Cambridge Waste Water Treatment Plant Relocation Project
Anglian Water Services Limited

Environmental Statement Appendix 14.11: GQRA

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Summary

This report presents a Generic Quantitative Risk Assessment (GQRA) for the proposed construction of a new WWTP. The Proposed Development also includes the construction of tunnels for transferring waste water from the existing Cambridge WWTP to the proposed WWTP, discharge pipelines transferring treated effluent to the River Cam which flows in-between the existing and proposed WWTPs, and a new transfer pipeline bringing waste water from the proposed development of Waterbeach New Town to the new WWTP. The GQRA constitutes an assessment of risks posed as a result of the development to identified receptors by potential land contamination.

A preliminary risk assessment (PRA) (App Doc Ref 5.4.14.1) has been completed for the site (Mott MacDonald, 2023) under a separate cover. The PRA identified current and historical uses of the site and vicinity, the site's environmental sensitivity and a preliminary assessment of contamination risk. The report made recommendations in respect of ground investigation (GI) to further understand the ground conditions and evaluate potential risks to human health, controlled waters and other identified receptors.

Two GIs were undertaken by Soil Engineering Ltd (2021) (App Doc Ref 5.4.14.7 and 5.4.14.8) and AF Howland (2022) to investigate the areas required for the proposed WWTP and accompanying infrastructure, and the area required for the Waterbeach pipeline, respectively. As informed by the PRA, these involved intrusive investigations followed by laboratory tests on soil, groundwater and surface water together with post fieldwork ground gas monitoring.

Geology across the areas was generally consistent with those published by the British Geological Survey (BGS) as reported in the PRA. The proposed WWTP site is underlain (in limited locations) by superficial deposits of River Terrace Deposits up to 2m below ground level (bgl). Bedrock encountered included the West Melbury Chalk and Cambridge Greensand Member interbedded up to 13.87m bgl; and Gault Formation proven to a depth of 47.6m bgl. Made ground was also encountered at the site, albeit with insignificant thickness of 0.3-0.5m locally in some boreholes.

Soil samples recovered from both GIs were subjected to laboratory testing as informed by the PRA. None of the tested samples returned exceedances of the generic assessment criteria (GACs) for commercial and public open space land use suitable for the proposed development. GAC exceedances of metals and inorganics were present from soil leachate samples (which are used to assess risks to controlled waters) at the proposed WWTP site and areas of the accompanying infrastructure. However, the exceedances are generally minor and within same order of magnitude of the GAC, implying no significant risk to controlled waters. There are also GAC exceedances recorded in groundwater samples (all within Chalk) samples for metals and inorganics. The exceedances were all minor and within same order of magnitude as the GAC except for chromium (III) which was found at relatively elevated concentrations in certain locations with no obvious distribution that is indicative of a single point source of chromium. Surface water samples had similar exceedances to groundwater indicating chromium may be present in the wider area and may relate agricultural practices such as fertiliser usage.

Based on the overall conceptualisation of ground gas and limited monitoring that has been undertaken, it is judged that ground gas risks are very low and no special precautions are judged to be required in connection with the protection of buildings or services from ground gases.

On the basis of the desk study work and phases of GI, no unacceptable risks have been identified to any of the receptors from the Proposed Development and no specific remediation measures are judged to be required. However, there are a number of measures that will be undertaken as part of the Scheme to ensure that contamination risks continue to be managed appropriately.

As outlined in Section 7.4 of the Code of Construction Practice (CoCP) (App Doc Ref 5.4.2.1) and stated in the draft DCO (App Doc Ref 2.1) an unexpected contamination protocol will be in place to deal with any contamination discoveries during works. As part of this requirement, in the event that contamination which has not previously been identified is suspected, works in that immediate area will stop and it will be made safe and secure. An appropriate strategy will be developed to identify the most appropriate option for dealing with unsuspected contamination and this may require further risk assessments to receptors. Findings will be reported to the Applicant, the relevant local authority and the Environment Agency. Where necessary, a remediation strategy will be agreed with the relevant local authority, in consultation with the Environment Agency and any other appropriate bodies as required and works will not recommence in the affected area until and approach for dealing with the contamination had been agreed.

Wider measures to protect the environment and surrounding land users (e.g. from leaks, spills or dust) are also summarised in the CoCP Part A (App Doc Ref 5.4.2.1) and these will be developed into Construction Environmental Management Plans as the Proposed Development is progressed.

As part of the project, a Outline Water Quality Monitoring Plan (App Doc Ref 5.4.20.13) has been developed and will be undertaken at the site including a programme of preconstruction monitoring of groundwater and surface water. This monitoring is aimed at providing further preconstruction baseline data upon which to measure temporary changes to water levels and or quality that could arise from construction activities including dewatering. The monitoring includes the site of the proposed WWTP and along the Waterbeach pipeline route as well as surface water receptors and will test for a range of contaminants including heavy metals and hydrocarbons.

As detailed in section 7.9 of the CoCP (App Doc Ref 5.4.2.1), a materials management plan (MMP) will be developed if required to allow for the reuse of excavated materials in the development. Where this is proposed some additional soil quality assessment (including total and leachable concentrations of contaminants) of material to be excavated for reuse is recommended to ensure suitability for use within the Proposed Development.

1 Introduction

1.1 Background

1.1.1 Mott MacDonald Limited was appointed by Anglian Water Services Limited to provide a Generic Quantitative Risk Assessment (GQRA) for the construction of the proposed Cambridge Wastewater Treatment Plant (WWTP).

1.2 Proposed Development

1.2.1 The proposed development is described in Chapter 2 of the Environmental Statement (App Doc Ref 5.2.2) and this will include the following:

- an integrated waste water and sludge treatment plant;
- a shaft to intercept waste water at the existing Cambridge WWTP on Cowley Road and a tunnel/ pipeline to transfer it to the proposed WWTP and terminal pumping station. Temporary intermediate shafts to launch and recover the micro-tunnel boring machine;
- a gravity pipeline transferring treated waste water from the proposed WWTP to a discharge point on the River Cam and a pipeline for storm water overflows;
- a twin pipeline transferring waste water from Waterbeach to the existing Cambridge WWTP, with the option of a connection direct in to the proposed WWTP when the existing works is decommissioned.
- on-site buildings, including - a Gateway Building with incorporated Discovery Centre, substation building, workshop, vehicle parking including electrical vehicle charging points, fencing and lighting.
- other ancillary development such as internal site access, utilities, including gas, electricity and communications and connection to the site drainage system.
- temporary construction works including compounds, temporary highway controls, accesses and signage, fencing and gates, security and safety measures, lighting, welfare facilities, communication control and telemetry infrastructure.
- decommissioning works to the existing Cambridge WWTP to cease its existing operational function and to facilitate the surrender of its operational permits including removal of pumps, isolation of plant, electrical connections and pipework, filling and capping of pipework, cleaning of tanks, pipes, screens and other structures, plant and machinery, works to decommission the potable water supply and works to restrict access to walkways, plant and machinery.

1.3 Report Objectives

1.3.1 The purpose of this GQRA is to further assess the pollutant linkages identified in the Preliminary Risk Assessment (PRA) (Mott MacDonald, 2023) or found to be present during the Ground Investigation (GI) undertaken in August-October 2020 (AF Howland Associates, 2022) and July-October 2021 (Soil Engineering Ltd, 2023).

1.3.2 The scope of this report relates solely to the development of land required for the Proposed Development (comprising the proposed WWTP site, transfer tunnel and final effluent pipeline and Waterbeach Pipeline). It excludes the extents that are within the footprint of the existing Cambridge WWTP site.

1.3.3 Decommissioning of the existing Cambridge WWTP site is outside the scope of this assessment. Land contamination assessments associated with the decommissioning will be undertaken as stated in the Outline Decommissioning Plan (App Doc Ref 5.4.2.3).

1.3.4 This GQRA includes:

- A summary of the ground investigation undertaken during the ground investigation (GI) works;
- Analysis and interpretation of the ground investigation results in the context of risks posed to potential receptors;
- Revision of the initial conceptual site model (CSM) presented in the PRA assessing risks from construction activities
- A generic quantitative contaminated land risk assessment;
- Recommendation of mitigation measures, including further assessment or remedial measures required to manage identified risks.

1.4 Sources of Information

1.4.1 The following sources have been used in the preparation of the GQRA:

- Mott MacDonald, Cambridge Waste Water Treatment Relocation Project Preliminary Risk Assessment, (2023) (App Doc Ref 5.4.14.1)
- Environmental Statement-Land Quality Chapter, Anglian Water, 2022 (App Doc Ref 5.2.14).
- Environmental Statement Appendix 2.1: Code of Construction Practice Part A, Anglian Water, 2024 (App Doc Ref 5.4.2.1)
- Envirocheck Report by Landmark (2021), Order Number: 285568096_1_1 (App Doc Ref 5.4.14.1)

- Envirocheck Report by Landmark (2019), Order Number: 225020744_1_1
- Envirocheck Report by Landmark (2018), Order Number: 172033276_1_1 (App Doc Ref 5.4.14.1)
- British Geological Survey: Geoindex (2021), [online]
- British Geological Survey, BGS Boreholes Records (2021), [online]
- Atlas for Mott MacDonald (2021), [online]
- Zetica (2021) – online risk assessment tool and pre-desk study assessment
- AF Howland Associates (2022) A Report on a Ground Investigation for the Waterbeach Growth Scheme, Cambridgeshire (Factual) (Appendix 6.5).
- Mott MacDonald, (2021) Cambridge WWTP Relocation, Hydrogeological Impact Assessment (HIA) report (App Doc Ref 5.4.20.9)

1.5 Limitations

1.5.1 To the extent that this document is based on information obtained in previous or recent ground investigations, persons using or relying on it should recognise that any such investigation can examine only a fraction of the subsurface conditions. In any ground investigation, there remains a risk that pockets or “hot-spots” of contamination or other hazards may not be identified, because investigations are necessarily based on sampling at localised points. Certain indicators or evidence of hazardous substances or conditions may have been outside the portion of the subsurface investigated or monitored, and thus may not have been identified or their full significance appreciated.

1.5.2 Mott MacDonald is not insured for, and therefore will not undertake surveys to identify asbestos or provide any guidance on the treatment of asbestos, or similarly for toxic mould. Should the presence of asbestos or toxic mould be suspected during the course of the study, Mott MacDonald would recommend the appointment of a specialist contractor to address the issue and would not provide advice on risk or remedial measures.

2 Site Background

2.1.1 This section summarises information relating to the nature of the site and its environs, and relevant environmental information. All information can be found in more details in the completed PRA (Mott MacDonald, 2023) (App Doc Ref (5.4.14.1).

2.2 Site description and topography

The Proposed WWTP

2.2.1 The land required for the proposed WWTP is located 1.3km east of the existing Cambridge WWTP within the administrative boundary of South Cambridgeshire District Council.

2.2.2 It lies between the villages of Horningsea to the north, Stow Cum Quy to the east and Fen Ditton to the south east. The A14 extends along the south western boundary of the site and Low Fen Drove Way, an unclassified road and public byway, follows parts of the eastern and north eastern boundary of the site area. Beyond Low Fen Drove Way, the open farmland extends to the north east towards and beyond Stow Cum Quy Fen (a Site of Special Scientific Interest-SSSI) and to the east, towards Stow Cum Quy village. To the west of the proposed WWTP lies Junction 34 of the A14, a junction intersected by Horningsea Road which extends north, parallel to the western boundary of the site area. Horningsea Road connects Fen Ditton to the south and the village of Horningsea in the north.

2.2.3 The land required for the proposed WWTP, permanent access and landscape masterplan is open farmland with large arable fields defined by boundary hedges and ditches. A dismantled railway, designated as a County Wildlife Site (CWS), crosses the south eastern end of the Proposed Development area and overhead powerlines cross the northern section and include six transmission towers within the site area.

2.2.4 Ordnance Survey mapping indicates that the land required for the proposed WWTP is located around the 10mAOD contour on the east side of the River Cam. There is a general elevation reduction from west to east across the proposed WWTP, towards a set of drainage features connected to Black Ditch. Black Ditch discharges to the north along the boundary of Stow-cum-Quy Fen to Bottisham Lode ditch. Quy Water, located to the east of the site, and the Black Ditch, are the main watercourses contributing to Bottisham Lode ditch. Bottisham Lode discharges to the River Cam near Waterbeach, about 5 km downstream of the A14 crossing.

The existing Cambridge WWTP

2.2.5 The existing Cambridge WWTP is outside the scope of this report and has been assessed within a separate report (Mott MacDonald, 2018).

Infrastructure Associated with the proposed WWTP

2.2.6 Infrastructure proposed as part of the WWTP relocation is detailed in section 1.2. The infrastructure will be located between the existing Cambridge and proposed WWTP.

2.2.7 The majority of this site is open farmland with associated farmhouses. The A14 and Horningsea Road are present west of the proposed WWTP.

2.2.8 Ordnance Survey maps indicate that there is a gentle reduction in elevation from 8m AOD in the west to the River Cam, which lies at approximately 3m AOD. There is a steeper increase in elevation from the River Cam to the proposed WWTP in the east, which lies at approximately 10m AOD. The River Cam runs south to north between the existing Cambridge WWTP and the proposed WWTP.

Infrastructure associated with Waterbeach Pipeline

2.2.9 A new pipeline (rising main) is required from Waterbeach to the proposed WWTP in order support the development of Waterbeach New Town as there is insufficient capacity within the current network to accommodate these flows.

2.2.10 The majority of the land required for the pipeline route is open farmland with associated farmhouses including Mulberry House Farm and Eye Hall Farm. Some residential development is present associated with the village of Horningsea with the closest houses located approximately 200m from the site. The existing Waterbeach WRC is located north of the proposed pipeline.

2.3 Site history

2.3.1 The history of the land required for the proposed WWTP, associated infrastructure, and the existing Cambridge WWTP has been summarised herein in Table 2.1.

Table 2.1: Site history

Date (scale)	Proposed WWTP footprint	Existing Cambridge WWTP	Associated Infrastructure	Waterbeach Pipeline
1886 - 1888 (1:2500)	The site's current land use is undeveloped rural agricultural land. A building and associated pump, is located approximately 350m south of snout corner. The Cambridge and Mildenhall railway line runs northeast-southwest within the Scheme Order Limits, 250m south-east of the proposed site footprint.	The Cambridge railway line runs north-south along the eastern boundary of the current WWTP.	The land use is predominantly agricultural with public drains and roads present. Biggin Abbey and Poplar Hall are present east of present-day Horningsea Road. A clay pit is present 100m northeast of Poplar Hall and a coprolite pit is present 300m south of Poplar Hall, adjacent to Field Lane.	The Great Eastern Railway line runs north to the south located to the west of the proposed Waterbeach Pipeline. The railway intersects the pipeline to the north. Rural, agricultural and farmland predominantly occupy the land along the Waterbeach Pipeline. The River Cam runs in a north-south direction intersecting the proposed pipeline location near Towing Park. Biggin pin plantation 500m east of the proposed pipeline located to the south of the Waterbeach Pipeline.
1886-1888 (1:10,560)	No significant changes.	The sites land use is agricultural land with public drains.	No significant changes.	No significant changes.
1904 (1:10,560)	No significant changes.	Site is a sewage farm.	Coprolite pit and clay pit are noted as disused.	Addition of farmhouses along the route. Brick works and old clay pit located near Horningsea

Date (scale)	Proposed WWTP footprint	Existing Cambridge WWTP	Associated Infrastructure	Waterbeach Pipeline
				within 250m west of the site.
1927 (1:10,560)	No significant changes.	Sewage farm has expanded within the site boundary.	No significant changes.	Roman pottery Kilns and other archaeological finds found 250m west of pipeline route near Horningsea.
1927 (1: 2,500)	No significant changes.	Sludge beds on site and sewage carrier pipes from site to southeast.	No significant changes.	No significant changes.
1971-1972 (1:2500)	Railway has been dismantled.	Pump house at the western site boundary.	No significant changes.	Vicarage within 250m west of the proposed pipeline near Horningsea.
1973-1974 (1:10,000)	No significant changes.	Modifications to sewage works with the addition of buildings and large tanks.	No significant changes.	Burial ground 500m east, located along the southern section of the proposed pipeline
1969-1988 (1: 1,250)	No significant changes.	Large tanks are shown as settling tanks. Pump house and square storage tanks on site.	No significant changes.	Clayhithe cottages located west of the proposed pipeline near Horningsea. Waterbeach barracks 750m west of the proposed pipeline.
1979 (1: 1,250)	No significant changes.	Electricity substation near northeastern site boundary.	No significant changes.	No significant changes.
1981-1985 (1:10,000)	The A45 (now A14) has been constructed which runs northwest-	Modifications to sewage works. Addition of large tanks. Agricultural	A45 trunk road (now A14) is now present on site, running west to southeast,	Sewage works (now Waterbeach Water Recycling Centre (WRC)

Date (scale)	Proposed WWTP footprint	Existing Cambridge WWTP	Associated Infrastructure	Waterbeach Pipeline
	southeast along the southwestern boundary of the proposed WWTP site.	machinery market southern edge of site.	crossing the River Cam and Horningsea Road.	located at the north end of the pipeline. Bannold Road located to the west of the pipeline just south of the sewage works. Ferry house located east of the proposed pipeline along Bannold Road.
1992 (1:1,250)	No significant change	Tanks are shown as settling tanks.	No significant changes.	No significant changes.
1992 (1:10,000)	No significant changes.	Car park at the southern west corner of site.	Electricity substation is present east of the current WWTP, south of the A14.	No significant changes.
1993 (1: 1,250)	No significant changes.	Gas holder tanks and gas burner on site.		No significant changes.
2000 (1:10,000)	No significant changes.	Agricultural machinery market is now a golf driving range.	Several electricity pylons across the site, running towards the substation in the west, 50m east of existing Cambridge WWTP.	Development along River Cam.
2019 (1:10,000)	No significant changes.	No significant changes.	No significant changes.	Addition of farmhouses west of the site near Horningsea.

2.4 Published Geology

2.4.1 The geology beneath the various elements of the Proposed Development has been summarised from the available 1:50,000 digital mapping provided by the British Geological Survey (BGS) in the Envirocheck Reports (Landmark, 2019) (App Doc Ref 5.4.14.1) (Landmark, 2021) (App Doc Ref 5.4.14.1), BGS historical borehole records (British Geological Survey, 2021) .

2.4.2 Superficial and bedrock geology are shown in Figure 20.2 of the 5.3.20 Environmental Statement - Volume 3 - Book of Figures Water.

Proposed and existing WWTP area

Artificial Geology

2.4.3 No artificial or made ground is identified beneath the Proposed Development by published mapping. However, this was informed by the BGS GeoIndex which only records where made ground is encountered at a thickness greater than 2.5m. Made ground is likely to be present on parts of the site associated with previous development, such as the existing Cambridge WWTP, roads and railway lines.

Superficial Geology

2.4.4 Superficial River Terrace Deposits (RTD), comprising sand and gravel, overlie the bedrock at the existing Cambridge WWTP and alongside the River Cam where the associated infrastructure lies. Superficial deposits were not found to be present on the footprint of the proposed WWTP site.

2.4.5 BGS mapping indicates that Alluvium, comprising clay, silt, sand and gravel, is present along the floor of the River Cam, with River Terrace Deposits at a slightly higher elevation, particularly along the western flank of the River Cam valley. Borehole logs (British Geological Survey, 2021) indicate that sandy clay and peat are present to a depth of 6 to 7 m near where the A14 crosses the River Cam, overlying sand and gravel to a depth of up to about 9 m. About 0.5 km further downstream, however, the superficial deposits have a depth of approximately 3.2 m, indicating that there is considerable variability in thickness (and composition) of superficial deposits along the river valley. The River Terrace Deposits on the western side of the river valley have a recorded depth of nearly 7m at one location but are more typically 2.5 to 4m in depth. Peat is present in some areas outside of the Scheme Order Limits: there are deposits noted east of Waterbeach and a narrow band is present east of the proposed WWTP site.

Bedrock Geology

2.4.6 The bedrock geology beneath the site comprises the following sequence, listed from youngest to the oldest formation:

- Grey Chalk, comprising the West Melbury Marly Chalk Formation
- Gault Formation;
- Lower Greensand (Woburn Sands Formation); and
- Kimmeridge Clay Formation.

2.4.7 The West Melbury Marly Chalk Formation is located towards the base of the Chalk Group (in the Grey Chalk Sub-group) and is described as grey, or dark grey, and marly in several borehole logs (British Geological Survey, 2021) in the vicinity of the proposed WWTP. The Cambridge Greensand Member (previously known as the Upper Greensand) may also be present at the boundary with the underlying Gault Formation.

2.4.8 The Cambridge Greensand Member is not present in outcrop in the Cambridge area but is described by BGS in the Hydrogeological Map of the area between Cambridge and Maidenhead (British Geological Survey, 1984) as comprising glauconitic, micaceous, calcareous, fine grained sandstones or siltstones elsewhere in the region. There is, however, no indication of any distinctive sandstone or siltstone in geological logs for existing boreholes which have been drilled previously through the contact between the Grey Chalk and Gault Formation in the vicinity of area of land required for the proposed WWTP (British Geological Survey, 2021).

2.4.9 BGS mapping indicates the boundary between the Gault and the Chalk to be adjacent to the east of the River Cam with the existing Cambridge WWTP underlain by Gault Formation and the proposed WWTP underlain by Chalk. The Gault Formation, which underlies the existing Cambridge WWTP, comprises a pale grey marl to dark grey silty clay, with a basal bed of glauconitic or phosphatic nodules. The total thickness of the Gault Formation in the area is about 35m based on geological logs for boreholes close to the contact with the overlying Grey Chalk.

2.4.10 The Lower Greensand (Woburn Sands Formation) underlies the Gault Formation but is not indicated as outcropping within the Scheme Order Limits. The BGS describes the formation generally as comprising a fine- to coarse-grained rounded marine quartz sandstone (or loose sand), glauconitic in part, commonly silty with few clay seams, typically grey or greenish grey, weathering to ochreous yellow-brown. The Lower Greensand is underlain by the Kimmeridge Clay.

Waterbeach Pipeline

Artificial Geology

2.4.11 No artificial or made ground is indicated along the Waterbeach Pipeline Envirocheck report (Landmark, 2021). However, this only records where made ground is greater than 2.5m thick. Made ground is likely to be present on parts of the route associated with previous development.

Superficial Geology

2.4.12 BGS Mapping suggests no superficial geology for the majority of the Waterbeach Pipeline. River Terrace Deposits underlie the region of the proposed Waterbeach pipeline to the north of Horningsea and from Clayhithe northwards. Where the pipeline protrudes to the east from the location of the existing Waterbeach WRC, peat is encountered and overlies the River Terrace Deposits for a small section of the pipeline route. Alluvium associated with the presence of the River Cam underlies route of the Waterbeach Pipeline south of the location of the existing Waterbeach WRC and overlies the River Terrace Deposits. Peat can be found to the east and west of the pipeline route located near Northfields Farm.

Bedrock Geology

2.4.13 Gault Formation bedrock underlies the northern section of the pipeline until Clayhithe where a localised outcrop of West Melbury Marly Chalk Formation overlies the Gault Formation. The Gault Formation bedrock continues to directly underlie the route between this outcrop and Horningsea where the younger West Melbury Marly Chalk Formation is present to the southern end of the pipeline route.

2.5 Environmental records

Hydrogeology

2.5.1 According to the Environment Agency, the River Terrace Deposits and Alluvium are classified as Secondary A aquifers. Peat is classified as Unproductive Strata while Chalk as a Principal aquifer. However, based on available geological logs in the study area, significant aquifer horizons are unlikely to be present in the West Melbury Marly Chalk Formation which underlies the site of the proposed WWTP and parts of the Waterbeach Pipeline. This is due to the marly nature, low permeability, and low transmissivity of the Chalk (Mott Macdonald, 2021). The Gault Formation is classified by the Environment Agency as Unproductive Strata (effectively a non-aquifer). The site, including the Waterbeach Pipeline, does not lie within a groundwater Source Protection Zone (SPZ). The Water Framework Directive (WFD) status of the groundwater body on site (Cam and Ely Ouse Chalk: GB40501G400500) has an overall “poor” rating from the year 2019 (Environment Agency).

Hydrology and flooding

2.5.2 There are several surface water features within the Proposed Development. The River Cam is a main river, and designated “moderate” status under the Water Framework Directive (GB105033042750) (Environment Agency) as of 2022. The River Cam runs south to north between the existing Cambridge WWTP and the proposed WWTP. Final effluent from the existing Cambridge WWTP currently discharges into the River Cam at a location approximately upstream of the A14 bridge. The Proposed Development would

cease use of this outfall and discharge of effluent from the proposed WWTP would be into the River Cam via a new outfall proposed downstream of the A14 road bridge. Figure 20.2 within the Book of Figures Water (App Doc Ref 5.3.20) shows the locations of these.

2.5.3 A section of tunnel will be built for the Waterbeach Pipeline near Northfields Farm cottages where the River Cam intersects with the proposed Waterbeach Pipeline.

2.5.4 The First Public Drain runs adjacent to the east of the existing Cambridge WWTP and drains to the River Cam. There are several small drains between the River Cam and the proposed WWTP which flow into the River Cam. In addition, there are several drains east of the proposed WWTP which feed into the Black Ditch which is located approximately 300m east of the site boundary.

2.5.5 A Flood Risk Assessment (App Doc Ref 5.4.20.1) has been prepared for the project. The risk maps indicate that the majority of the Proposed Development is at low risk of flooding from rivers and surface water. However, the River Cam, intersecting the proposed transfer tunnel and Waterbeach Pipeline and is within flood risk zone 3 – this is land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%).

Environmental Permits, incidents and registers

2.5.6 There are several discharge consents within 500m of the Proposed Development. The majority of these are for sewage discharges of either storm tanks or final effluent which discharge to the River Cam or its tributaries.

2.5.7 A total of thirteen abstraction licenses are recorded within 500m of the site boundary. These are all groundwater sourced and are used for general farming and domestic uses. None of these is within the footprint of the proposed WWTP.

2.5.8 Several pollution incidents to controlled waters within 500m of the site are recorded by the Environment Agency and listed in the Envirocheck Reports (App Doc Ref 5.4.14.1). The majority of these are category 3- minor incidents. Three category 2 incidents (significant incidents) were noted.

2.5.9 Details of the discharge consents, water abstraction points and pollution incidents can be found in more details in the completed preliminary risk assessment (Mott MacDonald, 2023).

Landfills and Mining

2.5.10 There are five historical landfills within 500m of the Scheme Order Limits. Figure 14.1, Contaminated land sources, within the Book of Figures Land Quality (App Doc Ref 5.3.14) shows the location of authorised and historic landfill sites. These are described below:

- Winship Industrial Estate is located 330m north of the existing Cambridge WWTP. This was used for inert waste between 1974 and 1980.
- Quy Mill Hotel is located 200m east of the Scheme Order Limits. This was used for inert waste between 1989 and 1992.
- Quy Bridge is located 200m east of the Scheme Order Limits. This was used for inert waste between 1990 and 1992.
- Clayhithe Cottage located 172m north of the Scheme Order Limits along the proposed Waterbeach Pipeline. This was used for inert waste between 1989 and 1992.
- Upon the closure of Clayhithe Cottage, Northfields Farm, Clayhithe, located 112m east of the Scheme Order Limits along the proposed Waterbeach Pipeline was opened. This was used for inert waste dating back to 1992 (end date of use not specified).

2.5.11 Two authorised landfill sites were also identified within 500m of the site. These are:

- Milton Landfill is located 550m north west of the existing Cambridge WWTP and 450m north west of the Scheme Order Limits. This is an active landfill with a capacity of >25,000 tonnes. Further details of risks from this landfill have been assessed within the Hydrogeological Impact Assessment (Mott Macdonald, 2021).
- Eversden Landfill (Quy Landfill) is located 400m east of the Scheme Order Limits. This has been accepting "non-biodegradable wastes" since 1993 but is now closed.

Sensitive Land Uses

2.5.12 The Envirocheck reports (Landmark, 2018, 2019 and 2021) (App Doc Ref 5.4.14.1) indicate that a local nature reserve, Bramblefields, is located 433m south of the existing Cambridge WWTP. A dismantled railway, designated as a County Wildlife Site (CWS), is present along the south eastern edge of the Scheme Order Limits.

2.5.13 Stow-cum-Quy Fen (SSSI) is located 1km north east of the proposed WWTP. Wilbraham Fens (SSSI) is located 600m east of the Scheme Order Limits, where the site access to the proposed WWTP is to be located. The site and Waterbeach Pipeline are located within a Nitrate Vulnerable Zone (NVZ). The proposed WWTP and proposed Waterbeach Pipeline lies within an area of adopted green belt.

Contemporary Land Uses

The existing and proposed WWTP

2.5.14 The Envirocheck reports indicate numerous active contemporary trade directories within 500m of the existing Cambridge WWTP and proposed WWTP. These are largely based near the existing Cambridge WWTP where there are several industrial sites,

works, electrical sub stations and the Cambridge Science Park. There are two fuel stations within 500m of the site, of which one is obsolete. There is an open fuel station located at Tesco in Milton, approximately 260m north west of the Proposed Development. Full details of these land uses can be found within the Envirocheck reports (Landmark, 2019) (App Doc Ref 5.4.14.1) (Landmark, 2018) (App Doc Ref 5.4.14.1).

Waterbeach Pipeline

2.5.15 The Envirocheck report indicates two active contemporary trade directories within 500m of the proposed Waterbeach Pipeline. These include a food product manufacturer 161m north and a garage 95m south of the proposed pipeline. The Envirocheck report also indicates one inactive contemporary trade directory entry within 500m of the proposed Waterbeach Pipeline. This comprises a commercial cleaning service 378m north of the Waterbeach Pipeline. Full details of these land uses can be found within the Envirocheck Report (Landmark, 2021) (App Doc Ref 5.4.14.1).

Radon

2.5.16 The study area including along the Waterbeach Pipeline is located in a Lower probability radon area (Landmark, 2019) (App Doc Ref 5.4.14.1) (Landmark, 2018) (App Doc Ref 5.4.14.1) (Landmark, 2021) (App Doc Ref 5.4.14.1) i.e. less than 1% of homes are estimated to be at or above the Action Level). No radon protective measures are necessary in the construction of new dwellings or extensions.

Unexploded Ordinance

2.5.17 The Zetica UXO online maps indicate that the site is in a low risk area for unexploded bombs. This is defined as an area incurring strikes of 10 bombs/km^2 or less. The presence of Waterbeach barracks located west of the route along the northern end of the proposed pipeline may have been a target for bombing, therefore the risk in this area may be higher.

3 Ground Investigations

3.1 Proposed WWTP and infrastructure

3.1.1 A ground investigation (GI) was conducted by Soil Engineering Ltd (2023) between 13th July 2021 and 18th October 2021 covering the land area required for the proposed WWTP, the treated effluent discharge outfall to River Cam and the transfer pipeline. The works resumed on 28th March 2022 for a Phase B continuation to complete outstanding works which finished on 28th April 2022. The ground investigation involved the following:

- Fifty-six rotary boreholes to a maximum depth of 49.50m bgl (achieved in BH_TUN_018)
- Fourteen cable percussive boreholes to a maximum depth of 35m bgl (achieved in BH_STW_001B)
- Installation of gas and groundwater monitoring points in eight boreholes (BH_STW_009, BH_STW_013C, BH_STW_015, BH_STW_022A, BH_TUN_001PM, BH_TUN_006 BH_TUN_011 and BH_TUN_014) with up to three rounds of monitoring taking place during and after the fieldwork.
- Geotechnical and geo-environmental laboratory testing.
- Provision of factual report containing all findings from the investigation and including core and trial pit photographs, as well as electronic data of the investigation.

3.1.2 It should be noted that the Soil Engineering Ltd investigation extended into the existing Cambridge WWTP. For completeness contamination results are included in the discussions in following sections but don't inform overall risk and remedial requirements in the Proposed Development. As outlined in Section 1.3.3 this area will be assessed separately as part of decommissioning.

3.1.3 It is noted that an early phase of GI was undertaken by AF Howland in 2020 (AF Howland 2020). However, with the exception of a single borehole located on scheme boundary on Low Fen Drove Way, these were all well outside the Proposed Development so do not form part of this GQRA. It is, however, noted that the single laboratory soil analysis of a sample of Chalk encountered in the nearest borehole did not recorded any elevated contaminant concentrations.

3.2 Waterbeach pipeline

3.2.1 Another GI was conducted by AF Howland between 10th and 26th January 2022, at discrete points along the route of the proposed Waterbeach pipeline within Appendix 14.6: Groundwater Investigation Report Waterbeach (App Doc Ref 5.4.14.6).

3.2.2 The scope of the investigation included:

- Nine cable percussive boreholes advanced to depths of between 10m and 20m bgl.
- Geotechnical and geo-environmental testing and sampling in the boreholes.

3.2.3 The borehole location plan can be found in Appendix A and the factual reports referred to can be found in:

- Appendix 14.6: Groundwater Investigation Report Waterbeach
- Appendix 14.7: Ground Investigation Report for Cambridge Waste Water Treatment Plant – Part 1: and
- Appendix 14.8: Ground Investigation Report for Cambridge Waste Water Treatment Plant – phase B are also referred to.

3.3 Ground investigation rationale

3.3.1 The ground investigations were undertaken to gather geo-environmental and hydrogeological information on the site and to obtain sufficient data to allow a GQRA to be undertaken. The GI was also completed in order to identify any specific remediation or mitigation requirements for the proposed development as required under Land Contamination Risk Management (LCRM) guidance.

3.3.2 As the majority of the site is greenfield land, with the exception of the limited construction within the existing Cambridge WWTP, the ground investigation was designed to be proportionate to the risk level and likely pollutant linkages identified in the PRA. As there were no contamination point sources identified, a non-targeted sampling approach was therefore implemented and testing was informed by encountered ground conditions (i.e. presence of made ground and visual or olfactory evidence of contamination). The approach, was based upon guidance set out in BSI 10175 (BSI, 2017) and represents an exploratory level investigation for a greenfield site.

3.3.3 The route of the Waterbeach Pipeline was investigated at discrete points specifically targeting the road, rail and river crossing where trenchless technologies will be utilised. The remainder of the pipeline route will be at shallow depth almost entirely through greenfield land. No specific investigation was undertaken through the remainder of the

route and land contamination risks will be managed through the unexpected contamination protocol (refer to Section 6.3.1).

3.4 Laboratory testing rationale

3.4.1 The suite of determinants selected for testing was based on the potential pollutant linkages identified in the PRA that had the potential to exist at the site.

3.4.2 Tests were conducted for leachable ammoniacal nitrogen (as N) rather than total ammonia as this provides information on risk to controlled waters which was the main identified pollutant linkage for ammonia.

3.4.3 Testing for pesticides was discounted during investigations on the proposed WWTP as the nature of the site (agricultural land) means presence of pesticides is more likely to be found as diffuse rather than point sources and are largely biodegradable to very low concentrations. They are not considered to be persistent in the environment due to their short life cycle.

3.4.4 MTBE testing was also excluded from the suite as sources of MTBE onsite (diffuse source from highways) were assessed to have a very low risk to identified receptors. No significant sources of hydrocarbon contamination such as fuel filling stations were identified in relation to the proposed development. The presence of petrol range hydrocarbons recorded in soils or groundwater can be used as an effective proxy for the likely presence of significant MTBE contamination and further testing undertaken if required.

3.4.5 A summary of the suite of determinants tested for in the GI Completed by Soil Engineering Ltd is included in Table 3.1, a separate summary table for determinants tested for in the GI completed by AF Howland Associates for the Waterbeach Pipeline is included in Table 3.2.

Table 3.1: Summary of Geo-environmental testing Completed by Soil Engineering Ltd

Analytical Suite	Determinants	No. of Samples Analysed
Soil Suite	Metals, Asbestos Screen, Organic Carbon, pH, Phenols, BTEX, Total Petroleum Hydrocarbons (TPH), Polycyclic Aromatic Hydrocarbons (PAH), Sulphate and Volatile Organic Compounds (VOCs)	30
Leachate Suite	Metals, Ammoniacal Nitrogen, Chloride, pH, Phenols, Cresols, Dimethylphenols, Trimethylphenols, Organic Carbon, Sulphate	5

Groundwater Suite	Metals, Hardness, pH, Chloride, Ammoniacal Nitrogen TPH, PAHs, Phenols	18

Table 3.2: Summary of Geo-environmental testing Completed by AF Howland Associates

Analytical Suite	Determinants	No. of Samples Analysed
Soil Suite	Metals, Asbestos Screen, Organic Carbon, pH, Phenols, BTEX, MTBE, Total Petroleum Hydrocarbons (TPH), Polycyclic Aromatic Hydrocarbons (PAH)	12

4 Ground Investigations Results

4.1 Encountered geology

The Proposed WWTP Site

4.1.1 The borehole logs from the ground investigation generally confirm the published geology across the site. A summary is provided herein in Table 4.1.Table 4.1

Table 4.1: Encountered geology- proposed WWTP

Encountered strata	Typical description	Typical thickness (m)	Depth to base (m bgl)
Topsoil	Slightly gravelly sandy clay.	0.3 – 0.5	0.3 – 0.5
Made ground (TP_STW_004, TP_STW_005, TP_STW_021 and BH_STW_12A only)	Slightly sandy gravelly clay. Gravel is brick, flint and quartz.	0.3 – 0.5	0.3 – 0.5
Possible River Terrace Deposits (limited locations only)	Sandy gravelly clay, fine to coarse calcareous sand and fine to coarse gravel.	0.2 – 1.7	0.3 – 2.0
West Melbury Chalk	Structureless Chalk comprising of calcareous clay.	7.25 – 13.41	9.0 – 13.5
Cambridge Greensand Member	Very stiff greenish slightly gravelly clay and fine sand. Gravel is coprolite.	0.15 – 0.5	9.25 – 13.87
Gault Formation	Very stiff dark grey clay.	Proven to 36.07	Proven to 47.6

* Made ground was encountered in discrete areas of the Scheme Order Limits only. No evidence of visual or olfactory contamination was confirmed

Site Encompassing the Treated Effluent and the Waste Water Transfer Tunnel Areas

4.1.2 The encountered geology across the area required for the construction of the outfall to River Cam and the wastewater transfer tunnel has been summarised separately in Table 4.2.and Table 4.3

Table 4.2: Encountered geology- Treated Effluent Transfer Pipeline

Encountered strata	Typical description	Thickness (m)	Depth to base (m bgl)
Topsoil	Slightly sandy slightly gravelly clay, gravel is flint and quartz.	0.16 – 0.32	0.16 – 0.32
Alluvium	Slightly gravelly sandy clay.	0.5 – 0.9	0.7 – 1.2
River Terrace Deposits (BH_FE_001 only)	Clayey sandy gravel and sand and gravel.	2.7	3.9
Chalk (limited locations BH_FE_002, BH_FE_003, BH_FE_004A)*	Chalk recovered as calcareous clay.	2.8 – 8.8	3.5 – 10
Cambridge Greensand	Greenish-grey clay with gravel of coprolite.	0.2 – 0.38	4.88 – 7.8
Gault Formation	Stiff clay.	Proven to 12	Proven to 15.9

** Chalk is thicker to the east of the transfer pipeline, thinning towards the river*

Table 4.3: Encountered geology Wastewater Transfer Tunnel to existing Cambridge WWTP

Encountered strata	Typical description	Thickness (m)	Depth to base (m bgl)
Topsoil	Slightly sandy gravelly clay	0.1 – 1.0	
Made ground (BH_TUN_001A, BH_TUN_001B, BH-TUN_001PM. BH_TUN_002, BH_TUN_003, BH_TUN_005Ab, BH_TUN_006)	Slightly sandy gravelly clay with fragments of brick, flint, ash and concrete. Brick fill.	0.2 – 1.2** 4.0 – 4.2 (BH_TUN_006 and 006P only)*	0.8 – 1.2 4.0 – 4.2
Alluvium (BH_TUN_011, BH_TUN_015, BH_TUN_016 only)	Slightly gravelly slightly silty clay. Gravel is flint.	0.65 – 0.9	0.75 – 1.2
River Terrace Deposits	Sand and gravel.	0.9 – 5.1	1.2 – 6.5

Encountered strata	Typical description	Thickness (m)	Depth to base (m bgl)
Chalk (BH_TUN_011 BH_TUN_015, BH_TUN_16, BH_TUN_17, BH_TUN_18 only)	Structureless Chalk recovered as calcareous clay.	3.25 – 12.85	4.0 – 13.15
Cambridge Greensand (BH_TUN_011, BH_TUN_015, BH_TUN-017 only)	Greenish grey slightly gravelly sandy clay.	0.2 – 0.28	4.2 – 13.43
Gault Formation	Dark grey clay.	28.7 – 36.69	32.9 – 46.64
Lower Greensand	Very stiff greenish grey slightly sandy gravelly clay and green sand.	Proven to 2.86	Proven to 49.5

** Located in the east of the existing WWTP*
*** Located in the existing WWTP*

Land area required for the construction of Waterbeach Pipeline

4.1.3 AF Howland Associates (2022) conducted ground investigations which included nine exploratory holes along the pipeline route for geotechnical and geo-environmental purposes. The borehole logs generally confirm the published geology and findings are summarised in Table 4.4.

Table 4.4: Encountered geology- Waterbeach Pipeline

Encountered strata	Typical description	Thickness (m)	Depth to base (m bgl)
Topsoil	Slightly gravelly silty clay, gravel is flint.	0.2 – 0.65	0.65
Made ground (BH07 and BH08 only)*	Slightly sandy gravelly clay, gravel is brick	0.6 – 1.1	0.6 – 1.1
Alluvium (including peat)	Peat and soft mottled clay	0.7 – 4.6	1.2 – 5.2
River Terrace Deposits	Slightly silty gravelly sand, gravel is flint	1.0 – 1.4	1.6 – 3.7
Chalk (BH06 only)	Structureless Chalk recovered as Chalk gravel	3.3	4.5

Encountered strata	Typical description	Thickness (m)	Depth to base (m bgl)
Gault Formation	Stiff blueish silty calcareous clay	Proven to 14.8 – 18.4	Proven to 20

* Made ground encountered in locations adjacent to a road/ track junctions. No visual or olfactory evidence of contamination

4.2 Groundwater strike

4.2.1 During ground investigations, the levels at which groundwater was encountered during drilling were recorded and a summary is presented in Table 4.5

Table 4.5: Summary of groundwater strike

Location	Range of groundwater strikes (m bgl)	Strata
Land required for the construction of the proposed WWTP	2.5 – 8.7 12.3 (second strike in one location)	Chalk Chalk near boundary with Cambridge Greensand
Land required for the construction of the waste water transfer tunnel and the outfall between the proposed WWTP and existing Cambridge WWTP	2.5 – 5.2 2.9 – 7.8 4.1 42.5	River Terrace Deposits Chalk Cambridge Greensand (upper) Cambridge Greensand (lower)
Land required for the construction of the Waterbeach pipeline from Waterbeach to Low Fen Drove Way	1.0 – 2.3 0.8 – 4.1	River Terrace Deposits Peat/alluvium

5 Generic Quantitative Risk Assessment

5.1 Legislative context and guidance

Land contamination

5.1.1 Contamination associated with land that is being redeveloped is managed through the planning system. Contaminated land must be considered in the context of the development proposal and remediated such that the land is suitable for its intended use. Once remediated, land should not be capable of being determined as 'contaminated land' under the provisions of Part 2A of the Environmental Protection Act 1990 (DEFRA, 2012).

5.1.2 This report adopts a strategy for the assessment of potential land contamination based on current guidance documents. Particular reference is made to the Environment Agency's LCRM guidance (Environment Agency, 2023) which sets out the overall framework and process for assessing land contamination risk in England.

5.1.3 In addition, reference has also made to other good practice guidance documents including the following:

- BS 10175: Investigation of Potentially Contaminated Sites: Code of Practice (BS1, 2017)
- NHBC/CIEH Guidance on the safe development for housing R&D66:2008 (R&D 66, 2008)
- CIRIA C665: Assessing risks posed by hazarodus ground gases to buildings, 2007.
- BS 8576: 2013 Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)
- The Environment Agency's approach to groundwater protection (Environment Agency, 2018) .

Protection of workforce

5.1.4 Construction (Design and Management) Regulations 2015 (CDM 2015) outlines the responsibilities and actions that people involved in construction work must take to safeguard themselves and other affected by work. Under CDM 2015, there will be requirements to ensure safe working practices for site staff who may be involved in contact with ground contamination if present. This includes activity specific method statements that will inform the use of personal protective or respiratory protective equipment.

5.2 Planning framework

5.2.1 New development is largely regulated under the Town and Country Planning Act 1990 (as amended), although other avenues are possible, such as through Permitted Development, or via the Development Consent Order process as a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008 in the case of the present project. The DCO process provides a mechanism for the planning authority to enforce the proper investigation of a development site in order to ensure that once development has occurred, the site is suitable for its intended use.

5.3 Standards employed

5.3.1 The standards employed for the assessment are outlined below. Further information relating to these is presented in Sections E and F.

Human Health Criteria

5.3.2 In order to assess the risks to human health, the soil results have been compared to generic assessment criteria (GAC) appropriate to the proposed site use. As the land use in this area will comprise commercial and public open space, the GAC relating to both of these land uses have been used. The GAC used are the LQM Suitable for Use Levels (S4ULs) (1% SOM).

Controlled Waters Criteria

5.3.3 In order to assess the risks to controlled waters, soil leachate, surface water and groundwater results were compared to the (Environmental Quality Standards) EQS, to be protective of surface water features such as field drains, and UK Drinking Water Standards (DWS), to be protective of the aquifers within the Scheme Order Limits.

5.4 Laboratory testing

5.4.1 All screened Laboratory data is displayed in Appendix B.

Land required for the proposed WWTP and associated landscaping

Soil tests – risks to human health

5.4.2 During the ground investigation geo-environmental laboratory testing was undertaken on fourteen soil samples taken from both made ground (one sample) and natural deposits. The laboratory testing covered a range of potential contaminants including metals, total petroleum hydrocarbons (TPH) and volatile organic compounds (VOC). The results provided details on the contamination status of the soils and potential risks to human health receptors.

5.4.3 Two soil samples (topsoil) contained polycyclic aromatic hydrocarbons (PAH) above the laboratory detection limit. Three soil samples contained TPH concentrations above the laboratory detection limit (two from topsoil and one from made ground).

5.4.4 There were no recorded exceedances of the GAC for commercial or public open space land use. Similarly, no asbestos was identified in any of the soil samples tested.

Leachate Tests-Risks to controlled waters

5.4.5 Two soil leachate samples (from made ground and Chalk) were tested for metals, inorganics and phenols. There were exceedances for metals and inorganics which are summarised below. Exceedances of DWS are highlighted in orange, EQS exceedances are highlighted in blue and exceedances of both are highlighted in red.

Table 5.1: Summary of leachate exceedances WWTP and landscape Masterplan in µg/l

Determinant	EQS	DWS	BH_STW_009 (Chalk)	BH_STW_012A (made ground)
Ammoniacal nitrogen as N	200	380	110	670
Fluoride	1500	-	550	1,600
Copper	1	2000	2.4	4.4
Lead	1.2	10	<0.50	1.4
Iron	1,000	200	<5.0	1,400

5.4.6 The exceedances are generally minor, with higher exceedances occurring within the made ground. Made ground was only encountered in four exploratory holes across this site (Table 4.1).

Groundwater-Risks to controlled waters

5.4.7 Seven groundwater samples, from standpipes installed within the Chalk, were tested for metals, inorganics, phenols, TPH, PAH and VOC. There were slight exceedances of metals and inorganics which are summarised in Table 5.2 . Exceedances of DWS are highlighted in orange, EQS exceedances are highlighted in blue and exceedances of both are highlighted in red.

Table 5.2: Summary of groundwater exceedances (proposed WWTP and landscaping) in µg/l

Determinant	EQS	DWS	BH_STW_026	BH_STW_001	BH_STW_009	BH_STW_015	BH_STW_023	BH_STW_024	BH_STW_025
Ammoniacal Nitrogen as N	200	380	550	7,500	2,000	160	140	170	230

Nitrate	-	1129.5	<500	350	53	670	2,300	1,200	210
Copper	1	200	0.09	1.6	1	1.1	1.4	1.1	0.6
Lead	1.2	10	1.4	1.2	0.5	0.5	0.5	0.5	0.5
Zinc	10.9	5,000	10	13	4	8	5	9	4
Chromium (III)	4.7	-	<20	<20	<20	6,700	580	3,800	<20

5.4.8 Exceedances are generally minor with the exception of Chromium (III). Chromium (VI) was recorded below laboratory detection limits in the groundwater samples. It should be noted that chromium samples were marked as deviating due to sample age exceeding the stability time.

5.4.9 Groundwater samples were all from Chalk strata, and there is limited made ground across this site (as seen Table 4.1). Chromium exceedances were confined to the central and southern part of the proposed WWTP site. The area of land required for the proposed WWTP is currently agricultural and there are no known sources of chromium on- or off-site although it is possible that the identified chromium may have originated from previous fertiliser usage. It is noted that chromium soil concentrations were not significantly elevated and recorded at or below the BGS estimated rural soil chemistry for the area.

Surface Waters-Risks to Controlled Waters

5.4.10 Three surface water samples were taken from Quy Fen pond (SW01), Allicky Farm Pond (SW02) and Black Ditch (SW03). There were slight exceedances of metals and inorganics which are summarised in Table 5.3. Exceedances of DWS are highlighted in orange, EQS exceedances are highlighted in blue and exceedances of both are highlighted in red.

Table 5.3: Summary of surface water exceedances (proposed WWTP and landscaping) in µg/l

Determinant	EQS	DWS	SW01 (Quy Fen Pond)	SW02 (Allicky Farm Pond)	SW03 (Black Ditch)
Ammoniacal nitrogen as N	200	380	4,900	1,200	2,300
Nitrate	-	11,295	<500	<500	43,000
Potassium	-	12,000	13,000	2,800	4,000
Copper	1	200	2.3	2.5	2.9
Manganese	123	50	3	74	7.3
Chromium (III)	4.7	-	7,600	7,200	7,800

5.4.11 Exceedances are generally minor with the exception of ammoniacal nitrogen as N and Chromium (III). Chromium (VI) was recorded below laboratory detection limits in the surface water samples. It should be noted that chromium samples were marked as deviating due to sample age exceeding the stability time.

5.4.12 Surface water samples had similar exceedances to groundwater on part of the proposed WWTP, and may be representative of agriculture practices which extend to the wider local area. The groundwater beneath the site is in continuity with the surface water in the area.

Soil testing - risks to planting

5.4.13 BS 3882:2015 Specification for Topsoil specifies requirements for the classification and composition of natural and manufactured topsoil. As part of this standard there are limits on potentially phytotoxic contaminants zinc, copper and nickel. The limiting values are dependent upon soil pH, the average measured pH of soils across the site is 8.58 with a range of 7.8 to 10.2. On this basis the limiting values appropriate to a pH> 7 have been used.

Table 5.4: Summary of phytotoxic contaminants

	Limiting value (mg/kg)	Exceedances	Maximum concentration (mg/kg)
Zinc	<300	None	90
Copper	<200	None	33
Nickel	<110	None	35

5.4.14 The soils at the site are therefore not considered to present a phytotoxic risk if reused in areas of planting and landscaping.

Land Required for the Construction of the Outfall and Wastewater Transfer Tunnel

Soil Tests- Risks to human health

5.4.15 During the ground investigation geo-environmental laboratory testing was undertaken on sixteen soil samples. The laboratory testing covered a range of potential contaminants including metals, total petroleum hydrocarbons and VOC. The results provided details on the contamination status of the soils and potential risks to human health receptors.

5.4.16 Four soil samples contained PAH above the laboratory detection limit (two from made ground and two from superficial deposits). Two soil samples contained TPH concentrations above the laboratory detection limit (one from topsoil and one from superficial deposits).

5.4.17 There were no exceedances of GAC for commercial or public open space land use.

5.4.18 No asbestos was identified in 11 samples tested.

Leachate- Risks to controlled waters

5.4.19 Three soil leachate samples (two from made ground and one from RTD) were tested for metals, inorganics and phenols. There were two EQS exceedances of copper from BH_TUN_003 (0.2m) of 7µg/l and BH_TUN_004 (1.1m) of 15µg/l compared to the EQS of 1µg/l. Nickel marginally exceeded the EQS (4µg/l) within BH_TUN_004 (1.1m), recorded at 4.3µg/l.

Groundwater- Risks to controlled waters

5.4.20 Eight groundwater samples, from five standpipes, were tested for metals, inorganics, phenols, TPH, PAH and VOC. Standpipe installations were installed within the Chalk (BH_FE_002), Chalk and Cambridge Greensand (BH_TUN_011), River Terrace Deposits (BH_FE_001 and BH_TUN_001A) and made ground/River Terrace Deposits (BH_TUN_006).

5.4.21 There were slight exceedances of some metals and inorganics together with more highly elevated levels of chromium III which are summarised in Table 5.5. Exceedances of DWS are highlighted in orange, EQS exceedances are highlighted in blue and exceedances of both are highlighted in red. All samples were taken in 2021.

5.4.22 Exceedances are generally minor with the exception of ammoniacal nitrogen as N and Chromium (III). Chromium (VI) was recorded below laboratory detection limits in the groundwater samples. It should be noted that chromium samples were marked as deviating due to sample age exceeding the stability time.

5.4.23 Groundwater samples were all from natural strata, and there is limited made ground across this site (see Table 4.3). Chromium exceedances along the infrastructure route were limited to a single borehole (BH_TUN_11).

Table 5.5: Summary of groundwater exceedances (outfall and waste water transfer tunnel) in µg/l

Determinant	EQS	DWS	BH_TUN_011	BH_FE_001	BH_FE_002	BH_TUN_001A	BH_FE_001	BH_FE_002	BH_TUN_011	BH_TUN_006
			17 Nov	17 Nov	17 Nov	3 Nov	3 Nov	3 Nov	2 Nov	2 Nov
Ammoniacal nitrogen as N	200	380	270	1,800	9,300	290	<50	<50	510	550
Nitrate	-	11,295	11,000	25,000	81,000	<500	2,400	6,500	1,100	830
Sulphate	-	250,000	56,000	12,000	130,000	420,000	13,000	140,000	39,000	240,000
Potassium	-	12,000	29,000	5,800	2,800	11,000	6,400	3,100	14,000	14,000
Sodium	-	200,000	310,000	55,000	30,000	160,000	55,000	35,000	510,000	81,000
Cadmium	0.08	5	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	0.57
Copper	1	200	18	2.7	1.1	2.2	1.7	1.1	1.5	9.5
Manganese	123	50	1.1	65	2.6	59	62	6.9	<0.5	3,500
Nickel	4	20	5.8	9.6	3.9	6.2	7.8	8.3	3.9	21
Lead	1.2	10	4.6	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Selenium	-	10	13	3	3.4	1.1	4.0	4.1	14	2.5
Iron	1,000	200	190	<5	<5	<5	<5	<5	240	19
Chromium (III)	4.7	-	9400	<20	<20	<20	<20	<20	13,000	<20

Land required for the Waterbeach pipeline

5.4.24 During the ground investigation (AF Howland Associates, 2022) geo-environmental laboratory testing was undertaken on 12 soil samples. Soil leachate samples were not tested but 10:1 leachate testing was undertaken as part of the Waste Acceptance Criteria (WAC) testing on 10 soil samples. The soil laboratory testing covered a range of potential contaminants including metals, TPH and VOC.

5.4.25 Eleven soil samples from both Made ground (one sample) and natural deposits were tested. Two soil samples (topsoil) contained PAHs above the laboratory detection limit. Three soil samples contained TPH concentrations above the laboratory detection limit (two from topsoil and one from made ground).

5.4.26 There were no exceedances of GAC for commercial or public open space land use.

5.4.27 No asbestos was detected in any of the six soil samples that were tested.

5.5 Gas monitoring

5.5.1 Eight boreholes across the proposed WWTP site and the area required for the construction of infrastructure were installed with gas monitoring standpipes (for the proposed WWTWP,BH_STW_009, BH_STW_013, BH_STW_015, BH_STW_022A and for the transfer tunnel BH_TUN_001, BH_TUN_006, BH_TUN_011, BH_TUN_014).

5.5.2 The gas monitoring results are displayed in Appendix C.

The proposed WWTP

5.5.3 Three rounds of ground gas monitoring were undertaken by Soil Engineering Ltd between the 19 October 2021 and the 8 November 2021. None of the boreholes were recorded to be flooded during the monitoring period so all monitoring results are included.

5.5.4 The atmospheric pressure during monitoring ranged from 997-1022mbar. The peak CO_2 volume was 1.9%vol and the peak methane volume was 0.1%vol. The peak CO concentration was 1 ppm and the peak H_2S concentrations was 1 ppm. The flow rates range from <0.1-0.1l/hr. The minimum oxygen values measured range from 15-21.1%vol.

5.5.5 The gas screening value (GSV) has been calculated for the wells by multiplying the maximum measured borehole flow rate by the maximum gas concentration per borehole for methane and carbon dioxide, these values are 0.0001 and 0.0019 respectively. As the calculated GSV is below <0.07 l/hr, the WWTP site is classified as very low risk from ground gas in line with C665 guidance (CIRIA, 2007) and has been classified as a Characteristic Situation 1 (CS1). No significant risks are therefore considered to be posed to the proposed WWTP by ground gas. The maximum

concentrations of carbon monoxide measured across the site are lower than the long term exposure limit of 20ppm as defined by HSE workplace exposure limits (WEL) (HSE, 2020)).

5.5.6 The maximum concentrations of hydrogen sulphide measured across the site are lower than the long term exposure limit of 5 ppm as defined by HSE WEL (HSE, 2020)).

Transfer Tunnel

5.5.7 Three of the boreholes in the transfer tunnel route underwent three rounds of ground gas monitoring were undertaken by Soil Engineering Ltd between the 19 October 2021 and the 8 November 2021 (BH_TUN_001, BH_TUN_006[1], BH_TUN_011), a fourth borehole underwent one round of monitoring on 21 April 2022 (BH_TUN_014).

5.5.8 The atmospheric pressure during monitoring ranged from 997-1022 mbar. The peak CO_2 volume was 19.1%vol and the peak methane volume was 0.2%vol. The peak CO concentration was 5 ppm and the peak H_2S concentrations was 1 ppm. The flow rates range from <0.1-0.2l/hr. the minimum oxygen values measured range from 2-21.8%vol.

5.5.9 The gas screening value (GSV) has been calculated for the wells by multiplying the maximum measured borehole flow rate by the maximum gas concentration per borehole for methane and carbon dioxide, these values are 0.0004 and 0.0382 respectively. These values are below <0.07 l/hr, and therefore classified as very low risk from ground gas in line with C665 guidance (CIRIA, 2007) and has been classified as a Characteristic Situation 1 (CS1).

5.5.10 The measured 19.1%vol concentration of $CO_2$and 2%vol oxygen was only encountered in one borehole on one occasion this result appears anomalous and has been discounted from the assessment. Depleted oxygen noted between 11.6-21.8%vol.

5.5.11 The maximum concentrations of carbon monoxide measured across the site are lower than the long term exposure limit of 20ppm as defined by HSE workplace exposure limits (WEL) (HSE, 2020)).

5.5.12 The maximum concentrations of hydrogen sulphide measured across the transfer tunnel site are lower than the long term exposure limit of 5 ppm as defined by HSE WEL (HSE, 2020)).

5.6 Discussion on gas risk

5.6.1 The desk study work, and following ground investigation has not identified any significant ground gas sources at the proposed WWTP site (for instance putrescible wastes, landfills, or mine gas). The area is greenfield and underlain by natural deposits which are not significant ground gas sources. Whilst some minor elevated carbon dioxide can be associated with carbonate deposits such as chalk where it is produced via

[1] BH_TUN_001 and BH_TUN_006 are both located in the existing Cambridge WWTP site.

biological respiration, such conditions are widespread throughout the UK with no known incidents of carbon dioxide emissions into buildings from this natural process (Ground Engineering, 2019).

5.6.2 Some ground gas monitoring has been undertaken, although it is recognised that these are below the typical/idealised monitoring frequency and duration given in CIRIA C665. However, given the overall conceptualisation of ground gas, coupled with the monitoring that has been undertaken, it is considered that ground gas risks are very low and no special precautions are judged to be required in connection with the protection of buildings or services from ground gases.

5.7 Conceptual Site Model and risk assessment

5.7.1 A key element of an environmental risk assessment is the development of a Conceptual Site Model (CSM) which is done by undertaking a Source – Pathway – Receptor analysis of the Site:

- Sources (S) are potential or known contaminant sources e.g. a former land use
- Pathways (P) are environmental systems through which a contaminant could migrate e.g. air
- Receptors (R) are sensitive environmental receptors that could be adversely affected by a contaminant e.g. Site end-users.

5.7.2 Where a source, relevant pathway and receptor are present, a pollutant linkage is considered to exist whereby there is a circumstance through which environmental harm could occur, and a potential environmental liability is considered to exist.

5.7.3 The CSM assess potential pollutant linkages through both the construction phase and the ongoing end-use of the proposed development.

5.7.4 Potential sources, pathways and receptors identified for the site are presented below, with the CSM and Generic Quantitative Risk Assessment for the Site presented in Section 5.7.

CSM Assumptions

5.7.5 The sources in the CSM have been refined from the preliminary conceptual site model and based on the ground investigation data and any changes in the Scheme Order Limits. For the infrastructure (specifically the transfer tunnel) and Waterbeach Pipeline routes the localised potential sources associated with rail or highways remain in the CSM on a precautionary basis; investigation coverage in these areas is naturally less comprehensive for this section than the existing Cambridge WWTP and risks will be managed during construction via the unexpected contamination protocol (refer to Section 6.4)..

5.7.6 Risk from ground gas and risk associated with phytotoxic metals to planting have been discounted from the assessment.

Sources

Proposed WWTP site

- S1: Localised made ground on site containing slightly elevated concentrations of metals and inorganics from soil leachate;
- S2: Slightly elevated concentrations of metals and inorganics in groundwater.

Associated Infrastructure Site

- S1: Potential contamination from localised sources along the route (railway, the existing WWTP and electrical substations)
- S2: Slightly elevated concentrations of metals and inorganics from soil leachate
- S3: Slightly elevated concentrations of metals and inorganics in groundwater

Waterbeach Pipeline Site

- S1: Potential contamination from railway, the existing WWTP and electrical substations
- S2: Potential contamination associated with presence of agricultural land on site.

Pathways

- P1: Human Uptake pathways:
  - P1a: Direct soil and dust ingestion.
  - P1b: Dermal contact.
  - P1c: Inhalation of dust, vapours and ground gas.
- P2: Production and vertical migration of leachates in unsaturated zone.
- P3: Vertical and horizontal migration of contaminants in saturated zone.
- Direct contact with buried structures and infrastructure.
- P5: Man-made contaminant transport pathways including utilities, piling for foundations, tunnels, and pipelines.
- P6: Surface run-off.

Receptors

- R1: On-site land users: WWTP visitors and workers

- R2: Offsite land users: Adjacent residents, walkers and farm workers
- R3: Secondary A aquifer (River Terrace Deposits and/or Alluvium)
- R4: Principal aquifer (Lower Greensand Group and/or Chalk)
- R5: Onsite watercourse (River Cam)
- R6: Buried structures and infrastructures: water supply pipe infrastructure, concrete structure (e.g. foundations and tunnels)
- R7: Surface water drainage channels (on and offsite)

Risk assessment assumptions

5.7.7 The risk assessment has been carried out using the methodology laid out in Appendix D.

5.7.8 All construction workers will be managed by the requirements of CDM 2015 and activity specific method statements which will inform the need for appropriate personal protective equipment (PPE) including respiratory protective equipment for any works undertaken in enclosed spaces;

5.7.9 A robust construction environmental management plan (CEMP) will be adopted in order to manage leaks, spills and dust during construction. The CEMP will be prepared in accordance with the CoCP and approved by the relevant local authority prior to the start of construction.

Conceptual Site Model and Risk Assessment

Table 5.6: Conceptual Site Model and Risk Assessment-proposed WWTP

Source	Pathway	Receptor	Consequence	Mitigated Risk Probability	Risk
S1: Localised made ground with slightly elevated concentrations of metals and inorganics from soil leachate	P2: Production and vertical migration of leachates in unsaturated zone. P3: Vertical and horizontal migration of contaminants in saturated zone. P5: Man-made contaminant transport pathways including utilities, piling for foundations, tunnels, and pipelines.	R3: Secondary A aquifer (River Terrace Deposits)	Medium	Unlikely	Low
		R4: Principal aquifer (Chalk)	Medium	Low	Moderate/Low
		R7: Drainage Channels (on and offsite)	Minor	Low	Very Low
S2: Slightly elevated concentration of metals and inorganics in groundwater	P3: Vertical and horizontal migration of contaminants in saturated zone. P5: Man-made contaminant transport pathways including utilities, piling for foundations, tunnels, and pipelines.	R3: Secondary A aquifer (River Terrace Deposits)	Medium	Unlikely	Low
		R4: Principal aquifer (Chalk)	Medium	Low	Moderate/Low
	P3: Vertical and horizontal migration of contaminants in saturated zone.	R7: Drainage Channels (on and offsite)	Minor	Low	Very Low

Table 5.7: Conceptual Site Model and Risk Assessment-Infrastructure Sites (Outfall to River Cam and transfer tunnel areas)

Source	Pathway	Receptor	Consequence	Mitigated Risk Probability	Risk
S1: Potential contamination from localised sources along the route (railway, the existing (adjacent) WWTP and electrical substations)	P1a: Direct soil and dust ingestion. P1b: Dermal contact (indoor and outdoor). P1c: Inhalation of dust, vapours and ground gas (indoor and outdoor).	R1: On-site land users: walkers, farm workers	Minor	Low	Very Low
		R2: Offsite land users: Adjacent residents, walkers and farm workers	Minor	Low	Very Low
	P4: Direct contact with buried structures and infrastructure.	R6: Buried structures and infrastructures: water supply pipe infrastructure, concrete structure (e.g. foundations and tunnels)	Mild	Low	Very Low
S2: Slightly elevated concentration of metals and inorganics from soil leachate	P2: Production and vertical migration of leachates in unsaturated zone. P3: Vertical and horizontal migration of contaminants in saturated zone. P5: Man-made contaminant transport pathways including utilities, piling for	R3: Secondary A aquifer (River Terrace Deposits)	Medium	Low	Moderate/ Low

Source	Pathway	Receptor	Consequence	Mitigated Risk Probability	Risk
	foundations, tunnels, and pipelines.				
		R4: Principal aquifer (Lower Greensand Group and Chalk)	Medium	Low	Moderate/Low
		R5: Onsite watercourse (River Cam)	Medium	Low	Moderate/Low
	P3: Vertical and horizontal migration of contaminants in saturated zone	R7: Drainage Channels (on and offsite)	Minor	Low	Very Low
S3: Slightly elevated concentration of metals and inorganics in groundwater	P3: Vertical and horizontal migration of contaminants in saturated zone. P5: Man-made contaminant transport pathways including utilities, piling for foundations, tunnels, and pipelines.	R3: Secondary A aquifer (River Terrace Deposits and/or Alluvium)	Medium	Unlikely	Low
		R4: Principal aquifer (Lower Greensand Group and Chalk)	Medium	Low	Moderate/Low

Table 5.8: Conceptual Site Model and Risk Assessment- Waterbeach Pipeline

Source	Pathway	Receptor	Consequence	Mitigated Risk Probability	Risk
S1: Potential contamination from	P1a: Direct soil and dust ingestion.	R1: On-site land users: walkers, farm workers.	Minor	Unlikely	Very Low

Source	Pathway	Receptor	Consequence	Mitigated Risk Probability	Risk
railway siding, the existing WWTP and electrical substations S2: Potential contamination from railway, existing Waterbeach WWTP and offsite landfill	P1b: Dermal contact (indoor and outdoor). P1c: Inhalation of dust, vapours and ground gas (indoor and outdoor).	R2: Offsite land users: Adjacent residents	Minor	Unlikely	Very Low
	P4: Direct contact with buried structures and infrastructure.	R6: Buried structures and infrastructures: water supply pipe infrastructure, concrete structure (e.g. foundations and tunnels)	Mild	Low	Low
	P2: Production and vertical migration of leachates in unsaturated zone. P3: Vertical and horizontal migration of contaminants in saturated zone. P5: Man-made contaminant transport pathways including utilities, piling for foundations, tunnels, and pipelines.	R3: Secondary A aquifer (River Terrace Deposits and/or Alluvium)	Medium	Unlikely	Low
		R4: Principal aquifer (Lower Greensand Group and/or Chalk)	Medium	Low	Moderate/Low
	P6: Surface run-off.	R5: Onsite watercourse (River Cam)	Medium	Low	Moderate/Low
		R7: Drainage Channels (on and offsite)	Minor	Low	Very Low

5.8 Risk assessment discussion

Risks to human health from soil contamination

5.8.1 The are of land required for the proposed WWTP is a greenfield site with no obvious contamination sources identified. No significantly elevated levels of contaminants above human health GACs have been identified by the ground investigations undertaken to date. Consequently, there are considered to be no risks to site end users from existing contamination. Risks to construction workers will be managed through the requirements of CDM 2015.

5.8.2 Similarly no contamination sources or elevated levels of contaminants were recorded in the final effluent pipeline route. Ground investigation was relatively limited along the route of the proposed transfer tunnel, however, similarly to the majority of the scheme order limits, this mostly comprises undeveloped greenfield land – although the existing Cambridge WWTP and railway are present at the western extent of the order limits. Construction along the transfer tunnel will be largely at depth in undisturbed natural deposits and land use will remain as the current usage. Risks to human health in this area are assessed as very low. An unsuspected contamination protocol will be in place to ensure that risks are managed appropriately during construction (refer to Section 6.4.1).

5.8.3 Given the lack of contamination and nature of the proposed development risks to offsite land users during construction are not considered to be significant and would be managed through the provisions within the CoCP used to prepare detailed CEMP for the phase.

Risk to controlled waters

5.8.4 Groundwater samples from the Chalk were generally found to contain slightly elevated concentrations of certain metals and inorganics. Some more highly elevated concentrations of chromium were recorded in the south east of the land required for the proposed WWTP as well as at a discrete location along the proposed transfer tunnel route. Surface water samples from Quy Fen, Allicky Farm Pond and the Black Ditch were found to contain slightly elevated concentrations of metals and inorganics as well as more highly elevated levels of chromium. This is consistent with the contaminant concentrations found within groundwater samples locally within the scheme.

5.8.5 The source of the chromium is unclear but may relate to agricultural practices onsite and in the wider area, such as the use of fertiliser, although no significantly elevated levels of chromium have been encountered in soils. Chromium concentrations are below the BGS estimated rural soil chemistry for the area. The construction of the Proposed Development is not expected to affect this pollutant linkage and risks to controlled

waters receptors (groundwater and surface water) are assessed as moderate/low to low.

5.8.6 Limited mobile contaminant testing has identified only minor elevated levels of fluoride, copper, lead, iron and slightly higher levels of Ammoniacal nitrogen. Higher values were recorded in the very thin discontinuous made ground recorded locally. Where re-use of excavated materials is required further analysis of soils is recommended to confirm suitability for reuse (refer to Section 6.4.4).

5.8.7 Further groundwater and surface water monitoring is planned as part of the outline water quality monitoring plan (App Doc Ref 5.4.2.3). This includes further pre construction baseline data gathering along the Waterbeach pipeline where trenchless construction methods are to be utilised around the River Cam and a railway crossing. An unsuspected contamination protocol will also be in place during construction to ensure that risks are managed appropriately.

Risks from ground gases

5.8.8 Based on the overall conceptualisation of ground gas risk, coupled with the monitoring that has been undertaken, it is considered that ground gas risks are very low and no special precautions are judged to be required in connection with the protection of buildings or services from bulk gases.

5.8.9

Risks to the built environment

5.8.10 Risks to the built environment are assessed as being very low. Information gathered as part of the ground investigations will be used to inform buried concrete design. Risks to water supply pipes are similarly also assessed as very low given the greenfield nature of the site and lack of contaminants recorded.

Risks to proposed planting

5.8.11 Ground investigations have not identified any significantly elevated levels of phytotoxic metals copper, zinc and nickel in comparison with the British Standards for topsoil. Where topsoil is proposed to be re used some further assessment of its characteristics would be beneficial to inform planting schemes. Section 7.4 of the CoCP Part A (App Doc Ref 5.4.2.1) and the Outline Soil Management Plan (App Doc Ref 5.4.6.3) sets out proposed soil management protocols.

6 Conclusions and Recommendations

6.1.1 The following section provides conclusions and recommendations based on the information gathered, and interpretation of the GI conducted for the three areas, i.e. the proposed WWTP site, the site for the infrastructure between the existing and the proposed WWTP and that of the Waterbeach Pipeline.

6.2 Conclusions

6.2.1 The encountered geology is largely consistent with those identified from preliminary desk-based investigation and comprises:

- Localised made ground (0.3-0.5m thick in the proposed WWTP site, 0.2-1.2m in the area of proposed infrastructure and 0.65m along Waterbeach pipeline area). These are within greenfield/ agricultural areas therefore presence of localised made ground is most likely due to historical agricultural land use.
- In the area of the existing Cambridge WWTP made ground up to 4.2m thick was encountered (BH_TUN_006 and 006P).
- River Terrace Deposits in all areas and Alluvium, excluding the area of land required for the proposed WWTP.
- Bedrock geology comprising the West Melbury Marly Chalk, Cambridge Greensand, Gault Formation and Lower Greensand.

6.2.2 The Lower Greensand Formation was only encountered along the site for the infrastructure routes between the existing Cambridge WWTP and the proposed WWTP (i.e. the area south of the A14).

6.2.3 Laboratory tests for soil which examined the levels of a range of potential contaminants as described in Section 5 returned no exceedance of the tested determinants against the human health GAC for commercial or public open space land use across the three areas investigated. Therefore, risks to human health receptors have been assessed as very low/negligible.

6.2.4 Exceedances recorded from soil leachate samples are generally minor and within same order of magnitude of the relevant GAC.

6.2.5 Exceedances were recorded for metals and inorganics from groundwater tests results in the GI undertaken for the proposed WWTP site and the land area to accommodate the infrastructure. However, these are minor and within same order of magnitude to the relevant GAC (EQS and DWS) with the exception of ammoniacal nitrogen (N) and chromium (III). There is no established source for chromium contamination on or near the three sites and the elevated concentrations are not widespread. Elevated chromium and ammoniacal nitrogen were also measured in surface water samples suggesting that

this may be a result of general presence in the area, potentially associated with farming practices.

6.2.6 No asbestos was detected in any of the areas investigated.

6.2.7 Based on the overall conceptualisation of ground gas and limited monitoring that has been undertaken, it is judged that ground gas risks are very low and no special precautions are judged to be required in connection with the protection of buildings or services from ground gases.

6.3 Remediation and verification

6.3.1 On the basis of the desk study work and phases of GI, no unacceptable risks have been identified to any of the receptors from the proposed development and no specific remediation measures are judged to be required. However, there are a number of measures that will be undertaken as part of the Proposed Development to ensure that contamination risks continue to be managed appropriately.

6.4 Recommendations and next steps

6.4.1 As outlined in Section 7.4 of the CoCP Part A (App Doc Ref 5.4.2.1) and stated in the draft DCO (App Doc Ref 2.1) an unsuspected contamination protocol will be in place to deal with any contamination discoveries during works. As part of this requirement, in the event that contamination which has not previously been identified is suspected, works in that immediate area will stop and it will be made safe and secure. An appropriate strategy will be developed to identify the most appropriate option for dealing with unsuspected contamination and this may require further risk assessments to receptors. Findings will be reported to the Applicant, the relevant local authority and the Environment Agency. Where necessary, a remediation strategy will be agreed with the relevant local authority, in consultation with the Environment Agency and any other appropriate bodies as required and works will not recommence in the affected area until and approach for dealing with the contamination had been agreed.

6.4.2 Wider measures to protect the environment and surrounding land users (e.g. from leak, spills or dust) are also summarised in the CoCP Part A (App Doc Ref 5.4.2.1) and these will be developed within the Construction Environmental Management Plan (CEMP) for each phase. These will be prepared prior to commencement of the phase.

6.4.3 As part of the Environmental Statement for the project, an Outline Water Quality Monitoring Plan (App Doc Ref 5.4.20.13) is being undertaken at the site including a programme of pre-construction monitoring of groundwater and surface water. This monitoring is aimed at providing further preconstruction baseline data upon which to measure temporary changes to water levels and or quality that could arise from construction activities including dewatering. The monitoring includes six boreholes outside the perimeter of the proposed WWTP, a borehole along the transfer tunnel and

three boreholes along the Waterbeach pipeline route as well as surface water receptors. The monitoring will test for a range of contaminants including heavy metals and hydrocarbons.

6.4.4 As detailed in section 7.9, Waste management and resource use, of the CoCP Part A (App Doc Ref 5.4.2.1), a materials management plan (MMP) will be developed if required to allow for the reuse of excavated materials within the Proposed Development. Where reuse is proposed, some additional soil quality assessment (including total and leachable concentrations of contaminants) of material to be excavated for reuse is recommended to ensure suitability for use within the Proposed Development. Additional investigations to confirm suitability should be undertaken prior to soil excavation works commencing and allow sufficient time for the preparation of the MMP.

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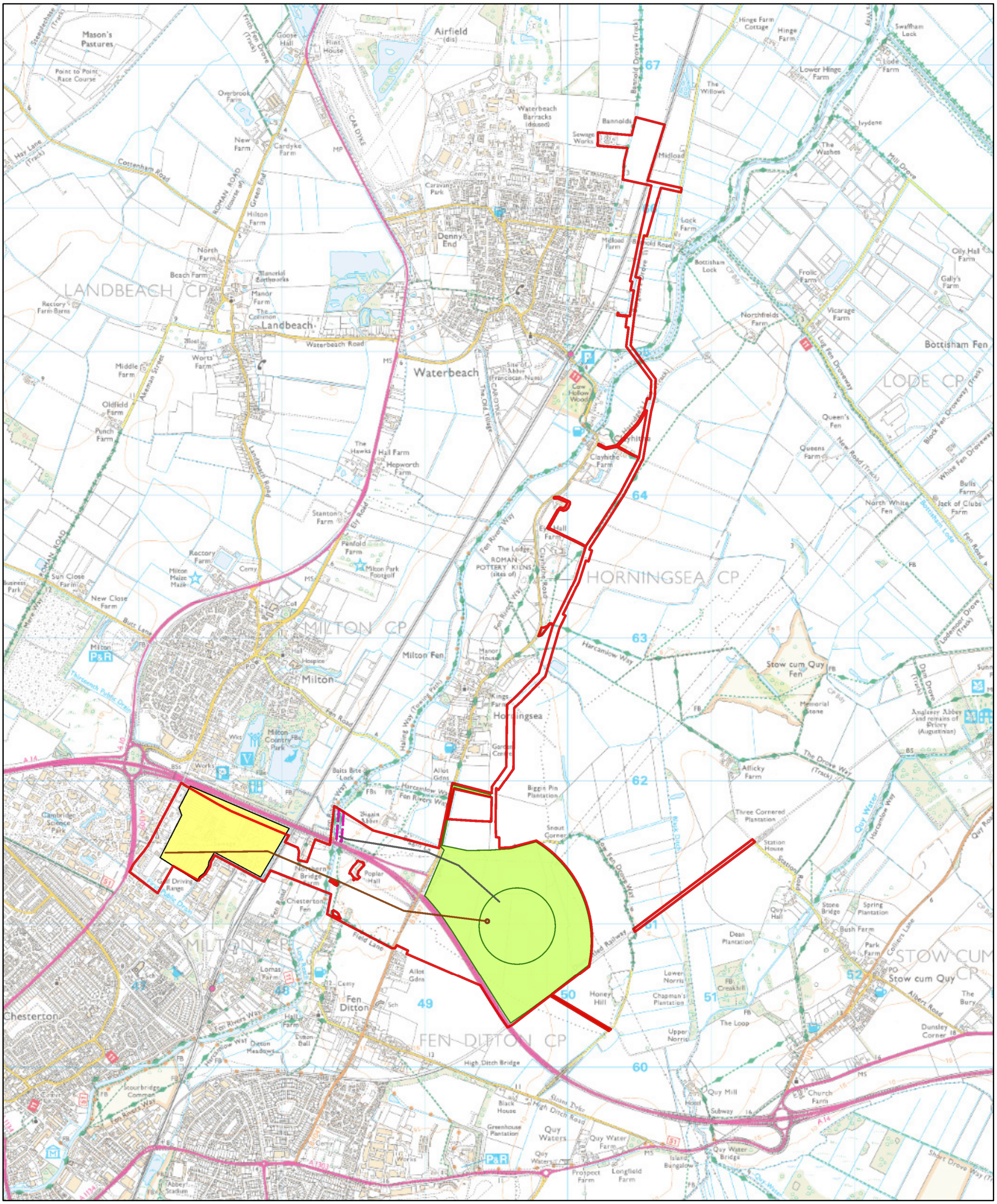
Appendices

A. Figures and Drawings

A.1 Site 3 location and infrastructure



17/01/2022

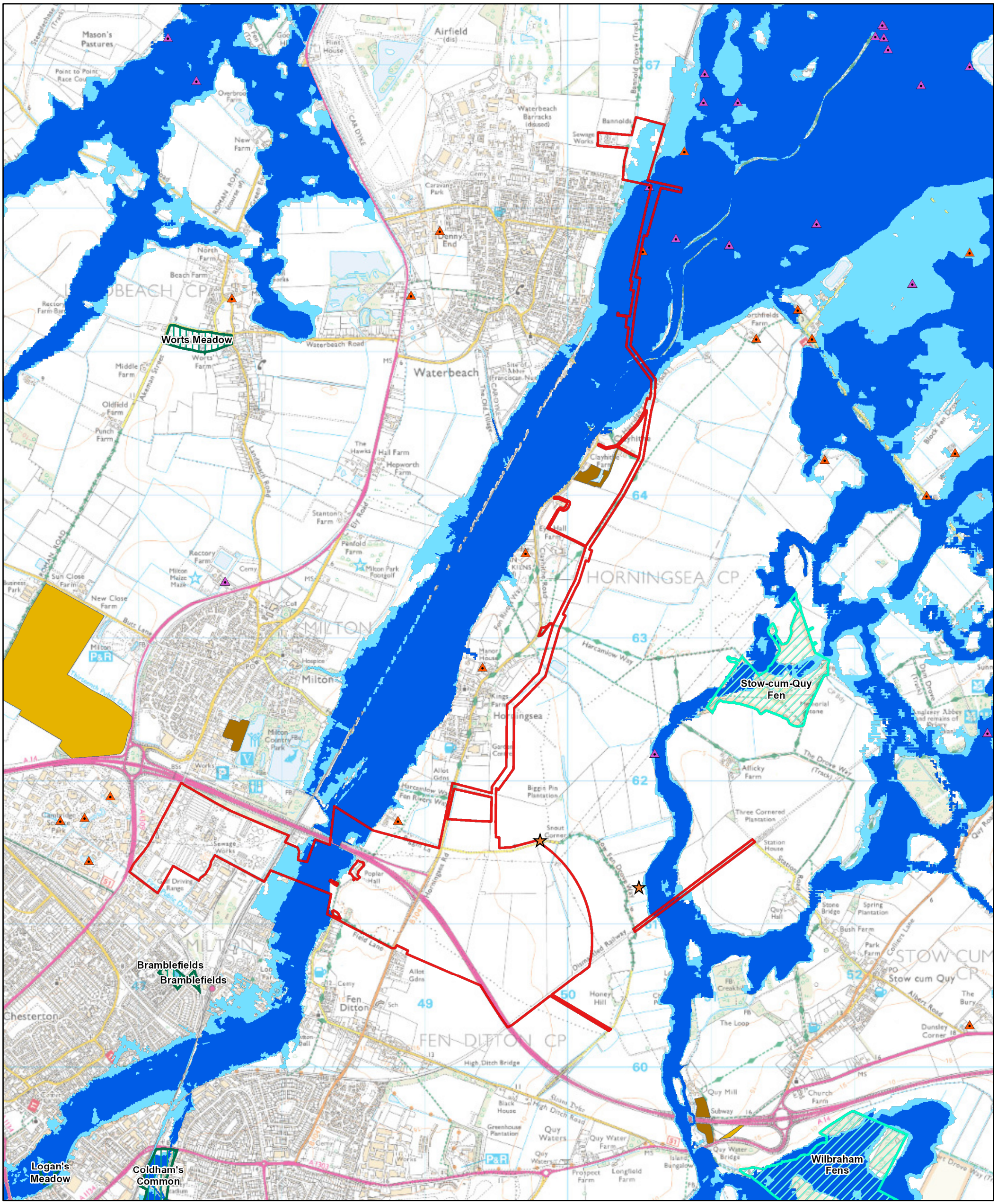
- Indicative DCO boundary
- Indicative route of proposed sewer tunnel
- Indicative route of proposed final effluent and storm flow pipelines
- Outfall structure zone
- Sewer tunnel
- Extent of Proposed Landscape
- Existing Cambridge WWTP

1:25,000

0 0.28 0.55 1.1 mi

0 0.45 0.9 1.8 km

A.4 Environmental Information



17/01/2022

- Indicative DCO boundary
- Local Nature Reserves
- Sites of Special Scientific Interest

Environment Agency Water Abstraction Licences

- Groundwater, Borehole
- Groundwater, Seepage Catchpipe
- Groundwater, Well
- Groundwater, Wellpoints
- Surfacewater, Catchpit
- Surfacewater, Onstream Pond
- Surfacewater, River / Stream
- Other

Abstraction Points 5km from Site 3

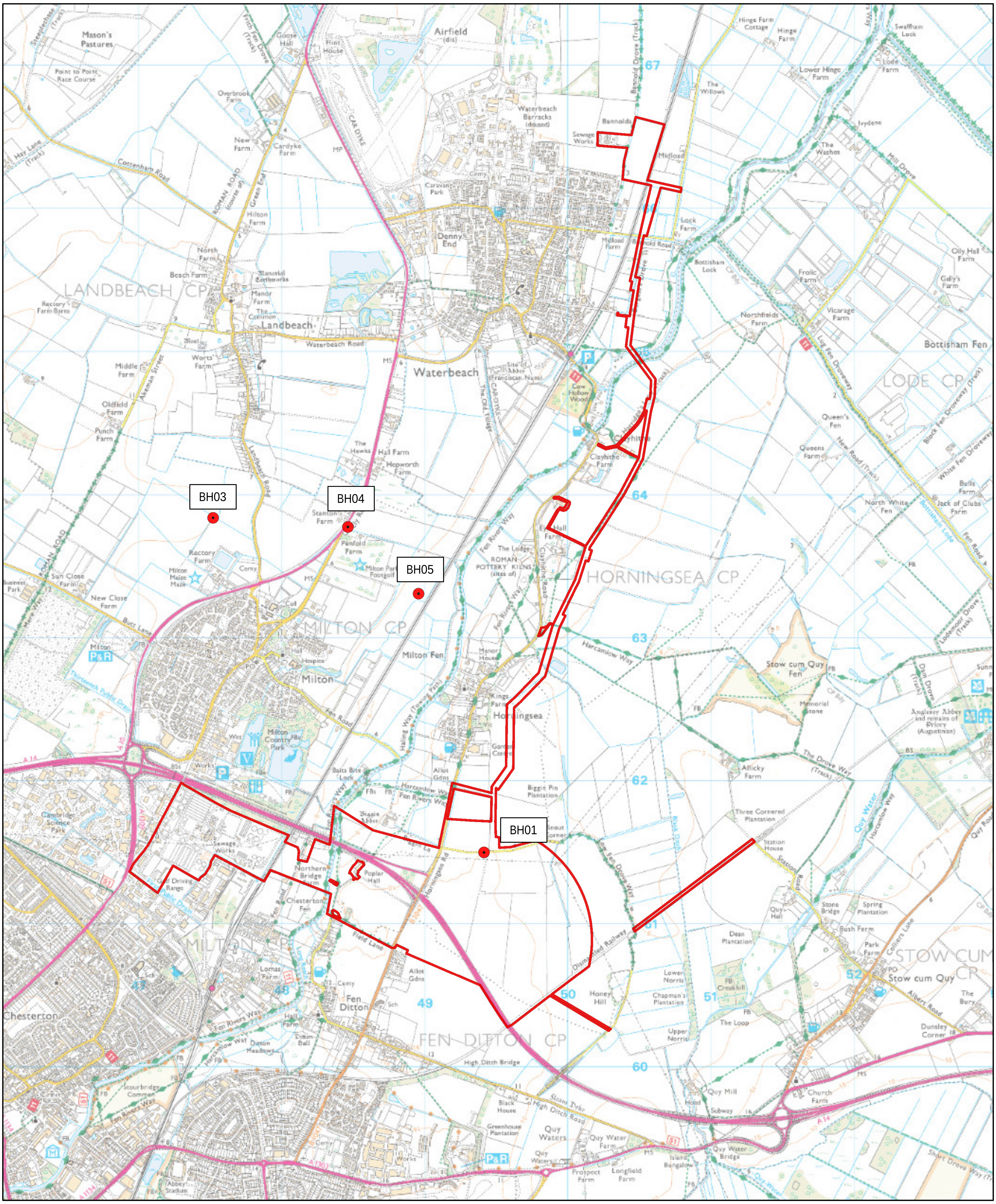
- Abstraction licence holders
- Deregulated abstractions
- Flood Zone 3
- Flood Zone 2
- Authorised Landfill Sites
- Historic Landfill Sites
- Man-made mining cavities

1:25,000

0 0.28 0.55 1.1 mi

0 0.45 0.9 1.8 km

A.3 Preliminary site Investigation Locations



17/01/2022

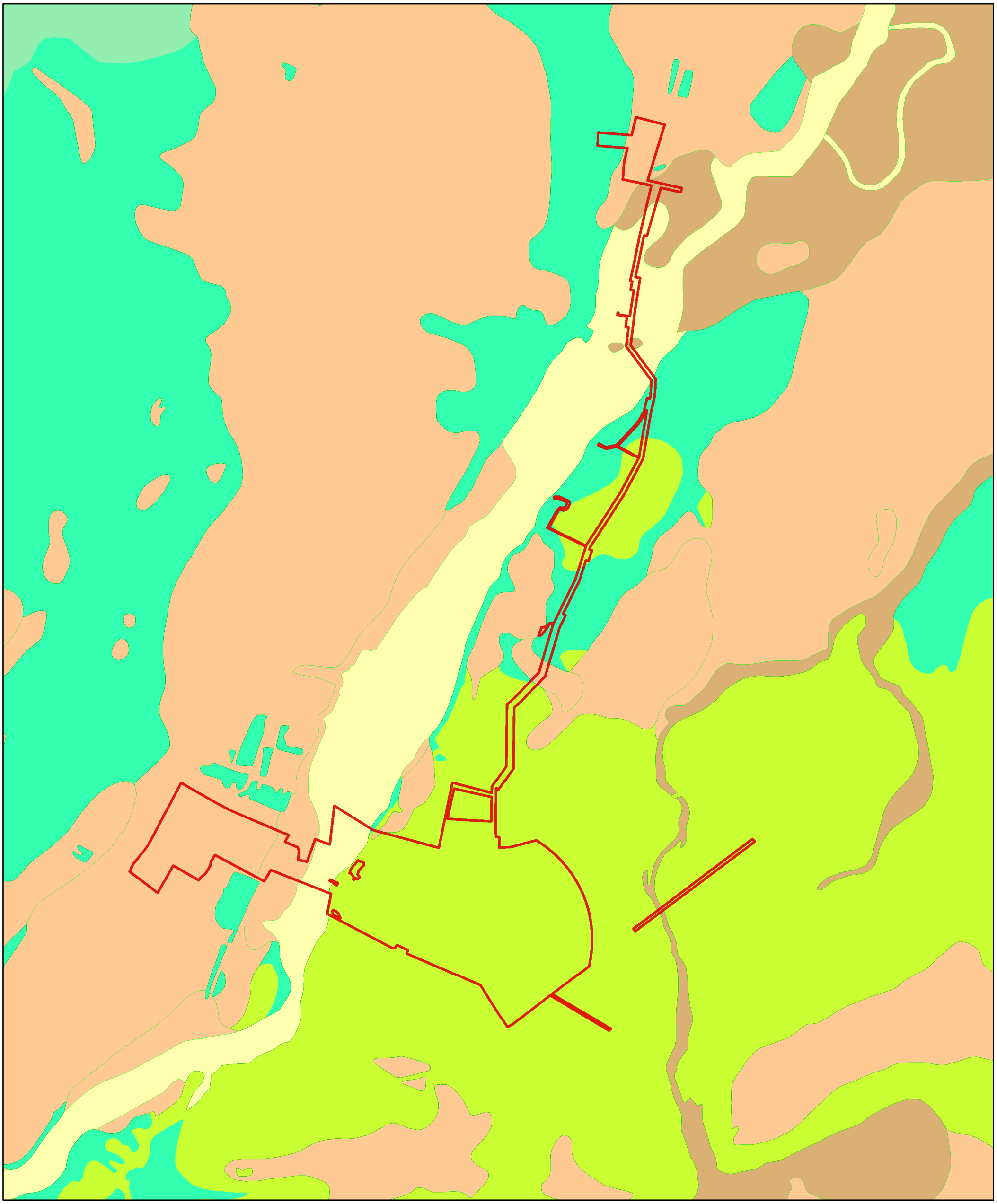
Indicative DCO boundary

Preliminary SI Borehole Locations

1:25,000

0	0.28	0.55	1.1 mi
0	0.45	0.9	1.8 km

A.2 Geology



17/01/2022

Indicative DCO boundary

Alluvium

Peat

River Terrace Deposits

Grey Chalk (West Melbury Marly Chalk Formation)

Gault Formation

1:25,000

0 0.28 0.55 1.1 mi

0 0.45 0.9 1.8 km

B. Contaminant Screening Summary

Project: TE8364 Cambridge Waste Water Treatment Plant Relocation

Results - Soil

2659 **2670**

							WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site
Client: Soil Engineering Geoservices Ltd	**Chemtest Job No.:**						21-25406	21-26285	21-26285	21-27533	21-28134	21-28134	21-28281	21-30056	21-30069	21-30825	21-30825	21-24944	21-25114
Quotation No.: Q21-24797	**Chemtest Sample ID.:**				**Public Open Space (park) 1% SOM mg/kg**	**Commercial 1% SOM mg/kg**	1246562	1251053	1251058	1257176	1260362	1260366	1261082	1269163	1269235	1273499	1273500	1244304	1245161
Order No.:	Client Sample Ref.:						2	2	8	2	2	5	4	5	8	8	2	1	5
	Client Sample ID.:						BH-STW-015	BH_STW_026	BH_STW_009	BH_STW_004	BH_STW_012A	BH_STW_016	BH_STW_013A	BH-STW.003A	BH_TPS_004	BH-STW-022A	BH.STW-020	BH_STW_001	BH_STW_023
	Sample Location:						BH-STW-015	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	0.3	0.6
	Sample Type:						SOIL	0.2	1.1	0.2	0.2	0.6	0.5	0.5	1.1	1.1	0.2	SOIL	SOIL
	Top Depth (m):						0.2	0.25	1.2	0.25	0.2	0.6	0.5	0.55	1.2	1.2	0.25	0.3	0.6
	Date Sampled:						22-Jul-2021	28-Jul-2021	28-Jul-2021	05-Aug-2021	10-Aug-2021	11-Aug-2021	13-Aug-2021	26-Aug-2021	26-Aug-2021	03-Sep-2021	03-Sep-2021	16-Jul-21	20-Jul-21
	Asbestos Lab:						DURHAM	DURHAM	DURHAM	DURHAM			DURHAM	COVENTRY	DURHAM	COVENTRY	COVENTRY	DURHAM	DURHAM
	Strata						TS	TS	WMCK	TS	MGR	SUPD	SUPD	SUPD	WMCK	SUPD	TS	SUPD	SUPD
Determinand	**Accred.**	**SOP**	**Units**	**LOD**															
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-	-	-	-	-	-		
Asbestos Identification	U	2192		N/A	-	-	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	-	-	5.5	6.4	3.8	6.4	7.2	9.7	4.2	5.7	4.1	6.4	9.4	11	6.8
Soil Colour	N	2040		N/A	-	-	Brown	Brown	Beige	Brown	Brown	Beige	Brown	Brown	Brown			Brown	Brown
Other Material	N	2040		N/A	-	-	Stones, Roots and Wood	Stones and Roots	Stones	Stones	Stones and Roots	Stones	Stones and Roots	Stones and Roots	Stones			Stones	Stones and roots
Soil Texture	N	2040		N/A	-	-	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand			Sand	Sand
pH	M	2010		4	-	-	8.1	8.4	8.7	8.4	8.5	8.8	8.5	8.6	8.9	8.9	8.3	9	8.6
Boron (Hot Water Soluble)	M	2120	mg/kg	0.4	-	-	1.4	1.7	0.53	< 0.40	1.7	0.53	1	0.63	< 0.40	3.2	6.1	0.6	<0.4
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.01	-	-	0.039	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.012	< 0.010	0.018	<0.01
Total Sulphur	M	2175	%	0.01	-	-	0.03	< 0.010	0.023	0.028	0.027	0.024	0.033	0.021	0.013	0.021	0.045	0.038	0.022
Cyanide (Free)	M	2300	mg/kg	0.5	-	-	< 0.50	< 0.50	< 0.50	[B] < 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	<0.5	<0.5
Iron	N	2430	mg/kg	100	-	-	19000	12000	11000	11000	16000	5100	15000	10000	10000	7300	11000	18000	12000
Arsenic	M	2450	mg/kg	1	170	640	16	9.1	16	5.9	13	8.6	7.7	7.4	14	3.7	9.8	13	9.3
Barium	M	2450	mg/kg	10	5800	22000	95	65	25	29	50	15	45	160	31	26	170	86	40
Beryllium	U	2450	mg/kg	1	63	12	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1	<1
Cadmium	M	2450	mg/kg	0.1	560	190	0.28	0.11	< 0.10	< 0.10	0.18	< 0.10	< 0.10	0.26	< 0.10	< 0.10	0.51	0.29	0.15
Chromium	M	2450	mg/kg	1	-	-	35	16	14	12	20	5.6	12	21	13			28	16
Manganese	M	2450	mg/kg	5	-	-	980	780	660	480	460	300	510	720	410	150	290	1400	450
Molybdenum	M	2450	mg/kg	2	2900	18000	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	<2	<2
Antimony	N	2450	mg/kg	2	3300	7400	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	2.4	< 2.0	<2	<2
Copper	M	2450	mg/kg	0.5	44000	68000	19	9.5	6.8	8	11	2.5	4.6	30	8.2	5.5	8.7	19	12
Mercury	M	2450	mg/kg	0.1	-	-	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.17	<0.1
Nickel	M	2450	mg/kg	0.5	800	980	29	18	17	13	18	5.8	19	27	19	7.5	19	33	17
Lead	M	2450	mg/kg	0.5	1300	2300	35	16	6.2	9.9	18	2.5	8.9	25	14	120	38	31	9.7
Selenium	M	2450	mg/kg	0.2	1800	12000	0.25	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	0.25	< 0.20	< 0.20	< 0.20	<0.2	<0.20
Vanadium	U	2450	mg/kg	5	5000	9000	59	28	29	18	38	19	17	24	29	10	25	38	24
Zinc	M	2450	mg/kg	0.5	170000	730000	67	31	17	26	38	6.8	21	70	23			51	33
Chromium (Trivalent)	N	2490	mg/kg	1	33000	8600	35	16	14	12	20	5.6	12	21	13	7.4	18	28	16
Chromium (Hexavalent)	N	2490	mg/kg	0.5	-	-	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	<0.50	<0.5
Fraction of Organic Carbon	M	2625		0.001	-	-	0.013	0.011	0.002	0.012	0.013	0.0042	0.0024	0.007	0.0021	0.002	0.016	0.015	0.0068
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	95000	3200	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	150000	7800	11	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	14000	2000	9.3	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	21000	9700	3.7	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	25000	59000	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	-	-	4.3	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	-	-	150	< 1.0	< 1.0	[B] 4.4	22	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5	-	-	170	< 5.0	< 5.0	[B] < 5.0	22	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	<5.0	<5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1	76000	26000	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1	87000	56000	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1	7200	3500	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1	9200	16000	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1	10000	36000	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1	7600	28000	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1	7800	28000	76	< 1.0	< 1.0	[B] 6.7	8.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1	7800	28000	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5	-	-	76	< 5.0	< 5.0	[B] 6.7	8.6	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	<5	<5
Total Petroleum Hydrocarbons	N	2680	mg/kg	10	-	-	250	< 10	< 10	[B] 11	31	< 10	< 10	< 10	< 10	< 10	< 10	<10	<10
Naphthalene	M	2700	mg/kg	0.1	1200	190	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.1	29000	83000	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.1	29000	84000	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.1	20000	63000	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.1	6200	22000	< 0.10	0.51	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.1	150000	520000	< 0.10	0.39	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.1	6300	23000	0.83	0.6	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: TE8364 Cambridge Waste Water Treatment Plant Relocation

							2659	2670

							WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site
Client: Soil Engineering Geoservices Ltd	**Chemtest Job No.:**						21-25406	21-26285	21-26285	21-27533	21-28134	21-28134	21-28281	21-30056	21-30069	21-30825	21-30825	21-24944	21-25114
Quotation No.: Q21-24797	**Chemtest Sample ID.:**				**Public Open Space (park) 1% SOM mg/kg**	**Commercial 1% SOM mg/kg**	1246562	1251053	1251058	1257176	1260362	1260366	1261082	1269163	1269235	1273499	1273500	1244304	1245161
Order No.:	Client Sample Ref.:						2	2	8	2	2	5	4	5	8	8	2	1	5
	Client Sample ID.:						BH-STW-015	BH_STW_026	BH_STW_009	BH_STW_004	BH_STW_012A	BH_STW_016	BH_STW_013A	BH-STW.003A	BH_TPS_004	BH-STW-022A	BH.STW-020	BH_STW_001	BH_STW_023
	Sample Location:						BH-STW-015	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	0.3	0.6
	Sample Type:						SOIL	0.2	1.1	0.2	0.2	0.6	0.5	0.5	1.1	1.1	0.2	SOIL	SOIL
	Top Depth (m):						0.2	0.25	1.2	0.25	0.2	0.6	0.5	0.55	1.2	1.2	0.25	0.3	0.6
	Date Sampled:						22-Jul-2021	28-Jul-2021	28-Jul-2021	05-Aug-2021	10-Aug-2021	11-Aug-2021	13-Aug-2021	26-Aug-2021	26-Aug-2021	03-Sep-2021	03-Sep-2021	16-Jul-21	20-Jul-21
	Asbestos Lab:						DURHAM	DURHAM	DURHAM	DURHAM			DURHAM	COVENTRY	DURHAM	COVENTRY	COVENTRY	DURHAM	DURHAM
	Strata						TS	TS	WMCK	TS	MGR	SUPD	SUPD	SUPD	WMCK	SUPD	TS	SUPD	SUPD
Determinand	**Accred.**	**SOP**	**Units**	**LOD**															
Pyrene	M	2700	mg/kg	0.1	15000	54000	0.82	0.56	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.1	49	170	< 0.10	0.32	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.1	93	350	< 0.10	0.44	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.1	13	44	< 0.10	0.32	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.1	370	1200	< 0.10	0.45	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.1	11	35	< 0.10	0.25	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.1	150	500	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.1	1.1	3.5	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.1	1400	3900	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2	-	-	< 2.0	3.8	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dichlorodifluoromethane	U	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.10	< 0.10
Chloromethane	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.10	< 0.10
Vinyl Chloride	M	2760	µg/kg	1	4.8	0.059	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.10	< 0.10
Bromomethane	M	2760	µg/kg	20	-	-	< 20	< 20	< 20	[B] < 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Chloroethane	U	2760	µg/kg	2	154000	900	< 2.0	< 2.0	< 2.0	[B] < 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	M	2760	µg/kg	1	3500	24	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	M	2760	µg/kg	1	20000	260	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	U	2760	µg/kg	5	-	-	< 5.0	< 5.0	< 5.0	[B] < 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Trichloromethane	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	M	2760	µg/kg	1	57000	660	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	M	2760	µg/kg	1	90	27	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	M	2760	µg/kg	2	21	0.67	< 2.0	< 2.0	< 2.0	[B] < 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichloroethene	N	2760	µg/kg	1	70	1.2	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	M	2760	µg/kg	1	160	3.1	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	M	2760	µg/kg	5	56	2	< 5.0	< 5.0	< 5.0	[B] < 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10	-	-	< 10	< 10	< 10	[B] < 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Toluene	M	2760	µg/kg	1	87000	56000	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	-	-	< 10	< 10	< 10	[B] < 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,1,2-Trichloroethane	M	2760	µg/kg	10	1100	89	< 10	< 10	< 10	[B] < 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	M	2760	µg/kg	1	810	19	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	2760	µg/kg	2	-	-	< 2.0	< 2.0	< 2.0	[B] < 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	U	2760	µg/kg	10	-	-	< 10	< 10	< 10	[B] < 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,2-Dibromoethane	M	2760	µg/kg	5	-	-	< 5.0	< 5.0	< 5.0	[B] < 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chlorobenzene	M	2760	µg/kg	1	1300	56	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2	1500	110	< 2.0	< 2.0	< 2.0	[B] < 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	M	2760	µg/kg	1	17000	5700	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1	17000	6600	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	M	2760	µg/kg	1	5900	3200	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	U	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	M	2760	µg/kg	1	23000	1300	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	M	2760	µg/kg	1	1800	92	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50	-	-	< 50	< 50	< 50	[B] < 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
N-Propylbenzene	U	2760	µg/kg	1	36000	3900	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	U	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	M	2760	µg/kg	1	310	39	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	M	2760	µg/kg	1	390	30	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Project: TE8364 Cambridge Waste Water Treatment Plant Relocation

Results - Soil

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							WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site
Client: Soil Engineering Geoservices Ltd	**Chemtest Job No.:**						21-25406	21-26285	21-26285	21-27533	21-28134	21-28134	21-28281	21-30056	21-30069	21-30825	21-30825	21-24944	21-25114
Quotation No.: Q21-24797	**Chemtest Sample ID.:**				**Public Open Space (park) 1% SOM mg/kg**	**Commercial 1% SOM mg/kg**	1246562	1251053	1251058	1257176	1260362	1260366	1261082	1269163	1269235	1273499	1273500	1244304	1245161
Order No.:	Client Sample Ref.:						2	2	8	2	2	5	4	5	8	8	2	1	5
	Client Sample ID.:						BH-STW-015	BH_STW_026	BH_STW_009	BH_STW_004	BH_STW_012A	BH_STW_016	BH_STW_013A	BH-STW.003A	BH_TPS_004	BH-STW-022A	BH.STW-020	BH_STW_001	BH_STW_023
	Sample Location:						BH-STW-015	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	0.3	0.6
	Sample Type:						SOIL	0.2	1.1	0.2	0.2	0.6	0.5	0.5	1.1	1.1	0.2	SOIL	SOIL
	Top Depth (m):						0.2	0.25	1.2	0.25	0.2	0.6	0.5	0.55	1.2	1.2	0.25	0.3	0.6
	Date Sampled:						22-Jul-2021	28-Jul-2021	28-Jul-2021	05-Aug-2021	10-Aug-2021	11-Aug-2021	13-Aug-2021	26-Aug-2021	26-Aug-2021	03-Sep-2021	03-Sep-2021	16-Jul-21	20-Jul-21
	Asbestos Lab:						DURHAM	DURHAM	DURHAM	DURHAM			DURHAM	COVENTRY	DURHAM	COVENTRY	COVENTRY	DURHAM	DURHAM
	Strata						TS	TS	WMCK	TS	MGR	SUPD	SUPD	SUPD	WMCK	SUPD	TS	SUPD	SUPD
Determinand	**Accred.**	**SOP**	**Units**	**LOD**															
1,4-Dichlorobenzene	M	2760	µg/kg	1	36000	4200	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene	U	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	M	2760	µg/kg	1	24000	2000	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	-	-	< 50	< 50	< 50	[B] < 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
1,2,4-Trichlorobenzene	M	2760	µg/kg	1	1700	220	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	2760	µg/kg	1	48	31	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	2760	µg/kg	2	-	-	< 2.0	< 2.0	< 2.0	[B] < 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1	98000	7500	< 1.0	< 1.0	< 1.0	[B] < 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Resorcinol	M	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Phenol	M	2920	mg/kg	0.02	440	440	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Cresols	M	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Xylenols	M	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
1-Naphthol	N	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Trimethylphenols	M	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Total Phenols	M	2920	mg/kg	0.1	-	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Project: TE8364 Cambridge Waste Water Treatment Plant Relocation

Results - Soil

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							WWTP Site	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas
Client: Soil Engineering Geoservices Ltd	**Chemtest Job No.:**						21-30854	21-28294	21-28294	21-28963	21-28992	21-28992	21-29416	21-29416	21-29416	21-28281	21-28281
Quotation No.: Q21-24797	**Chemtest Sample ID.:**				**Public Open Space (park) 1% SOM mg/kg**	**Commercial 1% SOM mg/kg**	1273651	1261123	1261124	1264390	1264554	1264556	1266475	1266476	1266477	1261078	1261079
Order No.:	Client Sample Ref.:						1	2	5	2	2	8	5	8	8	2	5
	Client Sample ID.:						TP_STW_007	BE_FE_005	BE_FE_005	TUN-003	BH_FE_001	BH_FE_001	BH_OUT-001	BH_OUT-001	BH-TUN-002	BH_FE_002	BH_FE_002
	Sample Location:						0.2	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sample Type:						SOIL	0.2	0.5	0.2	0.2	1.1	0.5	1.1	1.1	0.2	0.5
	Top Depth (m):						0.2	0.25	0.55	0.25	0.25	1.2	0.55	1.2	1.2	0.25	0.55
	Date Sampled:						01-Sep-21	10-Aug-2021	10-Aug-2021	16-Aug-2021	18-Aug-2021	18-Aug-2021	19-Aug-2021	19-Aug-2021	23-Aug-2021	12-Aug-2021	12-Aug-2021
	Asbestos Lab:						DURHAM	DURHAM		DURHAM	COVENTRY		DURHAM		DURHAM	DURHAM	
	Strata						TS	TS	SUPD	MGR	TS	SUPD	SUPD	SUPD	MGR	TS	SUPD
Determinand	**Accred.**	**SOP**	**Units**	**LOD**													
ACM Type	U	2192		N/A	-	-		-		-	-		-		-	-	
Asbestos Identification	U	2192		N/A	-	-	No Asbestos Detected	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected		No Asbestos Detected		No Asbestos Detected	No Asbestos Detected	
Moisture	N	2030	%	0.020	-	-	4.4	10	7.8	3.3	22	12	2.5	10	5.7	3.6	3.8
Soil Colour	N	2040		N/A	-	-	-			Brown	Brown		Brown		Brown	Brown	
Other Material	N	2040		N/A	-	-	-			Stones	Stones and Roots		Stones and Roots		Roots and Stones	Stones	
Soil Texture	N	2040		N/A	-	-	-			Sand	Sand		Sand		Sand	Sand	
pH	M	2010		4	-	-	8.8	8.2	8.7	8.2	8.3	8.7	7.8	7.9	8.7	8.4	8.7
Boron (Hot Water Soluble)	M	2120	mg/kg	0.4	-	-				0.98	1.7		< 0.40		< 0.40	1.4	
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.01	-	-	0.035	0.014		0.17	< 0.010		0.077		0.16	< 0.010	
Total Sulphur	M	2175	%	0.01	-	-	0.032	0.038		0.062	0.046		0.3		0.01	0.046	
Cyanide (Free)	M	2300	mg/kg	0.5	-	-	<0.5	0.6		< 0.50	< 0.50		< 0.50		< 0.50	< 0.50	
Iron	N	2430	mg/kg	100	-	-	12000	12000		16000	17000		11000		16000	16000	
Arsenic	M	2450	mg/kg	1	170	640	7.2	7.2		12	14		7.7		45	11	
Barium	M	2450	mg/kg	10	5800	22000	41	37		48	110		370		28	39	
Beryllium	U	2450	mg/kg	1	63	12	<1	< 1.0		< 1.0	1		< 1.0		< 1.0	< 1.0	
Cadmium	M	2450	mg/kg	0.1	560	190	0.19	0.13		1.2	0.21		0.26		0.26	0.17	
Chromium	M	2450	mg/kg	1	-	-	-			20	29		24		26	17	
Manganese	M	2450	mg/kg	5	-	-	510	690		310	430		3900		620	560	
Molybdenum	M	2450	mg/kg	2	2900	18000	<2	< 2.0		< 2.0	< 2.0		< 2.0		2.4	< 2.0	
Antimony	N	2450	mg/kg	2	3300	7400	<2	< 2.0		< 2.0	< 2.0		< 2.0		< 2.0	< 2.0	
Copper	M	2450	mg/kg	0.5	44000	68000	15	7		19	14		7.5		9.2	10	
Mercury	M	2450	mg/kg	0.1	-	-	<0.1	< 0.10		0.28	< 0.10		< 0.10		< 0.10	< 0.10	
Nickel	M	2450	mg/kg	0.5	800	980	17	17		23	31		26		35	23	
Lead	M	2450	mg/kg	0.5	1300	2300	17	19		28	23		13		9.6	24	
Selenium	M	2450	mg/kg	0.2	1800	12000	<0.2	< 0.20		< 0.20	0.53		0.3		< 0.20	0.21	
Vanadium	U	2450	mg/kg	5	5000	9000	25	11		27	36		44		66	24	
Zinc	M	2450	mg/kg	0.5	170000	730000	16			64	58		35		35	36	
Chromium (Trivalent)	N	2490	mg/kg	1	33000	8600	16	9.5		20	29		24		26	17	
Chromium (Hexavalent)	N	2490	mg/kg	0.5	-	-	<0.5	< 0.50		< 0.50	< 0.50		< 0.50		< 0.50	< 0.50	
Fraction of Organic Carbon	M	2625		0.001	-	-	0.0093	0.016		0.028	0.02		0.018		< 0.0010	0.013	
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	95000	3200	<1.0	< 1.0	< 0.010	< 1.0	< 1.0	< 0.010	< 1.0	< 0.010	< 1.0	< 1.0	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	150000	7800	< 1.0	< 1.0	< 0.010	< 1.0	< 1.0	< 0.010	< 1.0	< 0.010	< 1.0	< 1.0	< 0.010
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	14000	2000	< 1.0	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	23	< 0.10	< 1.0	< 1.0	< 0.10
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	21000	9700	< 1.0	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	180	< 0.10	< 1.0	< 1.0	< 0.10
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	25000	59000	< 1.0	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	170	< 0.10	< 1.0	< 1.0	< 0.10
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	-	-	< 1.0	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	-	-	< 1.0	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	< 1.0	< 0.10	< 1.0	110	< 0.10
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	-	-	< 1.0	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5	-	-	<5.0	< 5.0	< 1.0	< 5.0	< 5.0	< 1.0	380	< 1.0	< 5.0	110	< 1.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1	76000	26000	< 1.0	< 1.0	< 0.010	< 1.0	< 1.0	< 0.010	< 1.0	< 0.010	< 1.0	< 1.0	< 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	1	87000	56000	< 1.0	< 1.0	< 0.010	< 1.0	< 1.0	< 0.010	< 1.0	< 0.010	< 1.0	< 1.0	< 0.010
Aromatic TPH >C8-C10	M	2680	mg/kg	1	7200	3500	< 1.0	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10
Aromatic TPH >C10-C12	M	2680	mg/kg	1	9200	16000	< 1.0	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	12	< 0.10	< 1.0	< 1.0	< 0.10
Aromatic TPH >C12-C16	M	2680	mg/kg	1	10000	36000	< 1.0	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10
Aromatic TPH >C16-C21	U	2680	mg/kg	1	7600	28000	< 1.0	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10
Aromatic TPH >C21-C35	M	2680	mg/kg	1	7800	28000	< 1.0	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	< 1.0	< 0.10	< 1.0	71	< 0.10
Aromatic TPH >C35-C44	N	2680	mg/kg	1	7800	28000	< 1.0	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	5	-	-	<5	< 5.0	< 1.0	< 5.0	< 5.0	< 1.0	12	< 1.0	< 5.0	71	< 1.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10	-	-	<10	< 10	< 2.0	< 10	< 10	< 2.0	390	< 2.0	< 10	180	< 2.0
Naphthalene	M	2700	mg/kg	0.1	1200	190	< 0.10	< 0.10	4.1	< 0.10	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	< 0.10	<0.050
Acenaphthylene	M	2700	mg/kg	0.1	29000	83000	< 0.10	< 0.10	0.12	< 0.10	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	< 0.10	<0.050
Acenaphthene	M	2700	mg/kg	0.1	29000	84000	< 0.10	< 0.10	1.3	< 0.10	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	< 0.10	<0.050
Fluorene	M	2700	mg/kg	0.1	20000	63000	< 0.10	< 0.10	0.2	< 0.10	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	< 0.10	<0.050
Phenanthrene	M	2700	mg/kg	0.1	6200	22000	< 0.10	< 0.10	0.098	< 0.10	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	< 0.10	<0.050
Anthracene	M	2700	mg/kg	0.1	150000	520000	< 0.10	< 0.10	< 0.050	< 0.10	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	< 0.10	<0.050
Fluoranthene	M	2700	mg/kg	0.1	6300	23000	< 0.10	< 0.10	0.17	0.11	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	< 0.10	<0.050

Project: TE8364 Cambridge Waste Water Treatment Plant Relocation

Results - Soil

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							WWTP Site	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas
Client: Soil Engineering Geoservices Ltd	**Chemtest Job No.:**						21-30854	21-28294	21-28294	21-28963	21-28992	21-28992	21-29416	21-29416	21-29416	21-28281	21-28281
Quotation No.: Q21-24797	**Chemtest Sample ID.:**				**Public Open Space (park) 1% SOM mg/kg**	**Commercial 1% SOM mg/kg**	1273651	1261123	1261124	1264390	1264554	1264556	1266475	1266476	1266477	1261078	1261079
Order No.:	Client Sample Ref.:						1	2	5	2	8	5	8	8	8	2	5
	Client Sample ID.:						TP_STW_007	BE_FE_005	BE_FE_005	TUN-003	BH_FE_001	BH_FE_001	BH_OUT-001	BH_OUT-001	BH-TUN-002	BH_FE_002	BH_FE_002
	Sample Location:						0.2	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sample Type:						SOIL	0.2	0.5	0.2	0.2	1.1	0.5	1.1	1.1	0.2	0.5
	Top Depth (m):						0.2	0.25	0.55	0.25	0.25	1.2	0.55	1.2	1.2	0.25	0.55
	Date Sampled:						01-Sep-21	10-Aug-2021	10-Aug-2021	16-Aug-2021	18-Aug-2021	18-Aug-2021	19-Aug-2021	19-Aug-2021	23-Aug-2021	12-Aug-2021	12-Aug-2021
	Asbestos Lab:						DURHAM	DURHAM		DURHAM	COVENTRY		DURHAM		DURHAM	DURHAM	
	Strata						TS	TS	SUPD	MGR	TS	SUPD	SUPD	SUPD	MGR	TS	SUPD
Determinand	**Accred.**	**SOP**	**Units**	**LOD**													
Pyrene	M	2700	mg/kg	0.1	15000	54000	< 0.10	< 0.10	0.13	0.12	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	< 0.10	<0.050
Benzo[a]anthracene	M	2700	mg/kg	0.1	49	170	< 0.10	< 0.10	< 0.050	0.29	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	< 0.10	<0.050
Chrysene	M	2700	mg/kg	0.1	93	350	< 0.10	< 0.10	< 0.050	0.32	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	< 0.10	<0.050
Benzo[b]fluoranthene	M	2700	mg/kg	0.1	13	44	< 0.10	< 0.10	< 0.050	< 0.10	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	< 0.10	<0.050
Benzo[k]fluoranthene	M	2700	mg/kg	0.1	370	1200	< 0.10	< 0.10	< 0.050	< 0.10	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	< 0.10	<0.050
Benzo[a]pyrene	M	2700	mg/kg	0.1	11	35	< 0.10	< 0.10	< 0.050	< 0.10	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	< 0.10	<0.050
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.1	150	500	< 0.10	< 0.10	< 0.050	< 0.10	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	< 0.10	<0.050
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.1	1.1	3.5	< 0.10	< 0.10	< 0.050	< 0.10	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	< 0.10	<0.050
Benzo[g,h,i]perylene	M	2700	mg/kg	0.1	1400	3900	< 0.10	< 0.10	< 0.050	< 0.10	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	< 0.10	<0.050
Total Of 16 PAH's	M	2700	mg/kg	2	-	-	< 2.0	< 2.0	-	< 2.0	< 2.0	-	< 2.0	< 0.050	< 2.0	< 2.0	-
Dichlorodifluoromethane	U	2760	µg/kg	1	-	-	< 0.10	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Chloromethane	M	2760	µg/kg	1	-	-	< 0.10	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Vinyl Chloride	M	2760	µg/kg	1	4.8	0.059	< 0.10	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Bromomethane	M	2760	µg/kg	20	-	-	< 20	< 20	< 0.20	< 20	< 20	< 0.20	< 20	< 0.20	< 20	< 20	< 0.20
Chloroethane	U	2760	µg/kg	2	154000	900	< 2.0	< 2.0	< 0.20	< 2.0	< 2.0	< 0.20	< 2.0	< 0.20	< 2.0	< 2.0	< 0.20
Trichlorofluoromethane	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
1,1-Dichloroethene	M	2760	µg/kg	1	3500	24	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Trans 1,2-Dichloroethene	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
1,1-Dichloroethane	M	2760	µg/kg	1	20000	260	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
cis 1,2-Dichloroethene	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Bromochloromethane	U	2760	µg/kg	5	-	-	< 5.0	< 5.0	< 0.50	< 5.0	< 5.0	< 0.50	< 5.0	< 0.50	< 5.0	< 5.0	< 0.50
Trichloromethane	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
1,1,1-Trichloroethane	M	2760	µg/kg	1	57000	660	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Tetrachloromethane	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
1,1-Dichloropropene	U	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Benzene	M	2760	µg/kg	1	90	27	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
1,2-Dichloroethane	M	2760	µg/kg	2	21	0.67	< 2.0	< 2.0	< 0.20	< 2.0	< 2.0	< 0.20	< 2.0	< 0.20	< 2.0	< 2.0	< 0.20
Trichloroethene	N	2760	µg/kg	1	70	1.2	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
1,2-Dichloropropane	M	2760	µg/kg	1	160	3.1	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Dibromomethane	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Bromodichloromethane	M	2760	µg/kg	5	56	2	< 5.0	< 5.0	< 0.20	< 5.0	< 5.0	< 0.20	< 5.0	< 0.20	< 5.0	< 5.0	< 0.20
cis-1,3-Dichloropropene	N	2760	µg/kg	10	-	-	< 10	< 10	< 0.20	< 10	< 10	< 0.20	< 10	< 0.20	< 10	< 10	< 0.20
Toluene	M	2760	µg/kg	1	87000	56000	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	-	-	< 10	< 10	< 0.20	< 10	< 10	< 0.20	< 10	< 0.20	< 10	< 10	< 0.20
1,1,2-Trichloroethane	M	2760	µg/kg	10	1100	89	< 10	< 10	< 0.20	< 10	< 10	< 0.20	< 10	< 0.20	< 10	< 10	< 0.20
Tetrachloroethene	M	2760	µg/kg	1	810	19	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
1,3-Dichloropropane	U	2760	µg/kg	2	-	-	< 2.0	< 2.0	< 0.20	< 2.0	< 2.0	< 0.20	< 2.0	< 0.20	< 2.0	< 2.0	< 0.20
Dibromochloromethane	U	2760	µg/kg	10	-	-	< 10	< 10	< 0.20	< 10	< 10	< 0.20	< 10	< 0.20	< 10	< 10	< 0.20
1,2-Dibromoethane	M	2760	µg/kg	5	-	-	< 5.0	< 5.0	< 0.20	< 5.0	< 5.0	< 0.20	< 5.0	< 0.20	< 5.0	< 5.0	< 0.20
Chlorobenzene	M	2760	µg/kg	1	1300	56	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2	1500	110	< 2.0	< 2.0	< 0.20	< 2.0	< 2.0	< 0.20	< 2.0	< 0.20	< 2.0	< 2.0	< 0.20
Ethylbenzene	M	2760	µg/kg	1	17000	5700	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
m & p-Xylene	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
o-Xylene	M	2760	µg/kg	1	17000	6600	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Styrene	M	2760	µg/kg	1	5900	3200	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Tribromomethane	U	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Isopropylbenzene	M	2760	µg/kg	1	23000	1300	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Bromobenzene	M	2760	µg/kg	1	1800	92	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
1,2,3-Trichloropropane	N	2760	µg/kg	50	-	-	< 50	< 50	< 0.20	< 50	< 50	< 0.20	< 50	< 0.20	< 50	< 50	< 0.20
N-Propylbenzene	U	2760	µg/kg	1	36000	3900	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	-	< 1.0	< 1.0	-
2-Chlorotoluene	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
1,3,5-Trimethylbenzene	M	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
4-Chlorotoluene	U	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Tert-Butylbenzene	U	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
1,2,4-Trimethylbenzene	M	2760	µg/kg	1	310	39	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	7.3	< 0.20
Sec-Butylbenzene	U	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
1,3-Dichlorobenzene	M	2760	µg/kg	1	390	30	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
4-Isopropyltoluene	U	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20

Project: TE8364 Cambridge Waste Water Treatment Plant Relocation

Results - Soil

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							WWTP Site	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas
Client: Soil Engineering Geoservices Ltd	**Chemtest Job No.:**						21-30854	21-28294	21-28294	21-28963	21-28992	21-28992	21-29416	21-29416	21-29416	21-28281	21-28281
Quotation No.: Q21-24797	**Chemtest Sample ID.:**				**Public Open Space (park) 1% SOM mg/kg**	**Commercial 1% SOM mg/kg**	1273651	1261123	1261124	1264390	1264554	1264556	1266475	1266476	1266477	1261078	1261079
Order No.:	Client Sample Ref.:						1	2	5	2	2	8	5	8	8	2	5
	Client Sample ID.:						TP_STW_007	BE_FE_005	BE_FE_005	TUN-003	BH_FE_001	BH_FE_001	BH_OUT-001	BH_OUT-001	BH-TUN-002	BH_FE_002	BH_FE_002
	Sample Location:						0.2	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sample Type:						SOIL	0.2	0.5	0.2	0.2	1.1	0.5	1.1	1.1	0.2	0.5
	Top Depth (m):						0.2	0.25	0.55	0.25	0.25	1.2	0.55	1.2	1.2	0.25	0.55
	Date Sampled:						01-Sep-21	10-Aug-2021	10-Aug-2021	16-Aug-2021	18-Aug-2021	18-Aug-2021	19-Aug-2021	19-Aug-2021	23-Aug-2021	12-Aug-2021	12-Aug-2021
	Asbestos Lab:						DURHAM	DURHAM		DURHAM	COVENTRY		DURHAM		DURHAM	DURHAM	
	Strata						TS	TS	SUPD	MGR	TS	SUPD	SUPD	SUPD	MGR	TS	SUPD
Determinand	**Accred.**	**SOP**	**Units**	**LOD**													
1,4-Dichlorobenzene	M	2760	µg/kg	1	36000	4200	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
N-Butylbenzene	U	2760	µg/kg	1	-	-	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	6.1	< 0.20
1,2-Dichlorobenzene	M	2760	µg/kg	1	24000	2000	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	-	-	< 50	< 50	< 0.20	< 50	< 50	< 0.20	< 50	< 0.20	< 50	< 50	< 0.20
1,2,4-Trichlorobenzene	M	2760	µg/kg	1	1700	220	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Hexachlorobutadiene	U	2760	µg/kg	1	48	31	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
1,2,3-Trichlorobenzene	U	2760	µg/kg	2	-	-	< 2.0	< 2.0	< 0.20	< 2.0	< 2.0	< 0.20	< 2.0	< 0.20	< 2.0	< 2.0	< 0.20
Methyl Tert-Butyl Ether	M	2760	µg/kg	1	98000	7500	< 1.0	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20	< 1.0	< 0.20	< 1.0	< 1.0	< 0.20
Resorcinol	M	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Phenol	M	2920	mg/kg	0.02	440	440	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Cresols	M	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Xylenols	M	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
1-Naphthol	N	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Trimethylphenols	M	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Total Phenols	M	2920	mg/kg	0.1	-	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Project: TE8364 Cambridge Waste Water Treatment Plant Relocation

Results - Soil

									2688	2688	2855	2855
							Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas
Client: Soil Engineering Geoservices Ltd	**Chemtest Job No.:**						21-28286	21-28286	21-26263	21-26263	21-35054-1	21-35054-1
Quotation No.: Q21-24797	**Chemtest Sample ID.:**				**Public Open Space (park) 1% SOM mg/kg**	**Commercial 1% SOM mg/kg**	1261104	1261105	1250921	1250924	1294728	1294729
Order No.:	Client Sample Ref.:						2	5	5	8	13.2	13.2
	Client Sample ID.:						BH_FE_003	BH_FE_003	BH_TUN_005	BH_TUN_004	BH_TUN_015	BH_TUN_018
	Sample Location:						SOIL	SOIL	0.5	1.1	10.5	10.5
	Sample Type:						0.2	0.5	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):						0.25	0.55	0.5	1.1	10.3	10.2
	Date Sampled:						13-Aug-2021	13-Aug-2021	29-Jul-21	28-Jul-21	08-Oct-21	07-Oct-21
	Asbestos Lab:						DURHAM		DURHAM	DURHAM	DURHAM	DURHAM
	Strata						SUPD	SUPD	MGR	RTD	WMCK	WMCK
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type	U	2192		N/A	-	-	-					
Asbestos Identification	U	2192		N/A	-	-	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	-	-	13	13	3	4.7	45	45
Soil Colour	N	2040		N/A	-	-	Brown		Brown	Brown	Grey	Beige
Other Material	N	2040		N/A	-	-	Stones		Stones	Stones	None	Stones
Soil Texture	N	2040		N/A	-	-	Sand		Sand	Sand	Clay	Gravel
pH	M	2010		4	-	-	8.5	8.6	10.2	9.1	8.5	8.4
Boron (Hot Water Soluble)	M	2120	mg/kg	0.4	-	-	0.78	200	0.55	1.2	0.7	0.41
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.01	-	-	< 0.010		0.24	0.14	0.33	0.5
Total Sulphur	M	2175	%	0.01	-	-	0.029		<0.01	0.063	0.13	0.16
Cyanide (Free)	M	2300	mg/kg	0.5	-	-	< 0.50		<0.5	<0.5	<0.5	[B] <0.5
Iron	N	2430	mg/kg	100	-	-	9900		13000	15000	2700	2200
Arsenic	M	2450	mg/kg	1	170	640	12		15	12	7.6	3.2
Barium	M	2450	mg/kg	10	5800	22000	24		93	72	17	13
Beryllium	U	2450	mg/kg	1	63	12	< 1.0		<1.0	<1	<1	<1
Cadmium	M	2450	mg/kg	0.1	560	190	< 0.10		4.3	3.2	<0.1	<0.1
Chromium	M	2450	mg/kg	1	-	-	14		26	24	3.5	2
Manganese	M	2450	mg/kg	5	-	-	470		400	330	470	430
Molybdenum	M	2450	mg/kg	2	2900	18000	< 2.0		<2.0	<2	<2	<2
Antimony	N	2450	mg/kg	2	3300	7400	< 2.0		<2.0	<2	<2	<2
Copper	M	2450	mg/kg	0.5	44000	68000	7.2		33	30	13	9.5
Mercury	M	2450	mg/kg	0.1	-	-	< 0.10		0.71	0.51	<0.1	<0.1
Nickel	M	2450	mg/kg	0.5	800	980	31		20	17	9.9	8.2
Lead	M	2450	mg/kg	0.5	1300	2300	7.9		57	36	7.7	4.8
Selenium	M	2450	mg/kg	0.2	1800	12000	0.33		<0.2	<0.2	<0.2	<0.2
Vanadium	U	2450	mg/kg	5	5000	9000	23		38	37	6.3	<5
Zinc	M	2450	mg/kg	0.5	170000	730000	20		90	90	11	6.8
Chromium (Trivalent)	N	2490	mg/kg	1	33000	8600	14		26	24	3.5	2
Chromium (Hexavalent)	N	2490	mg/kg	0.5	-	-	< 0.50		<0.5	<0.5	<0.5	<0.5
Fraction of Organic Carbon	M	2625		0.001	-	-	0.0064		0.012	0.005	0.003	0.002
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	95000	3200	< 1.0	< 0.10	< 1.0	<1.0	<1.0	[B] <1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	150000	7800	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	[B] <1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	14000	2000	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	[B] <1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	21000	9700	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	[B] <1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	25000	59000	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	[B] <1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	-	-	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	[B] <1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	-	-	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	[B] <1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	-	-	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	[B] <1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5	-	-	< 5.0	< 1.0	<5.0	<5.0	<5.0	[B] <5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1	76000	26000	< 1.0	< 0.010	< 1.0	< 1.0	< 1.0	[B] <1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1	87000	56000	< 1.0	< 0.010	< 1.0	< 1.0	< 1.0	[B] <1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1	7200	3500	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	[B] <1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1	9200	16000	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	[B] <1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1	10000	36000	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	[B] <1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1	7600	28000	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	[B] <1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1	7800	28000	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	[B] <1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1	7800	28000	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	[B] <1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5	-	-	< 5.0	< 1.0	<5	<5	<5	[B] <5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10	-	-	< 10	< 2.0	<10	<10	<10	[B] <1.0
Naphthalene	M	2700	mg/kg	0.1	1200	190	< 0.10	< 0.050	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.1	29000	83000	< 0.10	< 0.050	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.1	29000	84000	< 0.10	< 0.050	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.1	20000	63000	< 0.10	< 0.050	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.1	6200	22000	< 0.10	< 0.050	0.6	< 0.10	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.1	150000	520000	< 0.10	< 0.050	0.22	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.1	6300	23000	< 0.10	< 0.050	1	0.26	< 0.10	< 0.10

Project: TE8364 Cambridge Waste Water Treatment Plant Relocation

Results - Soil

									2688	2688	2855	2855
							Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas
Client: Soil Engineering Geoservices Ltd	**Chemtest Job No.:**						21-28286	21-28286	21-26263	21-26263	21-35054-1	21-35054-1
Quotation No.: Q21-24797	**Chemtest Sample ID.:**				**Public Open Space (park) 1% SOM mg/kg**	**Commercial 1% SOM mg/kg**	1261104	1261105	1250921	1250924	1294728	1294729
Order No.:	Client Sample Ref.:						2	5	5	8	13.2	13.2
	Client Sample ID.:						BH_FE_003	BH_FE_003	BH_TUN_005	BH_TUN_004	BH_TUN_015	BH_TUN_018
	Sample Location:						SOIL	SOIL	0.5	1.1	10.5	10.5
	Sample Type:						0.2	0.5	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):						0.25	0.55	0.5	1.1	10.3	10.2
	Date Sampled:						13-Aug-2021	13-Aug-2021	29-Jul-21	28-Jul-21	08-Oct-21	07-Oct-21
	Asbestos Lab:						DURHAM		DURHAM	DURHAM	DURHAM	DURHAM
	Strata						SUPD	SUPD	MGR	RTD	WMCK	WMCK
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Pyrene	M	2700	mg/kg	0.1	15000	54000	< 0.10	< 0.050	1	0.32	< 0.10	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.1	49	170	< 0.10	< 0.050	0.64	0.2	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.1	93	350	< 0.10	< 0.050	0.99	0.29	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.1	13	44	< 0.10	< 0.050	0.84	0.2	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.1	370	1200	< 0.10	< 0.050	0.63	0.41	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.1	11	35	< 0.10	< 0.050	0.79	0.27	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.1	150	500	< 0.10	< 0.050	0.92	0.35	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.1	1.1	3.5	< 0.10	< 0.050	0.51	0.29	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.1	1400	3900	< 0.10	< 0.050	0.71	0.29	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2	-	-	< 2.0	< 0.050	8.9	2.9	< 2.0	< 2.0
Dichlorodifluoromethane	U	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 0.10	< 0.10	< 0.10	[B] <1.0
Chloromethane	M	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 0.10	< 0.10	< 0.10	[B] <1.0
Vinyl Chloride	M	2760	µg/kg	1	4.8	0.059	< 1.0	< 0.20	< 0.10	< 0.10	< 0.10	[B] <1.0
Bromomethane	M	2760	µg/kg	20	-	-	< 20	< 0.20	< 20	< 20	< 20	[B] <20
Chloroethane	U	2760	µg/kg	2	154000	900	< 2.0	< 0.20	< 2.0	< 2.0	< 2.0	[B] <2.0
Trichlorofluoromethane	M	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
1,1-Dichloroethene	M	2760	µg/kg	1	3500	24	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
Trans 1,2-Dichloroethene	M	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
1,1-Dichloroethane	M	2760	µg/kg	1	20000	260	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
cis 1,2-Dichloroethene	M	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
Bromochloromethane	U	2760	µg/kg	5	-	-	< 5.0	< 0.50	< 5.0	< 5.0	< 5.0	[B] <5.0
Trichloromethane	M	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
1,1,1-Trichloroethane	M	2760	µg/kg	1	57000	660	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
Tetrachloromethane	M	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
1,1-Dichloropropene	U	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
Benzene	M	2760	µg/kg	1	90	27	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
1,2-Dichloroethane	M	2760	µg/kg	2	21	0.67	< 2.0	< 0.20	< 2.0	< 2.0	< 2.0	[B] <2.0
Trichloroethene	N	2760	µg/kg	1	70	1.2	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
1,2-Dichloropropane	M	2760	µg/kg	1	160	3.1	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
Dibromomethane	M	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
Bromodichloromethane	M	2760	µg/kg	5	56	2	< 5.0	< 0.20	< 5.0	< 5.0	< 5.0	[B] <1.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10	-	-	< 10	< 0.20	< 10	< 10	< 10	[B] <10
Toluene	M	2760	µg/kg	1	87000	56000	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	-	-	< 10	< 0.20	< 10	< 10	< 10	[B] <10
1,1,2-Trichloroethane	M	2760	µg/kg	10	1100	89	< 10	< 0.20	< 10	< 10	< 10	[B] <10
Tetrachloroethene	M	2760	µg/kg	1	810	19	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
1,3-Dichloropropane	U	2760	µg/kg	2	-	-	< 2.0	< 0.20	< 2.0	< 2.0	< 2.0	[B] <2.0
Dibromochloromethane	U	2760	µg/kg	10	-	-	< 10	< 0.20	< 10	< 10	< 10	[B] <1.0
1,2-Dibromoethane	M	2760	µg/kg	5	-	-	< 5.0	< 0.20	< 5.0	< 5.0	< 5.0	[B] <5.0
Chlorobenzene	M	2760	µg/kg	1	1300	56	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2	1500	110	< 2.0	< 0.20	< 2.0	< 2.0	< 2.0	[B] <2.0
Ethylbenzene	M	2760	µg/kg	1	17000	5700	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
m & p-Xylene	M	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
o-Xylene	M	2760	µg/kg	1	17000	6600	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
Styrene	M	2760	µg/kg	1	5900	3200	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
Tribromomethane	U	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
Isopropylbenzene	M	2760	µg/kg	1	23000	1300	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
Bromobenzene	M	2760	µg/kg	1	1800	92	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50	-	-	< 50	< 0.20	< 50	< 50	< 50	[B] <50
N-Propylbenzene	U	2760	µg/kg	1	36000	3900	-	-	< 1.0	< 1.0	< 1.0	[B] <1.0
2-Chlorotoluene	M	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
1,3,5-Trimethylbenzene	M	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
4-Chlorotoluene	U	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
Tert-Butylbenzene	U	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
1,2,4-Trimethylbenzene	M	2760	µg/kg	1	310	39	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
Sec-Butylbenzene	U	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
1,3-Dichlorobenzene	M	2760	µg/kg	1	390	30	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0
4-Isopropyltoluene	U	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0

Project: TE8364 Cambridge Waste Water Treatment Plant Relocation

Results - Soil

								2688	2688	2855	2855		
							Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	
Client: Soil Engineering Geoservices Ltd	**Chemtest Job No.:**						21-28286	21-28286	21-26263	21-26263	21-35054-1	21-35054-1	
Quotation No.: Q21-24797	**Chemtest Sample ID.:**				**Public Open Space (park) 1% SOM mg/kg**	**Commercial 1% SOM mg/kg**	1261104	1261105	1250921	1250924	1294728	1294729	
Order No.:	Client Sample Ref.:						2	5	5	8	13.2	13.2	
	Client Sample ID.:						BH_FE_003	BH_FE_003	BH_TUN_005	BH_TUN_004	BH_TUN_015	BH_TUN_018	
	Sample Location:						SOIL	SOIL	0.5	1.1	10.5	10.5	
	Sample Type:						0.2	0.5	SOIL	SOIL	SOIL	SOIL	
	Top Depth (m):						0.25	0.55	0.5	1.1	10.3	10.2	
	Date Sampled:						13-Aug-2021	13-Aug-2021	29-Jul-21	28-Jul-21	08-Oct-21	07-Oct-21	
	Asbestos Lab:						DURHAM		DURHAM	DURHAM	DURHAM	DURHAM	
	Strata						SUPD	SUPD	MGR	RTD	WMCK	WMCK	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
1,4-Dichlorobenzene	M	2760	µg/kg	1	36000	4200	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0	
N-Butylbenzene	U	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0	
1,2-Dichlorobenzene	M	2760	µg/kg	1	24000	2000	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0	
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	-	-	< 50	< 0.20	< 50	< 50	< 50	[B] <50	
1,2,4-Trichlorobenzene	M	2760	µg/kg	1	1700	220	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0	
Hexachlorobutadiene	U	2760	µg/kg	1	48	31	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0	
1,2,3-Trichlorobenzene	U	2760	µg/kg	2	-	-	< 2.0	< 0.20	< 2.0	< 2.0	< 2.0	[B] <2.0	
Methyl Tert-Butyl Ether	M	2760	µg/kg	1	98000	7500	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0	
Resorcinol	M	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	[B] <0.02	
Phenol	M	2920	mg/kg	0.02	440	440	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	[B] <0.02	
Cresols	M	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	[B] <0.02	
Xylenols	M	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	[B] <0.02	
1-Naphthol	N	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	[B] <0.02	
Trimethylphenols	M	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	[B] <0.02	
Total Phenols	M	2920	mg/kg	0.1	-	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	[B] <0.1	

Project: TE8364 Cambridge Waste Water Treatment Plant Relocation

Results - Soil

								2688	2688	2855	2855		
							Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	
Client: Soil Engineering Geoservices Ltd	**Chemtest Job No.:**						21-28286	21-28286	21-26263	21-26263	21-35054-1	21-35054-1	
Quotation No.: Q21-24797	**Chemtest Sample ID.:**				**Public Open Space (park) 1% SOM mg/kg**	**Commercial 1% SOM mg/kg**	1261104	1261105	1250921	1250924	1294728	1294729	
Order No.:	Client Sample Ref.:						2	5	5	8	13.2	13.2	
	Client Sample ID.:						BH_FE_003	BH_FE_003	BH_TUN_005	BH_TUN_004	BH_TUN_015	BH_TUN_018	
	Sample Location:						SOIL	SOIL	0.5	1.1	10.5	10.5	
	Sample Type:						0.2	0.5	SOIL	SOIL	SOIL	SOIL	
	Top Depth (m):						0.25	0.55	0.5	1.1	10.3	10.2	
	Date Sampled:						13-Aug-2021	13-Aug-2021	29-Jul-21	28-Jul-21	08-Oct-21	07-Oct-21	
	Asbestos Lab:						DURHAM		DURHAM	DURHAM	DURHAM	DURHAM	
	Strata						SUPD	SUPD	MGR	RTD	WMCK	WMCK	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
1,4-Dichlorobenzene	M	2760	µg/kg	1	36000	4200	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0	
N-Butylbenzene	U	2760	µg/kg	1	-	-	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0	
1,2-Dichlorobenzene	M	2760	µg/kg	1	24000	2000	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0	
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	-	-	< 50	< 0.20	< 50	< 50	< 50	[B] <50	
1,2,4-Trichlorobenzene	M	2760	µg/kg	1	1700	220	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0	
Hexachlorobutadiene	U	2760	µg/kg	1	48	31	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0	
1,2,3-Trichlorobenzene	U	2760	µg/kg	2	-	-	< 2.0	< 0.20	< 2.0	< 2.0	< 2.0	[B] <2.0	
Methyl Tert-Butyl Ether	M	2760	µg/kg	1	98000	7500	< 1.0	< 0.20	< 1.0	< 1.0	< 1.0	[B] <1.0	
Resorcinol	M	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	[B] <0.02	
Phenol	M	2920	mg/kg	0.02	440	440	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	[B] <0.02	
Cresols	M	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	[B] <0.02	
Xylenols	M	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	[B] <0.02	
1-Naphthol	N	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	[B] <0.02	
Trimethylphenols	M	2920	mg/kg	0.02	-	-	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	[B] <0.02	
Total Phenols	M	2920	mg/kg	0.1	-	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	[B] <0.1	

Results - Leachate

Project: TE8364 Cambridge Waste Water Treatment Plant Relocation

								WWTP Site	WWTP Site	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas
Client: Soil Engineering Geoservices Ltd			**Chemtest Job No.:**					21-26285	21-28134	21-28963	21-31059	21-26263
Quotation No.: Q21-24797			**Chemtest Sample ID.:**			**UK DWS mg/l**	**EQS mg/l**	1251058	1260362	1264390	1274689	1250924
			Client Sample ID.:					8	2	2	2	8
			Sample Location:					BH_STW_009	BH_STW_012A	TUN-003	BH-TUN-001A	BH_TUN_004
			Sample Type:					SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):					1.1	0.2	0.2	0.2	1.1
			Bottom Depth (m):					1.2	0.2	0.25	0.25	1.2
			Date Sampled:					28-Jul-2021	10-Aug-2021	16-Aug-2021	06-Sep-2021	44405
			Strata:					WMCK	MGR	MGR	MGR	RTD
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**							
pH	U	1010	2:1		N/A	-	-	8.5	8.2	7.2	8.9	8.3
Chloride	U	1220	2:1	mg/l	1	250	-	1.8	2	2.3	1.8	9.6
Fluoride	U	1220	2:1	mg/l	0.05	1.5	-	0.55	1.6	1.2	0.8	0.35
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.05	0.38	0.2	0.11	0.67	0.061	0.075	0.15
Sulphate	U	1220	2:1	mg/l	1	250	-	7.7	8.7	160	13	110
Cyanide (Total)	U	1300	2:1	mg/l	0.05	-	-	< 0.050	< 0.050	< 0.050		< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.05	0.05	0.001	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Cyanide (Complex)	U	1300	2:1	mg/l	0.05	-	-	< 0.050	< 0.050	< 0.050	0.1	< 0.050
Calcium	U	1455	2:1	mg/l	2	250	-	24	29	69	32	68
Magnesium	U	1455	2:1	mg/l	0.2	50	-	0.76	0.72	2.7	1	3.2
Arsenic	U	1455	2:1	µg/l	0.2	0.01	0.05	0.34	2.8	1.8	0.003	6
Boron	U	1455	2:1	µg/l	10	1	2	43	35	64	0.02	130
Barium	U	1455	2:1	µg/l	5	1300	-	< 5.0	6.3	53	0.019	11
Beryllium	U	1455	2:1	µg/l	1	-	-	< 1.0	< 1.0	< 1.0	< 0.001	<1.0
Cadmium	U	1455	2:1	µg/l	0.11	0.005	0.00008	< 0.11	< 0.11	< 0.11	< 0.00011	<0.11
Chromium	U	1455	2:1	µg/l	0.5	0.05	-	< 0.50	0.97	< 0.50		1.9
Copper	U	1455	2:1	µg/l	0.5	2	0.001	2.4	4.4	7	0.0072	15
Manganese	U	1455	2:1	µg/l	0.5	0.05	0.123	2.7	4.8	2	0.0013	1.5
Molybdenum	U	1455	2:1	µg/l	0.2	0.07	-	6.4	2.3	21	0.013	15
Nickel	U	1455	2:1	µg/l	0.5	0.02	0.004	< 0.50	2.3	3.8	0.0014	4.3
Lead	U	1455	2:1	µg/l	0.5	0.01	0.0012	< 0.50	1.4	< 0.50	< 0.0005	<0.5
Antimony	U	1455	2:1	µg/l	0.5	0.005	-	< 0.50	< 0.50	0.83	0.0013	3.8
Selenium	U	1455	2:1	µg/l	0.5	0.01	-	0.58	< 0.50	1.3	0.0012	1
Vanadium	U	1455	2:1	µg/l	0.5	-	-	0.55	3.9	2.3	< 0.0005	10
Zinc	U	1455	2:1	µg/l	2.5	5	0.0109	2.6	< 2.5	< 2.5	< 0.003	2.5
Mercury Low Level	U	1460	2:1	µg/l	0.01	-	-	< 0.010	< 0.010	0.02		<0.01
Iron	N	1455	2:1	µg/l	5	0.2	1	< 5.0	1400	13	0.042	11
Chromium (Trivalent)	N	1490	2:1	µg/l	20	-	0.0047	< 20	< 20	< 20	< 20	<20
Low-Level Chromium (Hexavalent)	N	1495	2:1	µg/l	0.1	-	-	< 0.10	0.17	0.16	< 20	0.65
Total Organic Carbon	U	1610	2:1	mg/l	2	-	-	15	9.1	8.6		19
Resorcinol	U	1920	2:1	mg/l	0.005	-	-	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Phenol	U	1920	2:1	mg/l	0.005	0.0005	0.0077	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Cresols	U	1920	2:1	mg/l	0.005	-	-	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Xylenols	U	1920	2:1	mg/l	0.005	-	-	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
1-Naphthol	N	1920	2:1	mg/l	0.005	-	-	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Trimethylphenols	U	1920	2:1	mg/l	0.005	-	-	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Total Phenols	U	1920	2:1	mg/l	0.03	-	-	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030

Project: TE8364 Cambridge Waste Water Treatment Plant Relocation

							Groundwater												
							Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site
Client: Soil Engineering Geoservices Ltd				**Chemtest Job No.:**			21-40931	21-40934	21-40935	21-38515	21-38515	21-38515	21-38384	21-38384	21-40932	21-40940	21-40941	21-40943	21-40944
Quotation No.:				**Chemtest Sample ID.:**			1324639	1324646	1324647	1312386	1312387	1312388	1311775	1311776	1324640	1324663	1324664	1324669	1324670
Order No.:				Client Sample Ref.:			2	2	2				1	1	1	1	1	1	1
				Sample Location:			BH_TUN_011	BH_FE_001	BH_FE_002	BH_TUN_001A	BH_FE_001	BH_FE_002	BH_TUN_011	BH_TUN_006	BH_STW_026	BH_STW_001	BH_STW_009	BH_STW_015	BH_STW_023
				Sample Type:	**UK DWS mg/l**	**EQS mg/l**	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
				Top Depth (m):			4	3	5				2	2	8	8	10	10	10
				Date Sampled:			17-Nov-2021	17-Nov-2021	17-Nov-2021	03-Nov-21	03-Nov-21	03-Nov-21	02-Nov-21	02-Nov-21	18-Nov-2021	18-Nov-2021	18-Nov-2021	18-Nov-2021	18-Nov-2021
				Strata			WMCK / CBG	RTD	WMCK	RTD	SUPD	WMCK	WMCK	MGR/RTD	WMCK	WMCK	WMCK	WMCK	WMCK
Determinand	**Accred.**	**SOP**	**Units**	**LOD**															
pH	U	1010		N/A	-	-	11.5	7.9	8	8.3	8	8	11.7	8.3	9.1	7.9	8	8.1	8.1
Total Dissolved Solids	N	1020	mg/l	1	-	-	1000	910	720	980	910	490	1700	850	510	650	480	550	460
Alkalinity (Bicarbonate)	U	1220	mg CaCO3/l	10	-	-	22	480	350	350	410	230	25	440	320	360	400	380	400
Chloride	U	1220	mg/l	1	250	-	51	190	95	120	210	93	47	140	67	97	51	76	58
Fluoride	U	1220	mg/l	0.05	1.5	-	0.57	0.25	0.19	0.33	0.27	0.25	0.7	0.22	0.15	0.12	0.15	0.13	0.14
Ammoniacal Nitrogen	U	1220	mg/l	0.05	0.38	0.2	0.27	1.8	0.3	0.29	<0.05	<0.05	0.31	0.55	0.55	1.9	2	0.16	0.14
Nitrate	U	1220	mg/l	0.5	11.295	-	11	25	81	<0.5	24	65	11	8.3	< 0.50	3.5	0.53	6.7	23
Sulphur	N	1220	mg/l	1	-	-	19	40	43	140	43	47	13	80	37	53	24	43	31
Sulphate	U	1220	mg/l	1	250	-	56	120	130	420	130	140	39	240	110	160	73	130	94
Cyanide (Free)	U	1300	mg/l	0.05	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Cyanide (Complex)	U	1300	mg/l	0.05	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.05	< 0.050	< 0.050	< 0.050
Calcium	U	1455	mg/l	2	250	-	100	240	180	150	220	160	92	210	130	170	120	140	130
Potassium	U	1455	mg/l	0.5	12	-	29	5.8	2.8	11	6.4	3.1	14	14	5.5	5.3	12	7	7
Magnesium	U	1455	mg/l	0.2	50	-	< 0.20	6.7	6.1	14	7.1	6.3	<0.20	12	12	8	8.9	7	6.8
Sodium	U	1455	mg/l	1.5	200	-	310	55	30	160	55	35	510	81	19	23	18	19	19
Total Hardness as CaCO3	U	1270	mg/l	15	-	-	260	620	470	430	590	430	230	570	380	470	340	380	360
Arsenic	U	1455	mg/l	0.0002	0.01	0.05	0.0022	< 0.0002	< 0.0002	0.0007	0.0003	0.0003	0.0026	0.0015	0.0003	0.0004	< 0.0002	< 0.0002	0.0002
Boron	U	1455	mg/l	0.01	1	2	< 0.01	0.07	0.07	0.17	0.08	0.73	0.01	0.25	0.04	0.04	0.05	0.03	0.04
Barium	U	1455	mg/l	0.005	1300	-	0.12	0.087	0.049	0.085	0.081	0.045	0.097	0.079	0.15	0.12	0.14	0.1	0.11
Beryllium	U	1455	mg/l	0.001	-	-	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Cadmium	U	1455	mg/l	0.00011	0.005	0.00008	< 0.00011	< 0.00011	< 0.00011	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.00057	< 0.00011	< 0.00011	< 0.00011	< 0.00011	< 0.00011
Copper	U	1455	mg/l	0.0005	2	0.001	0.018	0.0027	0.0011	0.0022	0.0017	0.0011	0.015	0.0095	0.0009	0.0016	0.001	0.0011	0.0014
Mercury	U	1455	mg/l	0.00005	0.001	0.00007	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	<0.0005	<0.0005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Manganese	U	1455	mg/l	0.0005	0.05	0.123	0.0011	0.065	0.0026	0.059	0.062	0.0069	<0.0005	0.35	0.047	0.034	0.031	0.02	0.017
Molybdenum	U	1455	mg/l	0.0002	0.07	-	0.062	0.0003	< 0.0002	0.0017	0.0005	0.0006	0.0064	0.0053	0.0009	0.0046	0.0005	0.0004	0.0003
Nickel	U	1455	mg/l	0.0005	0.02	0.004	0.0058	0.0096	0.0039	0.0062	0.0078	0.0083	0.0039	0.021	0.001	0.0039	0.0015	0.0035	0.0036
Lead	U	1455	mg/l	0.0005	0.01	0.0012	0.0046	0.0015	< 0.0005	< 0.0005	< 0.0005	< 0.0005	<0.0005	<0.0005	0.0014	0.0012	< 0.0005	< 0.0005	< 0.0005
Antimony	U	1455	mg/l	0.0005	0.005	-	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	<0.0005	0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Selenium	U	1455	mg/l	0.0005	0.01	-	0.013	0.003	0.0034	0.0011	0.004	0.0041	0.014	0.0025	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Vanadium	U	1455	mg/l	0.0005	-	-	0.012	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.01	0.0011	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Zinc	U	1455	mg/l	0.002	5	0.0109	0.006	0.006	0.008	0.003	<0.003	<0.003	<0.003	0.006	0.01	0.013	0.004	0.008	0.005
Iron	N	1455	mg/l	0.005	0.2	1	0.19	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.24	0.019	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Chromium (Trivalent)	N	1490	mg/l	0.02	-	0.0047	[B] 9.4	[B] < 0.020	[B] < 0.020	<0.02	<0.02	<0.02	13	<0.02	[B] < 0.020	[B] < 0.020	[B] < 0.020	[B] 6.7	[B] 0.58
Chromium (Hexavalent)	U	1490	mg/l	0.02	-	0.0034	[B] < 0.020	[B] < 0.020	[B] < 0.020	<0.02	<0.02	<0.02	<0.02	<0.02	[B] < 0.020	[B] < 0.020	[B] < 0.020	[B] < 0.020	[B] < 0.020
Aliphatic TPH >C5-C6	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10	< 0.10	140	470	230	370	200	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.1	-	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5	-	-	< 5.0	< 5.0	< 5.0	140	470	230	< 0.10	< 0.10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.1	0.01	0.01	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.1	0.01	0.074	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10	93	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	48	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5	-	-	< 5.0	< 5.0	93	< 5.0	< 5.0	48	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	-	-	< 10	< 10	93	140	470	280	370	200	< 10	< 10	< 10	< 10	< 10
Dichlorodifluoromethane	U	1760	µg/l	1	-	-	< 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
Chloromethane	U	1760	µg/l	1	-	-	< 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
Vinyl Chloride	N	1760	µg/l	1	0.0005	-	< 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
Bromomethane	U	1760	µg/l	5	-	-	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chloroethane	U	1760	µg/l	2	-	-	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1	-	-	< 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
1,1-Dichloroethene	U	1760	µg/l	1	-	-	< 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
Trans 1,2-Dichloroethene	U	1760	µg/l	1	-	-	< 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
1,1-Dichloroethane	U	1760	µg/l	1	-	-	< 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
cis 1,2-Dichloroethene	U	1760	µg/l	1	-	-	< 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

Project: TE8364 Cambridge Waste Water Treatment Plant Relocation							Groundwater												
							Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	Transfer Tunnel Areas	WWTP Site	WWTP Site	WWTP Site	WWTP Site	WWTP Site
Client: Soil Engineering Geoservices Ltd				**Chemtest Job No.:**			21-40931	21-40934	21-40935	21-38515	21-38515	21-38515	21-38384	21-38384	21-40932	21-40940	21-40941	21-40943	21-40944
Quotation No.:				**Chemtest Sample ID.:**			1324639	1324646	1324647	1312386	1312387	1312388	1311775	1311776	1324640	1324663	1324664	1324669	1324670
Order No.:				Client Sample Ref.:			2	2	2				1	1	1	1	1	1	1
				Sample Location:			BH_TUN_011	BH_FE_001	BH_FE_002	BH_TUN_001A	BH_FE_001	BH_FE_002	BH_TUN_011	BH_TUN_006	BH_STW_026	BH_STW_001	BH_STW_009	BH_STW_015	BH_STW_023
				Sample Type:	**UK DWS mg/l**	**EQS mg/l**	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
				Top Depth (m):			4	3	5				2	2	8	8	10	10	10
				Date Sampled:			17-Nov-2021	17-Nov-2021	17-Nov-2021	03-Nov-21	03-Nov-21	03-Nov-21	02-Nov-21	02-Nov-21	18-Nov-2021	18-Nov-2021	18-Nov-2021	18-Nov-2021	18-Nov-2021
				Strata			WMCK / CBG	RTD	WMCK	RTD	SUPD	WMCK	WMCK	MGR/RTD	WMCK	WMCK	WMCK	WMCK	WMCK
Determinand	**Accred.**	**SOP**	**Units**	**LOD**															
Bromochloromethane	U	1760	µg/l	5	-	-	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trichloromethane	U	1760	µg/l	1	-	-	< 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
1,1,1-Trichloroethane	U	1760	µg/l	1	-	0.1	< 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
Tetrachloromethane	U	1760	µg/l	1	-	-	< 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
1,1-Dichloropropene	U	1760	µg/l	1	-	-	< 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
Benzene	U	1760	µg/l	1	0.001	0.01	< 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
1,2-Dichloroethane	U	1760	µg/l	2	0.003	0.01	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichloroethene	N	1760	µg/l	1	0.01	0.01	< 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
1,2-Dichloropropane	U	1760	µg/l	1	0.04	-	< 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
Dibromomethane	U	1760	µg/l	10	-	-	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Bromodichloromethane	U	1760	µg/l	5	0.06	-	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	N	1760	µg/l	10	-	-	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Toluene	U	1760	µg/l	1	0.7	0.074	< 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
Trans-1,3-Dichloropropene	N	1760	µg/l	10	-	-	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	-	0.4	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	U	1760	µg/l	1	0.01	0.01	< 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
1,3-Dichloropropane	U	1760	µg/l	2	-	-	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	0.1	-	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,2-Dibromoethane	U	1760	µg/l	5	0.0004	-	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	N	1760	µg/l	1	-	-	< 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
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2	-	-	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1	0.3	-	< 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
m & p-Xylene	U	1760	µg/l	1	-	0.01	< 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
o-Xylene	U	1760	µg/l	1	-	0.01	< 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
Styrene	U	1760	µg/l	1	0.02	-	< 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
Tribromomethane	U	1760	µg/l	1	-	-	< 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
Isopropylbenzene	U	1760	µg/l	1	-	-	< 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
Bromobenzene	U	1760	µg/l	1	-	-	< 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
1,2,3-Trichloropropane	N	1760	µg/l	50	-	-	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
N-Propylbenzene	U	1760	µg/l	1	-	-	< 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
2-Chlorotoluene	U	1760	µg/l	1	-	-	< 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
1,3,5-Trimethylbenzene	U	1760	µg/l	1	-	-	< 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
4-Chlorotoluene	U	1760	µg/l	1	-	-	< 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
Tert-Butylbenzene	U	1760	µg/l	1	-	-	< 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
1,2,4-Trimethylbenzene	U	1760	µg/l	1	-	-	< 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
Sec-Butylbenzene	U	1760	µg/l	1	-	-	< 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
1,3-Dichlorobenzene	N	1760	µg/l	1	-	-	< 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
4-Isopropyltoluene	U	1760	µg/l	1	-	-	< 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
1,4-Dichlorobenzene	U	1760	µg/l	1	0.3	-	< 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
N-Butylbenzene	U	1760	µg/l	1	-	-	< 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
1,2-Dichlorobenzene	U	1760	µg/l	1	1	-	< 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
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	0.001	-	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1	-	-	< 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
Hexachlorobutadiene	U	1760	µg/l	1	0.0006	0.0001	< 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
1,2,3-Trichlorobenzene	U	1760	µg/l	2	-	-	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1	-	-	< 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
Naphthalene	U	1800	µg/l	0.1	-	0.002	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1800	µg/l	0.1	-	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1800	µg/l	0.1	-	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	1800	µg/l	0.1	-	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	1800	µg/l	0.1	-	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	1800	µg/l	0.1	-	0.0001	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1800	µg/l	0.1	0.000038	0.0000063	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1800	µg/l	0.1	-	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1800	µg/l	0.1	-	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	1800	µg/l	0.1	-	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1800	µg/l	0.1	0.001	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1800	µg/l	0.1	0.001	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1800	µg/l	0.1	0.00001	0.00000017	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	µg/l	0.1	0.0001	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1800	µg/l	0.1	-	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1800	µg/l	0.1	0.001	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	1800	µg/l	2	-	-	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Resorcinol	U	1920	mg/l	0.005	-	-	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Phenol	U	1920	mg/l	0.005	0.0005	0.0077	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Cresols	U	1920	mg/l	0.005	-	-	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Xylenols	U	1920	mg/l	0.005	-	-	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
1-Naphthol	N	1920	mg/l	0.005	-	-	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Trimethylphenols	U	1920	mg/l	0.005	-	-	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Total Phenols	U	1920	mg/l	0.03	-	-	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030

Project: TE8364 Cambridge Waste Water Treatment Plant Relocation

											Surface water		
							WWTP Site	WWTP Site		Quy Fen main por	Allicky Farm Pond	Black ditch	
Client: Soil Engineering Geoservices Ltd				**Chemtest Job No.:**			21-40945	21-40946		21-40949	21-40950	21-40952	
Quotation No.:				**Chemtest Sample ID.:**			1324671	1324672		1324689	1324690	1324693	
Order No.:				Client Sample Ref.:			1	1		1	1	1	
				Sample Location:			BH_STW_024	BH_STW_025		SW01	SW02	SW03	
				Sample Type:	**UK DWS mg/l**	**EQS mg/l**	WATER	WATER		WATER	WATER	WATER	
				Top Depth (m):			10	8		0	0	0	
				Date Sampled:			18-Nov-2021	18-Nov-2021		##########	##########	##########	
				Strata			WMCK	WMCK		n/a	n/a	n/a	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
pH	U	1010		N/A	-	-	8.1	8.1		8.4	8.4	8.2	
Total Dissolved Solids	N	1020	mg/l	1	-	-	550	630		590	650	780	
Alkalinity (Bicarbonate)	U	1220	mg CaCO3/l	10	-	-	370	380		230	380	410	
Chloride	U	1220	mg/l	1	250	-	76	87		89	120	140	
Fluoride	U	1220	mg/l	0.05	1.5	-	0.13	0.14		0.18	0.21	0.17	
Ammoniacal Nitrogen	U	1220	mg/l	0.05	0.38	0.2	0.17	**0.23**		**0.45**	**1.2**	**2.3**	
Nitrate	U	1220	mg/l	0.5	11.295	-	12	2.1		< 0.50	< 0.50	43	
Sulphur	N	1220	mg/l	1	-	-	43	57		33	40	40	
Sulphate	U	1220	mg/l	1	250	-	130	170		100	120	120	
Cyanide (Free)	U	1300	mg/l	0.05	-	-	< 0.050	< 0.050		< 0.050	< 0.050	< 0.050	
Cyanide (Complex)	U	1300	mg/l	0.05	-	-	< 0.050	< 0.050		< 0.050	< 0.050	< 0.050	
Calcium	U	1455	mg/l	2	250	-	150	170		120	160	180	
Potassium	U	1455	mg/l	0.5	12	-	4.8	5.2		13	2.8	4	
Magnesium	U	1455	mg/l	0.2	50	-	7.6	8.9		8.3	5.7	5.7	
Sodium	U	1455	mg/l	1.5	200	-	20	22		35	30	40	
Total Hardness as CaCO3	U	1270	mg/l	15	-	-	400	450		340	430	480	
Arsenic	U	1455	mg/l	0.0002	0.01	0.05	< 0.0002	< 0.0002		0.0015	0.001	0.0006	
Boron	U	1455	mg/l	0.01	1	2	0.04	0.04		0.05	0.03	0.04	
Barium	U	1455	mg/l	0.005	1300	-	0.11	0.11		0.065	0.11	0.097	
Beryllium	U	1455	mg/l	0.001	-	-	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	
Cadmium	U	1455	mg/l	0.00011	0.005	0.00008	< 0.00011	< 0.00011		< 0.00011	< 0.00011	< 0.00011	
Copper	U	1455	mg/l	0.0005	2	0.001	**0.0011**	0.0006		**0.0023**	**0.0025**	**0.0029**	
Mercury	U	1455	mg/l	0.00005	0.001	0.00007	< 0.00005	< 0.00005		< 0.00005	< 0.00005	< 0.00005	
Manganese	U	1455	mg/l	0.0005	0.05	0.123	0.03	0.037		0.003	0.074	0.0073	
Molybdenum	U	1455	mg/l	0.0002	0.07	-	0.0002	0.0003		0.0007	0.0002	0.0008	
Nickel	U	1455	mg/l	0.0005	0.02	0.004	0.0014	0.0007		0.0032	0.0008	**0.0089**	
Lead	U	1455	mg/l	0.0005	0.01	0.0012	< 0.0005	< 0.0005		< 0.0005	< 0.0005	< 0.0005	
Antimony	U	1455	mg/l	0.0005	0.005	-	< 0.0005	< 0.0005		0.0006	< 0.0005	0.0006	
Selenium	U	1455	mg/l	0.0005	0.01	-	< 0.0005	< 0.0005		0.0015	0.0008	0.0015	
Vanadium	U	1455	mg/l	0.0005	-	-	< 0.0005	< 0.0005		< 0.0005	< 0.0005	< 0.0005	
Zinc	U	1455	mg/l	0.002	5	0.0109	0.009	0.004		0.004	0.008	0.01	
Iron	N	1455	mg/l	0.005	0.2	1	< 0.005	< 0.005		0.01	0.047	0.017	
Chromium (Trivalent)	N	1490	mg/l	0.02	-	0.0047	**[B] 3.8**	[B] < 0.020		**[B] 7.6**	**[B] 7.2**	**[B] 7.8**	
Chromium (Hexavalent)	U	1490	mg/l	0.02	-	0.0034	[B] < 0.020	[B] < 0.020		[B] < 0.020	[B] < 0.020	[B] < 0.020	
Aliphatic TPH >C5-C6	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Aliphatic TPH >C6-C8	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Aliphatic TPH >C8-C10	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Aliphatic TPH >C10-C12	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Aliphatic TPH >C12-C16	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Aliphatic TPH >C16-C21	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Aliphatic TPH >C21-C35	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Aliphatic TPH >C35-C44	N	1675	µg/l	0.1	-	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Total Aliphatic Hydrocarbons	N	1675	µg/l	5	-	-	< 5.0	< 5.0		< 5.0	< 5.0	< 5.0	
Aromatic TPH >C5-C7	N	1675	µg/l	0.1	0.01	0.01	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Aromatic TPH >C7-C8	N	1675	µg/l	0.1	0.01	0.074	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Aromatic TPH >C8-C10	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Aromatic TPH >C10-C12	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Aromatic TPH >C12-C16	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Aromatic TPH >C16-C21	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Aromatic TPH >C21-C35	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Aromatic TPH >C35-C44	N	1675	µg/l	0.1	0.01	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Total Aromatic Hydrocarbons	N	1675	µg/l	5	-	-	< 5.0	< 5.0		< 5.0	< 5.0	< 5.0	
Total Petroleum Hydrocarbons	N	1675	µg/l	10	-	-	< 10	< 10		< 10	< 10	< 10	
Dichlorodifluoromethane	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	
Chloromethane	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	
Vinyl Chloride	N	1760	µg/l	1	0.0005	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	
Bromomethane	U	1760	µg/l	5	-	-	< 5	< 5		< 5	< 5	< 5	
Chloroethane	U	1760	µg/l	2	-	-	< 2.0	< 2.0		< 2.0	< 2.0	< 2.0	
Trichlorofluoromethane	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	
1,1-Dichloroethene	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	
Trans 1,2-Dichloroethene	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	
1,1-Dichloroethane	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	
cis 1,2-Dichloroethene	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	

Project: TE8364 Cambridge Waste Water Treatment Plant Relocation

											Surface water		
							WWTP Site	WWTP Site		Quy Fen main por	Allicky Farm Pond	Black ditch
Client: Soil Engineering Geoservices Ltd				**Chemtest Job No.:**			21-40945	21-40946		21-40949	21-40950	21-40952
Quotation No.:				**Chemtest Sample ID.:**			1324671	1324672		1324689	1324690	1324693
Order No.:				Client Sample Ref.:			1	1		1	1	1
				Sample Location:			BH_STW_024	BH_STW_025		SW01	SW02	SW03
				Sample Type:	**UK DWS mg/l**	**EQS mg/l**	WATER	WATER		WATER	WATER	WATER
				Top Depth (m):			10	8		0	0	0
				Date Sampled:			18-Nov-2021	18-Nov-2021		##########	##########	##########
				Strata			WMCK	WMCK		n/a	n/a	n/a
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Bromochloromethane	U	1760	µg/l	5	-	-	< 5	< 5		< 5	< 5	< 5
Trichloromethane	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1	-	0.1	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Benzene	U	1760	µg/l	1	0.001	0.01	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2	0.003	0.01	< 2.0	< 2.0		< 2.0	< 2.0	< 2.0
Trichloroethene	N	1760	µg/l	1	0.01	0.01	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1	0.04	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	-	-	< 10	< 10		< 10	< 10	< 10
Bromodichloromethane	U	1760	µg/l	5	0.06	-	< 5	< 5		< 5	< 5	< 5
cis-1,3-Dichloropropene	N	1760	µg/l	10	-	-	< 10	< 10		< 10	< 10	< 10
Toluene	U	1760	µg/l	1	0.7	0.074	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10	-	-	< 10	< 10		< 10	< 10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	-	0.4	< 10	< 10		< 10	< 10	< 10
Tetrachloroethene	U	1760	µg/l	1	0.01	0.01	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	1760	µg/l	2	-	-	< 2.0	< 2.0		< 2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	0.1	-	< 10	< 10		< 10	< 10	< 10
1,2-Dibromoethane	U	1760	µg/l	5	0.0004	-	< 5	< 5		< 5	< 5	< 5
Chlorobenzene	N	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2	-	-	< 2.0	< 2.0		< 2.0	< 2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1	0.3	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1	-	0.01	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1	-	0.01	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Styrene	U	1760	µg/l	1	0.02	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Tribromomethane	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Bromobenzene	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	-	-	< 50	< 50		< 50	< 50	< 50
N-Propylbenzene	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2-Chlorotoluene	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1	0.3	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1	1	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	0.001	-	< 50	< 50		< 50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1	0.0006	0.0001	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2	-	-	< 2.0	< 2.0		< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1	-	-	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Naphthalene	U	1800	µg/l	0.1	-	0.002	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1800	µg/l	0.1	-	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Acenaphthene	U	1800	µg/l	0.1	-	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Fluorene	U	1800	µg/l	0.1	-	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Phenanthrene	U	1800	µg/l	0.1	-	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Anthracene	U	1800	µg/l	0.1	-	0.0001	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Fluoranthene	U	1800	µg/l	0.1	0.000038	0.0000063	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Pyrene	U	1800	µg/l	0.1	-	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1800	µg/l	0.1	-	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Chrysene	U	1800	µg/l	0.1	-	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1800	µg/l	0.1	0.001	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1800	µg/l	0.1	0.001	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1800	µg/l	0.1	0.00001	0.00000017	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	µg/l	0.1	0.0001	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1800	µg/l	0.1	-	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1800	µg/l	0.1	0.001	-	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	1800	µg/l	2	-	-	< 2.0	< 2.0		< 2.0	< 2.0	< 2.0
Resorcinol	U	1920	mg/l	0.005	-	-	< 0.0050	< 0.0050		< 0.0050	< 0.0050	< 0.0050
Phenol	U	1920	mg/l	0.005	0.0005	0.0077	< 0.0050	< 0.0050		< 0.0050	< 0.0050	< 0.0050
Cresols	U	1920	mg/l	0.005	-	-	< 0.0050	< 0.0050		< 0.0050	< 0.0050	< 0.0050
Xylenols	U	1920	mg/l	0.005	-	-	< 0.0050	< 0.0050		< 0.0050	< 0.0050	< 0.0050
1-Naphthol	N	1920	mg/l	0.005	-	-	< 0.0050	< 0.0050		< 0.0050	< 0.0050	< 0.0050
Trimethylphenols	U	1920	mg/l	0.005	-	-	< 0.0050	< 0.0050		< 0.0050	< 0.0050	< 0.0050
Total Phenols	U	1920	mg/l	0.03	-	-	< 0.030	< 0.030		< 0.030	< 0.030	< 0.030

C. Contaminant Screening Summary

Summary of Gas Monitoring

				Flow (l/hr)		CH_4 (%vol)		CO_2 (%vol)		Qhg (%vol)			O_2 (%vol)	H2S (ppm)	CO (ppm)					
BH ID	Response Zone(m)	Strata of Response Zone	Date of Monitoring	Peak	Steady State	Peak	Steady State	Peak	Steady State	Q_{hg} CH_4	Q_{hg} CO_2	*Characteristic Situation based on Q hg*	Minimum	peak	peak	Atmospheric Pressure (mB)	Depth to Base (mbgl)	Water Level (mbgl)	Flooded (Y/N)	Gas and Groundwater Monitoring Remarks
BH_STW_009	1.5-12.0	West Melbury Chalk Formation	19/10/2021	0.1	0.1	0.1	0.1	1.9	1.8	0.0001	0.0019		20.4	1	1	1009	3.06	Dry	No	
			02/11/2021	<0.1	0.1	<0.1	<0.1	1.9	1.9	0.0000	0.0019		18.6	<1	<1	997	3.06	Dry	No	
			08/11/2021	<0.1	0.1	<0.1	<0.1	1.9	1.9	0.0000	0.0019		18.6	<1	<1	1022	3.07	Dry	No	
BH_STW_013	0.5-1.5	West Melbury Chalk Formation	19/10/2021	0.1	0.1	0.1	0.1	0.2	0.2	0.0001	0.0002		20.7	1	1	1008	1.45	Dry	No	
			02/11/2021	<0.1	0.1	<0.1	<0.1	0.2	0.2	0.0000	0.0002		20.5	<1	<1	997	3.00	Dry	No	
			08/11/2021	<0.1	0.1	<0.1	<0.1	0.1	0.1	0.0000	0.0001		20.8	<1	<1	1022	3.00	Dry	No	
BH_STW_015	1.5-12.0	West Melbury Chalk Formation	19/10/2021	0.1	0.1	0.1	0.1	1.6	1.6	0.0001	0.0016		19	<1	<1	1009	3.00	Dry	No	
			02/11/2021	<0.1	0.1	<0.1	<0.1	1.6	1.6	0.0000	0.0016		18.6	<1	<1	997	3.00	Dry	No	
			08/11/2021	<0.1	0.1	<0.1	<0.1	0.1	0.1	0.0000	0.0001		21.1	<1	<1	1022	2.70	Dry	No	
BH_STW_022A	1.0-2.0	River Terrace Deposits and West Melbury Chalk Formation	19/10/2021	0.1	0.1	0.1	0.1	0.6	0.6	0.0001	0.0006		15	<1	1	1010	2.10	1.96	No	
			02/11/2021	<0.1	0.1	<0.1	<0.1	0.2	0.1	0.0000	0.0002		18.9	<1	1	997	2.00	Dry	No	
			08/11/2021	<0.1	0.1	<0.1	<0.1	0.2	0.1	0.0000	0.0002		18.9	<1	1	1022	2.00	Dry	No	
BH_TUN_001	0.5-1.50	Made Ground and, River Terrace Deposit	19/10/2021	0.2	0.1	0.1	0.1	0.1	0.1	0.000100	0.0001		21.8	<1	<1	1009	1.50	1.27	No	
			02/11/2021	<0.1	0.1	<0.1	<0.1	3.1	3	0.000000	0.0031		13.4	<1	<1	997	1.50	1.24	No	
			08/11/2021	<0.1	0.1	<0.1	<0.1	2.7	2.6	0.000000	0.0027		15.4	<1	<1	1022	1.50	1.25	No	
BH_TUN_006	1.5-6.0	Made Ground and, River Terrace Deposit	19/10/2021	0.1	0.1	0.2	0.2	0.8	0.8	0.000200	0.0008		20.5	<1	<1	1009	3.50	Dry	No	
			02/11/2021	<0.1	0.1	<0.1	<0.1	0.1	0.1	0.000000	0.0001		21.2	<1	<1	997	3.45	Dry	No	
			08/11/2021	<0.1	0.1	0.3	0.3	19.1	19.1	0.000300	0.0191		2	<1	1	1022	3.45	Dry	No	
BH_TUN_011	1.50-5.00	West Melbury Chalk Formation	19/10/2021	0.1	0.1	0.1	0.1	2	2	0.0001	0.0020		11.6	1	5	1008	2.50	1.77	No	
			02/11/2021	<0.1	0.1	<0.1	<0.1	0.1	0.1	0.0000	0.0001		17.4	<1	1	997	2.50	Dry	No	
			08/11/2021	<0.1	0.1	<0.1	<0.1	0.1	0.1	0.0000	0.0001		19.8	<1	1	1022	2.50	Dry	No	
BH_TUN_014	1.25-11.75	West Melbury Chalk Formation	21/04/2022	0.2	0.2	<0.1	<0.1	0.9	0.9	0.0000	0.0018		19	<1	<1	1011	11.75	4.84	No	
Max (unflooded boreholes)				0.20	0.10	0.30	0.30	19.10	19.10	0.00	0.00		21.80	1.00	5.00	1022				
Min (unflooded borehole)				0.10	0.10	0.10	0.10	0.10	0.10	0.00	0.00		2.00	1.00	1.00	997				

Worst Case Check For WTTP

			Worst Case	
Max Flow (l/h)	Max CH4 (%vol)	Max CO_2 (%vol)	CH4 Qhg (%vol)	CO2 Qhg (%vol)
0.10	0.10	1.90	0.0001	0.0019
		Charateristic Situation =	0	0

Worst Case Check Fror Transfer Tunnel

Max Flow (l/h)	Max CH4 (%vol)	Max CO_2 (%vol)	CH4 Qhg (%vol)	CO2 Qhg (%vol)
0.20	0.20	19.10	0.0004	0.0382
		Charateristic Situation =	0	0

Notes
Worst Case Check calculated by multiplying the maximum recorded flow in any standpipe in that strata with the maximum gas concentration in any other standpipe in that strata, but discounting any peak instantaneous flows and negative flows judged to be unrepresentative of a possible worst case.
Where flow results have been reporteded a zero, these have been updated to 0.1 (flow detection limit)
If CO2 >5% or CH4 >1% concentration consider increase to **CS2**
The third monitoring round in BH_TUNP_006 is not considered representative of the ground gas conditions.

D. Contaminated Land Risk Methodology

The assessment of contamination risk has adopted R&D Publication 66:2008 Guidance for the Safe Development of Housing on Land Affected by Contamination published jointly by the National House-Building Council, Environment Agency and the Chartered Institute of Environmental Health [a].

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

the magnitude of the potential consequence (severity)	(considers the potential severity of the hazard and the sensitivity of the receptor)
the magnitude of probability (likelihood)	(considers 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 B-1 below

Table D-1: Classification of Consequence

Classification	Definition
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".

Classification	Definition
	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&D66:2008 Table A4.3

The probability of contamination risks occurring at the site is classified in accordance with Table D-2. Note: A pollution linkage must first be established before probability is classified. If there is no pollution linkage, then there is no potential risk and no need to apply tests for probability and consequence.

Table D-2: Classification of Probability

Classification	Definition
High likelihood	There is a pollutant linkage and an event that either appears very likely in the short term or almost inevitable over the longer term, or there is evidence at the receptor of harm or pollution.
Likely	There is a pollutant linkage and all elements are present and in the right place which means 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 pollutant linkage and circumstances are possible under which an event would occur.
	However, it is by no means certain that even over a longer period such event would take place, and it is less likely in the shorter term.
Unlikely	There is a pollutant linkage, but circumstances are such that it is improbable that an event would occur even in the very long-term.

Source: R&D66:2008 Table A4.4

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 D-3.

Table D-3: Qualitative 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&D66:2008 Table A4.5

R&D 66:2008 presents descriptions of these risk levels which are reproduced in Table D-4. The risks apply to each pollutant linkage, not simply to each hazard or receptor.

Table D-4: Description of Risk Levels

Term	Description
Very high risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action.
High risk	Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action.
Moderate risk	It is possible that without appropriate remediation action harm could arise to a to a designated receptor. It is relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that such harm would be mild.
Low risk	It is possible that harm could arise to a designated receptor from identified hazard. It is likely that, at worst, if any harm was realised the effects would be mild.
Very low risk	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.

Source: R&D66:2008 – section A4.5.1LCRM

E. Human Health Assessment Criteria Methodology

Risks to human health from historically contaminated soils have been assessed by comparison of laboratory contamination data with generic screening values established using the UK Contaminated Land Exposure Assessment (CLEA) framework.

Suitable for Use Levels (S4ULs) have been developed by Land Quality Management and the Chartered Institute of Environmental Health (LQM/CIEH)[2] in-accordance with the CLEA framework which replace the previously developed 2009 LQM / Chartered Institute of Environmental Health (CIEH) Generic Assessment Criteria (GAC) values. S4ULs are based on the principles of 'minimal' or 'tolerable' risk enshrined within SR2[3] and are intended as 'trigger values' above which further assessment of the risks may be needed. The derivation of S4ULs has adopted modifications to the CLEA exposure assessment parameters proposed by Department for Environment, Food and Rural Affairs (Defra)[4] and used revised toxicological data based on recent research. S4ULs have been calculated for the four standard land use scenarios published within the CLEA model[5] and also include two new land uses for public open space developed by Defra. GACs developed by CL:AIRE, Association of Geotechnical and Geoenvironmental Specialist (AGS), and the Environmental Industries Commission (EIC) (2010)[6] have been recalculated by Mott MacDonald using the revisions to the CLEA exposure assessment parameters and including the public open space land uses.

LQM states that their GAC are 'broadly equivalent to the SGVs'. Defra[7] recognises the use of the LQM and CL:AIRE GAC through statutory guidance thereby providing authoritative backing to their use in appropriate circumstances.

In the absence of SGVs and S4ULs, lead has been assessed by reference to the Category 4 Screening Level (C4SL)[8], C4SLs have been developed in support of Defra's revision to the Statutory Guidance for Part 2A of the Environmental Protection Act 1990. The revised guidance presents a four-category system for determining land as contaminated land under Part 2A, ranging from Category 4 (the level of risk posed is acceptably low) to Category 1 (the level of risk is clearly unacceptable). The C4SLs provide criteria to determine whether contamination risks are low and definitely do not represent contaminated

[2] Nathanail, C.P. et al. (2015) The LQM / CIEH Suitable 4 Use Levels for Human Health Risk Assessment. Nottingham: Land Quality Press. Document reference: S4UL3389.
[3] Environment Agency. (2009) *Human health toxicological assessment of contaminants in soil*, *Science Report Final SC050021/SR2*. Bristol: Environment Agency.
[4] Department for Environment, Food and Rural Affairs. (2014) *SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, Final Project Report (Revision 2)*. London: CL:AIRE.
[5] Environment Agency. (2009) *Updated technical background to the CLEA model, Science Report SC050021/SR3*. Bristol: Environment Agency.
[6] CL:AIRE., Association of Geotechnical & Geoenvironmental Specialist., and The Environmental Industries Commission. (2010) Soil Generic Assessment Criteria for Human Health Risk Assessment. London: CL:AIRE
[7] Department for Environment Food & Rural Affairs. (2012) Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance.
[8] Department for Environment, Food and Rural Affairs. (2014) SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, Final Project Report (Revision 2). London: CL:AIRE.

land (i.e. contaminant concentrations do not present a Significant Possibility of Significant Harm). The published C4SLs and S4ULs are therefore conservative thresholds.

The Environment Agency (EA) withdrew SGVs for nickel due to a report published by the European Food Safety Authority (EFSA) in February 2015[9] containing new recommendations for nickel. Following the EFSA (2015) opinion and the EA withdrawal of the SGVs for nickel, LQM published S4ULs for nickel, which have been utilised in this report. The SGV for mercury was withdrawn in 2019 due to EFSA re-evaluating the toxicity of inorganic mercury and methylmercury[10]; however, the LQM S4ULs use toxicological data from a more recent EFSA publication and are considered current.

[9] European Food Safety Authority. (2015) 'Scientific Opinion on the risks to public health related to the presence of nickel in food and drinking water', *EFSA Journal*, 13(2). Available at: https://efsa.onlinelibrary.wiley.com/doi/pdf/10.2903/j.efsa.2015.4002

[10] European Food Safety Authority. (2012) 'Scientific Opinion on the risk for public health related to the presence of mercury and methylmercury in food', *EFSA Journal*, 10(12). Available at: https://efsa.onlinelibrary.wiley.com/doi/abs/10.2903/j.efsa.2012.2985

F. Controlled Waters Assessment Background

Defra's guidance[11] on the application of Part 2A defines tests for significant pollution of controlled waters. Key tests are as follows:

- Contaminants are continuing to enter into controlled waters additional to entry which has already occurred, and such entry is likely to occur again,
- Contamination on site has caused and is continuing to cause the following:
  - Pollution equivalent to 'environmental damage' to surface water or groundwater as defined by The Environmental Damage (Prevention and Remediation) Regulations 2009, but which cannot be dealt with under those Regulations;
  - Inputs of pollutants resulting in deterioration of the quality of water abstracted, or intended to be used in the future, for use in human consumption such that additional treatment would be required to enable that use;
  - A breach of a statutory surface water Environment Quality Standard, either directly or via a groundwater pathway;
- Input of a substance into groundwater resulting in a significant and sustained upward trend in concentration of pollutants [as defined in Article 2(3) of the Groundwater Daughter Directive (2006/118/EC/1).
- If the contamination risks to controlled waters can be ascribed to background soil contamination levels effectively from natural or 'common' or 'widespread' human activity the Local Authority should not normally regard the contamination as representing significant possibility of significant risk of pollution to controlled waters.

In-addition, under the Groundwater Daughter Directive (2006/118/EC), entry of hazardous contaminants into groundwater should be prevented ('prevent objective'). Entry of non-hazardous substances should not result in pollution of controlled waters ('limit objective'). The interpretation of the Groundwater Daughter Directive through the UK contaminated land risk assessment framework is described in EA's 'The Environment Agency's Approach to Groundwater Protection' (2018)[12].

[11] Department for Environment Food & Rural Affairs. (2012) Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance.
[12] Environment Agency. (2018) *The Environment Agency's approach to groundwater protection*. Bristol: Environment Agency.

Hazardous substances are defined in the Water Framework Directive[13] as 'substances or groups of substances that are toxic, persistent and liable to bio-accumulate, and other groups of substances which give rise to an equivalent level of concern'. An 'equivalent level of concern' refers to a level of protection prescribed for hazardous substances equivalent to the 1980 Groundwater Directive (which has now been repealed). Non-hazardous substances are those substances not defined as hazardous substances. Hazardous substances are defined in accordance with the Groundwater Daughter Directive by the Joint Agencies Groundwater Directive Advisory Group.

The prevent objective is achieved by requiring that hazardous substances must 'not be discernible after the immediate dilution that occurs after the discharge enters groundwater'. The compliance target used to measure discernibility is the highest of the natural background quality of groundwater, a Minimum Reporting Value (MRV); (typically the laboratory detection limit for that substance (MDL)) or 'another value prescribed by legislation'.

[13] Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

G. LCRM Checklist and Author Qualifications

Report Author Professional Qualifications

Initials	Role	Job title	Academic and professional affiliations/qualifications
[redacted]	Originator	Graduate Contaminated Land Consultant	BSc, MSc
[redacted]	Checker	Associate Environmental Engineer	BEng, MSc, MCIWEM, C.WEM
[redacted]	Approver	Technical Director - Contaminated Land	BSc, MSc, MIEnvSc, CEnv, SiLC, SQP

Reporting Checklist

The following checklist has been generated from the guidance given in LCRM on the report requirements for GQRA.

Item	Relevant section of this report
Summary of the preliminary risk assessment	Section 20
Objectives and approach for this tier of risk assessment	Section 1 and 5.7
Details of how generic assessment criteria were selected or derived and what assumptions were used or made	Section 5.3
Information collected and the methods used	Section 3
Interpretive information from the detailed site investigation	Section 5
Quality assessment of data	Section 5.4
Results of the comparison with generic assessment criteria	Section 5.4
Details of how the risk was evaluated – both unacceptable or acceptable	Section 5
Details of any tools used to assess the risks	Appendix D
Initial and updated conceptual site model – explain how it was updated with the site investigation results	Section 5.7
Contaminant linkages you have identified	Table 5.6: Conceptual Site Model and Risk Assessment-proposed WWTP

Item	Relevant section of this report
Details of any uncertainties, data gaps and limitations	Section 1.5, 6.4
Reasons for not considering any potential contaminant linkages	Section 5.7.5, 5.7.7
Confirmed contaminant linkages	Table 5.6: Conceptual Site Model and Risk Assessment-proposed WWTP
Conclusions and justification for next steps	Section 6
Factual details of the investigation and monitoring results	Appendix C, Appendix 14.6: Groundwater Investigation Report Waterbeach (App Doc Ref 5.4.14.6), Appendix 14.7: Ground Investigation Report for Cambridge Waste Water Treatment Plant – Part 1 (App Doc Ref 5.4.14.7), and Appendix 14.8: Ground Investigation Report for Cambridge Waste Water Treatment Plant – phase B ((App Doc Ref 5.4.14.8)