
1/1

Sample / Tests

Field Records

Depth
(m)
(Thickness)

Description

Legend

Water

D1

D2

0.34-1.00

D3

3.01

(0.34)

0.34

MADE GROUND (Dark brown black gravelly sand. Gravel is angular to subrounded fine to medium brick)
...geotextile membrane. Becoming mottled grey, and gravel is also clinker and charcoal

Soft to firm brown mottled dark brown in places slightly sandy CLAY with sand pockets

2.35

1.00

Complete at 1.00m

No image available

Remarks

1. Location CAT scanned prior to excavation.
2. No groundwater encountered
3. Pit remained open and sidewalls stable during excavation
4. Backfilled with arisings upon completion

Scale (approx)

1:25

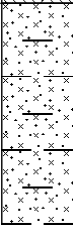
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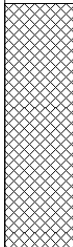
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Figure No.

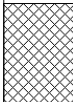
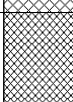
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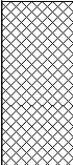
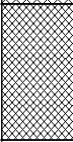
 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet			Trial Pit Number TP08	
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 0.7 m		Ground Level (mOD) 3.44		Client Mr & Mrs Needham		Job Number 17.041	
		Location		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.40 0.40	D1 ES1		Fast(1) at 0.58m.	3.29	(0.15) 0.15	CONCRETE over plastic membrane		∇1	
					(0.55)	MADE GROUND (Red brick rubble in a dark brown sandy subangular fine to coarse brick, concrete and glass gravel matrix)			
					2.74	0.70	Terminated at 0.70m		
					Remarks				
					1. Location CAT scanned prior to excavation. 2. Groundwater struck at 0.58 m 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion and reinstated with post-crete				
Scale (approx)					Logged By		Figure No.		
1:25					DJM		17.041.TP08		

 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet		Trial Pit Number TP09		
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.46		Client Mr & Mrs Needham		Job Number 17.041	
		Location 525682 E 328576 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.10	D1 ES1			3.21	(0.25)	TOPSOIL (Brown silty sand)			
0.10					0.25	Brown clayey slightly sandy SILT			
0.50	D2				(0.75)				
				2.46	1.00	Complete at 1.00m			
No image available						Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion			
						Scale (approx) 1:25		Logged By DJM	

 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet			Trial Pit Number TP10	
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.80		Client Mr & Mrs Needham		Job Number 17.041	
		Location 525683 E 328549 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
0.00-0.15	D1					MADE GROUND? (Brown sandy silt)			
0.10-0.20	ES1				(0.82)	...plastic sheeting partially across the hole			
0.15-0.82	D2								
0.82-1.00	D3			2.98	0.82	Light brown clayey SILT			
				2.80	(0.18)				
			1.00	Complete at 1.00m					
					Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion				
					Scale (approx) 1:25		Logged By JDR		Figure No. 17.041.TP10

 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet		Trial Pit Number TP11		
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.70		Client Mr & Mrs Needham		Job Number 17.041	
		Location 525700 E 328549 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.00-0.64	D1			3.06	(0.64)	Plastic sheeting over TOPSOIL (Brown sandy silt)			
0.10-0.20	ES1								
0.64-1.00	D2								
				2.70	1.00	Light brown clayey SILT			
						Complete at 1.00m			
No image available						Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion			
						Scale (approx) 1:25		Logged By JDR	

 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet			Trial Pit Number TP12	
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.68		Client Mr & Mrs Needham		Job Number 17.041	
		Location 525693 E 328548 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.00-0.34	D1			3.34 3.28	(0.34)	MADE GROUND (Dark brown clayey slightly gravelly silt. Gravel is subangular fine to medium brick and sandstone)			
0.10-0.20	ES1								
0.34-0.40 0.40-1.00	D2 D3				0.34 0.40	MADE GROUND (Yellow brown subangular to rounded fine to medium sandstone gravel, with rare sandstone cobbles)			
					(0.60)	MADE GROUND (Brown mottled dark brown in places clayey slightly gravelly silt with clay pockets. Gravel is subangular fine to medium brick and sandstone)			
0.90	ES2			2.68	1.00	Complete at 1.00m			
					Remarks				
					1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion				
Scale (approx) 1:25					Logged By JDR		Figure No. 17.041.TP12		

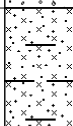
 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet		Trial Pit Number TP13			
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 4.06		Client Mr & Mrs Needham		Job Number 17.041		
		Location 525708 E 328596 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1		
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water		
0.10 0.10	D1 ES1				(0.55)	MADE GROUND (Dark brown to black in places ashy slightly clayey slightly gravelly organic sand. Gravel is subangular fine to medium brick) ...becoming orange brown				
0.70 0.70	D2 ES2			3.51	0.55 (0.45)	MADE GROUND (Dark brown clayey sand with ash pockets)				
				3.06	1.00	Complete at 1.00m				
					Remarks					
					Scale (approx) 1:25		Logged By DJM		Figure No. 17.041.TP13	

 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet		Trial Pit Number TP14			
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.79		Client Mr & Mrs Needham		Job Number 17.041		
		Location 525715 E 328553 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1		
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water		
0.00-0.71	D1					TOPSOIL (Dark brown clayey slightly sandy silt with rootlets)				
0.10-0.20	ES1				(0.71)					
0.71-1.00	D2			3.08	0.71	Yellow brown silty fine to medium SAND				
					(0.29)					
		2.79	1.00	Complete at 1.00m						
					Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion					
					Scale (approx) 1:25		Logged By JDR		Figure No. 17.041.TP14	

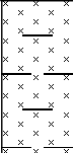
 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet		Trial Pit Number TP15		
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.76		Client Mr & Mrs Needham		Job Number 17.041	
		Location 525719 E 328547 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.10	D1 ES1			3.46	(0.30)	TOPSOIL (Dark brown slightly clayey silty sand)			
0.10					0.30	Light brown clayey sandy SILT			
0.40-0.50	ES2				(0.70)				
0.80	D2			2.76	1.00	Complete at 1.00m			
No image available						Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion			
						Scale (approx) 1:25		Logged By DJM	

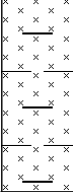
 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet		Trial Pit Number TP16		
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 4.21		Client Mr & Mrs Needham		Job Number 17.041	
		Location 525733 E 328522 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
0.00-0.82	D1					TOPSOIL (Dark brown clayey silt)			
0.10-0.20	ES1				(0.82)				
0.82-1.00	D2			3.39	0.82 (0.18)	Brown clayey slightly sandy SILT			
				3.21	1.00	Complete at 1.00m			
No image available					Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion				
					Scale (approx) 1:25		Logged By JDR		Figure No. 17.041.TP16

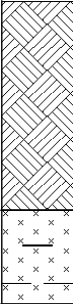
 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet			Trial Pit Number TP17		
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.86		Client Mr & Mrs Needham		Job Number 17.041		
		Location 525732 E 328545 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1		
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water		
0.10 0.10	D1 ES1			3.56	(0.30) 0.30	MADE GROUND (Dark brown very clayey silty sand, with rare subangular to subrounded fine to medium brick, concrete and coal gravel)				
					(0.70)	Brown very clayey silty fine to medium SAND				
0.80	D2			2.86	1.00	Complete at 1.00m				
					Remarks					
					1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion					
					Scale (approx) 1:25		Logged By DJM		Figure No. 17.041.TP17	

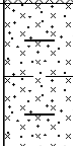
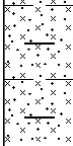
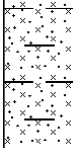
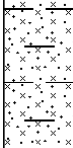
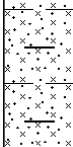
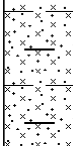
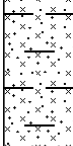
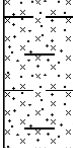
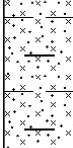
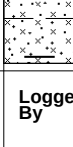
 A F Howland Associates Geotechnical Engineers				Site Land adjacent to 72 Station Road, Surfleet			Trial Pit Number TP18		
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.81		Client Mr & Mrs Needham		Job Number 17.041	
		Location 525743 E 328549 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.10 0.10	D1 ES1				(0.50)	MADE GROUND (Dark brown clayey sand with rare subangular fine brick gravel and metal wire fragments)			
				3.31 3.21	0.50 (0.10) 0.60	CONCRETE			
					(0.40)	Light brown slightly clayey sandy SILT			
0.80 0.80	D2 ES2			2.81	1.00	Complete at 1.00m			
						Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion			
						Scale (approx) 1:25		Logged By DJM	

 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet		Trial Pit Number TP19		
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.31		Client Mr & Mrs Needham		Job Number 17.041	
		Location 525728 E 328573 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.00-0.38	D1			2.93		TOPSOIL (Dark brown clayey silt)			
0.10-0.20	ES1				(0.38)				
0.38-1.00	D2				0.38	Light yellow brown clayey SILT			
		(0.62)							
				2.31	1.00	Complete at 1.00m			
No image available						Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion			
						Scale (approx) 1:25		Logged By JDR	

 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet		Trial Pit Number TP20		
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.60		Client Mr & Mrs Needham		Job Number 17.041	
		Location 525727 E 328592 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.00-0.48	D1			3.12	(0.48)	MADE GROUND (Dark brown grey clayey gravelly silt. Gravel is subangular to subrounded clinker, charcoal and glass. Rare clinker cobbles)			
0.10-0.20	ES1				0.48	Light brown clayey SILT			
0.48-1.00	D2				(0.52)	Complete at 1.00m			
No image available					Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion				
					Scale (approx) 1:25		Logged By JDR		Figure No. 17.041.TP20

 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet		Trial Pit Number TP21		
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.44		Client Mr & Mrs Needham		Job Number 17.041	
		Location 525750 E 328589 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.00-0.36	D1			3.08		TOPSOIL (Dark brown clayey silt with rootlets)			
0.10-0.20	ES1				(0.36)	Light yellow brown clayey SILT			
0.36-1.00	D2				0.36				
					(0.64)				
0.90	ES2			2.44	1.00	Complete at 1.00m			
No image available						Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion			
						Scale (approx) 1:25		Logged By JDR	

 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet		Trial Pit Number TP22	
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.55		Client Mr & Mrs Needham		Job Number 17.041
		Location 525756 E 328564 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.27	D1					TOPSOIL (Dark brown clayey silt with occasional subangular to subrounded fine to medium flint)		
0.10-0.20	ES1					...gravel becoming absent and with clay pockets		
0.27-0.69	D2				(0.69)			
0.69-1.00	D3			2.86	0.69	Light brown clayey SILT		
					(0.31)			
				2.55	1.00	Complete at 1.00m		
No image available						Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion		

 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet			Number WS01	
Excavation Method Tracked Window Sampling Rig, Dando Terrier 2002. 102 mm to 2.00 m 87 mm to 3.00 m 75 mm to 4.00 m 65 mm to 5.00 m		Dimensions		Ground Level (mOD) 4.09		Client Mr & Mrs Needham		Job Number 17.041	
		Location 525695 E 328533 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/2	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.10 0.10	D1 ES1			3.61	(0.48)	MADE GROUND (Brown silty fine sand with rare subangular to subrounded fine to medium brick and coal gravel)			
					0.48	Light brown slightly clayey sand SILT			
0.70	D2								
1.20-2.00	L1					...becoming clayey and slightly sandy			
1.50	D3								
2.00-3.00	L2					...becoming damp			
2.50	D4					...becoming brown, slightly clayey and sandy			
3.00-4.00	L3				(4.72)				
3.60	D5								
4.00-5.00	L4								
4.50	D6					...becoming very sandy			
Remarks 1. Location CAT scanned prior to excavation. 2. Hand dug inspection pit to 1.20 m. 3. No groundwater encountered 4. Recovered soil samples damp from 2.0 m 5. Upon completion the hole collapsed/swelled to 2.0 m 6. Position backfilled with arisings							Scale (approx)	Logged By	
							1:25	DJM	
							Figure No. 17.041.WS01		

 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet		Number WS01		
Excavation Method Tracked Window Sampling Rtg, Dando Terrier 2002. 102 mm to 2.00 m 87 mm to 3.00 m 75 mm to 4.00 m 65 mm to 5.00 m		Dimensions		Ground Level (mOD) 4.09		Client Mr & Mrs Needham		Job Number 17.041	
		Location 525695 E 328533 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 2/2	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
5.00-6.00	L5			-1.11	5.20	Brown slightly clayey silty fine SAND ...becoming a slightly clayey silty fine SAND			
5.50	D7				(0.80)				
			23/03/2017:DRY	-1.91	6.00	Complete at 6.00m			
									
Remarks							Scale (approx)		Logged By
							1:25		DJM
							Figure No. 17.041.WS01		

APPENDIX C: LABORATORY TESTING

Contamination Test Results



Concept Life Sciences

Certificate of Analysis

Report Number: 643464-3

Date of Report: 06-Apr-2017

Customer: A F Howland Associates
The Old Exchange
Newmarket Road
Cringleford
Norwich
NR4 6UF

Customer Contact: Mr Daniel Myhill

Customer Job Reference: DJM/17.041/00/01

Customer Purchase Order: DJM/17.041/00/01

Customer Site Reference: Land adjacent to 72 Station Road, Surfleet

Date Job Received at Concept: 29-Mar-2017

Date Analysis Started: 31-Mar-2017

Date Analysis Completed: 06-Apr-2017

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

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

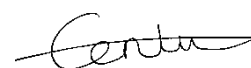
This report should not be reproduced except in full without the written approval of the laboratory

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



Report checked
and authorised by :
Chelsea Entwistle
Senior Project Manager

Issued by :
Chelsea Entwistle
Senior Project Manager



Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01													
Soil		Analysed as Soil											
Asbestos Screen													
Concept Reference				643464 005		643464 006		643464 007		643464 009		643464 010	
Customer Sample Reference				TP06 ES1 @ 0.20m		TP07 ES1 @ 0.10m		TP08 ES1 @ 0.40m		TP10 ES1 @ 0.10m		TP11 ES1 @ 0.10m	
Date Sampled				23-MAR-2017		23-MAR-2017		23-MAR-2017		23-MAR-2017		23-MAR-2017	
Type				Topsoil		Topsoil		Fill		Sandy Soil		Sandy Soil	
Determinand		Method	Test Sample	LOD	Units								
Asbestos ID		T27	A40			Asbestos not detected	Asbestos not detected	Asbestos not detected	Asbestos not detected	Asbestos not detected	Asbestos not detected	Asbestos not detected	Asbestos not detected

Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01													
Soil		Analysed as Soil											
Asbestos Screen													
Concept Reference				643464 011		643464 013		643464 014		643464 015		643464 019	
Customer Sample Reference				TP12 ES1 @ 0.10m		TP13 ES1 @ 0.10m		TP14 ES1 @ 0.10m		TP15 ES1 @ 0.10m		TP18 ES1 @ 0.10m	
Date Sampled				23-MAR-2017		23-MAR-2017		23-MAR-2017		23-MAR-2017		23-MAR-2017	
Type				Sandy Soil		Sandy Soil		Sandy Soil		Sandy Soil		Sandy Soil	
Determinand		Method	Test Sample	LOD	Units								
Asbestos ID		T27	A40			Asbestos not detected	Asbestos not detected	Asbestos not detected	Asbestos not detected	Asbestos not detected	Asbestos not detected	Asbestos not detected	Asbestos not detected

Concept Reference: 643464								
Project Site: Land adjacent to 72 Station Road, Surfleet								
Customer Reference: DJM/17.041/00/01								
Soil			Analysed as Soil					
Asbestos Screen								
Concept Reference					643464 020	643464 021	643464 023	
Customer Sample Reference					TP19 ES1 @ 0.10m	TP20 ES1 @ 0.10m	WS01 ES1 @ 0.10m	
Date Sampled					23-MAR-2017	23-MAR-2017	23-MAR-2017	
Type					Sandy Soil	Sandy Soil	Topsoil	
Determinand	Method	Test Sample	LOD	Units				
Asbestos ID	T27	A40			Asbestos not detected	Asbestos not detected	Asbestos not detected	

Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01 Soil Analysed as Soil AFHA Soil Contamination 3									
Concept Reference					643464 001	643464 002	643464 003	643464 004	643464 005
Customer Sample Reference					TP01 ES1 @ 0.10m	TP03 ES1 @ 0.10m	TP04 ES1 @ 0.10m	TP05 ES1 @ 0.10m	TP06 ES1 @ 0.20m
Date Sampled					23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017
Type					Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Topsoil
Determinand	Method	Test Sample	LOD	Units					
Antimony	T257	A40	5	mg/kg	<5	<5	<5	<5	<5
Arsenic	T257	A40	2	mg/kg	9	10	10	9	11
Beryllium	T245	A40	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	T257	A40	0.1	mg/kg	0.1	0.1	0.2	0.1	0.7
Chromium	T257	A40	0.5	mg/kg	14	19	22	15	15
Copper	T257	A40	2	mg/kg	18	21	27	21	34
Lead	T257	A40	2	mg/kg	27	41	42	33	95
Mercury	T245	A40	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel	T257	A40	0.5	mg/kg	13	14	14	13	14
Selenium	T257	A40	3	mg/kg	<3	<3	<3	<3	<3
Vanadium	T257	A40	0.1	mg/kg	21	23	23	23	20
Zinc	T257	A40	2	mg/kg	57	61	71	60	130
Chromium VI	T82	A40	1	mg/kg	<1	<1	<1	<1	<1
Organic Matter	T258	A40	0.5	%	-	2.1	-	2.3	6.4
pH	T7	A40			7.9	7.7	7.6	7.7	7.4
Cyanide(Total)	T921	AR	1	mg/kg	<1	<1	<1	<1	<1
Phenols(Mono)	T921	AR	1	mg/kg	<1	<1	<1	<1	<1
Moisture @105C	T162	AR	0.1	%	20	19	19	19	29
Retained on 2mm	T2	A40	0.1	%	1.1	<0.1	<0.1	0.4	<0.1

Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01 Soil Analysed as Soil AFHA Soil Contamination 3									
Concept Reference					643464 006	643464 007	643464 008	643464 009	643464 010
Customer Sample Reference					TP07 ES1 @ 0.10m	TP08 ES1 @ 0.40m	TP09 ES1 @ 0.10m	TP10 ES1 @ 0.10m	TP11 ES1 @ 0.10m
Date Sampled					23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017
Type					Topsoil	Fill	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units					
Antimony	T257	A40	5	mg/kg	<5	<5	<5	<5	<5
Arsenic	T257	A40	2	mg/kg	18	18	13	12	12
Beryllium	T245	A40	1	mg/kg	3	<1	<1	<1	<1
Cadmium	T257	A40	0.1	mg/kg	0.3	0.6	0.3	0.3	0.3
Chromium	T257	A40	0.5	mg/kg	15	12	21	21	22
Copper	T257	A40	2	mg/kg	43	22	34	35	31
Lead	T257	A40	2	mg/kg	120	100	69	120	120
Mercury	T245	A40	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel	T257	A40	0.5	mg/kg	36	15	15	14	15
Selenium	T257	A40	3	mg/kg	<3	<3	<3	<3	<3
Vanadium	T257	A40	0.1	mg/kg	33	28	25	23	23
Zinc	T257	A40	2	mg/kg	160	160	110	130	140
Chromium VI	T82	A40	1	mg/kg	<1	<1	<1	<1	<1
Organic Matter	T258	A40	0.5	%	18	5.0	2.9	-	-
pH	T7	A40			7.6	10.9	7.6	7.4	7.4
Cyanide(Total)	T921	AR	1	mg/kg	<1	<1	<1	<1	<1
Phenols(Mono)	T921	AR	1	mg/kg	<1	<1	<1	<1	<1
Moisture @105C	T162	AR	0.1	%	22	13	13	8.4	18
Retained on 2mm	T2	A40	0.1	%	0.8	74.4	<0.1	0.1	<0.1

Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01 Soil Analysed as Soil AFHA Soil Contamination 3									
Concept Reference					643464 011	643464 012	643464 013	643464 014	643464 015
Customer Sample Reference					TP12 ES1 @ 0.10m	TP12 ES2 @ 0.90m	TP13 ES1 @ 0.10m	TP14 ES1 @ 0.10m	TP15 ES1 @ 0.10m
Date Sampled					23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017
Type					Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units					
Antimony	T257	A40	5	mg/kg	<5	<5	<5	<5	<5
Arsenic	T257	A40	2	mg/kg	12	8	9	11	13
Beryllium	T245	A40	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	T257	A40	0.1	mg/kg	0.4	<0.1	0.3	0.1	0.4
Chromium	T257	A40	0.5	mg/kg	22	15	17	15	17
Copper	T257	A40	2	mg/kg	39	10	73	23	23
Lead	T257	A40	2	mg/kg	230	31	80	250	290
Mercury	T245	A40	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel	T257	A40	0.5	mg/kg	15	14	13	13	13
Selenium	T257	A40	3	mg/kg	<3	<3	<3	<3	<3
Vanadium	T257	A40	0.1	mg/kg	25	24	20	23	28
Zinc	T257	A40	2	mg/kg	180	54	230	85	250
Chromium VI	T82	A40	1	mg/kg	<1	<1	<1	<1	<1
Organic Matter	T258	A40	0.5	%	5.9	1.3	5.1	-	4.8
pH	T7	A40			7.4	8.1	8.0	7.6	7.4
Cyanide(Total)	T921	AR	1	mg/kg	<1	<1	<1	<1	<1
Phenols(Mono)	T921	AR	1	mg/kg	<1	<1	<1	<1	<1
Moisture @105C	T162	AR	0.1	%	25	19	31	19	22
Retained on 2mm	T2	A40	0.1	%	3.2	<0.1	<0.1	0.1	<0.1

Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01 Soil Analysed as Soil AFHA Soil Contamination 3									
Concept Reference					643464 016	643464 017	643464 018	643464 019	643464 020
Customer Sample Reference					TP15 ES2 @ 0.40m	TP16 ES1 @ 0.10m	TP17 ES1 @ 0.10m	TP18 ES1 @ 0.10m	TP19 ES1 @ 0.10m
Date Sampled					23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017
Type					Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units					
Antimony	T257	A40	5	mg/kg	<5	<5	<5	<5	<5
Arsenic	T257	A40	2	mg/kg	10	11	10	11	15
Beryllium	T245	A40	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	T257	A40	0.1	mg/kg	0.1	0.3	0.2	0.6	0.3
Chromium	T257	A40	0.5	mg/kg	14	17	15	21	25
Copper	T257	A40	2	mg/kg	16	24	42	42	26
Lead	T257	A40	2	mg/kg	100	52	380	330	190
Mercury	T245	A40	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel	T257	A40	0.5	mg/kg	12	13	13	15	14
Selenium	T257	A40	3	mg/kg	<3	<3	<3	<3	<3
Vanadium	T257	A40	0.1	mg/kg	21	23	21	24	24
Zinc	T257	A40	2	mg/kg	75	78	110	310	77
Chromium VI	T82	A40	1	mg/kg	<1	<1	<1	<1	<1
Organic Matter	T258	A40	0.5	%	1.7	2.3	-	6.2	2.4
pH	T7	A40			8.0	7.6	7.5	7.4	7.6
Cyanide(Total)	T921	AR	1	mg/kg	<1	<1	<1	<1	<1
Phenols(Mono)	T921	AR	1	mg/kg	<1	<1	<1	<1	<1
Moisture @105C	T162	AR	0.1	%	20	19	24	28	27
Retained on 2mm	T2	A40	0.1	%	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 643464							
Project Site: Land adjacent to 72 Station Road, Surfleet							
Customer Reference: DJM/17.041/00/01							
Soil		Analysed as Soil					
AFHA Soil Contamination 3							
Concept Reference				643464 021		643464 022	643464 023
Customer Sample Reference				TP20 ES1 @ 0.10m		TP22 ES1 @ 0.10m	WS01 ES1 @ 0.10m
Date Sampled				23-MAR-2017		23-MAR-2017	23-MAR-2017
Type				Sandy Soil		Sandy Soil	Topsoil
Determinand	Method	Test Sample	LOD	Units			
Antimony	T257	A40	5	mg/kg	<5	<5	<5
Arsenic	T257	A40	2	mg/kg	16	15	10
Beryllium	T245	A40	1	mg/kg	2	<1	<1
Cadmium	T257	A40	0.1	mg/kg	0.3	0.3	0.1
Chromium	T257	A40	0.5	mg/kg	18	26	14
Copper	T257	A40	2	mg/kg	34	27	20
Lead	T257	A40	2	mg/kg	220	320	48
Mercury	T245	A40	1.0	mg/kg	<1.0	<1.0	<1.0
Nickel	T257	A40	0.5	mg/kg	27	14	12
Selenium	T257	A40	3	mg/kg	<3	<3	<3
Vanadium	T257	A40	0.1	mg/kg	33	23	21
Zinc	T257	A40	2	mg/kg	140	86	63
Chromium VI	T82	A40	1	mg/kg	<1	<1	<1
Organic Matter	T258	A40	0.5	%	5.3	3.1	-
pH	T7	A40			7.5	7.7	7.8
Cyanide(Total)	T921	AR	1	mg/kg	<1	<1	<1
Phenols(Mono)	T921	AR	1	mg/kg	<1	<1	<1
Moisture @105C	T162	AR	0.1	%	28	19	17
Retained on 2mm	T2	A40	0.1	%	0.3	<0.1	<0.1

Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01 Soil Analysed as Soil Miscellaneous							
Concept Reference				643464 002	643464 004	643464 008	643464 020
Customer Sample Reference				TP03 ES1 @ 0.10m	TP05 ES1 @ 0.10m	TP09 ES1 @ 0.10m	TP19 ES1 @ 0.10m
Date Sampled				23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017
Type				Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units			
Nitrate	T686	A40	1	mg/kg	76	38	72
Phosphorous	T257	A40	5	mg/kg	1500	1700	1900
Phosphate	T686	A40	1	mg/kg	22	37	6
K (Extractable BS 3882)	T272	A40	10	mg/l	410	430	80
Ammoniacal nitrogen	T4	AR	0.5	mg/kg	2.5	2.5	2.0

Concept Reference: 643464

Project Site: Land adjacent to 72 Station Road, Surfleet

Customer Reference: DJM/17.041/00/01

Soil

Analysed as Soil

Total and Speciated USEPA16 PAH (SE) (MCERTS)

Concept Reference					643464 011	643464 012	643464 013	643464 014	643464 015
Customer Sample Reference					TP12 ES1 @ 0.10m	TP12 ES2 @ 0.90m	TP13 ES1 @ 0.10m	TP14 ES1 @ 0.10m	TP15 ES1 @ 0.10m
Date Sampled					23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017
Type					Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T16	AR	0.1	mg/kg	<0.1	<0.1	0.1	<0.1	0.2
Acenaphthylene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	T16	AR	0.1	mg/kg	0.4	<0.1	<0.1	0.3	0.2
Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	T16	AR	0.1	mg/kg	1.5	<0.1	0.2	0.5	<0.1
Pyrene	T16	AR	0.1	mg/kg	1.3	<0.1	0.2	0.4	<0.1
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	0.8	<0.1	<0.1	0.2	<0.1
Chrysene	T16	AR	0.1	mg/kg	0.9	<0.1	<0.1	0.3	<0.1
Benzo(b)fluoranthene	T16	AR	0.1	mg/kg	0.9	<0.1	<0.1	0.2	<0.1
Benzo(k)fluoranthene	T16	AR	0.1	mg/kg	0.5	<0.1	<0.1	0.2	<0.1
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	0.7	<0.1	<0.1	0.2	<0.1
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
PAH(total)	T16	AR	0.1	mg/kg	7.5	<0.1	0.5	2.3	0.3

Concept Reference: 643464

Project Site: Land adjacent to 72 Station Road, Surfleet

Customer Reference: DJM/17.041/00/01

Soil

Analysed as Soil

Total and Speciated USEPA16 PAH (SE) (MCERTS)

Concept Reference					643464 016	643464 017	643464 018	643464 019	643464 020
Customer Sample Reference					TP15 ES2 @ 0.40m	TP16 ES1 @ 0.10m	TP17 ES1 @ 0.10m	TP18 ES1 @ 0.10m	TP19 ES1 @ 0.10m
Date Sampled					23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017
Type					Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	T16	AR	0.1	mg/kg	<0.1	0.3	0.5	0.4	0.4
Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	T16	AR	0.1	mg/kg	0.1	0.8	0.6	0.6	0.6
Pyrene	T16	AR	0.1	mg/kg	<0.1	0.7	0.5	0.4	0.5
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	<0.1	0.3	0.2	0.2	0.2
Chrysene	T16	AR	0.1	mg/kg	<0.1	0.3	0.3	0.3	0.2
Benzo(b)fluoranthene	T16	AR	0.1	mg/kg	<0.1	0.2	0.2	0.2	0.2
Benzo(k)fluoranthene	T16	AR	0.1	mg/kg	<0.1	0.3	0.1	0.1	0.2
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	<0.1	0.2	0.2	0.2	0.2
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
PAH(total)	T16	AR	0.1	mg/kg	0.1	3.1	2.6	2.4	2.5

Concept Reference: 643464									
Project Site: Land adjacent to 72 Station Road, Surfleet									
Customer Reference: DJM/17.041/00/01									
Soil		Analysed as Soil							
Total and Speciated USEPA16 PAH (SE) (MCERTS)									
Concept Reference				643464 021		643464 022		643464 023	
Customer Sample Reference				TP20 ES1 @ 0.10m		TP22 ES1 @ 0.10m		WS01 ES1 @ 0.10m	
Date Sampled				23-MAR-2017		23-MAR-2017		23-MAR-2017	
Type				Sandy Soil		Sandy Soil		Topsoil	
Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1		
Acenaphthylene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1		
Acenaphthene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1		
Fluorene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1		
Phenanthrene	T16	AR	0.1	mg/kg	0.2	0.1	0.7		
Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	0.2		
Fluoranthene	T16	AR	0.1	mg/kg	0.4	0.3	1.2		
Pyrene	T16	AR	0.1	mg/kg	0.3	0.2	1.0		
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	0.2	0.2	0.5		
Chrysene	T16	AR	0.1	mg/kg	0.2	0.2	0.5		
Benzo(b)fluoranthene	T16	AR	0.1	mg/kg	0.1	0.2	0.5		
Benzo(k)fluoranthene	T16	AR	0.1	mg/kg	0.2	0.1	0.4		
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	0.2	0.2	0.5		
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	<0.1	<0.1	0.3		
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1		
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	<0.1	<0.1	0.3		
PAH(total)	T16	AR	0.1	mg/kg	1.7	1.4	6.0		

Concept Reference: 643464										
Project Site: Land adjacent to 72 Station Road, Surfleet										
Customer Reference: DJM/17.041/00/01										
Soil					Analysed as Soil					
TPH (CWG) with MTBE & BTEX SE										
Concept Reference					643464 001		643464 002		643464 003	
Customer Sample Reference					TP01 ES1 @ 0.10m		TP03 ES1 @ 0.10m		TP04 ES1 @ 0.10m	
Date Sampled					23-MAR-2017		23-MAR-2017		23-MAR-2017	
Type					Sandy Soil		Sandy Soil		Sandy Soil	
Determinand	Method	Test Sample	LOD	Units						
Benzene	T209	AR	10	µg/kg	<10	<10	<10	<10	<10	
Toluene	T209	AR	10	µg/kg	<10	<10	<10	<10	<10	
EthylBenzene	T209	AR	10	µg/kg	<10	<10	<10	<10	<10	
M/P Xylene	T209	AR	10	µg/kg	<10	<10	<10	<10	<10	
O Xylene	T209	AR	10	µg/kg	<10	<10	<10	<10	<10	
Methyl tert-Butyl Ether	T209	AR	10	µg/kg	46	37	43	48	48	
TPH (C5-C6 aliphatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	
TPH (C6-C7 aromatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	
TPH (C6-C8 aliphatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	
TPH (C7-C8 aromatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	
TPH (C8-C10 aliphatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	
TPH (C8-C10 aromatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	
TPH (C10-C12 aliphatic)	T219	AR	2	mg/kg	4	5	6	6	5	
TPH (C10-C12 aromatic)	T219	AR	2	mg/kg	<2	2	3	3	3	
TPH (C12-C16 aliphatic)	T219	AR	2	mg/kg	3	3	4	5	4	
TPH (C12-C16 aromatic)	T219	AR	2	mg/kg	3	5	6	7	8	
TPH (C16-C21 aliphatic)	T219	AR	2	mg/kg	<2	<2	<2	<2	5	
TPH (C16-C21 aromatic)	T219	AR	2	mg/kg	3	4	5	12	13	
TPH (C21-C35 aliphatic)	T219	AR	2	mg/kg	<2	3	9	3	37	
TPH (C21-C35 aromatic)	T219	AR	2	mg/kg	7	6	8	26	50	

Concept Reference: 643464									
Project Site: Land adjacent to 72 Station Road, Surfleet									
Customer Reference: DJM/17.041/00/01									
Soil Analysed as Soil									
TPH (CWG) with MTBE & BTEX SE									
Concept Reference					643464 016	643464 017	643464 018	643464 019	643464 020
Customer Sample Reference					TP15 ES2 @ 0.40m	TP16 ES1 @ 0.10m	TP17 ES1 @ 0.10m	TP18 ES1 @ 0.10m	TP19 ES1 @ 0.10m
Date Sampled					23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017
Type					Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units					
Benzene	T209	AR	10	µg/kg	<10	<10	<10	<10	<10
Toluene	T209	AR	10	µg/kg	<10	<10	<10	<10	<10
EthylBenzene	T209	AR	10	µg/kg	<10	<10	<10	<10	<10
M/P Xylene	T209	AR	10	µg/kg	<10	<10	<10	<10	<10
O Xylene	T209	AR	10	µg/kg	<10	<10	<10	<10	<10
Methyl tert-Butyl Ether	T209	AR	10	µg/kg	<10	<10	10	<10	<10
TPH (C5-C6 aliphatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
TPH (C6-C7 aromatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
TPH (C6-C8 aliphatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
TPH (C7-C8 aromatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
TPH (C8-C10 aliphatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
TPH (C8-C10 aromatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
TPH (C10-C12 aliphatic)	T219	AR	2	mg/kg	6	6	<2	<2	<2
TPH (C10-C12 aromatic)	T219	AR	2	mg/kg	<2	<2	<2	<2	<2
TPH (C12-C16 aliphatic)	T219	AR	2	mg/kg	4	4	<2	<2	<2
TPH (C12-C16 aromatic)	T219	AR	2	mg/kg	6	4	2	<2	<2
TPH (C16-C21 aliphatic)	T219	AR	2	mg/kg	2	<2	<2	<2	<2
TPH (C16-C21 aromatic)	T219	AR	2	mg/kg	13	5	6	5	2
TPH (C21-C35 aliphatic)	T219	AR	2	mg/kg	17	3	12	7	<2
TPH (C21-C35 aromatic)	T219	AR	2	mg/kg	9	10	21	17	11

TPH (C6-C7 aromatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10
TPH (C6-C8 aliphatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10
TPH (C7-C8 aromatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10
TPH (C8-C10 aliphatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10
TPH (C8-C10 aromatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10
TPH (C10-C12 aliphatic)	T219	AR	2	mg/kg	2	<2	<2
TPH (C10-C12 aromatic)	T219	AR	2	mg/kg	<2	<2	<2
TPH (C12-C16 aliphatic)	T219	AR	2	mg/kg	<2	<2	<2
TPH (C12-C16 aromatic)	T219	AR	2	mg/kg	<2	<2	<2
TPH (C16-C21 aliphatic)	T219	AR	2	mg/kg	<2	<2	<2
TPH (C16-C21 aromatic)	T219	AR	2	mg/kg	6	2	7
TPH (C21-C35 aliphatic)	T219	AR	2	mg/kg	3	<2	9
TPH (C21-C35 aromatic)	T219	AR	2	mg/kg	12	10	38

Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01 Soil Analysed as Soil Organo-Tin (Tributyl, Triphenyl)								
Concept Reference					643464 002	643464 004	643464 008	643464 020
Customer Sample Reference					TP03 ES1 @ 0.10m	TP05 ES1 @ 0.10m	TP09 ES1 @ 0.10m	TP19 ES1 @ 0.10m
Date Sampled					23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017
Type					Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units				
Tributyl tin	T72	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
Triphenyl Tin	T72	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01

Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01 Soil Analysed as Soil Organochlorine insecticides								
Concept Reference					643464 002	643464 004	643464 008	643464 020
Customer Sample Reference					TP03 ES1 @ 0.10m	TP05 ES1 @ 0.10m	TP09 ES1 @ 0.10m	TP19 ES1 @ 0.10m
Date Sampled					23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017
Type					Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units				
Hexachlorocyclohexane	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
Hexachlorobenzene	T1	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
Heptachlor	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
Aldrin	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
Heptachlor epoxide	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
Chlordane	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
Endosulphan	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
DDE	T16	AR	0.01	mg/kg	0.05	<0.01	0.19	0.08
Dieldrin	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
Endrin	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	0.02
DDD	T16	AR	0.01	mg/kg	<0.01	<0.01	0.04	0.04
DDT	T16	AR	0.01	mg/kg	(147) 0.12	(147) 0.05	(147) 0.88	(147) 0.11

Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01 Soil Analysed as Soil Organophosphorous insecticides								
Concept Reference					643464 002	643464 004	643464 008	643464 020
Customer Sample Reference					TP03 ES1 @ 0.10m	TP05 ES1 @ 0.10m	TP09 ES1 @ 0.10m	TP19 ES1 @ 0.10m
Date Sampled					23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017
Type					Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units				
Dichlorvos	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
Mevinphos	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
Dimethoate	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
Diazinon	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
Pirimiphos methyl	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
Malathion	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
Fenitrothion	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
Parathion	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01
Azinphos methyl	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01

Customer Reference: DJM/17.041/00/01

Analysed as Water

Total and Speciated USEPA16 PAH (SE)

Concept Reference					643464 005	643464 007	643464 011	643464 013	643464 019	643464 021
Customer Sample Reference					TP06 ES1 @ 0.20m	TP08 ES1 @ 0.40m	TP12 ES1 @ 0.10m	TP13 ES1 @ 0.10m	TP18 ES1 @ 0.10m	TP20 ES1 @ 0.10m
Date Sampled					23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017
Type					Topsoil	Fill	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units						
Naphthalene	T149	10:1	0.01	µg/l	0.05	0.02	0.06	<0.01	0.06	0.05
Acenaphthylene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Anthracene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	0.02
Pyrene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	0.02
Benzo(a)Anthracene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)Pyrene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(123-cd)Pyrene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(ah)Anthracene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)Perylene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PAH(total)	T149	10:1	0.01	µg/l	0.05	0.02	0.06	<0.01	0.06	0.14

Customer Reference: DJM/17.041/00/01

Analysed as Water

TPH (CWG) with MTBE & BTEX SE

Concept Reference					643464 005	643464 007	643464 011	643464 013	643464 019	643464 021
Customer Sample Reference					TP06 ES1 @ 0.20m	TP08 ES1 @ 0.40m	TP12 ES1 @ 0.10m	TP13 ES1 @ 0.10m	TP18 ES1 @ 0.10m	TP20 ES1 @ 0.10m
Date Sampled					23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017
Type					Topsoil	Fill	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units						
Benzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1
Toluene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1
EthylBenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1
M/P Xylene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1
O Xylene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1
Methyl tert-Butyl Ether	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1
TPH (C5-C6 aliphatic)	T54	10:1	0.020	mg/l	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
TPH (C6-C7 aromatic)	T54	10:1	0.020	mg/l	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
TPH (C6-C8 aliphatic)	T54	10:1	0.020	mg/l	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
TPH (C7-C8 aromatic)	T54	10:1	0.020	mg/l	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
TPH (C8-C10 aliphatic)	T54	10:1	0.020	mg/l	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
TPH (C8-C10 aromatic)	T54	10:1	0.020	mg/l	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
TPH (C10-C12 aliphatic)	T219	10:1	0.01	mg/l	<0.01	<0.01	<0.01	0.01	0.02	<0.01
TPH (C10-C12 aromatic)	T219	10:1	0.01	mg/l	<0.01	<0.01	<0.01	0.01	0.01	<0.01
TPH (C12-C16 aliphatic)	T219	10:1	0.01	mg/l	0.02	0.02	0.01	0.02	0.02	0.01
TPH (C12-C16 aromatic)	T219	10:1	0.01	mg/l	0.05	0.02	0.03	0.04	0.06	0.02
TPH (C16-C21 aliphatic)	T219	10:1	0.01	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TPH (C16-C21 aromatic)	T219	10:1	0.01	mg/l	0.09	0.05	0.06	0.09	0.05	0.02
TPH (C21-C35 aliphatic)	T219	10:1	0.01	mg/l	<0.01	<0.01	<0.01	<0.01	0.02	<0.01
TPH (C21-C35 aromatic)	T219	10:1	0.01	mg/l	0.07	0.02	0.03	0.06	0.02	0.02

Index to symbols used in 643464-3

Value	Description
A40	Assisted dried < 40C

10:1	Leachate
AR	As Received
2	LOD Raised Due to Matrix Interference
147	Result has been Recovery corrected.
S	Analysis was subcontracted
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Retained on 2mm is removed before analysis
Reported results on as received samples are corrected to a 105 degree centigrade dry weight basis except Ammonia, TPH c5-c35 aro/ali split, OCP/OPP, Phenoxy Acetic Acid, Triazines and Organo-tins
Asbestos subcontracted to REC Limited

Method Index

Value	Description
T281	ICP/MS (Filtered)
T245	ICP/OES (Aqua Regia Extraction)
T162	Grav (1 Dec) (105 C)
T2	Grav
T27	PLM
T72	GC/MS (Deriv.)
T209	GC/MS (Head Space)(MCERTS)
T54	GC/MS (Headspace)
T82	ICP/OES (Sim)
T149	GC/MS (SIR)
T219	GC/FID (SE)
T921	Colorimetry (CF) (MCERT)
T1	GC/MS (HR)
T4	Colorimetry
T16	GC/MS
T258	Titration (Dichromate)
T546	Colorimetry (CF)
T686	Discrete Analyser
T7	Probe
T257	ICP/OES (SIM) (Aqua Regia Extraction)
T272	ICP/OES (Ammonium Nitrate)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Nitrate	T686	A40	1	mg/kg	N	002,004,008,020
Phosphorous	T257	A40	5	mg/kg	N	002,004,008,020
Phosphate	T686	A40	1	mg/kg	N	002,004,008,020
K (Extractable BS 3882)	T272	A40	10	mg/l	N	002,004,008,020
Ammoniacal nitrogen	T4	AR	0.5	mg/kg	N	002,004,008,020
Asbestos ID	T27	A40			SU	005-007,009-011,013-015,019-021,023
Hexachlorocyclohexane	T16	AR	0.01	mg/kg	U	002,004,008,020
Hexachlorobenzene	T1	AR	0.01	mg/kg	U	002,004,008,020
Heptachlor	T16	AR	0.01	mg/kg	U	002,004,008,020
Aldrin	T16	AR	0.01	mg/kg	U	002,004,008,020
Heptachlor epoxide	T16	AR	0.01	mg/kg	U	002,004,008,020
Chlordane	T16	AR	0.01	mg/kg	U	002,004,008,020
Endosulphan	T16	AR	0.01	mg/kg	U	002,004,008,020
DDE	T16	AR	0.01	mg/kg	U	002,004,008,020
Dieldrin	T16	AR	0.01	mg/kg	U	002,004,008,020
Endrin	T16	AR	0.01	mg/kg	U	002,004,008,020
DDD	T16	AR	0.01	mg/kg	U	002,004,008,020
DDT	T16	AR	0.01	mg/kg	U	002,004,008,020
Simazine	T16	AR	0.01	mg/kg	N	002,004,008,020
Atrazine	T16	AR	0.01	mg/kg	N	002,004,008,020
Propazine	T16	AR	0.01	mg/kg	N	002,004,008,020
Trietazine	T16	AR	0.01	mg/kg	N	002,004,008,020
Prometryn	T16	AR	0.01	mg/kg	N	002,004,008,020
Terbutryn	T16	AR	0.01	mg/kg	N	002,004,008,020
Mecoprop	T16	AR	0.01	mg/kg	N	002,004,008,020

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Phenoxy Acetic acid herbicide: MCPA	T16	AR	0.01	mg/kg	N	002,004,008,020
Dichlorprop	T16	AR	0.01	mg/kg	N	002,004,008,020
Phenoxy Acetic acid herbicide: 2,4-D	T16	AR	0.01	mg/kg	N	002,004,008,020
Fenoprop	T16	AR	0.01	mg/kg	N	002,004,008,020
Phenoxy Acetic acid herbicide: 2,4,5-T	T16	AR	0.01	mg/kg	N	002,004,008,020
Dichlorvos	T16	AR	0.01	mg/kg	U	002,004,008,020
Mevinphos	T16	AR	0.01	mg/kg	U	002,004,008,020
Dimethoate	T16	AR	0.01	mg/kg	U	002,004,008,020
Diazinon	T16	AR	0.01	mg/kg	U	002,004,008,020
Pirimiphos methyl	T16	AR	0.01	mg/kg	U	002,004,008,020
Malathion	T16	AR	0.01	mg/kg	U	002,004,008,020
Fenitrothion	T16	AR	0.01	mg/kg	U	002,004,008,020
Parathion	T16	AR	0.01	mg/kg	U	002,004,008,020
Azinphos methyl	T16	AR	0.01	mg/kg	U	002,004,008,020
Tributyl tin	T72	AR	0.01	mg/kg	N	002,004,008,020
Triphenyl Tin	T72	AR	0.01	mg/kg	N	002,004,008,020
Antimony	T257	A40	5	mg/kg	N	001-023
Arsenic	T257	A40	2	mg/kg	M	001-006,008-023
Arsenic	T257	A40	2.0	mg/kg	U	007
Beryllium	T245	A40	1	mg/kg	U	001-023
Cadmium	T257	A40	0.1	mg/kg	M	001-006,008-023
Cadmium	T257	A40	0.1	mg/kg	U	007
Chromium	T257	A40	0.5	mg/kg	M	001-006,008-023
Chromium	T257	A40	0.5	mg/kg	U	007
Copper	T257	A40	2	mg/kg	M	001-006,008-023
Copper	T257	A40	2	mg/kg	U	007
Lead	T257	A40	2	mg/kg	M	001-006,008-023
Lead	T257	A40	2	mg/kg	U	007
Mercury	T245	A40	1.0	mg/kg	U	001-023
Nickel	T257	A40	0.5	mg/kg	M	001-006,008-023
Nickel	T257	A40	0.5	mg/kg	U	007
Selenium	T257	A40	3	mg/kg	U	001-023
Vanadium	T257	A40	0.1	mg/kg	U	001-023
Zinc	T257	A40	2	mg/kg	M	001-006,008-023
Zinc	T257	A40	2	mg/kg	U	007
Chromium VI	T82	A40	1	mg/kg	N	001-023
Organic Matter	T258	A40	0.5	%	N	002,004-008,011-013,015-017,019-022
pH	T7	A40			M	001-006,008-023
pH	T7	A40			U	007
Cyanide(Total)	T921	AR	1	mg/kg	M	001-006,008-023
Cyanide(Total)	T921	AR	1	mg/kg	U	007
Phenols(Mono)	T921	AR	1	mg/kg	M	001-006,008-023
Phenols(Mono)	T921	AR	1	mg/kg	U	007
Moisture @105C	T162	AR	0.1	%	N	001-023
Retained on 2mm	T2	A40	0.1	%	N	001-023
Benzene	T209	AR	10	µg/kg	M	001-006,008-023
Benzene	T209	AR	10	µg/kg	U	007
Toluene	T209	AR	10	µg/kg	M	001-006,008-023
Toluene	T209	AR	10	µg/kg	U	007
EthylBenzene	T209	AR	10	µg/kg	M	001-006,008-023
EthylBenzene	T209	AR	10	µg/kg	U	007
M/P Xylene	T209	AR	10	µg/kg	M	001-006,008-023
M/P Xylene	T209	AR	10	µg/kg	U	007
O Xylene	T209	AR	10	µg/kg	M	001-006,008-023
O Xylene	T209	AR	10	µg/kg	U	007
Methyl tert-Butyl Ether	T209	AR	10	µg/kg	M	001-006,008-023
Methyl tert-Butyl Ether	T209	AR	10	µg/kg	U	007
TPH (C5-C6 aliphatic)	T54	AR	0.10	mg/kg	N	001-023
TPH (C6-C7 aromatic)	T54	AR	0.10	mg/kg	N	001-023
TPH (C6-C8 aliphatic)	T54	AR	0.10	mg/kg	N	001-023
TPH (C7-C8 aromatic)	T54	AR	0.10	mg/kg	N	001-023
TPH (C8-C10 aliphatic)	T54	AR	0.10	mg/kg	N	001-023
TPH (C8-C10 aromatic)	T54	AR	0.10	mg/kg	N	001-023
TPH (C10-C12 aliphatic)	T219	AR	2	mg/kg	N	001-023
TPH (C10-C12 aromatic)	T219	AR	2	mg/kg	N	001-023
TPH (C12-C16 aliphatic)	T219	AR	2	mg/kg	N	001-023
TPH (C12-C16 aromatic)	T219	AR	2	mg/kg	N	001-023
TPH (C16-C21 aliphatic)	T219	AR	2	mg/kg	N	001-023
TPH (C16-C21 aromatic)	T219	AR	2	mg/kg	N	001-023
TPH (C21-C35 aliphatic)	T219	AR	2	mg/kg	N	001-023

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
TPH (C21-C35 aromatic)	T219	AR	2	mg/kg	N	001-023
Naphthalene	T16	AR	0.1	mg/kg	U	001-023
Acenaphthylene	T16	AR	0.1	mg/kg	U	001-023
Acenaphthene	T16	AR	0.1	mg/kg	M	001-006,008-023
Acenaphthene	T16	AR	0.1	mg/kg	U	007
Fluorene	T16	AR	0.1	mg/kg	M	001-006,008-023
Fluorene	T16	AR	0.1	mg/kg	U	007
Phenanthrene	T16	AR	0.1	mg/kg	U	001-023
Anthracene	T16	AR	0.1	mg/kg	M	001-006,008-023
Anthracene	T16	AR	0.1	mg/kg	U	007
Fluoranthene	T16	AR	0.1	mg/kg	N	001-023
Pyrene	T16	AR	0.1	mg/kg	N	001-023
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	M	001-006,008-023
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	U	007
Chrysene	T16	AR	0.1	mg/kg	M	001-006,008-023
Chrysene	T16	AR	0.1	mg/kg	U	007
Benzo(b)fluoranthene	T16	AR	0.1	mg/kg	U	001-023
Benzo(k)fluoranthene	T16	AR	0.1	mg/kg	N	001-023
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	M	001-006,008-023
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	U	007
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	M	001-006,008-023
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	U	007
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	M	001-006,008-023
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	U	007
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	M	001-006,008-023
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	U	007
PAH(total)	T16	AR	0.1	mg/kg	U	001-023
Sb (Dissolved)	T281	10:1	0.001	mg/l	U	005,007,011,013,019,021
As (Dissolved)	T281	10:1	0.0002	mg/l	U	005,007,011,013,019,021
Be (Dissolved)	T281	10:1	0.00005	mg/l	U	005,007,011,013,019,021
Cd (Dissolved)	T281	10:1	0.00002	mg/l	U	005,007,011,013,019,021
Cr (Dissolved)	T281	10:1	0.001	mg/l	U	005,007,011,013,019,021
Cu (Dissolved)	T281	10:1	0.0005	mg/l	U	005,007,011,013,019,021
Pb (Dissolved)	T281	10:1	0.0003	mg/l	U	005,007,011,013,019,021
Hg (Dissolved)	T281	10:1	0.00005	mg/l	U	005,007,011,013,019,021
Ni (Dissolved)	T281	10:1	0.001	mg/l	U	005,007,011,013,019,021
Se (Dissolved)	T281	10:1	0.0005	mg/l	U	005,007,011,013,019,021
V (Dissolved)	T281	10:1	0.002	mg/l	U	005,007,011,013,019,021
Zn (Dissolved)	T281	10:1	0.002	mg/l	U	005,007,011,013,019,021
Chromium VI	T686	10:1	0.003	mg/l	U	005,007,011,013,019,021
Cyanide(Total)	T546	10:1	0.01	mg/l	U	005,007,011,013,019,021
pH	T7	10:1			N	005,007,011,013,019,021
Phenols(Mono)	T546	10:1	0.02	mg/l	U	005,007,011,013,019,021
Naphthalene	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
Acenaphthylene	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
Acenaphthene	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
Fluorene	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
Phenanthrene	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
Anthracene	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
Fluoranthene	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
Pyrene	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
Benzo(a)Anthracene	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
Chrysene	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
Benzo(b)fluoranthene	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
Benzo(k)fluoranthene	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
Benzo(a)Pyrene	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
Indeno(123-cd)Pyrene	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
Dibenzo(ah)Anthracene	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
Benzo(ghi)Perylene	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
PAH(total)	T149	10:1	0.01	µg/l	N	005,007,011,013,019,021
Benzene	T54	10:1	1	µg/l	U	005,007,011,013,019,021
Toluene	T54	10:1	1	µg/l	U	005,007,011,013,019,021
EthylBenzene	T54	10:1	1	µg/l	U	005,007,011,013,019,021
M/P Xylene	T54	10:1	1	µg/l	U	005,007,011,013,019,021
O Xylene	T54	10:1	1	µg/l	U	005,007,011,013,019,021
Methyl tert-Butyl Ether	T54	10:1	1	µg/l	U	005,007,011,013,019,021
TPH (C5-C6 aliphatic)	T54	10:1	0.020	mg/l	N	005,007,011,013,019,021
TPH (C6-C7 aromatic)	T54	10:1	0.020	mg/l	N	005,007,011,013,019,021
TPH (C6-C8 aliphatic)	T54	10:1	0.020	mg/l	N	005,007,011,013,019,021
TPH (C7-C8 aromatic)	T54	10:1	0.020	mg/l	N	005,007,011,013,019,021

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
TPH (C8-C10 aliphatic)	T54	10:1	0.020	mg/l	N	005,007,011,013,019,021
TPH (C8-C10 aromatic)	T54	10:1	0.020	mg/l	N	005,007,011,013,019,021
TPH (C10-C12 aliphatic)	T219	10:1	0.01	mg/l	N	005,007,011,013,019,021
TPH (C10-C12 aromatic)	T219	10:1	0.01	mg/l	N	005,007,011,013,019,021
TPH (C12-C16 aliphatic)	T219	10:1	0.01	mg/l	N	005,007,011,013,019,021
TPH (C12-C16 aromatic)	T219	10:1	0.01	mg/l	N	005,007,011,013,019,021
TPH (C16-C21 aliphatic)	T219	10:1	0.01	mg/l	N	005,007,011,013,019,021
TPH (C16-C21 aromatic)	T219	10:1	0.01	mg/l	N	005,007,011,013,019,021
TPH (C21-C35 aliphatic)	T219	10:1	0.01	mg/l	N	005,007,011,013,019,021
TPH (C21-C35 aromatic)	T219	10:1	0.01	mg/l	N	005,007,011,013,019,021



APPENDIX D: BRE 465 COVER SYSTEM CALCULATION

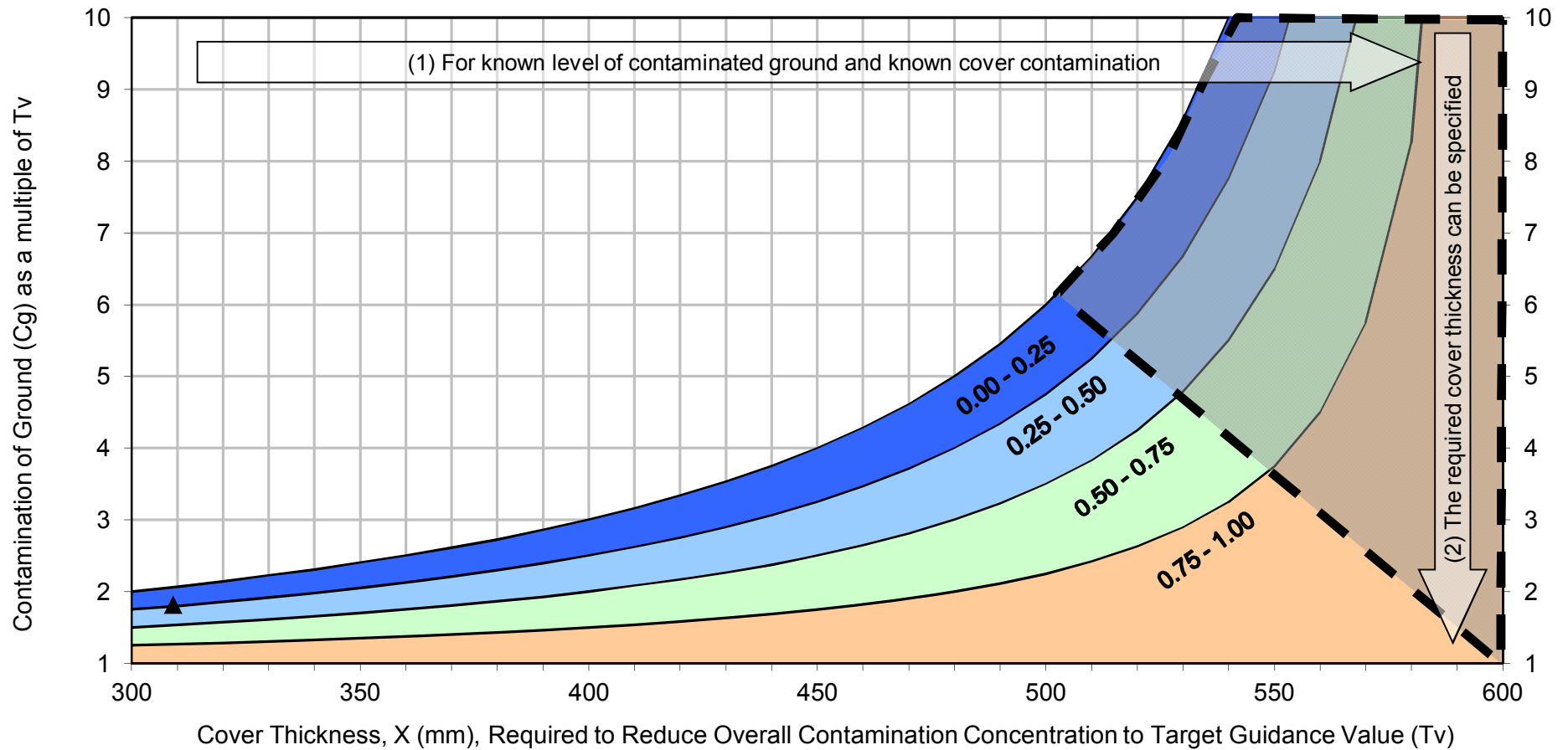


mmNo TV0

Design Chart

- $C_c = 0.00 - 0.25 \times \text{Trigger levels}$
- $C_c = 0.25 - 0.50 \times \text{Trigger levels}$
- $C_c = 0.50 - 0.75 \times \text{Trigger levels}$
- $C_c = 0.75 - 1.00 \times \text{Trigger levels}$
- ▲ Target Guideline Value 2
- ▲ Target Guideline Value 1

If site specific data falls in shaded area consideration should be given to the applicability of using a cover system



APPENDIX E: DRAWINGS

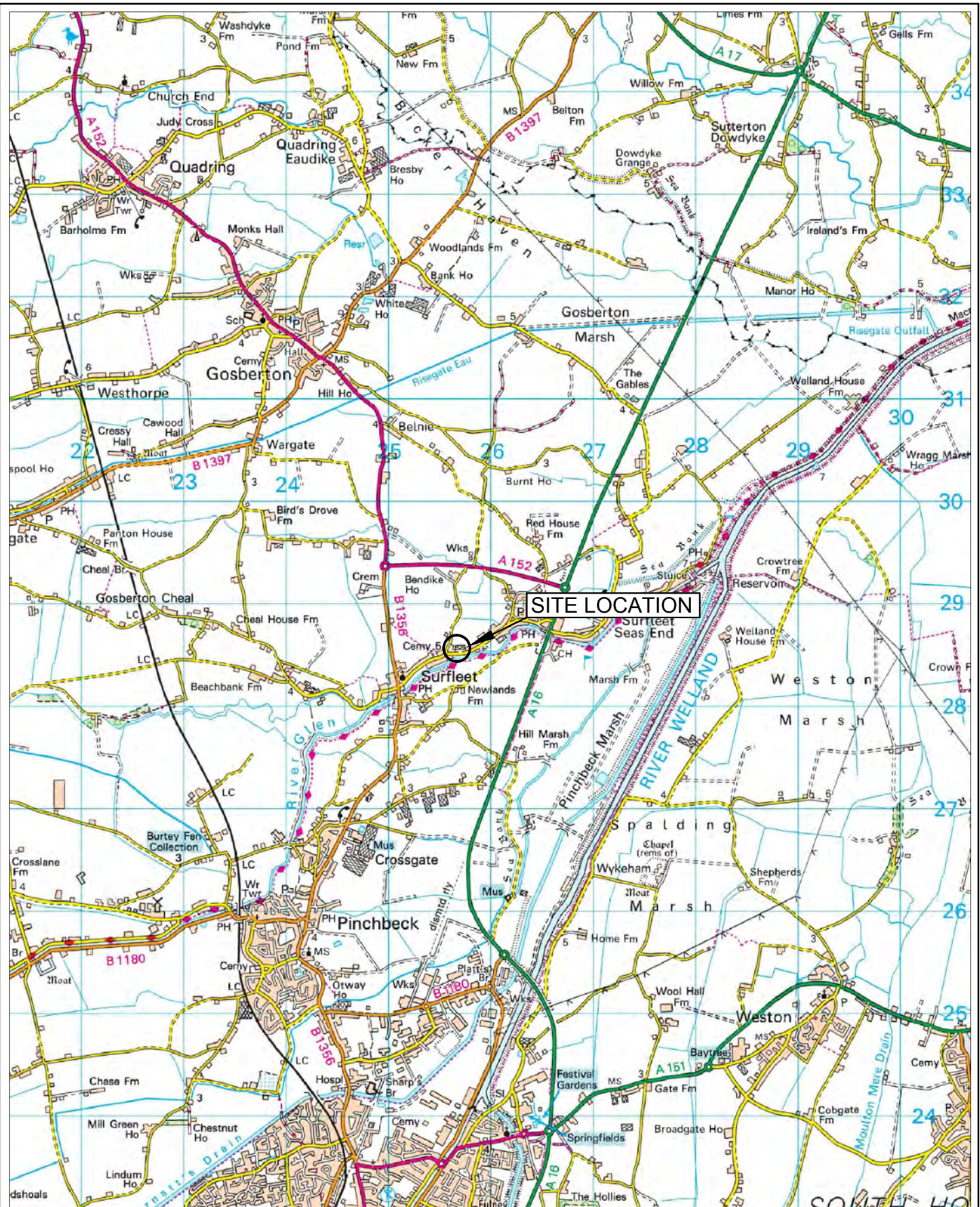
Drawing 17.041/Phasel/1

Site Location Plan

Drawing 17.041/Phasel/2

Exploratory Hole Location Plan





North



Circle indicates approximate location of site



A F Howland Associates
Geotechnical Engineers

Site: Land adjacent to 72 Station Road, Surfleet, PE11 4DB

SITE LOCATION PLAN

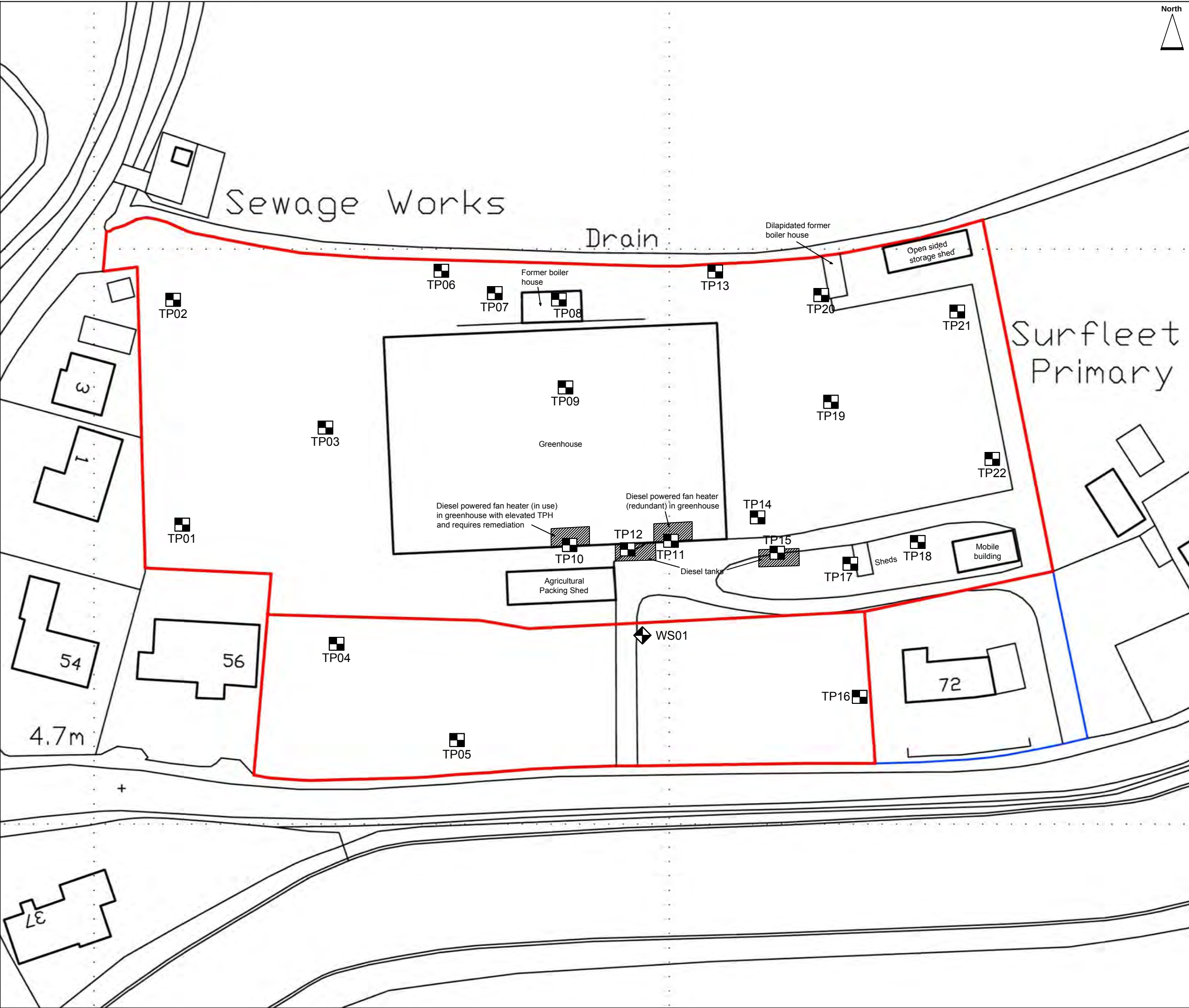
Client : Mr J W & Mrs G M Needham

Date : May 2017

Dwg : 17.041/Phasel1/1

Scale 1: 50,000 @ A4

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North

Window sample location and reference

Trial pit location and reference

Potential contamination sources identified during the Phase I Desk Study (AFHA, 2017)

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Rev	Date	Revision Description	Drwn	Chkd

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Client: Mr J W & Mrs G M Needham

Site:
Land adjacent to 72 Station Road, Surfleet, PE11 4DB

Job No.: 17.041

Drawing Title:
EXPLORATORY HOLE LOCATION PLAN

Date: May 2017

Drawing No: 17.041/PhaseII/2

Scale: 1:625 @ A3

APPENDIX F: RISK ASSESSMENT CLASSIFICATION

Classification	Definition	Examples
Severe	Short term (acute) risk to human health. Short term risk of pollution of sensitive water resource. Catastrophic damage to buildings/property. A short term risk to a particular ecosystem, or organism forming part of such ecosystem.	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water.
Medium	Chronic damage to Human Health. Pollution of sensitive water resources. A significant change in a particular ecosystem, or organism forming part of such ecosystem.	Concentrations of a contaminant from site exceeds the generic, or site specific assessment criteria. Leaching of contaminants from a site to an aquifer.
Mild	Pollution of non-sensitive water resources. Significant damage to buildings/structures and crops ("significant harm" as defined in the Circular on Contaminated Land, DETR, 2000). Damage to sensitive buildings/structures or the environment.	Pollution of non-classified groundwater. Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as Personal Protective Clothing, etc). Easily repairable effects of damage to buildings/structures.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme.

Classification of consequence



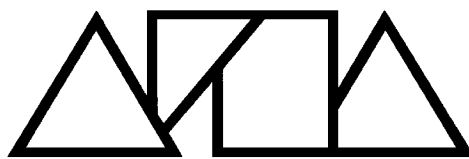
Classification	Definition
High Likelihood	There is a pollution linkage and an event which would either appear very likely in the short term and almost inevitable over the long term, or, there is evidence at the receptor of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term

Classification of probability

		CONSEQUENCE			
		Severe	Medium	Mild	Minor
PROBABILITY	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate/ Low Risk
	Likely	High Risk	Moderate Risk	Moderate/ Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/ Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/ Low Risk	Low Risk	Very Low Risk	Very Low Risk

Comparison of consequence against probability





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