Cambridge South East Transport Scheme

Contaminated Land Risk Assessment - Historical Landfills

Project:	Cambridge South East Transport Scheme		
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Subject:	Contaminated Land Risk Assessment – Historical Landfills		

1 Introduction

Mott MacDonald has been commissioned by Greater Cambridge Partnership to undertake an Environmental Impact Assessment for the Cambridge South East Transport Scheme Phase 2. A Contaminated Land Risk Assessment relating to historical landfills adjacent to the route is required to inform the Environmental Statement Chapter: Water Resources and Flood Risk (CSET-030).

Greater Cambridge Partnership (GCP) is proposing to procure the construction of infrastructure required to enable a High Quality Public Transport (HQPT) service to operate between the A11 / A1307 junction (near Babraham) and Cambridge – this scheme is known as Cambridge South East Transport (hereafter referred to as the 'CSET Scheme'). The project is made up of three core elements:

- A new segregated and guided public transport route, with public transport priority measures between the A11 and A1307 junction and Cambridge Biomedical Campus (CBC), that avoids general traffic congestion.
- A new Travel Hub which will be an area where car parking is provided and an interchange with the HQPT will be available.
- New high-quality non-motorised user facilities.

1.1 Scope of report

The Preliminary Risk Assessment (CSET-104) identified three historical landfills adjacent to the Scheme. The risks from these have been evaluated by carrying out the following works:

- A review of baseline data and previous ground investigation works carried out at the site to determine a Conceptual Site Model (CSM) for each area adjacent to the landfill site.
- Risk assessment of the potential contamination risks from soil or groundwater.
- Recommendations to mitigate any risks to identified receptors.

It should be noted that risks from ground gases have not been assessed as there are no enclosed structures proposed as part of the development.

1.2 Site background

1.2.1 Location

The CSET Scheme lies to the south east of Cambridge, running for approximately 8.5kms between the A1307/A11/A505 junction and Cambridge Biomedical Campus (CBC) skirting the eastern edges of Sawston, Stapleford and Great Shelford. In addition, it is proposed that connections will be provided from the Travel Hub to Babraham, Babraham Research Campus and Granta Park. At the CBC, the new route is proposed to run on dedicated public transport lanes on Francis Crick Avenue, connecting to the existing Guided Busway, enabling services to continue to the stations and Cambridge City Centre via the Busway.

The majority of the CSET Scheme runs on a new off-road alignment for the segregated carriageway. This alignment is proposed to be on land used for agricultural purposes (largely arable) and some land that is occupied by grassland, woodland or scrub. The Travel Hub and the length of the route until the CBC Boundary is within the Cambridgeshire Green Belt.

1.2.2 Landfills

As the majority of the route is located in greenfield areas, the main identified source of contaminated land relates to three historical landfills located adjacent to the scheme. The details of these landfills are shown in Table 1-1 below. The location of these can also be seen in Figure 2.1, Figure 2.2 and Figure 2.3.

Table 1-1: Historical Landfill information

Landfill Name [location]	License issue and surrender	First and last input	Location	Waste type
Sindalls [Sawston]	01/02/1974 – 03/05/1993	31/12/1971 – 31/05/1991	30m south of the CSET Scheme on southern side of abandoned railway line, north of Sawston.	Inert
Home Farm 1 [Babraham- between Sawston Road and High Street]	30/06/1978 – 12/10/1982	28/02/1981 – 04/10/1982	On southern boundary of the CSET Scheme. Located between High Street and Babraham Road.	Inert (located along historical railway line)
Home Farm 2 [Babraham – located between Travel Hub and A11]	30/06/1978 – 12/10/1982	01/07/1978 – 01/10/1982	Eastern boundary of the CSET Scheme. East of the Travel Hub, adjacent to the A11.	Inert (located along historical railway line

1.3 Geology

Published geological information from the British Geological Survey[1] indicates that Alluvium and River Terrace Deposits are present on site, associated with the land adjacent to the River Granta. Glacial Till and Glaciofluvial deposits of the Lowstoft Formation are shown to be located only in the south eastern extent of the scheme.

The site is underlain by the Chalk Group bedrock comprising the West Melbury Marly Chalk Formation in the north west, overlain by the Zig Zag Chalk Formation (with Totternhoe Stone Member at the base) which is present along most of the main route. This is overlain by the Holywell Nodular Chalk Formation (with Melbourn Rock Member at the base) which is present at the travel hub and south east of the route.

1.4 Hydrogeology

The Envirocheck Report records that the Alluvium, River Terrace Deposits and Lowestoft Formation (Glaciofluvial Deposits) are classified as Secondary A aquifers with high groundwater vulnerability. The

[1] British Geological Survey. 2021. GeoIndex Onshore [Online]. Available at: http://mapapps2.bgs.ac.uk/geoindex/home.html [Accessed March 2021]

Lowestoft Formation (Glacial Till) is classified as a Secondary Undifferentiated aquifer with high groundwater vulnerability.

The Chalk Group are classified as a Principal aquifer with high groundwater vulnerability. However locally, the West Melbury Marly Chalk Formation, Zig Zag Chalk Formation and Holywell Nodular Chalk Formation are classified as medium groundwater vulnerability.

The south eastern part of the scheme is located within groundwater Source Protection Zones as follows:

- A Zone III “Total Catchment” Source Protection Zone extends from approximately 650m east of Stapleford to 1.8km east;
- A Zone II “Outer Zone” Source Protection Zone is indicated for the remaining portion of the site footprint; and,
- Three Zone I “Inner Zone” Source Protection Zones are indicated outside of the site footprint, in the east of Sawston; in the southeast of Babraham and approximately 780m northwest of Babraham.

The historical landfill sites are all located within a Zone III.

1.5 Hydrology

The scheme crosses the River Granta twice, between the villages of Stapleford and Sawston and also between Babraham and the Great Abingdon. The route will also cross two drains to the north and south of the River Granta and drains near the CBC, 120m south of Dame Mary Archer Way. There are several other surface water features adjacent to the scheme including ponds, lakes and reservoirs.

A spring is indicated on historical mapping proximal to North Farm, Sawston. A pond is located north of Sindalls historical landfill and there are several drains along the historical landfill boundary.

The linear Home Farm 2 historical landfill appears to cross the River Granta and other drains located east of the A11 (see Figure 2.3). However, the river is not affected by the landfill (ie. not covered by the landfill) as it is on an embankment in this area.

2 Ground Investigation Results

An intrusive ground investigation at the site was undertaken by Tetratech between March and June 2021. The factual report was not completed at the time of writing and so results in this section are based on preliminary information provided by Tetratech and the laboratory. The results used are only those in the vicinity of the historical landfill sites. The historical landfill sites are depicted in orange in Figure 2.1, Figure 2.2 and Figure 2.3. The exploratory hole positions relative to the historical landfills are also included within these figures.

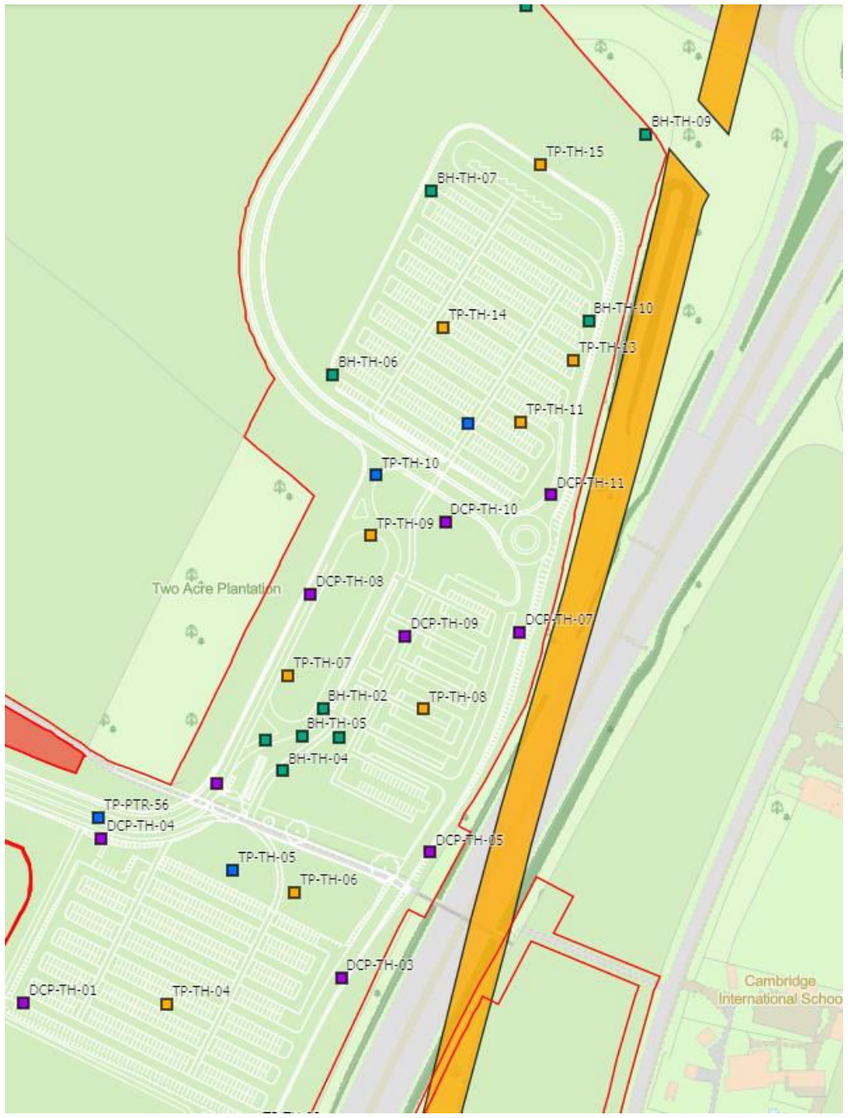
Figure 2.1: Sindalls Landfill

Note: orange polygon indicates historic landfill site. Red line indicates red line boundary of scheme. Red polygons indicate temporary land take areas.

Figure 2.2: Home Farm Landfill – 1

Note: orange polygon indicates historic landfill site. Red line indicates red line boundary of scheme. Red polygons indicate temporary land take areas.

Figure 2.3: Home Farm Landfill - 2



Note: orange polygon indicates historic landfill site. Red line indicates red line boundary of scheme. Red polygons indicate temporary land take areas.

2.1 Encountered geology

The encountered ground conditions confirm the published BGS geological information which suggests Chalk is present below the site. In places this is overlain by superficial deposits of Alluvium and/or River Terrace Deposits. A summary of the geology along the route in the area of the three landfills can be see below in Table 2-1, Table 2-2 and Table 2-3.

2.1.1 Encountered geology at Sindalls

Results are based on preliminary logs available from the following exploratory holes: TP-PTR-33 to TP-PTR-37 and BH-PTR-38.

Table 2-1: Geological summary Sindalls

Strata	Description	Occurrence	Depth to base	Thickness
Topsoil	Crop over brown gravelly very sandy silt.	Only encountered within TP-PTR-37 and 38.	0.30 – 0.40	0 - 0.40
Made Ground	Grass over brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is angular to subrounded fine to medium flint, chalk, and brick. Cobbles are angular brick.	Absent from TP-PTR-37 and TP-PTR-38.	0.60 - 1.45	0. - 1.45
River Terrace Deposits	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional wood fragments. Sand is fine to coarse. Gravel is angular fine to coarse chalk and flint. Above Yellowish brown silty fine to medium SAND.	Only encountered within TP-PTR-33, TP-PTR-38, BH-PTR-38.	0.75 - 3.0	0 - 1.55
Zig Zag Chalk Formation	Light grey structureless CHALK to very weak orangish white CHALK. Recovered as slightly sandy gravelly silt. Sand is fine to medium. Gravel is angular to sub-rounded chalk and occasional flint. (Grade Dm to Dc).	Not encountered within TP-PTR-33.	2.5 – 12.0 (depth not proven)	>1.90 (thickness not proven)

Groundwater strikes were recorded at 2.30m bgl (TP-PTR-36) and 3.0m bgl (TP-PTR-37) within the Chalk. BH-PTR-38 recorded groundwater at 2.60m bgl within the Alluvium.

2.1.2 Encountered geology at Home Farm 1

Results are based on preliminary logs available from the following exploratory holes: TP-PTR-44, TB-OBC-01 to TP-OBC-08, TP-SRS-01, TP-SRS-02, DCP-SRS-06 and DCP-SRS-07.

Table 2-2: Geological summary Home Farm 1

Strata	Description	Occurrence	Depth to base	Thickness
Topsoil	Grass over brown slightly gravelly sandy silty clay with frequent rootlets.	TP-PTR-44 TB-OBC-08 TP-OBC-01 TP-SRS-01	0.15 - 0.40	0 - 0.40
Made Ground	Firm brown mottled orangish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is angular fine to coarse flint, concrete, chalk and macadam.	TP-SRS-01 TP-SRS-02 TP-OBC-02 TP-OBC-01	0.0 – 2.30	0 - 2.30
River Terrace Deposits	Soft orangish brown slightly gravelly very sandy CLAY to orangish brown gravelly dine to medium SAND. Sand is fine to medium. Gravel is subangular to subrounded fine to medium flint and chalk.	TP-PTR-44 TP-OBC-08 TP-OBC-03 TP-PBC-03A TP-OBC-02 TP-OBC-01	0.50 – 4.0	0 – 3.60
Holywell Nodular Chalk Formation	Structureless CHALK recovered as white light orangish brown silty GRAVEL with low cobble content.	TP-PTR-44 TP-SRS-01 TP-SRS-02 All OBC except 03	3.0 - 4.0 (depth not proven)	> 3.60 (thickness not proven)

It should be noted that, within TP-SRS-01 and TP-SRS-02, made ground directly overlies the Chalk.

Groundwater was not encountered within any of these exploratory holes.

2.1.3 Encountered geology at Home Farm 2

Results are based on preliminary logs available from the following exploratory holes: TP-TH-01 to TP-TH-06, TP-TH-10 and TP-TH-12.

Table 2-3: Geological summary Home Farm 2

Strata	Description	Occurrence	Depth to base	Thickness
Topsoil	Grass over brown slightly gravelly sandy silty clay with frequent rootlets.	TP-TH-01 TP-TH-03 TP-TH-05 TP-TH-06 TP-TH-10 TP-TH-12	0.0 – 0.30	0.0 - 0.30
River Terrace Deposits	Yellowish orangish brown gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse flint and chalk.	TP-TH-01 TP-TH-02 TP-TH-03 TP-TH-04 TP-TH-05 TP-TH-06	0.5 – 2.80	0.25 – 2.65
Holywell Nodular Chalk Formation	Structureless CHALK recovered as white yellow silty gravelly fine to coarse SAND with low cobble content Clasts are weak low to medium density angular to subangular.	TP-TH-01 TP-TH-02 TP-TH-03 TP-TH-05 TP-TH-06 TP-TH-10 TP-TH-12	3.0 (depth not proven)	1.60 to > 2.7 (thickness not proven)

Groundwater was not encountered within any of these exploratory holes. Made ground was not encountered within any of these exploratory holes.

2.2 Visual or olfactory contamination

No olfactory evidence of contamination was noted during the ground investigation at the boreholes located adjacent to the landfill sites. Made ground at Home Farm 1 contained concrete and macadam. Made ground at Sindalls contained brick.

2.3 Contamination Assessment

The preliminary ground investigation information and laboratory test results for soil, soil leachate and groundwater have been compared to assessment criteria. At the time of writing, one groundwater sampling round had been undertaken during the week beginning 18th May 2021.

2.3.1 Human health assessment criteria

The proposed end use of the development is a public transport scheme. The screening values deemed most appropriate for the assessment are Land Quality Management (LQM)/ Chartered Institute for Environmental Health (CIEH) Suitable for Use Levels (S4ULs) (publication number S4UL 3420) or Human Health Risk Assessment related to “public open space (park)” land use. The values have been selected for a soil organic matter (SOM) concentration of 1% as a conservative measure. Where S4ULs were not available, Department for Environment, Food & Rural Affairs Category 4 Screening Levels (C4SL) have been used, again for commercial use. The combined screening values are referred to as generic assessment criteria (GAC).

2.3.2 Controlled waters assessment criteria

Drinking Water Standards (DWS) were used due to the Chalk Group being classed as a Principal aquifer and the superficial deposits being classed as Secondary A aquifers. Environmental Quality Standards (EQS) for

surface and freshwater were also used in consideration of the River Granta, Hobson's Brook and other surface water features adjacent to the site. Where EQS values are dependent on the hardness of the water, this has been calculated using M-BAT (metal bioavailability assessment tool) based on data available for the River Granta (Environment Agency, 2021a) (Environment Agency, 2021b). The M-BAT inputs and results can be found in Appendix A of this document.

2.3.3 Soil laboratory results

Three hundred and twenty-six (326) soil samples were scheduled for laboratory testing as part of the larger CSET Ground Investigation. These were tested for a range of contaminants including: metals, inorganics, Total Petroleum Hydrocarbons (TPH), Polycyclic Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs) and phenols.

These were compared to the GAC for protection of human health. There was one marginal exceedance of Dibenz-a-h-anthracene (1.1 mg/kg GAC) of 1.38 mg/kg. This occurred at DCP-SRS-02 (0.5m). this is located adjacent to Home Farm 1 historical landfill.

Full contamination test results can be found in Appendix B of this document.

2.3.4 Soil Leachate laboratory results

Soil leachate samples were tested for a range of contaminants including metals, phenols, ammoniacal nitrogen as N, and other inorganics. The results are discussed and summarised below.

Full contaminant test results can be found in Appendix C and D of this document.

2.3.4.1 Sindalls

Fifteen soil leachate samples taken from made ground and natural deposits (topsoil). There were several exceedances of metals and inorganics. These have been summarised in Table 2-4 below. The metal exceedances are generally minor or within an order of magnitude. The ammoniacal nitrogen as N exceedances are localised to one exploratory hole position.

Table 2-4: Leachate exceedances at Sindalls

Contaminant	DWS (µg/l)	EQS (µg/l)	Exploratory hole [strata]	Result (µg/l)
Ammoniacal Nitrogen as N	380	200	BH-PTR-44 [MG]	3610
			BH-PTR-44A [MG]	447
Arsenic	10	50	BH-PTR-44A [MG]	14.4
Cadmium	5	0.08	BH-PTR-44A [MG]	0.12
Chromium (VI)	-	3.4	BH-PTR-42 [MG]	4.15
Iron	200	1000	BH-PTR-40 [MG]	300
			BH-PTR-42 [MG]	1550
			BH-PTR-42 [MG]	875
			BH-PTR-43 [MG]	613
			BH-PTR-44 [MG]	265
			BH-PTR-44 A [MG]	475
			TP-PTR-32 [MG]	309
Lead	10	1.2	BH-PTR-43 [MG]	1.61

Contaminant	DWS (µg/l)	EQS (µg/l)	Exploratory hole [strata]	Result (µg/l)
			BH-PTR-44 [MG]	2.23
			BH-PTR-44 A [MG]	6.98
Mercury	1	0.07	BH-PTR-43 [MG]	0.115
Zinc	5000	41.61	BH-PTR-44 A [MG]	50.7

Note: EQS exceedance is highlighted in blue text and DWS exceedance is highlighted in orange text. Exceedances of both are highlighted in red. MG = Made Ground.

2.3.4.2 Home Farm 1

Fifteen soil leachate samples were taken from made ground and natural deposits (RTD, Chalk, topsoil). There were two metal exceedances. These have been summarised in Table 2-5Table 2-4 below. The zinc exceedance is minor. The iron exceedances are within an order of magnitude and are widespread across the scheme so likely naturally occurring.

Table 2-5: Leachate exceedances at Home Farm 1

Contaminant	DWS (ug/l)	EQS (ug/l)	Exploratory hole [strata]	Result (ug/l)
Iron	200	1000	TP-PTR-43 [RTD]	739
			TP-SRS-02 [MG]	785
			TP-SRS-02 [MG]	205
			TP-OBC-02 [MG]	648
Zinc	5000	41.61	TP-SRS-02 [MG]	42.8

Note: EQS exceedance is highlighted in blue text and DWS exceedance is highlighted in orange text. Exceedances of both are highlighted in red. MG = Made Ground.

2.3.4.3 Home Farm 2

Five soil leachate samples were taken from natural deposits (topsoil, RTD). There were two metal exceedances. These have been summarised in Table 2-6. The lead exceedance is minor. The iron exceedances are within an order of magnitude and are widespread across the scheme so likely naturally occurring.

Table 2-6: Leachate exceedances at Home Farm 2

Contaminant	DWS (ug/l)	EQS (ug/l)	Exploratory hole [strata]	Result (ug/l)
Iron	200	1000	BH-TH-01 [topsoil]	527
			DCP-TH-07 [topsoil]	685
Lead	10	1.2	BH-TH-01 [topsoil]	1.23

Note: EQS exceedance is highlighted in blue text and DWS exceedance is highlighted in orange text. Exceedances of both are highlighted in red.

2.3.5 Groundwater laboratory results

At the time of writing, one groundwater monitoring round had been completed (during week beginning 18th May 2021) with a second round due to be completed. Groundwater samples were tested for a range of contaminants including metals, phenols, total Petroleum Hydrocarbons (TPHs), Polycyclic Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs) and Semi-VOCs.

2.3.5.1 Sindalls

Six samples were taken from four boreholes at this location. These were taken from across made ground deposits and Chalk. There were several exceedances of EQS and DWS and these are summarised in Table 2-7.

Exceedances of metals and inorganics are generally minor. Exceedances of TPH and PAHs may be a results of the adjacent historical landfill. The exceedances of TPHs and PAHs are generally minor and within an order of magnitude. They do not indicate a significant contamination source. Sulphate and ammoniacal nitrogen as N are present in elevated concentrations, but these are restricted to one location.

Table 2-7: Groundwater exceedances at Sindalls

Contaminant	DWS (ug/l)	EQS (ug/l)	Exploratory hole [strata]	Result (ug/l)
Aliphatics >C21-35	10	-	BH-PTR-41 [Chalk]	22
			BH-PTR-41S [MG]	95
Benzo(a)pyrene	0.01	0.00017	BH-PTR-41S [MG]	0.0534
			BH-PTR-42D [Chalk]	0.0106
			BH-PTR-43D [Chalk]	0.0197
			BH-PTR-43S [MG/Chalk]	0.0405
Fluoranthene	0.038	0.0063	BH-PTR-41S [MG]	0.0641
			BH-PTR-42D [Chalk]	0.0123
			BH-PTR-43D [Chalk]	0.0243
			BH-PTR-43S [MG/Chalk]	0.068
Ammoniacal Nitrogen as N	380	200	BH-PTR-43S [MG/Chalk]	664
Calcium	250000	-	BH-PTR-43S [MG/Chalk]	253000
Fluoride	1500	-	BH-PTR-43D [Chalk]	2730
Manganese	50	355	BH-PTR-41S [MG]	59.6
			BH-PTR-43D [Chalk]	126
			BH-PTR-43S [MG/Chalk]	474
Sulphate as SO4	250000	-	BH-PTR-43S [MG/Chalk]	606000

Note: EQS exceedance is highlighted in blue text and DWS exceedance is highlighted in orange text. Exceedances of both are highlighted in red.

2.3.5.2 Home Farm 1

One borehole is located adjacent to this location. A groundwater sample was taken from the Chalk strata. Two exceedances of PAHs were recorded and may be a result of the adjacent historical landfill. The results are summarised in Table 2-8. The PAH exceedances are generally minor and within an order of magnitude.

Table 2-8: Groundwater exceedances at Home Farm 1.

Contaminant	DWS (ug/l)	EQS (ug/l)	Exploratory hole [strata]	Result (ug/l)
Benzo(a)pyrene	0.01	0.00017	BH-PTR-45 [Chalk]	0.0404
Fluoranthene	0.038	0.0063	BH-PTR-45 [Chalk]	0.0496

Note: EQS exceedance is highlighted in blue text and DWS exceedance is highlighted in orange text. Exceedances of both are highlighted in red.

2.3.5.3 Home Farm 2

One borehole is located at this location with a groundwater install. A groundwater sample was taken from the Chalk strata within BH-TH-01. No exceedances of EQS or DWS were recorded.

3 Contaminated Land Risk Assessment

3.1 Conceptual Site Model and risk assessment

A key element of the risk assessment is the development of a conceptual site model (CSM) which may be refined or revised as more information and understanding is obtained through the risk assessment process adopted with the Environment Agency's Land Contamination Risk Management (LCRM) (Environment Agency, 2020).

Following the most recent ground investigation, the CSM has been refined based on the preliminary CSM (CSET-104)**Error! Bookmark not defined.** and the potential pollutant linkages have been updated. A s ummary of the potential sources, pathways and receptors and the potential pollutant linkages based on the information collected to date, is presented in this section.

This only relates to the areas adjacent to the landfill sites and not the entire CSET Scheme.

Asbestos has not been considered in the CSM. An asbestos specialist should be consulted prior to construction.

3.1.1 Sources

3.1.1.1 Sindalls

S1: Historical landfill 30m south of site

S2: Soil leachate contamination (exceedances of metals and ammoniacal nitrogen as N)

S3: Groundwater contamination (exceedances of metals, PAHs and ammoniacal nitrogen as N)

3.1.1.2 Home Farm 1

S1: Historical landfills along southern site boundary

S2: Soil leachate contamination (exceedances of metals)

S3: Groundwater contamination (exceedances of metals and PAHs)

3.1.1.3 Home Farm 2

S1: Historical landfills on eastern site boundary

S2: Soil leachate contamination (exceedances of metals)

3.1.2 Pathways

P1: Human uptake through ingestion, dermal contact, or inhalation of dust/vapours from soils and/or groundwater

P2: Production and vertical migration of leachates in the unsaturated zone

P3: Horizontal and vertical migration of contaminants in the saturated zone.

P4: Surface runoff

P5: Man-made pathways (e.g. utilities)

P4: Direct contact with utilities or buried structures

3.1.3 Receptors

R1: Construction workers

R2: Future end users (HQPT route users)

R3: Groundwater in Principal aquifer (Chalk Group) and Secondary A aquifers (RTD and Alluvium) and SPZ III.

R4: Surface water features (drains, ponds, River Granta)

R5: Construction materials/built environment

3.2 Risk Estimation & Risk Evaluation

Following the development of the conceptual model and the identification and assessment of potential pollutant linkages, a preliminary assessment can be made of risk estimation and risk evaluation, as discussed in LCRM (Environment Agency, 2020), to determine whether an unacceptable contamination risk is likely to exist.

A description of the risk assessment methodology adopted is given in Appendix E of this document.

Risk assessment tables have been created for the three historical landfill sites. These include both associated unmitigated and mitigated risks. Control measures which are assumed to be implemented during the risk assessment, such as implementation of PPE for construction workers and Construction Environmental Management Plans, are also included.

Table 3-1: Conceptual Site Model and Generic Quantitative Risk Assessment for Sindalls historical landfill

Source	Pathway	Receptor	Consequence	Unmitigated risk		Mitigated risk		Comments/ Mitigation Measures
				Probability	Risk	Probability	Risk	
S1: Historical landfill 30m south of site	P1: Human uptake through ingestion, dermal contact, or inhalation of dust/vapours from soils and/or groundwater	R1: Construction workers	Mild	Low likelihood	Low	Unlikely	Very low	The Sindalls landfill is located 30m south of the site boundary. No landfill material was encountered during the ground investigation. Due to the nature of ground investigation and heterogeneity of made ground deposits, there remains a low risk of construction workers coming into contact with potentially contaminated material. No significant groundwater contamination has been recorded, slight exceedances of metals were measured. Health and safety risk assessments and method statements to manage risk to humans will need to be provided to the local planning authority to approve prior to construction. The Code of Construction Practice (CoCP) and Construction Environmental Management Plan (CEMP) will be implemented to ensure dust is minimised and control measures are in place for waste materials.
		R2: R2: Future end users (HQPT route users)	Mild	Low likelihood	Low	Unlikely	Very low	Future end users unlikely to come into contact with soils in the area as the scheme will comprise hardstanding at the surface. The Sindalls landfill is located 30m south of the site boundary and no landfill material was encountered during the ground investigation. The proposed works are unlikely to impact any existing pollutant linkages.
	P2: Production and vertical migration of leachates in the unsaturated zone	R3: Groundwater in Principal aquifer (chalk Group) and	Medium	Low likelihood	Moderate/ low	Unlikely	Low	The Sindalls landfill is located 30m south of the site boundary. No landfill material was encountered during the ground investigation therefore the works north of Sindalls landfill are unlikely to

Source	Pathway	Receptor	Consequence	Unmitigated risk		Mitigated risk		Comments/ Mitigation Measures
				Probability	Risk	Probability	Risk	
	P3: Horizontal and vertical migration of contaminants in the saturated zone. P5: Man-made pathways (e.g. utilities)	Secondary A aquifers (RTD and Alluvium) and SPZ III.						encounter landfill. The works are unlikely to impact any existing pathways to the aquifer. The CoCP and CEMP will be implemented to ensure dust is minimised and control measures are in place to reduce impacts to controlled waters.
	P4: Surface runoff	R4: Surface water features (drains, River Granta)	Medium	Low likelihood	Moderate/ low	Unlikely	Low	
	P4: Direct contact with utilities or buried structures	R5: Construction materials/built environment	Mild	Low likelihood	Low	Unlikely	Very low	Proposed works have been designed to remain outside of the historical landfill site boundary. Any below ground infrastructure should be designed to consider the prevailing ground conditions.
S2: Soil leachate contamination (metals and ammoniacal nitrogen as N)	P1: Human uptake through ingestion, dermal contact, or inhalation of dust/vapours from soils and/or groundwater	R1: Construction workers	Mild	Low likelihood	Low	Unlikely	Very low	Soil leachate contained exceedances of metals compared to the DWS/EQS. However, these were generally minor exceedances. Metal exceedances are likely naturally occurring as minor metal exceedances have been noted from natural deposits across the wider scheme. No landfill material was encountered during the ground investigation. Due to the nature of ground investigation and heterogeneity of made ground deposits, there remains a low risk of construction workers coming into contact with potentially contaminated material. No significant groundwater contamination has been recorded, slight exceedances of metals were measured. Health and safety risk assessments and method statements to manage risk to humans will need to be provided to the local planning authority to approve prior to construction.

Source	Pathway	Receptor	Consequence	Unmitigated risk		Mitigated risk		Comments/ Mitigation Measures
				Probability	Risk	Probability	Risk	
								The CoCP and CEMP will be implemented to ensure dust is minimised and control measures are in place for waste materials.
	P2: Production and vertical migration of leachates in the unsaturated zone P3: Horizontal and vertical migration of contaminants in the saturated zone. P5: Man-made pathways (e.g. utilities)	R3: Groundwater in Principal aquifer (chalk Group) and Secondary A aquifers (RTD and Alluvium) and SPZ III.	Medium	Low likelihood	Moderate/ Low	Unlikely	Low	Soil leachate contained exceedances of metals compared to the DWS/EQS. However, these were all minor exceedances. These are likely naturally occurring as minor metal exceedances have been noted from natural deposits across the wider scheme. A hot spot of ammoniacal nitrogen as N was noted within BH-PTR-44A. However, works include a HQPTR comprised of hardstanding at surface. This will reduce leaching through the soils locally. The Sindalls landfill is located south of the site boundary, no landfill material was encountered during the ground investigation. The proposed works are unlikely to impact any existing pollutant linkages.
	P4: Surface runoff	R4: Surface water features (drains, River Granta)	Medium	Low likelihood	Moderate/ Low	Unlikely	Low	
	P4: Direct contact with utilities or buried structures	R5: Construction materials/built environment	Mild	Low likelihood	Low	Unlikely	Very low	Any below ground infrastructure should be designed to consider the prevailing ground conditions.
S3: Groundwater contamination (metals, PAHs and ammoniacal nitrogen as N)	P1: Human uptake through ingestion, dermal contact, or inhalation of dust/vapours from soils and/or groundwater	R1: Construction workers	Mild	Low likelihood	Low	Unlikely	Very low	Groundwater was found to contain exceedances of PAH, metals and ammoniacal nitrogen as N when compared to the DWS/EQS. These were generally minor or within an order of magnitude. No landfill material was encountered during the ground investigation. Due to the nature of ground investigation and heterogeneity of made ground deposits, there remains a low risk of construction workers coming into contact with potentially contaminated material. No significant groundwater contamination has been recorded, slight exceedances of metals were measured.

Source	Pathway	Receptor	Consequence	Unmitigated risk		Mitigated risk		Comments/ Mitigation Measures
				Probability	Risk	Probability	Risk	
								Health and safety risk assessments and method statements to manage risk to humans will need to be provided to the local planning authority to approve prior to construction. The CoCP and CEMP will be implemented to ensure risks to controlled waters are minimised.
	P2: Production and vertical migration of leachates in the unsaturated zone P3: Horizontal and vertical migration of contaminants in the saturated zone. P5: Man-made pathways (e.g. utilities)	R3: Groundwater in Principal aquifer (chalk Group) and Secondary A aquifers (RTD and Alluvium) and SPZ III.	Medium	Low likelihood	Moderate/ low	Unlikely	Low	Groundwater was found to contain exceedances of PAH, metals and ammoniacal nitrogen as N when compared to the DWS/EQS. These were generally minor or within an order of magnitude. Dewatering is not anticipated to be required. If dewatering is required, waters may not be suitable for disposal to ground or surface waters. Water may require treatment or disposal to a suitable licensed waste facility. The CoCP and CEMP will be implemented to ensure risks to controlled waters are minimised.
	P4: Direct contact with utilities or buried structures	R5: Construction materials/built environment	Mild	Low likelihood	Low	Unlikely	Very low	Any below ground infrastructure should be designed to consider the prevailing ground conditions.

Table 3-2: Conceptual Site Model and Generic Quantitative Risk Assessment for Home Farm 1 historical landfill

Source	Pathway	Receptor	Consequence	Unmitigated risk		Mitigated risk		Comments/ Mitigation Measures
				Probability	Risk	Probability	Risk	
S1: Historical landfills along southern site boundary	P1: Human uptake through ingestion, dermal contact, or inhalation of dust/vapours from soils and/or groundwater	R1: Construction workers	Mild	Low likelihood	Low	Unlikely	Very low	The Home Farm 1 landfill is on the southern site boundary. No landfill material was encountered during the ground investigation. Due to the nature of ground investigation and heterogeneity of made ground deposits, there remains a low risk of construction workers coming into contact with potentially contaminated material. No significant groundwater contamination has been recorded, slight exceedances of metals were measured. Health and safety risk assessments and method statements to manage risk to humans will need to be provided to the local planning authority to approve prior to construction. The CoCP and CEMP will be implemented to ensure dust is minimised and control measures are in place for waste materials.
		R2: Future end users (HQPT route users)	Mild	Low likelihood	Low	Unlikely	Very low	The Home Farm 1 landfill is located on the southern site boundary. Future end users are unlikely to come into contact with soils on site due to the scheme consisting of hardstanding at the surface. The proposed works are unlikely to impact any existing pollutant linkages.
	P2: Production and vertical migration of leachates in the unsaturated zone P3: Horizontal and vertical migration of contaminants in the saturated zone. P5: Man-made pathways (e.g. utilities)	R3: Groundwater in Principal aquifer (chalk Group) and Secondary A aquifers (RTD and Alluvium) and SPZ III.	Medium	Low likelihood	Moderate/ low	Unlikely	Low	The Home Farm 1 landfill is located on the southern site boundary. The scheme consists of hardstanding at the surface which will reduce leaching through any made ground. The CoCP and CEMP will be implemented to ensure dust is minimised and control measures are in place to reduce impacts to controlled waters.

Source	Pathway	Receptor	Consequence	Unmitigated risk		Mitigated risk		Comments/ Mitigation Measures
				Probability	Risk	Probability	Risk	
	P4: Surface runoff	R4: Surface water features (drains, River Granta)	Medium	Low likelihood	Moderate/ low	Unlikely	Low	
	P4: Direct contact with utilities or buried structures	R5: Construction materials/built environment	Mild	Low likelihood	Low	Unlikely	Very low	Any below ground infrastructure should be designed to consider the prevailing ground conditions.
S2: Soil leachate contamination (metals)	P1: Human uptake through ingestion, dermal contact, or inhalation of dust/vapours from soils and/or groundwater	R1: Construction workers	Mild	Low likelihood	Low	Unlikely	Very low	Soil leachate contained exceedances of metals and hydrocarbons compared to the DWS/EQS. However, these were all minor exceedances. Metals are likely naturally occurring as minor metal exceedances have been noted from natural deposits across the wider scheme. Due to the nature of ground investigation and heterogeneity of made ground deposits, there remains a low risk of construction workers coming into contact with potentially contaminated material. No significant groundwater contamination has been recorded, slight exceedances of metals were measured in soils. Health and safety risk assessments and method statements to manage risk to humans will need to be provided to the local planning authority to approve prior to construction. The CoCP and CEMP will be implemented to ensure dust is minimised and control measures are in place for waste materials.
	P2: Production and vertical migration of leachates in the unsaturated zone	R3: Groundwater in Principal aquifer (chalk Group) and Secondary A aquifers (RTD and Alluvium) and SPZ III.	Medium	Low likelihood	Moderate/ low	Unlikely	Low	Soil leachate contained exceedances of metals and hydrocarbons compared to the DWS/EQS. However, these were all minor exceedances. Metals are likely naturally occurring as minor metal exceedances have

Source	Pathway	Receptor	Consequence	Unmitigated risk		Mitigated risk		Comments/ Mitigation Measures
				Probability	Risk	Probability	Risk	
	P3: Horizontal and vertical migration of contaminants in the saturated zone. P5: Man-made pathways (e.g. utilities)	and Alluvium) and SPZ III.						been noted from natural deposits across the wider scheme. The Home Farm 1 landfill is located south of the site boundary. No landfill material was encountered during the ground investigation. The proposed works are unlikely to impact any existing pollutant linkages.
	P4: Surface runoff	R4: Surface water features (drains, River Granta)	Medium	Low likelihood	Moderate/ low	Unlikely	Low	
	P4: Direct contact with utilities or buried structures	R5: Construction materials/built environment	Mild	Low likelihood	Low	Unlikely	Very low	Any below ground infrastructure should be designed to consider the prevailing ground conditions.
S3: Groundwater contamination (metals, PAHs)	P1: Human uptake through ingestion, dermal contact, or inhalation of dust/vapours from soils and/or groundwater	R1: Construction workers	Mild	Low likelihood	Low	Unlikely	Very low	Groundwater was found to contain exceedances of PAH and metals when compared to the DWS/EQS. These were generally minor or within an order of magnitude. No significant groundwater contamination was encountered during ground investigations. Health and safety risk assessments and method statements to manage risk to humans will need to be provided to the local planning authority to approve prior to construction. The CoCP and CEMP will be implemented to ensure risks to controlled waters are minimised.
	P2: Production and vertical migration of leachates in the unsaturated zone P3: Horizontal and vertical migration of contaminants in the saturated zone.	R3: Groundwater in Principal aquifer (chalk Group) and Secondary A aquifers (RTD and Alluvium) and SPZ III.	Medium	Low likelihood	Moderate/ low	Unlikely	Low	Groundwater was found to contain exceedances of PAH and metals when compared to the DWS/EQS. These were generally minor or within an order of magnitude. Dewatering is not anticipated to be required. If dewatering is required, waters may not be suitable for disposal to ground or surface

Source	Pathway	Receptor	Consequence	Unmitigated risk		Mitigated risk		Comments/ Mitigation Measures
				Probability	Risk	Probability	Risk	
	P5: Man-made pathways (e.g. utilities)							waters. Water may require treatment or disposal to a suitable licensed waste facility. The CoCP and CEMP will be implemented to ensure risks to controlled waters are minimised.
	P4: Direct contact with utilities or buried structures	R5: Construction materials/built environment	Mild	Low likelihood	Low	Unlikely	Very low	Any below ground infrastructure should be designed to consider the prevailing ground conditions.

Table 3-3: Conceptual Site Model and Generic Quantitative Risk Assessment for Home Farm 2 historical landfill

Source	Pathway	Receptor	Consequence	Unmitigated risk		Mitigated risk		Comments/ Mitigation Measures
				Probability	Risk	Probability	Risk	
S1: Historical landfills east of site boundary	P1: Human uptake through ingestion, dermal contact, or inhalation of dust/vapours from soils and/or groundwater	R1: Construction workers	Mild	Low likelihood	Low	Unlikely	Very low	The Home Farm 2 landfill is located on the eastern boundary of the site. Proposed works have been designed to not overlap the historical landfill site. No landfill material was encountered during the ground investigation. No landfill material was encountered during the ground investigation. Due to the nature of ground investigation and heterogeneity of made ground deposits, there remains a low risk of construction workers coming into contact with potentially contaminated material. No significant groundwater contamination has been recorded, slight exceedances of metals were measured. Health and safety risk assessments and method statements to manage risk to humans will need to be provided to the local planning authority to approve prior to construction.

Source	Pathway	Receptor	Consequence	Unmitigated risk		Mitigated risk		Comments/ Mitigation Measures
				Probability	Risk	Probability	Risk	
								The CoCP and CEMP will be implemented to ensure dust is minimised and control measures are in place for waste materials.
		R2: R2: Future end users (HQPT route users)	Mild	Low likelihood	Low	Unlikely	Very low	The Home Farm 2 landfill is located on the eastern boundary of the site boundary. Proposed works have been designed to not overlap the historical landfill site. No landfill material was encountered during the ground investigation. The proposed works will not impact on the historical landfill and therefore not impact any existing pollutant linkages.
	P2: Production and vertical migration of leachates in the unsaturated zone P3: Horizontal and vertical migration of contaminants in the saturated zone. P5: Man-made pathways (e.g. utilities)	R3: Groundwater in Principal aquifer (chalk Group) and Secondary A aquifers (RTD and Alluvium) and SPZ III.	Medium	Low likelihood	Moderate/ low	Unlikely	Low	The Home Farm 2 landfill is located on the eastern boundary of the site boundary. Proposed works have been designed to not overlap the historical landfill site. No landfill material was encountered during the ground investigation. The works adjacent to Home Farm 2 are unlikely to encounter landfill material. The works are unlikely to impact any existing pathways to the aquifer.
	P4: Surface runoff	R4: Surface water features (drains, River Granta)	Medium	Low likelihood	Moderate/ low	Unlikely	Low	The CoCP and CEMP will be implemented to ensure dust is minimised and control measures are in place to reduce impacts to controlled waters.
	P4: Direct contact with utilities or buried structures	R5: Construction materials/built environment	Mild	Low likelihood	Low	Unlikely	Very low	Proposed works have been designed to not overlap the historical landfill site. Any below ground infrastructure should be designed to consider the prevailing ground conditions.
S2: Soil leachate contamination (metals)	P1: Human uptake through ingestion, dermal contact, or inhalation of dust/vapours from soils and/or groundwater	R1: Construction workers	Mild	Low likelihood	Low	Unlikely	Very low	Soil leachate contained exceedances of metals compared to the DWS/EQS. However, these were all minor and were sampled from natural deposits. These are likely naturally occurring.

Source	Pathway	Receptor	Consequence	Unmitigated risk		Mitigated risk		Comments/ Mitigation Measures
				Probability	Risk	Probability	Risk	
								No landfill material was encountered during the ground investigation. Due to the nature of ground investigation and heterogeneity of made ground deposits, there remains a low risk of construction workers coming into contact with potentially contaminated material. No significant groundwater contamination has been recorded, slight exceedances of metals were measured. Health and safety risk assessments and method statements to manage risk to humans will need to be provided to the local planning authority to approve prior to construction. The CoCP and CEMP will be implemented to ensure dust is minimised and control measures are in place for waste materials.
P2: Production and vertical migration of leachates in the unsaturated zone P3: Horizontal and vertical migration of contaminants in the saturated zone. P5: Man-made pathways (e.g. utilities)	R3: Groundwater in Principal aquifer (chalk Group) and Secondary A aquifers (RTD and Alluvium) and SPZ III.	Medium	Low likelihood	Moderate/ low	Low likelihood	Unlikely	Low	Soil leachate contained exceedances of metals compared to the DWS/EQS. However, these were all minor and were sampled from natural deposits. These are likely naturally occurring. The Home Farm 2 landfill is located on the eastern boundary of the site boundary. Proposed works have been designed to not overlap the historical landfill site.
P4: Surface runoff	R4: Surface water features (drains, River Granta)	Medium	Low likelihood	Moderate/ low	Low likelihood	Unlikely	Low	No landfill material was encountered during the ground investigation. The proposed works will not impact on the historical landfill and therefore not impact any existing pollutant linkages.
P4: Direct contact with utilities or buried structures	R5: Construction materials/built environment	Mild	Low likelihood	Low	Low likelihood	Unlikely	Very low	Any below ground infrastructure should be designed to consider the prevailing ground conditions.

4 Conclusion and Recommendations

4.1 Conclusions

A Contaminated Land Risk Assessment for the areas of historical landfills along the route was included in the Scoping Opinion requirements for the Environmental Statement. This risk assessment completes that requirement and is used to inform the ES chapter on Water Resources and Flood Risk (CSET-030). The risk assessment has been based on analysis of preliminary data collected during the ground investigation completed between March and June 2021. Preliminary data from adjacent to the three historical landfill sites was used for this risk assessment.

The ground investigation determined the geology underlying the site comprises:

- Topsoil (0.15 – 0.40m thick)
- Made Ground (0.0 – 2.30m thick)(absent from Home Farm 2)
- Superficial deposits, comprising Alluvium and/or River Terrace Deposits, (0.5 – 4.0m thick)
- Chalk Group (depth not proven) comprising the:
  - Zig Zag Chalk Formation (Sindalls)
  - Holywell Nodular chalk Formation (Home Farm 1 and Home Farm 2)

4.2 Contaminated land risks

The following risks have been assessed assuming mitigation measures are implemented:

- Risks to construction workers are assessed as **very low**.
- Risks to site end users (HQPTR) are assessed as **very low**.
- Risks to groundwater (Principal aquifer and Secondary A aquifers and SPZ III) are assessed as **low**.
- Risks to construction materials/built environment are assessed as **very low** assuming materials are designed to consider the prevailing ground conditions.

4.3 Recommendations

The following recommendations are given:

- The draft Code of Construction Practice and the draft Construction Environmental Management Plan will be updated to Final Status when the appointed contractor plans works in the area of the landfills. The CoCP and CEMP will have to be in place to mitigate risks to receptors during construction.
- There is the potential for undiscovered hot spots of contamination to exist within the scheme. The protocol for dealing with unexpected contamination protocol should be developed and adopted during the construction works under the final CEMP.
- If excavated soils are to be re-used at the site, then a materials management plan in accordance with the CL:AIRE Waste Code of Practice should be undertaken.
- If dewatering is required the discharge of dewatering fluid back to ground or surface waters may not be approved due to the presence of contaminants exceeding the DWS/EQS. Waters may require treatment or disposal at a licensed waste facility.
- Following receipt of additional groundwater monitoring data, this report may require updating if results indicate unexpected groundwater contamination.

Appendices

A. M-BAT calculations

	INPUT DATA												RESULTS (Copper)			RESULTS (Zinc)			RESULTS (Mn)			RESULTS (Ni)		
ID	Location	Waterbody	Date	Measured Cu Concentration (dissolved) ($\mu g\,l^{-1}$)	Measured Zn Concentration (dissolved) ($\mu g\,l^{-1}$)	Measured Mn Concentration (dissolved) ($\mu g\,l^{-1}$)	Measured Ni Concentration (dissolved) ($\mu g\,l^{-1}$)	pH	DOC	Ca	Site-specific PNEC Dissolved Copper ($\mu g\,l^{-1}$)	BioF	Bioavailable Copper Concentration ($\mu g\,l^{-1}$)	Risk Characterisation Ratio	Site-specific PNEC Dissolved Zinc ($\mu g\,l^{-1}$)	BioF	Bioavailable Zinc Concentration ($\mu g\,l^{-1}$)	Risk Characterisation Ratio	Site-specific PNEC Dissolved Manganese ($\mu g\,l^{-1}$)	BioF	Bioavailable Manganese Concentration ($\mu g\,l^{-1}$)	Risk Characterisation Ratio	Site-specific PNEC Dissolved Nickel ($\mu g\,l^{-1}$)	BioF	Bioavailable Nickel Concentration ($\mu g\,l^{-1}$)	Risk Characterisation Ratio
1	R.GRANTA	River Granta	16/09/2005					7.61	9.53	152	41.69	0.02			40.13	0.27			467.12	0.26			21.23	0.19		
2			14/10/2005					7.53	7.38	150	33.69	0.03			33.52	0.33			545.37	0.23			19.08	0.21		
3			09/11/2005					7.32	7.97	147	37.74	0.03			33.05	0.33			818.93	0.15			22.21	0.18		
4			08/12/2005					7.59	7.97	150	35.64	0.03			35.62	0.31			485.56	0.25			19.27	0.21		
5			20/01/2005					7.76	9.5	152	37.52	0.03			41.92	0.26			349.40	0.35			19.38	0.21		
6	R.GRANTA	River Granta	06/09/2005					8.1	8.04	121	23.05	0.04			39.94	0.27			180.91	0.68			13.01	0.31		
7			28/09/2005					8.33	11.7	132	12.50	0.08			53.23	0.20			123.00	1.00			12.94	0.31		
8			27/10/2005					8.03	8.6	133	26.41	0.04			41.86	0.26			207.16	0.59			14.62	0.27		
9			23/11/2005					7.97	10.4	146	30.89	0.03			47.78	0.23			232.68	0.53			17.66	0.23		
10			04/01/2006					8.23	10.6	136	19.29	0.05			49.07	0.22			140.66	0.87			13.72	0.29		
											29.84	**ug/l**			**41.61**	**ug/l**			**355.08**	**ug/l**			**17.32**	**ug/l**		
											0.03	**mg/l**			0.04	**mg/l**			0.36	**mg/l**			0.02	**mg/l**		

B. Soil results

Available on request.

C. Soil Leachate results

C.1 Sindalls leachate results

Max of Normalised Results (ug/l)			Location ID	BH - PTR - 40	BH - PTR - 42	BH - PTR - 42	BH - PTR - 43	BH - PTR - 43	BH - PTR - 44	BH - PTR - 44	BH PTR 44 A	BH-PTR-38	BH-PTR-39	BH-PTR-42	BH-PTR-42	TP-PTR-31	TP - PTR - 32	TP - PTR - 36
			Sample Depth	0.2	0.2	0.5	0.2	1	0.2	1.4	2.2	0.2	0.1	1.4	2.2	0.2	0.5	0.5
			Strata	made ground	made ground	made ground	made ground	made ground	made ground	made ground	made ground	topsoil	topsoil	made ground	made ground	made ground	made ground	made ground
Determinant Name	Normalise	EQS (Annual Average, Surface Freshwaters) ug/l	UK DWS (ug/l)															
1-naphthol	ug/l	-	-	<10	<10	<10	<10	<10	<10	<10	<10			<10	<10	<10	<10	<10
2,3,4,6-Tetrachlorophenol	ug/l	-	-															
2,3,5,6-Tetrachlorophenol	ug/l	-	-															
2,3,5-Trimethylphenol	ug/l	-	-	<3	<3	<3	<3	<3	<3	<3				<3	<3	<3	<3	<3
2,4,5-Trichlorophenol	ug/l	-	-															
2,4,6-Trichlorophenol	ug/l	-	200															
2,4-Dichlorophenol	ug/l	4.2	-															
2,4-Dimethylphenol	ug/l	-	-															
2,4-Dinitrophenol	ug/l	-	-															
2,6-Dichlorophenol	ug/l	-	-															
2-Chlorophenol	ug/l	-	-															
2-Isopropylphenol	ug/l	-	-	<6	<6	<6	<6	<6	<6	<6	<6			<6	<6	<6	<6	<6
2-Methyl-4,6-Dinitrophenol	ug/l	-	-															
2-Methylphenol	ug/l	-	-															
2-Nitrophenol	ug/l	-	-															
2-sec-Butyl-4,6-dinitrophenol	ug/l	-	-															
4-Chloro-3-Methylphenol	ug/l	-	-															
4-Chlorophenol	ug/l	-	-															
4-Methylphenol	ug/l	-	-															
4-Nitrophenol	ug/l	-	-															
Ammoniacal Nitrogen as N	ug/l	200	380	25	17	11	16	12	14	3610	447			15	11	21	15	<10
Antimony	ug/l	-	5		<1				1.67			<1	<1					
Arsenic	ug/l	50	10	0.976	1.34	<0.5	1.3	8.38	2.04	2.33	14.4	0.867	1.11	1.85	1.29	<0.5	0.767	<0.5
Barium	ug/l	-	1300000	11.6	182	3.57	233	16.6	154	46.2	526	8.19	102	288	13.2	157	5.96	4.69
Beryllium	ug/l	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1
Boron	ug/l	2000	1000	26.2	76.5	31.5	88.4	63.9	62	106	380			109	53	110	22.1	15.1
Cadmium	ug/l	0.08	5	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.12	<0.08		<0.08	<0.08	<0.08	<0.08	<0.08
Calcium	ug/l	-	250000	28500	23200	26300	24000	25500	24000	43200	6090			28000	25900	17100	21800	14100
Catechol	ug/l	-	-	<10	<10	<10	<10	<10	<10	<10	<10			<10	<10	<10	<10	<10
Chloride	ug/l	-	250000	<2000	2500	<2000	2000	<2000	<2000	<2000	12000	<2000	<2000	2600	<2000	<2000	<2000	<2000
Chromium	ug/l	-	50	<1	<1	<1	<1	<1	<1	<1	<1	1.12	<1	1.2	<1	<1	<1	<1
Chromium - Hexavalent	ug/l	3.4	-	<3	4.15	<3	<3	<3	<3	<3	<3			<3	<3	<3	<3	<3
Complex Cyanide	ug/l	-	-	<5	<5	<5	<5	<5	<5	<5	<5			<5	<5	<5	<5	<5
Copper	ug/l	29.84	2000	2.06	<0.3	<0.3	4.24	1.17	12.9	6.51	14.2	2.92	<0.3	3.74	2.62	<0.3	1.93	<0.3
Cresols*	ug/l	-	-	<6	<6	<6	<6	<6	<6	<6	<6			<6	<6	<6	<6	<6
Cyanide	ug/l	1	50															
Cyanide Free	ug/l	-	-	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5			<2.5	<2.5	<2.5	<2.5	<2.5
Dissolved Organic Carbon	ug/l	-	-	6750	6570	4380	6360	4860	5510	8780	23800	7080	5250	4910	5240	4420	7580	3110
Fluoride	ug/l	-	1500	684	768	828	568	633	<500	<500	1040	925	653	761	700	827	725	597
Hardness,Total as CaC03	ug/l	-	-	74100	60600	68800	62400	69000	62600	118000	19500			79200	72800	44100	58300	36700
Iron	ug/l	1000	200	300	1000	875	199	613	265	<19	475			<19	<19	150	309	<19
Lead	ug/l	1.2	10	<0.2	0.571	<0.2	0.956	1.61	2.23	<0.2	6.98	0.642	0.301	0.21	<0.2	<0.2	<0.2	<0.2
Magnesium	ug/l	-	50000	725	627	705	624	1310	632	2420	1080			2260	1960	309	940	352
Manganese	ug/l	355.08	50	<3	<3	<3	<3	<3	<3	11.8	20.7			<3	<3	<3	<3	<3
Mercury	ug/l	0.07	-	<0.01	<0.01	<0.01	0.014	0.115	0.0335	<0.01	0.0456	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum	ug/l	-	70	<3	<3	6.51	8.17	<3	<3	9.85	36	5.88		12	6.79	<3	3.54	4.08
Nickel	ug/l	17.32	20	1.69	2.42	0.449	1.29	1.17	1.05	2.15	9.54	1.84	1.34	1.43	1.76	<0.4	1.1	<0.4
Pentachlorophenol (PCP)	ug/l	0.4	9															
Phenol	ug/l	7.7	0.5	<2	<2	<2	<2	<2	<2	<2	<2			<2	<2	<2	<2	<2
Phenol (Monohydric)	ug/l	-	-		<16				<16			<16	<16					
Phenols, Total Detected 5 speci	ug/l	-	-															
Resorcinol	ug/l	-	-	<10	<10	<10	<10	<10	<10	<10	<10			<10	<10	<10	<10	<10
Selenium	ug/l	-	10	<1	<1	<1	<1	1.04	<1	<1	5.89	1.06	<1	<1	<1	<1	<1	<1
Sulphate as SO4	ug/l	-	250000	<2000	<2000	<2000	<2000	23400	<2000	14500	158000	<2000	<2000	12400	9900	<2000	3700	<2000
Total dissolved solids	ug/l	-	-		97700				89700			83800	85600					
Total Phenols of 8 Speciated*	ug/l	-	-	<45	<45	<45	<45	<45	<45	<45	<45			<45	<45	<45	<45	<45
Trimethylphenol	ug/l	-	-															
Trivalent Chromium	ug/l	-	-	<3	<3	<3	<3	<3	<3	<3	<3			<3	<3	<3	<3	<3
Vanadium	ug/l	-	-	<1	1.14	<1	1.45	26.5	1.64	<1	16.7			1.21	<1	<1	1.01	<1
Water Soluble Sulphate as SO4	g/l	-	-	0.0403	0.0043	0.0072	0.239	0.154	<0.004	0.0221		<0.004	<0.004	0.0359	0.0269	0.0079	0.0393	0.0165
Xylenols	ug/l	-	-	<8	<8	<8	<8	<8	<8	<8	<8			<8	<8	<8	<8	<8
Zinc	ug/l	41.61	5000	1.93	15.8	<1	31.6	32.5	25.8	2.03	50.7	3.89	31.4	7.69	<1	6.65	<1	1.58
M-BAT calculated																		

C.2 Home Farm 1 leachate results

TP-PTR-42 to 44																			
Max of Normalised Results (ug/l)			Location ID	TP-PTR-42	TP-PTR-43	TP - PTR - 44	BH PTR 45 A	BH PTR 45 A	TP-SRS-01	TP-SRS-02	TP-SRS-02	TP-SRS-02	DCP-SRS-02	DCP-SRS-02	TP - OBC - 02	TP-OBC-01	TP-OBC-03	TP-OBC-05
			Sample Depth	0.2	0.5	0.2	1.6	2.3	0.5	1.1	1.6	2.5	0.5	1	0.2	0.2	0.1	0.2
			Strata	topsoil	RTD	topsoil	made ground	Chalk	made ground	made ground	made ground	Chalk	made ground	made ground	made ground	topsoil	topsoil	topsoil
Determinant Name	Normalise	EQS (Annual Average, Surface Freshwaters) ug/l	UK DWS (ug/l)															
1-naphthol	ug/l	-	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,3,4,6-Tetrachlorophenol	ug/l	-	-															
2,3,5,6-Tetrachlorophenol	ug/l	-	-															
2,3,5-Trimethylphenol	ug/l	-	-	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
2,4,5-Trichlorophenol	ug/l	-	-															
2,4,6-Trichlorophenol	ug/l	-	200															
2,4-Dichlorophenol	ug/l	4.2	-															
2,4-Dimethylphenol	ug/l	-	-															
2,4-Dinitrophenol	ug/l	-	-															
2,6-Dichlorophenol	ug/l	-	-															
2-Chlorophenol	ug/l	-	-															
2-isopropylphenol	ug/l	-	-	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
2-Methyl-4,6-Dinitrophenol	ug/l	-	-															
2-Methylphenol	ug/l	-	-															
2-Nitrophenol	ug/l	-	-															
2-sec-Butyl-4,6-dinitrophenol	ug/l	-	-															
4-Chloro-3-Methylphenol	ug/l	-	-															
4-Chlorophenol	ug/l	-	-															
4-Methylphenol	ug/l	-	-															
4-Nitrophenol	ug/l	-	-															
Ammoniacal Nitrogen as N	ug/l	200	380	33	19	17	25	14	12	19	27	16	24	<10	16	18	14	16
Antimony	ug/l	-	5						<1	<1								
Arsenic	ug/l	50	10	2.84	<0.5	0.99	1.36	<0.5	0.582	1.03	1.08	0.573	0.868	0.566	2.46	1.5	1.72	1.63
Barium	ug/l	-	1300000	176	3.71	71.4	187	3.2	1.65	8.36	95.4	3.5	5.86	6.57	6.77	123	92.3	78
Beryllium	ug/l	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	ug/l	2000	1000	88.1	28.2	103	110	15.1	17.9	28.7	127	16.8	16.6	18.8	49.2	139	74	79.5
Cadmium	ug/l	0.08	5	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Calcium	ug/l	-	250000	19100	18800	23300	22900	10300	11400	20300	25700	12600	19600	20300	23600	18400	27300	22700
Catechol	ug/l	-	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Chloride	ug/l	-	250000	3300	<2000	2000	2600	3200	<2000	<2000	4100	<2000	<2000	<2000	<2000	3400	3100	3400
Chromium	ug/l	-	50	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium - Hexavalent	ug/l	3.4	-	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Complex Cyanide	ug/l	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Copper	ug/l	29.84	2000	4.97	1.95	2.68	<0.3	<0.3	1.35	4.3	3.88	1.51	2.61	3.27	5.37	2.7	1.89	1.73
Cresols*	ug/l	-	-	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
Cyanide	ug/l	1	50															
Cyanide Free	ug/l	-	-	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Dissolved Organic Carbon	ug/l	-	-	5270	5180	5210	7170	<3000	4600	6210	12700	<3000	5280	3700	6330	6360	4380	5250
Fluoride	ug/l	-	1500	747	<500	720	1150	<500	<500	520	<500	<500	588	<500	745	768	525	<500
Hardness,Total as CaC03	ug/l	-	-	50700	50200	60600	61100	28300	29900	55000	69600	34000	51000	53200	61600	48700	71000	59300
Iron	ug/l	1000	200	147	739	103	144	<19	<19	785	205	<19	65.6	<19	648	197	50.8	131
Lead	ug/l	1.2	10	0.585	<0.2	<0.2	0.909	<0.2	<0.2	0.356	0.58	<0.2	0.258	<0.2	<0.2	0.466	<0.2	0.279
Magnesium	ug/l	-	50000	681	777	577	915	588	312	1030	1280	626	508	605	636	645	662	628
Manganese	ug/l	355.08	50	<3	<3	<3	<3	<3	<3	<3	6.25	<3	<3	<3	<3	<3	<3	<3
Mercury	ug/l	0.07	1	<0.01	0.0111	<0.01	0.0116	<0.01	<0.01	<0.01	0.0151	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum	ug/l	-	70	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	3.22
Nickel	ug/l	17.32	20	0.922	0.525	0.848	1.04	<0.4	<0.4	1.22	2.22	<0.4	0.676	0.762	1.04	1.02	0.806	0.861
Pentachlorophenol (PCP)	ug/l	0.4	9															
Phenol	ug/l	7.7	0.5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Phenol (Monohydric)	ug/l	-	-						<16	<16								
Phenols, Total Detected 5 speci	ug/l	-	-															
Resorcinol	ug/l	-	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Selenium	ug/l	-	10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sulphate as SO4	ug/l	-	250000	<2000	<2000	<2000	<2000	4300	2000	4200	10400	5900	<2000	<2000	<2000	<2000	<2000	<2000
Total dissolved solids	ug/l	-	-						42900	81100								
Total Phenols of 8 Speciated*	ug/l	-	-	<45	<45	<45	<45	<45	<45	<45	<45	<45	<45	<45	<45	<45	<45	<45
Trimethylphenol	ug/l	-	-															
Trivalent Chromium	ug/l	-	-	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Vanadium	ug/l	-	-	1.14	<3	1.16	1.55	<1	1.28	<1	1.18	1.08	<1	<1	2.53	1.18	1.58	1.36
Water Soluble Sulphate as SO4	g/l	-	-	0.0183	0.0127	<0.004	0.0192	0.0271	0.0155	0.0305	0.04	0.0277	<0.004	<0.004	0.0156	<0.004	0.0283	<0.004
Xylenols	ug/l	-	-	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8
Zinc	ug/l	41.61	5000	9.08	3.08	8.75	20.4	<1	2.11	1.89	42.8	<1	<1	1.22	1.45	9.21	12.1	9.63
M-BAT calculated																		

C.3 Home Farm 2 leachate results

Max of Normalised Results (ug/l)			Location ID	TP-TH-12	BH-TH-01	BH-TH-07	DCP-TH-07	DCP-TH-11
			Sample Depth	0.2	0.2	0.1	0.2	0.5
			Strata	topsoil	topsoil	topsoil	topsoil	RTD
Determinant Name	Normalise	EQS (Annual Average, Surface Freshwaters) ug/l	UK DWS (ug/l)					
1-naphthol	ug/l	-	-	<10	<10	<10		
2,3,4,6-Tetrachlorophenol	ug/l	-	-				<0.5	<0.5
2,3,5,6-Tetrachlorophenol	ug/l	-	-				<0.5	<0.5
2,3,5-Trimethylphenol	ug/l	-	-	<3	<3	<3	<3	<3
2,4,5-Trichlorophenol	ug/l	-	-				<0.5	<0.5
2,4,6-Trichlorophenol	ug/l	-	200				<0.5	<0.5
2,4-Dichlorophenol	ug/l	4.2	-				<0.5	<0.5
2,4-Dimethylphenol	ug/l	-	-				<0.5	<0.5
2,4-Dinitrophenol	ug/l	-	-				<5	<5
2,6-Dichlorophenol	ug/l	-	-				<0.5	<0.5
2-Chlorophenol	ug/l	-	-				<0.5	<0.5
2-isopropylphenol	ug/l	-	-	<6	<6	<6	<6	<6
2-Methyl-4,6-Dinitrophenol	ug/l	-	-				<3	<3
2-Methylphenol	ug/l	-	-				<0.5	<0.5
2-Nitrophenol	ug/l	-	-				<0.5	<0.5
2-sec-Butyl-4,6-dinitrophenol	ug/l	-	-				<4	<4
4-Chloro-3-Methylphenol	ug/l	-	-				<0.5	<0.5
4-Chlorophenol	ug/l	-	-				<1	<1
4-Methylphenol	ug/l	-	-				<0.5	<0.5
4-Nitrophenol	ug/l	-	-				<0.5	<0.5
Ammoniacal Nitrogen as N	ug/l	200	380	22	19	15	15	62
Antimony	ug/l	-	5				<1	<1
Arsenic	ug/l	50	10	1.08	4.41	2.31	3.58	1.32
Barium	ug/l	-	1300000	2.92	3.59	88.5	4.31	5.48
Beryllium	ug/l	-	-	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	ug/l	2000	1000	17.6	31.5	94	27.1	19.2
Cadmium	ug/l	0.08	5	<0.08	<0.08	<0.08	<0.08	<0.08
Calcium	ug/l	-	250000	18200	17500	18200	19500	22200
Catechol	ug/l	-	-	<10	<10	<10		
Chloride	ug/l	-	250000	<2000	<2000	2200	<2000	<2000
Chromium	ug/l	-	50	<1	<1	<1	1.05	<1
Chromium - Hexavalent	ug/l	3.4	-	<3	<3	<3	<3	<3
Complex Cyanide	ug/l	-	-	<5	<5	<5	<5	<5
Copper	ug/l	29.84	2000	1.98	4.17	3.19	2.84	2.59
Cresols*	ug/l	-	-	<6	<6	<6	<6	<6
Cyanide	ug/l	1	50				<5	<5
Cyanide Free	ug/l	-	-	<2.5	<2.5	<2.5	<2.5	<2.5
Dissolved Organic Carbon	ug/l	-	-	4860	4990	4220	4270	4580
Fluoride	ug/l	-	1500	646	<500	<500	621	533
Hardness,Total as CaC03	ug/l	-	-	47600	45600	47900	51300	58400
Iron	ug/l	1000	200	115	527	160	685	25.6
Lead	ug/l	1.2	10	<0.2	1.23	0.785	0.266	<0.2
Magnesium	ug/l	-	50000	513	447	585	628	712
Manganese	ug/l	355.08	50	<3	<3	3.63	<3	<3
Mercury	ug/l	0.07	1	<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum	ug/l	-	70	<3	5.41	7.93	5.12	<3
Nickel	ug/l	17.32	20	0.458	0.804	1.05	0.628	0.921
Pentachlorophenol (PCP)	ug/l	0.4	9				<2	<2
Phenol	ug/l	7.7	0.5	<2	<2	<2	<1.5	<1.5
Phenol (Monohydric)	ug/l	-	-					
Phenols, Total Detected 5 speci	ug/l	-	-				<25	<25
Resorcinol	ug/l	-	-	<10	<10	<10		
Selenium	ug/l	-	10	<1	<1	<1	<1	<1
Sulphate as SO4	ug/l	-	250000	<2000	<2000	<2000	<2000	<2000
Total dissolved solids	ug/l	-	-					
Total Phenols of 8 Speciated*	ug/l	-	-	<45	<45	<45		
Trimethylphenol	ug/l	-	-				<0.5	<0.5
Trivalent Chromium	ug/l	-	-	<3	<3	<3	<3	<3
Vanadium	ug/l	-	-	<1	2.84	1.86	2.54	1.05
Water Soluble Sulphate as SO4	g/l	-	-	0.0055	<0.004	<0.004	<0.004	<0.004
Xylenols	ug/l	-	-	<8	<8	<8	<8	<8
Zinc	ug/l	41.61	5000	1.08	1.26	9.72	1.59	1.09
M-BAT calculated								

D. Groundwater results

D.1 Sindalls groundwater results

			Location ID	BH-PTR-39	BH-PTR-41D	BH-PTR-41S	BH-PTR-42D	BH-PTR-43D	BH-PTR-43S
Max of Normalised Results (ug/l)			Sample Depth	13	7.5	1.7	6.5	7	2
				Chalk	Chalk	MG	Chalk	Chalk	MG/Chalk
Determinant Name	Normalise	(ug/l) UK DW Sta	EQS (ug/l)						
1,1,1,2-Tetrachloroethane	ug/l	-	-	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	ug/l	-	100	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/l	-	-	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	ug/l	-	400	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/l	-	-	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/l	-	-	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/l	-	-	<1	<1	<1	<1	<1	<1
1,2,3 Trichlorobenzene	ug/l	-	-	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/l	-	-	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/l	-	-	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/l	-	-	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-Chloropropane	ug/l	1	-	<1	<1	<1	<1	<1	<1
1,2-Dibromoethane	ug/l	0.4	-	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/l	1000	-	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/l	3	10	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	ug/l	40	-	<1	<1	<1	<1	<1	<1
1,3,5 Trichlorobenzene	ug/l	-	-	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/l	-	-	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/l	-	-	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/l	-	-	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	ug/l	300	-	<1	<1	<1	<1	<1	<1
1-naphthol	ug/l	-	-	<10	<10	<10	<10	<10	<10
2,2-Dichloropropane	ug/l	-	-	<1	<1	<1	<1	<1	<1
2,3,5-Trimethylphenol	ug/l	-	-	<3	<3	<3	<3	<3	<3
2-Chlorotoluene	ug/l	-	-	<1	<1	<1	<1	<1	<1
2-isopropylphenol	ug/l	-	-	<6	<6	<6	<6	<6	<6
4-bromofluorobenzene	%	-	-	96.9	98.3	96	97.3	96.6	96.8
4-Chlorotoluene	ug/l	-	-	<1	<1	<1	<1	<1	<1
4-Isopropyltoluene	ug/l	-	-	<1	<1	<1	<1	<1	<1
Acenaphthene	ug/l	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	0.0175
Acenaphthylene	ug/l	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Aliphatics & Aromatics >C5-35	ug/l	-	-	<10	22	95	11	<10	<10
Aliphatics >C10-12	ug/l	10	-	<10	<10	<10	<10	<10	<10
Aliphatics >C12-16	ug/l	10	-	<10	<10	<10	<10	<10	<10
Aliphatics >C12-35	ug/l	-	-	<10	22	95	<10	<10	<10
Aliphatics >C16-21	ug/l	10	-	<10	<10	<10	<10	<10	<10
Aliphatics >C16-C35	ug/l	-	-	<10	22	95	<10	<10	<10
Aliphatics >C21-35	ug/l	10	-	<10	22	95	<10	<10	<10
Aliphatics >C5-6	ug/l	10	-	<10	<10	<10	<10	<10	<10
Aliphatics >C6-8	ug/l	10	-	<10	<10	<10	<10	<10	<10
Aliphatics >C8-10	ug/l	10	-	<10	<10	<10	<10	<10	<10
Alkalinity (Bicarbonate)	ug/l	-	-	6000000	7150000	6350000	6150000	2850000	1400000
Ammoniacal Nitrogen as N	ug/l	380	200	<10	10	15	66	48	664
Anthracene	ug/l	-	0.1	<0.005	<0.005	0.00582	<0.005	<0.005	0.00638
Antimony	ug/l	5	-	<1	<1	<1	<1	<1	<1
Aromatics >C10-12	ug/l	10	-	<10	<10	<10	<10	<10	<10
Aromatics >C12-16	ug/l	10	-	<10	<10	<10	<10	<10	<10
Aromatics >C12-35	ug/l	-	-	<10	<10	<10	<10	<10	<10
Aromatics >C16-21	ug/l	10	-	<10	<10	<10	<10	<10	<10
Aromatics >C21-35	ug/l	10	-	<10	<10	<10	<10	<10	<10
Aromatics >C5-7	ug/l	10	10	<10	<10	<10	<10	<10	<10
Aromatics >C7-8	ug/l	10	74	<10	<10	<10	<10	<10	<10
Aromatics >C8-10	ug/l	10	-	<10	<10	<10	<10	<10	<10
Arsenic	ug/l	10	50	<0.5	<0.5	<0.5	<0.5	<0.5	1.4
Barium	ug/l	1300000	-	42.7	44.2	50.8	45.6	74.7	122
Benzene	ug/l	1	10	<1	<1	<1	<1	<1	<1
Benzo (g,h,i) perylene	ug/l	1	-	<0.005	<0.005	0.0442	<0.005	0.0135	0.0366
Benzo(a)anthracene	ug/l	-	-	<0.005	<0.005	0.0398	0.00953	0.0126	0.0326
Benzo(a)pyrene	ug/l	0.01	0.00017	<0.002	<0.002	0.0534	0.0106	0.0197	0.0405
Benzo(b)fluoranthene	ug/l	1	-	<0.005	<0.005	0.0736	<0.005	0.0311	0.0591
Benzo(k)fluoranthene	ug/l	1	-	<0.005	<0.005	0.03	<0.005	0.0132	0.0255
Beryllium	ug/l	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	ug/l	1000	2000	24.2	26.7	38.3	23.9	81	413
Bromobenzene	ug/l	-	-	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/l	-	-	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/l	60	-	<1	<1	<1	<1	<1	<1
Bromomethane	ug/l	-	-	<1	<1	<1	<1	<1	<1
Cadmium	ug/l	5	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Calcium	ug/l	250000	-	108000	126000	109000	124000	217000	253000
Carbon Disulphide	ug/l	-	-	<1	<1	<1	<1	<1	<1
Catechol	ug/l	-	-	<10	<10	<10	<10	<10	<10
Chloride	ug/l	250000	-	20800	22100	25200	22700	23200	52500
Chlorobenzene	ug/l	-	-	<1	<1	<1	<1	<1	<1
Chloroethane	ug/l	-	-	<1	<1	<1	<1	<1	<1
Chloroethene	ug/l	0.5	-	<1	<1	<1	<1	<1	<1
Chloroform	ug/l	300	-	<1	<1	<1	<1	<1	<1
Chloromethane	ug/l	-	-	<1	<1	<1	<1	<1	<1
Chromium	ug/l	50	-	<1	<1	<1	<1	1.56	<1
Chromium - Hexavalent	ug/l	-	3.4	<3	<3	<3	<3	<3	<3
Chrysene	ug/l	-	-	<0.005	<0.005	0.0454	0.00785	0.0122	0.0335
cis-1,2-Dichloroethene	ug/l	-	-	<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/l	-	-	<1	<1	<1	<1	<1	<1
Copper	ug/l	2000	29.84	<0.3	<0.3	4.66	<0.3	1.15	2.35
Cresols*	ug/l	-	-	<6	<6	<6	<6	<6	<6
Cyanide	ug/l	50	1	<5	<5	<5	<5	<5	<5
Cyanide Free	ug/l	-	-	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Dibenz-a-h-anthracene	ug/l	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dibromochloromethane	ug/l	100	-	<1	<1	<1	<1	<1	<1
Dibromofluoromethane	%	-	-	111	114	114	116	115	112
Dibromomethane	ug/l	-	-	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/l	-	-	<1	<1	<1	<1	<1	<1
Dichloromethane	ug/l	20	20	<3	<3	<3	<3	<3	<3
Dissolved Organic Carbon	ug/l	-	-	<3000	<3000	<3000	<3000	6780	16600
Ethylbenzene	ug/l	300	-	<1	<1	<1	<1	<1	<1
Fluoranthene	ug/l	0.038	0.0063	<0.005	<0.005	0.0641	0.0123	0.0243	0.068
Fluorene	ug/l	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	0.00721
Fluoride	ug/l	1500	-	<500	<500	<500	<500	2730	<500
GRO >C5-12	ug/l	-	-	<50	<50	<50	<50	<50	<50
GRO Surrogate % recovery	%	-	-	99	100	94	90	92	88
Hardness,Total as CaC03	ug/l	-	-	6240000	9210000	8910000	6510000	6350000	7050000
Hexachlorobutadiene (HCBD)	ug/l	0.6	0.1	<1	<1	<1	<1	<1	<1
Indeno(1,2,3-cd)pyrene	ug/l	0.1	-	<0.005	<0.005	0.0365	<0.005	<0.005	0.0267
Iron	ug/l	200	1000	86.7	<19	<19	66.2	<19	<19
Isopropylbenzene	ug/l	-	-	<1	<1	<1	<1	<1	<1
Lead	ug/l	10	1.2	0.292	<0.2	<0.2	0.458	<0.2	<0.2
m,p xylenes	ug/l	-	-	<1	<1	<1	<1	<1	<1
Magnesium	ug/l	50000	-	4300	4630	4970	4030	7210	12200
Manganese	ug/l	50	355	7.06	5.83	59.6	7.9	126	474
Mercury	ug/l	1	0.07	<0.01	0.0584	<0.01	<0.01	<0.01	<0.01
Methyl tert-butyl ether (MTBE)	ug/l	-	-	<1	<1	<1	<1	<1	<1
Methyl tert-pentyl ether	ug/l	-	-	<1	<1	<1	<1	<1	<1
Molybdenum	ug/l	70	-	<3	<3	<3	<3	<3	<3
Napthalene	ug/l	-	2	<0.01	<0.01	<0.01	<0.01	<0.01	0.0144
n-Butylbenzene	ug/l	-	-	<1	<1	<1	<1	<1	<1
Nickel	ug/l	20	17.32	0.976	1.97	5.05	1.46	5.96	10.3
Nitrate as NO3	ug/l	-	-	43700	13600	11500	33400	814	548
n-propylbenzene	ug/l	-	-	<1	<1	<1	<1	<1	<1
O-Xylene	ug/l	-	10	<1	<1	<1	<1	<1	<1
PAH, Total Detected USEPA 16	ug/l	-	-	<0.082	<0.082	0.496	<0.082	0.165	0.451
pH	pH Units	-	-	7.52	7.45	7.57	7.5	7.21	7.6
Phenanthrene	ug/l	-	-	<0.005	<0.005	0.0289	<0.005	0.012	0.0222
Phenol	ug/l	0.5	7.7	<2	<2	<2	<2	<2	<2
Pyrene	ug/l	-	-	<0.005	<0.005	0.0748	0.014	0.0265	0.0605
Resorcinol	ug/l	-	-	<10	<10	<10	<10	<10	<10
Sec-Butylbenzene	ug/l	-	-	<1	<1	<1	<1	<1	<1
Selenium	ug/l	10	-	<1	<1	1.68	3.61	<1	1.89
Sodium	ug/l	200000	-	9180	13000	78300	10100	22200	200000
Styrene	ug/l	20	-	<1	<1	<1	<1	<1	<1
Sulphate as SO4	ug/l	250000	-	15800	25300	67300	25300	97700	606000
Sulphur	ug/l	-	-	4370	7220	19600	7090	28800	187000
Tert-Butylbenzene	ug/l	-	-	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/l	10	10	<1	<1	<1	<1	<1	<1
Tetrachloromethane (Carbon Tetra Chloride)	ug/l	4	12	<1	<1	<1	<1	<1	<1
Toluene	ug/l	700	74	<1	<1	<1	<1	<1	<1
Toluene-D8	%	-	-	99.3	99	99.2	99.7	101	100
Total BTEX	ug/l	-	-	<28	<28	<28	<28	<28	<28
Total dissolved solids	ug/l	-	-	422000	458000	560000	441000	759000	1380000
Total Speciated Phenols	ug/l	-	-	<45	<45	<45	<45	<45	<45
trans-1,2-Dichloroethene	ug/l	-	-	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/l	-	-	<1	<1	<1	<1	<1	<1
Tribromomethane	ug/l	100	-	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/l	10	10	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	ug/l	-	-	<1	<1	<1	<1	<1	<1
Trivalent Chromium	ug/l	-	-	<3	<3	<3	<3	<3	<3
Vanadium	ug/l	-	-	<1	<1	<1	<1	<1	<1
Xylene	ug/l	-	-	<11	<11	<11	<11	<11	<11
Xylenols	ug/l	-	-	<8	<8	<8	<8	<8	<8
Zinc	ug/l	5000	41.61	8.15	12.7	15.4	33	22.1	10.3

D.2 Home Farm 1 groundwater results

Max of Normalised Results (ug/l)			Location ID	BH PTR 4S
			Sample Depth	7.5
			Strata	Chalk
Determinant Name	Normalised	(ug/l) UK DW Stds	EQS (ug/l)	
1,1,1,2-Tetrachloroethane	ug/l	-	-	<1
1,1,1-Trichloroethane	ug/l	-	100	<1
1,1,2,2-Tetrachloroethane	ug/l	-	-	<1
1,1,2-Trichloroethane	ug/l	-	400	<1
1,1-Dichloroethane	ug/l	-	-	<1
1,1-Dichloroethe ne	ug/l	-	-	<1
1,1-Dichloropropene	ug/l	-	-	<1
1,2,3 Trichlorobenzene	ug/l	-	-	<1
1,2,3-Trichloropropane	ug/l	-	-	<1
1,2,4-Trichlorobenzene	ug/l	-	-	<1
1,2,4-Trimethylbenzene	ug/l	-	-	<1
1,2-Dibromo-3-Chloropropane	ug/l	1	-	<1
1,2-Dibromoethane	ug/l	0.4	-	<1
1,2-Dichlorobenzene	ug/l	1000	-	<1
1,2-Dichloroethane	ug/l	3	10	<1
1,2-Dichloropropane	ug/l	40	-	<1
1,3,5 Trichlorobenzene	ug/l	-	-	<1
1,3,5-Trimethylbenzene	ug/l	-	-	<1
1,3-Dichlorobenzene	ug/l	-	-	<1
1,3-Dichloropropane	ug/l	-	-	<1
1,4-Dichlorobenzene	ug/l	300	-	<1
1-naphthol	ug/l	-	-	<10
2,2-Dichloropropane	ug/l	-	-	<1
2,3,5-Trimethylphenol	ug/l	-	-	<3
2-Chlorotoluene	ug/l	-	-	<1
2-Isopropylphenol	ug/l	-	-	<6
4-bromofluorobenzene	%	-	-	96.7
4-Chlorotoluene	ug/l	-	-	<1
4-Isopropyltoluene	ug/l	-	-	<1
Acenaphthene	ug/l	-	-	<0.005
Acenaphthylene	ug/l	-	-	<0.005
Aliphatics & Aromatics >C5-35	ug/l	-	-	<10
Aliphatics >C10-12	ug/l	10	-	<10
Aliphatics >C12-16	ug/l	10	-	<10
Aliphatics >C12-35	ug/l	-	-	<10
Aliphatics >C16-21	ug/l	10	-	<10
Aliphatics >C16-C35	ug/l	-	-	<10
Aliphatics >C21-35	ug/l	10	-	<10
Aliphatics >C5-6	ug/l	10	-	<10
Aliphatics >C6-8	ug/l	10	-	<10
Aliphatics >C8-10	ug/l	10	-	<10
Alkalinity (Bicarbonate)	ug/l	-	-	2050000
Ammoniacal Nitrogen as N	ug/l	380	200	14
Anthracene	ug/l	-	0.1	0.00522
Antimony	ug/l	5	-	<1
Aromatics >C10-12	ug/l	10	-	<10
Aromatics >C12-16	ug/l	10	-	<10
Aromatics >C12-35	ug/l	-	-	<10
Aromatics >C16-21	ug/l	10	-	<10
Aromatics >C21-35	ug/l	10	-	<10
Aromatics >C5-7	ug/l	10	10	<10
Aromatics >C7-8	ug/l	10	74	<10
Aromatics >C8-10	ug/l	10	-	<10
Arsenic	ug/l	10	50	<0.5
Barium	ug/l	1300000	-	41.2
Benzene	ug/l	1	10	<1
Benzo (g,h,i) perylene	ug/l	1	-	0.0279
Benzo(a)anthracene	ug/l	-	-	0.0323
Benzo(a)pyrene	ug/l	0.01	0.00017	0.0268
Benzo(b)fluoranthene	ug/l	1	-	0.0587
Benzo(k)fluoranthene	ug/l	1	-	0.0241
Beryllium	ug/l	-	-	<0.1
Boron	ug/l	1000	2000	66.7
Bromobenzene	ug/l	-	-	<1
Bromochloromethane	ug/l	-	-	<1
Bromodichloromethane	ug/l	60	-	<1
Bromomethane	ug/l	-	-	<1
Cadmium	ug/l	5	0.08	<0.08
Calcium	ug/l	250000	-	224000
Carbon Disulphide	ug/l	-	-	<1
Catechol	ug/l	-	-	<10
Chloride	ug/l	250000	-	84200
Chlorobenzene	ug/l	-	-	<1
Chloroethane	ug/l	-	-	<1
Chloroethene	ug/l	0.5	-	<1
Chloroform	ug/l	300	-	<1
Chloromethane	ug/l	-	-	<1
Chromium	ug/l	50	-	<1
Chromium - Hexavalent	ug/l	-	3.4	<3
Chrysene	ug/l	-	-	0.0265
cis-1,2-Dichloroethene	ug/l	-	-	<1
cis-1,3-Dichloropropene	ug/l	-	-	<1
Copper	ug/l	2000	29.84	2.7
Cresols*	ug/l	-	-	<6
Cyanide	ug/l	50	1	<5
Cyanide Free	ug/l	-	-	<2.5
Dibenz-a-h-anthracene	ug/l	-	-	0.00537
Dibromochloromethane	ug/l	100	-	<1
Dibromofluoromethane	%	-	-	112
Dibromomethane	ug/l	-	-	<1
Dichlorodifluoromethane	ug/l	-	-	<1
Dichloromethane	ug/l	20	20	<3
Dissolved Organic Carbon	ug/l	-	-	4220
Ethylbenzene	ug/l	300	-	<1
Fluoranthene	ug/l	0.038	0.0063	0.0494
Fluorene	ug/l	-	-	<0.005
Fluoride	ug/l	1500	-	<500
GRO >C5- 12	ug/l	-	-	<50
GRO Surrogate % recovery	%	-	-	97
Hardness,Total as CaCO3	ug/l	-	-	1480000
Hexachlorobutadiene (HCBD)	ug/l	0.6	0.1	<1
Indeno(1,2,3-cd)pyrene	ug/l	0.1	-	0.0188
Iron	ug/l	200	1000	<19
Isopropylbenzene	ug/l	-	-	<1
Lead	ug/l	10	1.2	0.22
m,p xylenes	ug/l	-	-	<1
Magnesium	ug/l	50000	-	6360
Manganese	ug/l	50	355	3.42
Mercury	ug/l	1	0.07	<0.01
Methyl tert-butyl ether (MTBE)	ug/l	-	-	<1
Methyl tert-pentyl ether	ug/l	-	-	<1
Molybdenum	ug/l	70	-	<3
Napthalene	ug/l	-	2	<0.01
n-Butylbenzene	ug/l	-	-	<1
Nickel	ug/l	20	17.32	2.4
Nitrate as NO3	ug/l	-	-	187000
n-propylbenzene	ug/l	-	-	<1
O-Xylene	ug/l	-	10	<1
PAH, Total Detected USEPA 16	ug/l	-	-	0.355
pH	pH Units	-	-	7.28
Phenanthrene	ug/l	-	-	0.0163
Phenol	ug/l	0.5	7.7	<2
Pyrene	ug/l	-	-	0.0497
Resorcinol	ug/l	-	-	<10
Sec-Butylbenzene	ug/l	-	-	<1
Selenium	ug/l	10	-	<1
Sodium	ug/l	200000	-	25700
Styrene	ug/l	20	-	<1
Sulphate as SO4	ug/l	250000	-	134000
Sulphur	ug/l	-	-	36900
Tert-Butylbenzene	ug/l	-	-	<1
Tetrachloroethene	ug/l	10	10	<1
Tetrachloromethane (Carbon Tetra Chloride)	ug/l	4	12	<1
Toluene	ug/l	700	74	<1
Toluene-D8	%	-	-	99.6
Total BTEX	ug/l	-	-	<28
Total dissolved solids	ug/l	-	-	856000
Total Speciated Phenols	ug/l	-	-	<45
trans-1,2-Dichloroethene	ug/l	-	-	<1
trans-1,3-Dichloropropene	ug/l	-	-	<1
Tribromomethane	ug/l	100	-	<1
Trichloroethene	ug/l	10	10	<1
Trichlorofluoromethane	ug/l	-	-	<1
Trivalent Chromium	ug/l	-	-	<3
Vanadium	ug/l	-	-	<1
Xylene	ug/l	-	-	<11
Xylenols	ug/l	-	-	<8
Zinc	ug/l	5000	41.61	5.97

D.3 Home Farm 2 groundwater results

Max of Normalised Results (ug/l)			Location ID	BH-TH-01
			Sample Depth	9
			Strata	Chalk
Determinant Name	Normalised	(ug/l) UK DW Stds	EQS (ug/l)	
1,1,1,2-Tetrachloroethane	ug/l	-	-	<1
1,1,1-Trichloroethane	ug/l	-	100	<1
1,1,2,2-Tetrachloroethane	ug/l	-	-	<1
1,1,2-Trichloroethane	ug/l	-	400	<1
1,1-Dichloroethane	ug/l	-	-	<1
1,1-Dichloroethene	ug/l	-	-	<1
1,1-Dichloropropene	ug/l	-	-	<1
1,2,3 Trichlorobenzene	ug/l	-	-	<1
1,2,3-Trichloropropane	ug/l	-	-	<1
1,2,4-Trichlorobenzene	ug/l	-	-	<1
1,2,4-Trimethylbenzene	ug/l	-	-	<1
1,2-Dibromo-3-Chloropropane	ug/l	1	-	<1
1,2-Dibromoethane	ug/l	0.4	-	<1
1,2-Dichlorobenzene	ug/l	1000	-	<1
1,2-Dichloroethane	ug/l	3	10	<1
1,2-Dichloropropane	ug/l	40	-	<1
1,3,5 Trichlorobenzene	ug/l	-	-	<1
1,3,5-Trimethylbenzene	ug/l	-	-	<1
1,3-Dichlorobenzene	ug/l	-	-	<1
1,3-Dichloropropane	ug/l	-	-	<1
1,4-Dichlorobenzene	ug/l	300	-	<1
1-naphthol	ug/l	-	-	<10
2,2-Dichloropropane	ug/l	-	-	<1
2,3,5-Trimethylphenol	ug/l	-	-	<3
2-Chlorotoluene	ug/l	-	-	<1
2-Isopropylphenol	ug/l	-	-	<6
4-bromofluorobenzene	%	-	-	106
4-Chlorotoluene	ug/l	-	-	<1
4-Isopropyltoluene	ug/l	-	-	<1
Acenaphthene	ug/l	-	-	<0.005
Acenaphthylene	ug/l	-	-	<0.005
Aliphatics & Aromatics >C5-35	ug/l	-	-	<10
Aliphatics >C10-12	ug/l	10	-	<10
Aliphatics >C12-16	ug/l	10	-	<10
Aliphatics >C12-35	ug/l	-	-	<10
Aliphatics >C16-21	ug/l	10	-	<10
Aliphatics >C16-C35	ug/l	-	-	<10
Aliphatics >C21-35	ug/l	10	-	<10
Aliphatics >C5-6	ug/l	10	-	<10
Aliphatics >C6-8	ug/l	10	-	<10
Aliphatics >C8-10	ug/l	10	-	<10
Alkalinity (Bicarbonate)	ug/l	-	-	4200000
Ammoniacal Nitrogen as N	ug/l	380	200	23
Anthracene	ug/l	-	0.1	<0.005
Antimony	ug/l	5	-	<1
Aromatics >C10-12	ug/l	10	-	<10
Aromatics >C12-16	ug/l	10	-	<10
Aromatics >C12-35	ug/l	-	-	<10
Aromatics >C16-21	ug/l	10	-	<10
Aromatics >C21-35	ug/l	10	-	<10
Aromatics >C5-7	ug/l	10	10	<10
Aromatics >C7-8	ug/l	10	74	<10
Aromatics >C8-10	ug/l	10	-	<10
Arsenic	ug/l	10	50	<0.5
Barium	ug/l	1300000	-	41.6
Benzene	ug/l	1	10	<1
Benzo (g,h,i) perylene	ug/l	1	-	<0.005
Benzo(a)anthracene	ug/l	-	-	<0.005
Benzo(a)pyrene	ug/l	0.01	0.00017	<0.002
Benzo(b)fluoranthene	ug/l	1	-	<0.005
Benzo(k)fluoranthene	ug/l	1	-	<0.005
Beryllium	ug/l	-	-	<0.1
Boron	ug/l	1000	2000	24
Bromobenzene	ug/l	-	-	<1
Bromochloromethane	ug/l	-	-	<1
Bromodichloromethane	ug/l	60	-	<1
Bromomethane	ug/l	-	-	<1
Cadmium	ug/l	5	0.08	<0.08
Calcium	ug/l	250000	-	201000
Carbon Disulphide	ug/l	-	-	<1
Catechol	ug/l	-	-	<10
Chloride	ug/l	250000	-	85100
Chlorobenzene	ug/l	-	-	<1
Chloroethane	ug/l	-	-	<1
Chloroethene	ug/l	0.5	-	<1
Chloroform	ug/l	300	-	<1
Chloromethane	ug/l	-	-	<1
Chromium	ug/l	50	-	<1
Chromium - Hexavalent	ug/l	-	3.4	<3
Chrysene	ug/l	-	-	<0.005
cis-1,2-Dichloroethene	ug/l	-	-	<1
cis-1,3-Dichloropropene	ug/l	-	-	<1
Copper	ug/l	2000	29.84	1.53
Cresols*	ug/l	-	-	<6
Cyanide	ug/l	50	1	<5
Cyanide Free	ug/l	-	-	<2.5
Dibenz-a-h-anthracene	ug/l	-	-	<0.005
Dibromochloromethane	ug/l	100	-	<1
Dibromofluoromethane	%	-	-	129
Dibromomethane	ug/l	-	-	<1
Dichlorodifluoromethane	ug/l	-	-	<1
Dichloromethane	ug/l	20	20	<3
Dissolved Organic Carbon	ug/l	-	-	<3000
Ethylbenzene	ug/l	300	-	<1
Fluoranthene	ug/l	0.038	0.0063	<0.005
Fluorene	ug/l	-	-	<0.005
Fluoride	ug/l	1500	-	<500
GRO >C5- 12	ug/l	-	-	<50
GRO Surrogate % recovery	%	-	-	100
Hardness,Total as CaCO3	ug/l	-	-	973000
Hexachlorobutadiene (HCBD)	ug/l	0.6	0.1	<1
Indeno(1,2,3-cd)pyrene	ug/l	0.1	-	<0.005
Iron	ug/l	200	1000	<19
Isopropylbenzene	ug/l	-	-	<1
Lead	ug/l	10	1.2	<0.2
m,p xylenes	ug/l	-	-	<1
Magnesium	ug/l	50000	-	3420
Manganese	ug/l	50	355	4.98
Mercury	ug/l	1	0.07	<0.01
Methyl tert-butyl ether (MTBE)	ug/l	-	-	<1
Methyl tert-pentyl ether	ug/l	-	-	<1
Molybdenum	ug/l	70	-	<3
Napthalene	ug/l	-	2	<0.01
n-Butylbenzene	ug/l	-	-	<1
Nickel	ug/l	20	17.32	1.13
Nitrate as NO3	ug/l	-	-	199000
n-propylbenzene	ug/l	-	-	<1
O-Xylene	ug/l	-	10	<1
PAH, Total Detected USEPA 16	ug/l	-	-	<0.082
pH	pH Units	-	-	7.3
Phenanthrene	ug/l	-	-	<0.005
Phenol	ug/l	0.5	7.7	<2
Pyrene	ug/l	-	-	<0.005
Resorcinol	ug/l	-	-	<10
Sec-Butylbenzene	ug/l	-	-	<1
Selenium	ug/l	10	-	<1
Sodium	ug/l	200000	-	27700
Styrene	ug/l	20	-	<1
Sulphate as SO4	ug/l	250000	-	63100
Sulphur	ug/l	-	-	18600
Tert-Butylbenzene	ug/l	-	-	<1
Tetrachloroethene	ug/l	10	10	<1
Tetrachloromethane (Carbon Tetra Chloride)	ug/l	4	12	<1
Toluene	ug/l	700	74	<1
Toluene-D8	%	-	-	101
Total BTEX	ug/l	-	-	<28
Total dissolved solids	ug/l	-	-	814000
Total Speciated Phenols	ug/l	-	-	<45
trans-1,2-Dichloroethene	ug/l	-	-	<1
trans-1,3-Dichloropropene	ug/l	-	-	<1
Tribromomethane	ug/l	100	-	<1
Trichloroethene	ug/l	10	10	<1
Trichlorofluoromethane	ug/l	-	-	<1
Trivalent Chromium	ug/l	-	-	<3
Vanadium	ug/l	-	-	<1
Xylene	ug/l	-	-	<11
Xylenols	ug/l	-	-	<8
Zinc	ug/l	5000	41.61	26.3

E. Contaminated Land Risk Methodology

The following classification published by the NHBC, EA, and CIEH (2008) (NHBC, EA, CIEH, 2008) has been developed from *DOE Guide to Risk Assessment and Risk Management for Environmental Protection and the Statutory Guidance on Contaminated Land* (Defra September 2006). The methodology differs from that presented in *Contaminated Land Risk Assessment, A Guide to Good Practice* (CIRIA C552, 2001), particularly in terms of the definitions of classification of consequence, which include a consideration of immediacy of hazards.

The key to the classification is that the designation of risk is based upon the consideration of both:

- **the magnitude of the potential consequence (i.e. severity).**
- [takes into account both the potential severity of the hazard and the sensitivity of the receptor]
- **the magnitude of probability (i.e. likelihood).**
- [takes into account both the presence of the hazard and receptor and the integrity of the pathway]

The potential consequences of contamination risks occurring at this Site are classified in accordance with Table 4-1 below:

Table 4-1: Classification of Consequence

Classification	Definition of Consequence
Severe	Highly elevated concentrations likely to result in "significant harm" to human health as defined by the EPA 1990, Part 2A, if exposure occurs. Equivalent to EA Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce. Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population. Catastrophic damage to crops, buildings or property.
Medium	Elevated concentrations which could result in "significant harm" to human health as defined by the EPA 1990, Part 2A if exposure occurs. Equivalent to EA Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce. Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population. Significant damage to crops, buildings or property.
Mild	Exposure to human health unlikely to lead to "significant harm". Equivalent to EA Category 3 pollution incident including minimal or short lived effect on water quality; marginal effect on amenity value, agriculture or commerce. Minor or short lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population. Minor damage to crops, buildings or property.
Minor	No measurable effect on humans. Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems. Repairable effects of damage to buildings, structures and services.

Source: R&D 66:2008

The probability of contamination risks occurring at this Site will be classified in accordance with Table 4-2 below from the CIRIA guidance. Note: A pollution linkage must first be established before probability is classified. If there is no pollution linkage then there is no potential risk. If there is no pollution linkage then there is no need to apply tests for probability and consequence

Table 4-2: Classification of Probability

Classification	Definition of Probability
High Likelihood	There is pollutant linkage and an event would 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 pollutant 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 pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place, and is less likely in the shorter term.
Unlikely	There is pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.

Source: R&D 66:2008

For each possible pollution linkage (source-pathway-receptor) identified, the potential risk can be evaluated based upon the following probability x consequence matrix shown in Table 4-3.

Table 4-3: Overall Contamination Risk Matrix

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High likelihood	Very high risk	High risk	Moderate risk	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

Source: R&D 66:2008

R&D 66:2008 presents definitions of the risk categories, together with the investigatory and remedial actions that are likely to be necessary in each case. These definitions are reproduced in Table 4-4. These risk categories apply to each pollutant linkage, not simply to each hazard or receptor.

Table 4-4: Definition of Risk Categories and Likely Actions Required

Risk Category	Definition and likely actions required
Very high	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to be site owner/or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.
High	Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely, that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.
Low	It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst, that this harm if realised would normally be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.
Very low	It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.
No potential risk	There is no potential risk if no pollution linkage has been established.

Source: R&D 66:2008