Phase I & II Geo-Environmental Assessment

North Campus East Car Park
College Way
Welwyn Garden City
Hertfordshire
AL8 6UN

Prepared for:

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NORTH CAMPUS EAST CAR PARK, WELWYN GARDEN CITY

NON-TECHNICAL CLIENT SUMMARY

This report presents the findings of a combined Phase I Desk Study and Phase II Geo-Environmental assessment undertaken to determine ground conditions, establish if there are any geo-environmental risks associated with the site and its proposed development and to provide a geotechnical appraisal. Pertinent findings and conclusions may be summarised as follows:

- The site is currently occupied by North Campus East Car Park with current plans understood to be for redevelopment of several new multi-storey buildings that include parking facilities on the ground floor with residential apartments above.
- Historically there have been some railway lines running through the study area and adjacent to the east, with some potential ground workings also noted in northern and central sections (anticipated to be associated with the development of this infrastructure). Some local areas of infilled land and significant commercial land uses (such as car workshops and an obsolete fuel station) have also been noted nearby, all of which present a potential risk to soil and groundwater beneath the site as well as future site users.
- To assess the nature/ quality of soils beneath the site, 15 boreholes were formed to a maximum depth of 25.0m below existing surface level. Ground conditions comprised a variable thickness of made ground overlying granular and clay based superficial Lowestoft Formation to around 10.0m, with chalk bedrock below. Groundwater was not encountered during the works.
- No clear evidence of contamination was noted during the field works and laboratory analysis found shallow soils across the site to be chemically suitable for their proposed end use. However, given the nature of the infill, it is recommended that a minimum of **100mm** of certified clean topsoil material is placed across all proposed soft landscaped areas to provide an adequate growing medium. No further works or risk assessment has been recommended with regards to contamination, providing that some standard health and safety precautions are followed during the redevelopment process.
- A gas monitoring programme has been completed and the data / risk assessment have determined that no gas protection measures are considered necessary for new buildings.

ENGINEERING SUMMARY

- The ground conditions across the site are considered suitable for conventional spread foundations with allowable bearing capacities ranging from 85kN/m² to 170kN/m² (depending on the nature and depth of the footings). The shallow soils will be subject to volume change, and foundation design should be carried out with all due consideration of the species and proximity of trees.
- Given the anticipated loads associated with the proposed structures, as well as the local presence of shallow clay soils (which will be subject to volume change) and a significant thickness of made ground in certain areas, a deeper foundation solution such as piles may well offer the most appropriate solution for the proposed development.
- Suspended ground floor slabs are recommended for any new buildings.
- A design sulphate class of DS-1 and an aggressive chemical environment for concrete (ACEC) of AC-1s is considered suitable for buried concrete in direct contact with the natural soils beneath the site.

The above points represent a simplified summary of the findings of this assessment and **must not** form the basis for key decisions for the proposed development. A thorough review of the details is contained within the following report, or alternatively get in touch and we'll talk you through it.

Project Reference:	UK21.5579
Title:	Phase I & II Geo–Environmental Assessment North Campus East Car Park, Welwyn Garden City
Client:	Bellway Homes Limited (North London)
Date:	19th November 2021
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Status:	Issue 1

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Consultant	Principal Consultant	Director

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If third parties have been contracted / consulted during compilation of this report, the validity of any data they may have supplied, and which are included in the report, have been assessed as far as possible by EPS however, EPS cannot guarantee the validity of these data.

Where ground investigations have been conducted, these have been limited to the level of detail required for the site in order to achieve the objectives of the investigation.

The report has been written, reviewed and authorised by the persons listed above. It has also undergone EPS' in house quality management inspection. Should you require any further assistance regarding the information provided within the report, please do not hesitate to contact us.

The National Planning Policy Framework requires a competent person to prepare site investigation information, which is defined as a person with a recognised relevant qualification, sufficient experience in dealing with the type(s) of pollution or land instability, and membership of a relevant professional organisation. EPS considers that it fulfils these criteria and would welcome any request for staff CVs or case studies to demonstrate it.

As stated within DEFRA's Contaminated Land Statutory Guidance, with any complex risk assessment it is possible that different suitably qualified people may reach slightly different conclusions when interpreting the same information. EPS recognises this and considers the conclusions presented within this report to be robust and appropriate but input from the Local Authority and their judgement in line with this guidance would still be welcomed.

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1 INTRODUCTION

In September 2021, Environmental Protection Strategies Ltd (EPS) was commissioned by Bellway Homes Limited (North London) to complete a Phase I & II Geo-Environmental Assessment at North Campus East Car Park, College Way, Welwyn Garden City, Hertfordshire, AL8 6UN, ('the site'); see Figure 1.

The work was commissioned in order to support future planning requirements as relating to contaminated land and to collect information on ground conditions and strength, in order to make appropriate recommendations for geotechnical design. At the time of writing, outline development proposals are understood to comprise the construction of several new multi-storey buildings that include parking facilities on the ground floor with residential apartments above. External works are anticipated to include areas of communal soft landscaping and hardstanding.

This report presents the findings, conclusions, and recommendations of the Phase I Desk Study and subsequent Phase II Intrusive Investigation undertaken.

1.1 Objectives

The objectives of this investigation were as follows:

a) Compile a Phase I desk study and Conceptual Site Model (CSM) to evaluate the potential risks the site may pose to human and environmental receptors, both currently and in future.
b) Assess potential contaminant linkages identified through the CSM by means of investigating shallow soils and groundwater (if encountered).
c) Determine the potential risks posed by the site and make recommendations for further work that may be required, to ensure safe development in accordance with the Environment Agency's *Land Contamination: Risk Management* (2020) and the *National Planning Policy Framework.*
d) Collect information on ground conditions and strength in order to make appropriate recommendations for geotechnical design.
e) Identify waste streams which could be generated as part of the redevelopment and appropriately classify these soils for future off-site disposal.

1.2 Scope of Work

The scope of works was to perform an exploratory assessment of the site in accordance with the principles and requirements of DEFRAs '*Contaminated Land Statutory Guidance*' (2012), BS10175 (2011) – '*Investigation of Potentially Contaminated Sites*', BS5930:2015 '*Code of Practice for Ground Investigation*' and BS EN 1997:2007 *'Geotechnical Design',* and therefore, the following tasks were undertaken:

Desk Study:

- Collection of site records.
- Study of existing geological, hydrogeological and historic maps of the area.
- Consultation of environmental databases, including records held by the local authority (where available).
- Review of proposed development plans.
- Development of a Conceptual Site Model (CSM) and Preliminary Risk Assessment.

Intrusive Investigation:

- Site walkover, inspection of any visual evidence of contamination, obtaining photographic records.
- Health and safety briefing/ site supervision.
- Drilling of three shell and auger boreholes, to a depth of 25.0m below ground level (bgl), using cable percussive methods.
- Formation of twelve window sample boreholes to a maximum depth of 4.0m bgl using a track-mounted, percussive drilling rig; and the completion of falling head infiltration tests at four of these positions.
- Installation of standpipes at selected borehole locations, with a return monitoring programme undertaken.
- In-situ testing, to assist with geotechnical design.
- Continual logging of ground conditions including inspection of samples for visual and olfactory contamination, and laboratory analysis of selected soil samples.

Reporting:

- Data collection
- Interpretation of data including completion of Generic Quantitative Risk Assessment
- Reporting

The findings of these investigations and their conclusions are presented in the following sections.

1.3 Project Limitations and Constraints

The purpose of this report is to present the findings of a soil sampling investigation conducted at the location(s) specified. When examining the data collected from the investigations made during the assessment, Environmental Protection Strategies Ltd (EPS) makes the following statements:

No investigation method is capable of completely identifying all ground conditions that might be present in the soil or groundwater under a site. Where outlined in our report, we have examined the ground beneath a site by constructing a number of boreholes and / or trial pits to recover soil and / or groundwater samples. The locations of these excavations and sampling points are considered to be representative of the condition of the whole site subsurface however, ground conditions are naturally variable and it may be possible that the ground conditions encountered may differ to those encountered during the investigation.

No visible evidence of Japanese Knotweed was identified during the site walkover. However, this plant can be difficult to identify in the early stages of growth and therefore it is not always possible to identify its presence at certain times of the year. For this reason, EPS cannot confirm that Japanese Knotweed rhizomes do not exist and it is recommended that if it is suspected that this species, or other similarly invasive plants are present at the site, a specialist contractor should be commissioned to make a detailed assessment.

The investigation was carried out to assess the significance of contamination resulting from the use of the site as identified in this report. Unless EPS has otherwise indicated, no assessment of potential impact of any other previous uses has been made.

2 SITE CHARACTERISATION

The following section provides a summary of the information collected in relation to the site location and history.

2.1 Site Location and Description

Detail	Description
Location	The site is located to the east of College Way, roughly 0.3km north east of Welwyn Garden City town centre in Hertfordshire.
National Grid Reference	523990, 213320
Topography	Levels lie between approximately 90m and 92m above ordnance datum (AOD) and appear to slope gently from north to south. The lowest lying sections of the property are along the southern boundary.
Description of Site	A walkover survey was completed by EPS on the 4th October 2021 and the site was found to comprise an irregular shaped parcel of land, covering approximately 2.15ha. The area of investigation was occupied by North Campus East Car Park which was open and active at the time of the work. The main access point was from the western boundary; which enters from College Way and runs just inside the northern boundary to an asphalt and concrete surfaced car park, covering the majority of the eastern area. In the centre is a two-storey structure that included private garages with locked, roller shutter doors on the ground floor and additional (uncovered) parking facilities above. This structure was noted to be roughly rectangular in shape, of brick construction and featured some cantilever sections on the upper platform, to extend the footprint of the parking area. Three access ramps were noted at the western elevation of this feature, with adjoining roads intersecting an adjacent area of grass surfaced soft landscaping to the west. A one-way system was in place throughout the car park with rows of spaces generally orientated north to south and east to west. Metal railings and grass verges separated selected rows, with a grid of large flood lights and pedestrian footpath borders also present. A small section of an east-to-west trending drain / ditch that marks the northern boundary was also identified during the EPS walkover, and was noted to contain shallow water. It is anticipated that sections of the channel may be culverted. A number of semi-mature to mature hedgerows, plants, shrubs and trees marked large sections of the property boundaries and were also present towards the centre of the car park and within the soft landscaping to the west. No external areas of significant fuel or chemical storage were noted. However, a fenced compound (secured at the time of the inspection), containing a number of coaches was noted in the east of the car park.

Detail	Description
Surrounding Land Use	The site is immediately surrounded by Oaklands College – Welwyn Garden City Campus and residential properties in the north with Welwyn rail depot and a north-to-south trending railway line adjacent to the east. In the south is a supermarket and associated parking with council offices and an assisted living facility located beyond College Way (to the west).

A plan showing the site location is provided as Figure 1, the current site layout is detailed on Figure 2 and an aerial photograph is included as Figure 3. Selected site photographs are included as Appendix A, an indicative proposed development plan is included as Appendix B and relevant extracts of the Envirocheck Report are included as Appendix C.

2.2 Geo-Environmental Setting

The following details are taken from the Envirocheck report sourced for the study area.

<table>
<tr><th>Detail</th><th colspan="2">Description</th></tr>
<tr><td>Geology</td><td colspan="2">Geological mapping indicates the site to be underlain by superficial Lowestoft Formation (diamicton) overlying bedrock of Lewes Nodular & Seaford Chalk Formation. Information on the site's geological context is included as Appendix D.</td></tr>
<tr><td>British Geological Survey (BGS)</td><td colspan="2">An historical borehole log was reviewed for a location around 255m south west of the site at 91m AOD, to give an indication of the ground conditions that may be anticipated beneath the study area. The log reports made ground to 0.4m, overlying layers of orangish brown, clayey, sandy, silty gravel and sandy silty clay to 10.6m. This was underlain by 'reworked chalk' interbedded with clay and gravel to 17.0m; before the natural chalk bedrock was recorded to the maximum depth of 25.5m bgl. Groundwater was encountered at 18.7m depth and the historical log is also included in Appendix D.</td></tr>
<tr><td rowspan="9">Geological Hazards</td><td>Hazard</td><td>On Site Risk</td></tr>
<tr><td>Mining Activities</td><td>Rare</td></tr>
<tr><td>Collapsible Ground</td><td>Very Low</td></tr>
<tr><td>Compressible Ground</td><td>No Hazard</td></tr>
<tr><td>Ground Dissolution</td><td>Moderate</td></tr>
<tr><td>Running Sand</td><td>Very Low</td></tr>
<tr><td>Landslide</td><td>Very Low</td></tr>
<tr><td>Shrinking/ Swelling Clay</td><td>Low</td></tr>
<tr><td colspan="2">Three BGS recorded mineral sites are listed within 1km, all of which are former opencast quarries which have now ceased operation. The closest of these features is located around 539m north and was previously used for the extraction of chalk.

Seven entries for natural cavities are highlighted within 500m, all in the form of sinkholes, the closest of which is around 80m west.</td></tr>
</table>

Detail	Description
Radon	The Envirocheck report indicates the site to lie in a location where the percentage of homes above the radon action level is less than 1%. It further reports that the site does not require any radon protection measures in the construction of new buildings.
Hydrogeology	Groundwater vulnerability maps for the area show that the superficial Lowestoft Formation is classified as a Secondary (Undifferentiated) Aquifer with the underlying bedrock of the Lewes Nodular & Seaford Chalk Formation defined as a sensitive Principal Aquifer. Furthermore, the site lies within a Total Catchment (Zone 3) groundwater Source Protection Zone (SPZ). One groundwater abstraction is listed within 500m, located around 124m east and used by Rank Xerox Ltd for industrial processing (miscellaneous). Groundwater vulnerability maps are included as Appendix E.
Hydrology	The nearest surface water feature appears to be a small east-to-west trending drain/ ditch, that marks the northern boundary. A small section of this feature was identified during the EPS site works, and was noted to contain shallow water, but it is anticipated that sections of the channel may be culverted. No further significant watercourses are noted in the local area. One discharge consent is listed within 1km and is located roughly 124m east and refers to a soakaway discharging into the underlying chalk bedrock between 30th October 1991 and 31st March 1996 by Rank Xerox Ltd (who manufacture electronic devices/ components). There are no surface water abstractions listed within 500m.
Known Site Drainage & Utilities	Based on the mains utilities plans it is anticipated that telecommunications cables enter the site from College Way in the west and run towards the north west corner of the garages / car park. These cables then divert to the south, around the west and south of the same structure, before reaching the boundary with the rail depot in the east. Whilst not clear on services plans, underground electricity cables associated with flood lights are anticipated in this section of the property. Surface water drainage was recorded entering the site in the north eastern corner, initially running in a south westerly direction before changing to a westerly course, around the southern elevation of the garages and car park, before crossing the boundary in the south western corner. Waste water drainage was recorded entering the site towards the centre of the northern boundary, running in a south westerly direction towards and around the western face of the garages and car park, before leaving the site in the south west. An additional east to west trending sewer was also identified towards the centre north of the car park.

Detail	Description
Flood Risk	Review of the EA flood zone map for the area indicates that the site lies within Flood Zone 1, which is defined within Table 1 of the technical guidance to the National Planning Policy Framework (NPPF) as '*the area with a low probability of flooding from rivers or the sea*'. It should be noted that the EA maps do not take into account flooding from other potential sources of floodwater, such as from poor drainage, or groundwater. Given the site is larger than 1ha in area, it is possible that a flood risk assessment will be required in support of any future planning submission. An indicative flood zone map is included in Appendix E.
Landfill & Waste	One registered landfill is listed within 1km and is located 425m south at 30 Broadwater Road. The landfill is categorised as 'very small' (less than 10,000 tonnes per year) and highlighted to have been active in June 1979 with authorised waste including aqueous effluent waste and industrial effluent treatment sludge. Seven registered waste treatment or disposal sites are listed within 1km, the closest of which is located 51m east at Bessemer Road. This facility is dated from May 1984 with authorised wastes included flammable solvents, industrial effluent/ treatment sludge and oil/water mixtures. Three licensed waste management facilities are listed within 1km, the closest of which is located 500m east and refers to an expired vehicle depollution facility that operated between February 2011 and July 2018. One registered waste transfer site is listed within 1km and is located 522m east at Tewin Road Depot. The waste transfer site is dated from May 1999 with authorised waste including bonded asbestos, household, commercial and industrial waste, general scrap metal and non-putrescible waste. Two records of potentially infilled land (non-water) are held within a 1km radius, the nearest of which is located 958m east and refers to the infilling of an unknown pit or quarry in the late 1980's.
Licensed Industrial Activity	Ten sites licensed by the local authority for industrial activity are reported within 1km, the closest of which (permitted) is located 257m south west and refers to dry cleaning.

<table>
<tr><th>Detail</th><th>Description</th></tr>
<tr><td rowspan="9">Industrial Land Use</td><td colspan="2">The Envirocheck report lists 59 industrial land uses within 500m (nine of which are present within 250m); the most pertinent of which are summarised below.</td></tr>
<tr><td>Land Use</td><td>Distance (Direction)</td><td>Status</td></tr>
<tr><td>D L G Auto Services
(Car Body Repairs)</td><td>89m (SE)</td><td>Active</td></tr>
<tr><td>Funnybones
(Distribution Services)</td><td>168m (E)</td><td>Inactive</td></tr>
<tr><td>Grace Foods
(Distribution Services)</td><td>168m (E)</td><td>Inactive</td></tr>
<tr><td>Luvata Welwyn Garden
(Car Manufacturers)</td><td>168m (E)</td><td>Active</td></tr>
<tr><td>Travis Perkins Plc
(Builders' Merchants)</td><td>204m (SE)</td><td>Active</td></tr>
<tr><td>Pakex Uk Plc
(Cleaning Materials & Equipment)</td><td>213m (E)</td><td>Active</td></tr>
<tr><td colspan="3">One fuel station entry is recorded within 500m and refers to a now obsolete Central Garage Petrol Filling Station (PFS) site, located roughly 448m south west.</td></tr>
<tr><td>Pollution Incidents</td><td colspan="2">Two pollution incidents to controlled waters are reported within 500m, the closest of which is located around 433m east. This event was recorded as a ‘Category 3’ minor incident and occurred in April 1992, involving the release of unknown chemicals.</td></tr>
<tr><td>Sensitive Land Use</td><td colspan="2">The site is reported to be located within a Nitrate Vulnerable Zone where surface water is considered to be susceptible to the leaching of nitrates from agricultural land.</td></tr>
<tr><td>Previous Investigation or Remediation</td><td colspan="2">EPS are not aware of any previous site investigations or remedial works undertaken at the site.</td></tr>
</table>

2.3 Site History

A summary of historical map data from 1878 to 2021 is summarised below. Key points are highlighted, and copies of relevant historic maps and any others examined during the investigation are included in this report as Appendix F.

- Early mapping from the late 1870s showed some of the site to have been developed, with a north west-to-south east trending railway line arcing through the centre of the area; which was eventually dismantled by the 1970s. Adjacent to the east was an embankment associated with a larger series of north-to-south trending railway lines, with infrastructure such as travelling cranes, engineering works and tanks noted close by. It is also possible that some ground workings were undertaken across the northern strip of the site, associated with this infrastructure. Further workings were noted slightly further south in the 1960s/1970s and are anticipated to be associated with the decommissioning of the railway. A few tracks were noted spanning the northern and western sections of the property, both of which converged just outside the north western corner, where a small series of buildings were present.

- By the 1970s, the south west of the site was occupied by a 'roof car park' and adjacent to the south west was an electricity sub-station. However, it wasn't until the 1990s that the remainder of the property appeared to resemble its current layout with the construction of the ground level car park in the north east. During this period, the immediate surrounding land had been developed with a local supermarket in the south and services including council offices, assisted living residence and a college to the west (along College Way) with the infrastructure beyond the railway line in the east later redeveloped to comprise a business park.
- Commercial and industrial land use had predominantly occupied the area beyond the railway line to the east and south east since the early 1960s and had largely consisted of various depots, factories, warehouses and work sites.
- The study area has remained largely unchanged for the past 30 years, consistently occupied by North Campus East Car Park with a patch of soft landscaping to the west.

3 PRELIMINARY RISK ASSESSMENT AND CONCEPTUAL SITE MODEL

In accordance with the Environment Agency's *Land Contamination: Risk Management* (LC:RM, 2020) guidance, there are three stages to managing contaminated land (Risk Assessment, Remedial Options Appraisal / Remediation and Verification). This section outlines the first tier of Stage 1, the Preliminary Risk Assessment.

The following section provides a review of the contaminant linkages that may be active at the site through examination of the potential sources that may be present as a result of historic and / or current site activities and where potential interaction between these sources and the identified human / environmental receptors may occur.

3.1 Background

A preliminary risk assessment comprises the first stage of any geo-environmental assessment, the purpose of which is to determine what potentially contaminative activities may have occurred at the property or the surrounding area which may pose an environmental or geological risk to site users, the surrounding environment or proposed development, either at present or in the future.

The method used in this investigation to assess the environmental risk posed is based on the concept of 'contaminant linkage', which considers the following three factors:

Source	The location from which an environmentally hazardous / contaminative substance is, (or was,) derived.
Pathway	A route or mechanism via which a source could come into contact with a receptor to cause significant harm.
Receptor	An environmentally sensitive object or condition e.g. person, property, controlled water, or ecological system, which may be present now or in future.

If all three factors are identified, there is the potential for a 'contaminant linkage' to be active, which could result in significant harm being caused to the environment or human health.

3.2 Source Characterisation

The following potential contaminant sources have been identified at the site and in the surrounding area:

Potential Source	Source Description	Principal Contaminants of Concern
Current and Historical Site Use	Infill material of unknown origin (made ground) used to level areas beneath the historic railway line/ tracks and current car park/ surfacing.	TPH, PAH, ACM & Metals
	Historic north west-to-south east trending railway line and associated infrastructure.	
	Areas of ground workings across the northern and central areas of the property, most likely associated with former railway infrastructure	PAH, Metals ACM & Ground Gas (CH_4, CO_2)

Potential Source	Source Description	Principal Contaminants of Concern
Current and Historical Surrounding Land Use	North-to-south trending railway lines and associated infrastructure adjacent to the east of the study area.	TPH, PAH, ACM & Metals
	Electricity sub-station adjacent to the south west.	PAH, PCB & TPH
	A registered landfill site and several entries of potentially infilled land within 1km.	Ground Gas (CH_4, CO_2)
	Current and historical commercial and industrial land use of the surrounding area including vehicle workshops, an obsolete fuel station, a number of waste transfer/ management facilities and various works sites to the east/ south east (beyond the adjacent railway).	ACM, Metals, PAH, TPH, VOC & SVOC

Notes

TPH	Total Petroleum Hydrocarbons	PAH	Polycyclic Aromatic Hydrocarbons
ACM	Asbestos Containing Material	CH_4	Methane
CO_2	Carbon Dioxide	PCB	Polychlorinated Biphenyls
VOC	Volatile Organic Compounds	SVOC	Semi-Volatile Organic Compounds

3.3 Potential Receptors

A framework for the assessment of risks arising from the presence of contamination in soils has been produced by the Environment Agency and the Department for the Environment, Food and Rural Affairs (DEFRA) and is presented with the report: '*Using Science to Create A Better Place: Updated Technical Background to the CLEA Model* – Science Report SC050021/SR3'. This guidance document defines a series of standard land-uses which have been further developed into six generic land uses in the Category 4 Screening Levels project for Land Affected by Contamination (DEFRA/Contaminated Land: Applications in Real Environments (CL:AIRE) Project Report SP1010, September 2014) which form a basis for the development of the Conceptual Site Model.

It is understood that the development involves the construction of several new multi-storey buildings that include parking facilities on the ground floor with residential apartments above. External works are anticipated to include areas of communal soft landscaping and hardstanding. Therefore, this proposed land use at this stage has been considered as:

- Public Open Space (Residential)

The proposed land use is considered to be most relevant to a POS_{RESI} for the following reasons:

- The soft landscaped areas within the development will likely comprise predominantly grassed or planted areas in close proximity to new multi-storey residential buildings.
- The type of activities which are envisaged in these areas are children playing and informal sports activities, such as a 'kickabout'.
- The critical receptor age class is not as sensitive as typical residential land uses and more realistically reflects the age of children who will use these areas most frequently.
- Home-grown vegetable intake is not assumed to take place but the amenity areas are considered close enough to properties to allow the tracking back of soils into people's homes, where POS (Parks) would not.

It should be noted that the above classification is subject to adjustment should finalised development plans reveal more sensitive areas of landscaping then currently anticipated, such as enclosed or private garden areas, albeit this is considered unlikely at this stage.

In view of the environmental setting, current and potential future land use of the site and surrounding sites, the potential receptors for any contaminant impact are discussed below:

Receptor	Site Specific Description
Human	Future site users, construction workers involved in the proposed redevelopment, and those working and living in the surrounding area have the potential to be at risk from exposure to potential contaminants of concern (CoCs), including from former or adjacent land uses.
Groundwater	The geology beneath the site is anticipated to comprise superficial Lowestoft Formation which is classified as a Secondary Aquifer with the underlying Lewes Nodular & Seaford Chalk Formation defined as a sensitive Principal Aquifer. Furthermore, the property lies within a Total Catchment (Zone 3) SPZ for nearby groundwater abstraction and groundwater is anticipated to be present from a local BGS record, albeit relatively deep. On this basis, groundwater should be considered as a sensitive receptor to site derived contaminants.
Surface Water	The nearest surface water feature appears to be a drain that marks the northern boundary, although no further channels have been highlighted locally. It is possible that site derived contaminants of concern may enter this ditch by overland flow, migration through unsaturated soils or entering shallow surface drainage/ historical land drainage which discharges to this feature. Therefore, surface waters must also be considered as a sensitive receptor within the conceptual site model.
Flora and Fauna	The proposed development is expected to include soft landscaped areas. Some of the identified contaminants of concern are known to be phytotoxic and as such, the potential for this impact should be considered.
Buildings & Infrastructure	Subsurface structures are likely to be present at the site that may be adversely affected by the potential presence of the identified contaminants of concern. These include concrete used in building foundations, buried potable water supply pipes and other service lines and pipes.
Adjacent Land	Adjacent properties including private residential dwellings could also be at risk from potential contaminants found at the site.

3.4 Potential Pathways

Where contaminants may be present in soil, there are a number of potential pathways that enable human receptors to come into contact with or be exposed to them. The most direct pathways, considered under current UK legislation, can be summarised as follows:

- Direct ingestion of contaminated soil
- Ingestion of household dust
- Ingestion of contaminated vegetables
- Ingestion of soil attached to vegetables
- Dermal contact with contaminated soil
- Dermal contact with household dust
- Inhalation of fugitive soil dust
- Inhalation of fugitive household dust
- Inhalation of vapours outdoors
- Inhalation of vapours indoors

Clearly, not all of these potential pathways apply for every standard land-use. For example, ingestion of contaminated vegetables will not apply to land uses other than residential with plant uptake and allotments.

However, in addition to direct exposure pathways, a number of physical transport mechanisms / pathways may also exist at a site that allow remote or less accessible contaminants in soil or groundwater to reach human or environmental receptors both at a site and beyond the site boundary. These include the following:

- Downward and lateral movement of contaminants in soil either by gravity or through being 'leached' by percolating rainwater.
- Lateral migration of contaminants dissolved in groundwater.
- Direct seepage or leaching of contaminants from soil into subsurface drains or supply pipework.
- Volatilisation of contaminants from groundwater or unsaturated soils into buildings or outdoor air.

Through examination of the standard land use and environmental setting at each site, the presence of pathways and transport mechanisms described above must be considered when assessing whether a contaminant linkage may plausibly be active, and therefore be included in the conceptual site model.

3.5 Summary of Site-Specific Contaminant Linkages

Considering the site use and environmental setting, and the proposed land use; the plausible contaminant linkages that require further investigation are summarised in the following table:

Source	Pathway	Receptor
Contaminated Soil	Direct contact and inadvertent ingestion by eating or smoking with dirty hands	Construction workers during redevelopment & site users
	Direct uptake via root systems	Plants
	Direct contact	Buried infrastructure
	Inhalation of fugitive dusts	Site Users
	Ingress/ diffusion through permeable potable water supply pipes	
	On-site migration of ground gas to indoor and outdoor air	

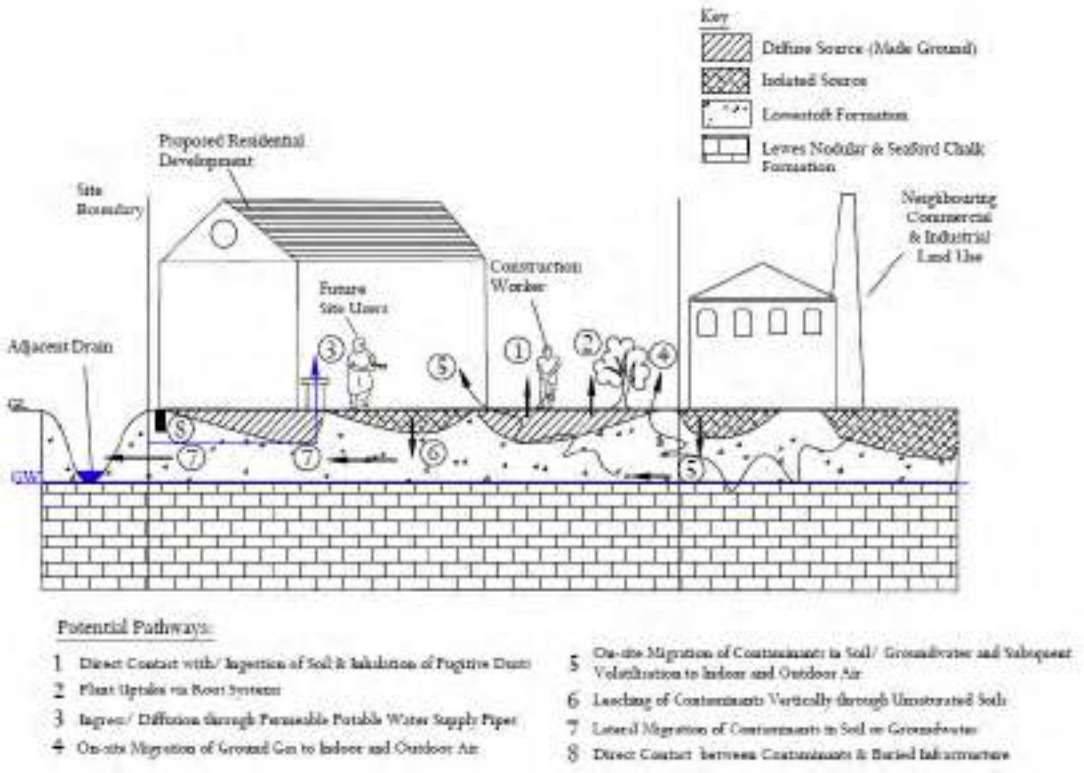
Source	Pathway	Receptor
Contaminated soil / groundwater	On-site migration of contaminants in soil and/ or groundwater and subsequent volatilisation of organic compounds to indoor and outdoor air	Site users
	Leaching of contaminants vertically through unsaturated soils	Groundwater
	Lateral migration of contaminants in soil or groundwater	Surface waters

The following comments are made with respect to contaminant linkages which have been considered through development of the conceptual model, but have not been concluded as 'plausible' – i.e., through which a significant possibility of significant harm could occur to an identified receptor:

- Contaminants including PAHs and Metals have been identified as contaminants of concern associated with the made ground beneath the site, however these contaminants are generally considered to be relatively immobile in the environment by virtue of their very low solubility and volatility. On this basis, plausible pathways by which these site derived contaminants could pose a significant risk to nearby surface watercourses or any underlying groundwater are not considered to be active.
- Despite some former ground workings being noted in the northern and central sections of the site, these entries on historical maps are anticipated to be the result of levelling activities before and after sections of railway were developed. Given that any infilled materials are anticipated to be limited in thickness and no such activities are understood to have taken place since the 1970s, this material is not considered capable of generating any notable concentrations of ground gas. Therefore, any potential risk from on-site sources affecting future or neighbouring site users have been discounted.
- Although significant fuel storage is not anticipated to have been present on site through previous or more modern land use, it is possible that small scale spills/ leaks could have occurred through daily activities via use as car park/ garages as well as through the presence of historic railway tracks. Any such contamination is not considered to be significant enough to lead to the generation of organic vapours, however, it is plausible that localised impacts to controlled waters may have occurred.
- Whilst the majority of relatively modern electrical transformers do not contain insulation oils containing PCBs, the electricity sub-station adjacent to the south west does represent a potential off-site source that could contain PCBs. However, given the distance of this sub-station and limited mobility of PCBs in the environment, this source is not considered to pose a significant risk to the proposed development.

The following diagram provides an illustration of the plausible contaminant linkages that may be active at the site and which may need further investigation or control to ensure safe development:

North Campus East Car Park, Welwyn Garden City– Illustrative Conceptual Site Model



4 SUMMARY OF INTRUSIVE INVESTIGATIONS

The intrusive ground investigation was undertaken between the 4th and 8th October 2021, in accordance with EPS standard operating procedures, copies of which will be made available on request. A summary of the site activities is presented in the following sections:

4.1 Borehole Locations

Borehole locations were selected through consideration of the proposed development layout, the findings of the conceptual site model, the location of below ground utilities as well as operational and health & safety considerations associated with undertaking a ground investigation within an active car park.

The overall objective, in terms of borehole locations, was to deliver an appropriate lateral and vertical coverage of the site in order to offer information relating to the nature, quality and strength of the underlying soils. Further rationale for each sampling location is provided within the table below:

Location	Rationale
BH1-BH3	Provide information on the nature and strength of underlying soils, particularly at depth, to assist with geotechnical design (specifically piling parameters, should they be required for any new buildings). The deeper boreholes were also intended to assess the depth of the groundwater table as well as the presence of any natural cavities within the profile of the chalk bedrock.
WS1-WS12	Assess the nature and quality of shallow soils across the site, providing more detailed lateral coverage for the contamination risk assessment and to assist with geotechnical design.

The borehole locations were formed in accordance with standard EPS methodologies, and all sub-contractors were supervised by an EPS engineer throughout the works.

Monitoring wells were installed at all three shell and auger positions (BH1-BH3) and four window sample positions (WS1, WS3, WS6 and WS12) using 50mm diameter uPVC well casing and fitted with a gas tap. Slotted casing (1mm slot) was installed at each location from the base (aside from BH1 and BH2 which were installed from 20.0m bgl) to approximately 1.0m below the surface. The installations were completed using plain casing to ground level. A filter pack of 2-3mm of washed gravel extended from the base of the open boreholes to approximately 0.1m above the slotted section, with a bentonite seal to surface. Each monitoring location was finished with forecourt rated, bolt down headworks.

All remaining positions were backfilled with soil arising's upon completion and concrete hardstanding was reinstated at the surface.

A borehole location plan is presented as Figure 4.

4.2 In-Situ Testing & Soil Sampling

Each borehole was logged for ground conditions encountered and inspected for any physical evidence of contamination, such as soil staining, odour and the presence of separate phase liquids, on a precautionary basis.

Where potentially volatile organic compounds are suspected, EPS carries a Photoionisation Detector (PID), which can be used to measure the relative concentrations of vapour associated with soil samples collected from different depths and locations at the site. PID readings are only used to provide EPS with a basic means to quantify areas of volatile organic compound in the field to help guide the investigation. However, given that no visual or olfactory evidence of impacted soils/ groundwater was encountered throughout the investigation, headspace testing was not conducted during the field works.

Soil samples were recovered from each location at regular intervals for record purposes and future laboratory testing. Selection of samples from the boreholes focused on providing an assessment of the geotechnical properties of the soils encountered, as well as the quality of sub-surface materials present across the site (including any impacts from previous or adjacent land uses, as identified within the Phase I section of this report).

Hand shear vane tests were attempted throughout the clay soils recovered from selected window sampler boreholes, but the material was found to be too friable and this method of strength testing was not considered to be representative.

Therefore, standard or cone penetration tests (SPT / CPT) were carried out in all of the boreholes using an automatic trip hammer. The number of blows required to advance a standard split spoon, (or solid 60^{o} nose cone for the CPT test) over the final 300mm of a 450mm total drive was recorded, and is shown on the borehole records at the penetration resistance ("N" value).

Falling head infiltration tests were completed at WS2, WS5, WS8 and WS11 in order to assess the suitability of surface water drainage options for the scheme.

4.3 Laboratory Testing

Soil samples were obtained for analysis of selected contaminants of concern in order to identify the presence of any contamination, confirm their suitability for future use and to classify for waste disposal purposes. Samples were submitted to Element Materials Technology of Flintshire, who hold appropriate UKAS/ MCERT accreditation for the required testing. Samples were transported in laboratory supplied containers and delivered by an approved courier.

Geotechnical testing was undertaken by Soil Property Testing, Huntingdon, a UKAS accredited laboratory.

Copies of the chain of custody documentation are held by EPS and will be made available on request. Furthermore, laboratory testing schedules detailing all samples submitted for environmental and geotechnical laboratory analysis are included within Table 1 and Table 2 respectively.

4.4 Soil Gas and Organic Vapour Monitoring

Due primarily to the proximity of a number of areas of localised infilling, the presence and concentration of ground gases including carbon dioxide, oxygen, methane and volatile organic compounds along with borehole flow rate were recorded on four separate occasions; following completion of the initial investigation. These return monitoring visits were completed using a GFM435 gas meter, Photoionization Detector and Flow Meter respectively between the 11th October and 1st November 2021, on approximately weekly intervals.

A summary of the field measurements recorded during the return monitoring programme are summarised in Table 3 of this report.

5 FINDINGS OF THE INVESTIGATION

This section of the report provides a summary of the findings of the intrusive investigations undertaken.

5.1 Ground Conditions

A total of 15 boreholes were formed across the site and the ground conditions encountered, from surface level, have been interpreted to comprise:

- Made Ground
- Lowestoft Formation
- Lewes Nodular & Seaford Chalk Formation

Site specific borehole logs are included as Appendix G and give full descriptions and depths of strata encountered. A summary of the general ground profile beneath the site is provided in the table below, with more detailed description given in the following sub-sections.

Geological Strata	Maximum Depth to Base of Strata (m bgl)	Strata Thickness (m)
Made Ground	4.3	0.3-4.3
Lowestoft Formation	12.7	>1.4-11.8 (where proven)
Lewes Nodular & Seaford Chalk Formation	>25.0	>12.3->15.3 (not proven)

5.1.1 Made Ground

Surfacing at BH1, BH2 and WS1-WS9 comprised a thin layer of asphalt, approximately 0.10-0.15m thick, whilst concrete (0.15-0.20m thick), was encountered from the surface of WS10 and WS11.

Made ground was encountered from the surface of BH3 and WS12 which were formed in areas of existing soft landscaping and generally comprised a yellowish brown, slightly gravelly, sandy, silty clay that extended to a maximum depth of 0.5m. A similar material was also found in BH1, between 0.35m and 0.9m bgl.

A different type of infill was recorded beneath the asphalt at BH1 and WS1-WS9; as a layer of yellowish brown, slightly clayey, sandy, silty gravel/ silty sand that was proven to a maximum depth of 0.9m in BH1. These granular deposits were generally indicative of compacted sub-base installed beneath the existing hardstanding. The materials were similar beneath the concrete at WS10 and WS11, recorded as dark grey, slightly clayey, sandy, silty gravel/ gravelly clay that was proven to a maximum depth of 0.45m. This was fairly typical across the property with Made Ground generally progressing to around 0.5m in the majority of locations.

However, at WS2 and BH2, a more notable thickness of Made Ground was recorded, which also differed in composition to the materials described above. In WS2 a secondary layer of yellowish brown, slightly gravelly, sandy, silty clay with dark grey organic pockets, decayed roots, brick and chert fragments was encountered between 0.5m and 2.3m bgl. At BH2, where made ground was recovered to the maximum thickness encountered during the works (4.3m bgl), the materials were described as dark grey, slightly gravelly, sandy, silty clay/ clayey, sandy, silty gravel with asphalt and brick fragments.

It is anticipated that the deeper infill encountered within WS2 and BH2 is associated with the historic ground workings and railway embankments noted within the historical map data.

5.1.2 Lowestoft Formation (LOFT)

Directly beneath the made ground were soils interpreted to be representative of superficial Lowestoft Formation that were proven to a maximum depth of 12.7m at BH1, 9.7m at BH2 and 10.2m at BH3. Given the typical depth of this unit, the superficial soils often extended beyond the full extent of the shallower window sample positions.

These soils generally comprised an initial layer of firm to stiff, yellowish brown and red, slightly gravelly, sandy, silty clay with light bluish grey mottling, occasional black staining and fine sand / silt pockets. In the deep boreholes and window samples formed towards the south eastern corner, granular deposits were encountered beneath the initial cohesive layers, recorded as medium dense to dense, black, brown and white, angular to rounded, slightly clayey, sandy, silty chert and quartzite gravel. These soils were found to be limited between roughly 0.5-2.5m in the south east (where cohesive material prevailed beneath); with a more significant profile identified in the shell and auger boreholes, between roughly 5.0-10.0m. It should be noted that in some areas the clays and gravels appeared to be finely interbedded.

Furthermore, some slightly lower strength material (soft/ loose) was recognised within the shallow profile of WS7 and WS9 (1.0m – 2.0m bgl), but was not identified in nearby locations.

5.1.3 Lewes Nodular & Seaford Chalk Formation (LESE)

Below the superficial Lowestoft Formation at BH1, BH2 and BH3 were materials interpreted to be representative of the Lewes Nodular & Seaford Chalk Formation.

These soils comprised structureless chalk recovered as <10% intact gravel in a white, slightly clayey, sandy, silty matrix, representative of a Dm (matrix dominated) grade material that extended to beyond maximum formation depth of >25.0m bgl.

5.2 Groundwater

Groundwater strike was not encountered at any location during the intrusive investigation, to a maximum depth of 25.0m bgl.

Furthermore, a discernible groundwater surface was not recorded within the monitoring points during return visits.

5.3 Physical Evidence of Contamination

Despite the presence of construction debris within the profile of the made ground in certain locations, such as asphalt and brick fragments, no palpable evidence of contamination was encountered at any of the borehole locations formed during the ground investigation. The soils did not include any notable evidence of waste or putrefiable material, with hydrocarbon staining/ odours also absent.

5.4 Laboratory Analysis – Soil

An environmental laboratory analysis testing schedule is presented as Table 1 and all environmental soil analysis results obtained from the laboratory are included as Appendix H.

The key results of laboratory testing on environmental soil samples are summarised below.

Contaminant	No. of Samples	No of Detections	Range of Detections (mg/kg)		Highest Location & Depth (m bgl)
			Min	Max	
Arsenic	13	13	0.6	23.2	WS5 (0.1-0.35)
Cadmium	13	5	0.1	0.5	WS12 (0.1-0.5)
Chromium III	13	13	7.4	83.6	BH2 (6.5-6.9)
Copper	13	13	3	160	BH2 (2.0-2.4)
Lead	13	10	5	63	BH2 (2.0-2.4)
Mercury	13	1	0.1		WS10 (0.15-0.3)
Nickel	13	13	2.7	37	BH2 (6.5-6.9)
Selenium	13	2	1		BH2 (6.5-6.9) WS11 (0.2-0.45)
Zinc	13	13	9	125	BH2 (2.0-2.4)
Benzo(a)pyrene	13	6	0.10	9.60	WS5 (0.1-0.35)
Dibenzo(ah)anthracene	13	4	0.06	1.06	WS5 (0.1-0.35)
Naphthalene	13	3	0.29	1.81	WS5 (0.1-0.35)
PAH (Total of 16)	13	6	0.8	94.1	WS5 (0.1-0.35)
Total TPH	9	2	165	409	BH2 (2.0-2.4)
MTBE	9	0	-		
Benzene	9	0	-		
Toluene	9	1	0.006		BH2 (2.0-2.4)
Ethylbenzene	9	0	-		
Xylenes	9	0	-		
PCB's	3	0	-		
ACM (mass %)	13	0	-		

Notes: - Contaminant not identified above MDL; PAH Polycyclic Aromatic Hydrocarbons; TPH Total Petroleum Hydrocarbons; MTBE Methyl Tertiary Butyl Ether; PCB Polychlorinated Biphenyls; ACM Asbestos Containing Material

- Low concentrations of the majority of heavy metals were identified within all of the shallow soil samples obtained from across the site, with the greatest concentrations often recorded within samples of made ground recovered from WS5 (0.1-0.35m), WS12 (0.1-0.5m), BH2 (2.0-2.4m), WS10 (0.15-0.3m) and WS11 (0.2-0.45m).
- Benzo(a)pyrene was identified within six shallow soil samples, with the highest concentration (9.60mg/kg) recorded within made ground at WS5 (0.1-0.35m).
- Detectable concentrations of TPH (total aliphatic and aromatic fractions) were analysed within two of nine soil samples, again being recorded within made ground at BH2 (2.0-2.4m) and WS10 (0.15-0.3m). Interpretative comments from the laboratory suggest that this could be due to the presence of possible PAH's, lubricating oil and degraded diesel.
- ACM was not detected in any of the shallow soil samples.

5.5 Waste Classification

Waste classification (i.e. hazardous or non-hazardous) was undertaken on samples of made ground and natural soils recovered from beneath the site; which included total concentrations of metals and hydrocarbons, using computer software provided by HazWaste Online™.

Waste Acceptance Criteria (WAC) testing was subsequently undertaken on one sample of made ground and each of the superficial (Lowestoft Formation) and bedrock (Lewes Nodular & Seaford Chalk Formation) materials. The results of the WAC analysis are included within Appendix H and the outputs from the software are included in a Waste Classification Report in Appendix I.

These results, together with those of the waste classification above, are summarised in the following table:

Waste Stream	Typical Depth (m bgl) and Description	Is it Hazardous?	Waste Code	Waste Acceptance Criteria	Appropriate Landfill
Made Ground	GL-4.3m - Made ground associated with former ground workings composed of dark grey silty clay/ gravel with construction debris, **but excluding asphalt surfacing.**	No	17 05 04	Passed Criteria for Inert Landfill	**INERT***
Lowestoft Formation	1.0-12.5m - Yellowish brown, gravelly silty clay and silty gravel.	No	17 05 04	Passed Criteria for Inert Landfill	**INERT**
Lewes Nodular & Seaford Chalk Formation	12.5->25.0m – Structureless chalk, recovered as <10% intact gravel in a white, clayey, sandy, silty matrix.	No	17 05 04	Passed Criteria for Inert Landfill	**INERT**

*The results of WAC testing indicate that made ground associated with former ground workings composed of dark grey silty clay/ gravel with construction debris (but excluding asphalt surfacing) that was encountered in selected boreholes, has a Total Organic Carbon (TOC) level greater than the Inert Waste limit of 3%. However, 'Waste Sampling and Testing for Disposal to Landfill (2013)' states that *"in the case of soils, a higher TOC Limit Value may be permitted by the Environment Agency at an inert waste landfill, provided the DOC value of 500mg/kg is achieved at L/S 10 l/kg, either at the soils own pH or at a pH value between 7.5 and 8.0."* In this scenario, the DOC value of 40mg/kg falls significantly below this threshold and on this basis has therefore been classified as **Inert** for the purpose of disposal.

Furthermore, natural soils considered representative of superficial Lowestoft Formation and underlying bedrock of the Lewes Nodular & Seaford Chalk Formation can be classified as **Inert** for the purposes of off-site disposal.

Although the soil sampling process did not identify Asbestos Containing Material (ACM) within the soil, it must be acknowledged that the material may exist within areas which were not sampled or accessible during the investigation. Any visually identifiable fragments of ACM can invalidate any non-hazardous waste classification, as such, the above waste classifications are made on the proviso that any visually identifiable fragments of ACM are removed from the material prior to its disposal off-site. The subsequent ACM must then be disposed of in accordance with the *Control of Asbestos Regulations 2012*.

The classification of the made ground does not include the existing asphalt surfacing or the sub-base materials comprising silty gravel/ sand found in the majority of locations beneath the existing car park; but to a limited depth. These materials should be segregated and analysed for any future off-site disposal requirements.

5.6 Soil Gas and Organic Vapour Results

Ground gas and organic vapour monitoring has been conducted on four occasions following the initial intrusive investigation, between the 11th October and 1st November 2021, on an approximate weekly basis.

Results of the monitoring are summarised below and presented in full in Table 3, along with calculated gas screening values, set out in CIRIA guidance *'Assessing Risks Posed by Hazardous Ground Gases to Buildings'*.

Borehole	CH_4 Range of Detections (%v/v)	CO_2 Range of Detections (%v/v)	O_2 Range of Detections (%v/v)	Organic Vapour Range of Detections (ppmV)
BH1	<0.1	<0.1	20.0-20.5	<0.1-0.1
BH2	<0.1	<0.1	20.3-20.6	<0.1
BH3	<0.1	<0.1	20.3-20.6	<0.1
WS1	<0.1	<0.1-3.8	16.6-20.5	<0.1-0.1
WS3	<0.1	<0.1-0.2	20.3-20.6	<0.1
WS6	<0.1	<0.1-0.2	20.3-20.6	<0.1-0.1
WS12	<0.1	<0.1-3.3	17.6-20.6	<0.1-0.1

Notes: CH_4 Methane CO_2 Carbon Dioxide O_2 Oxygen

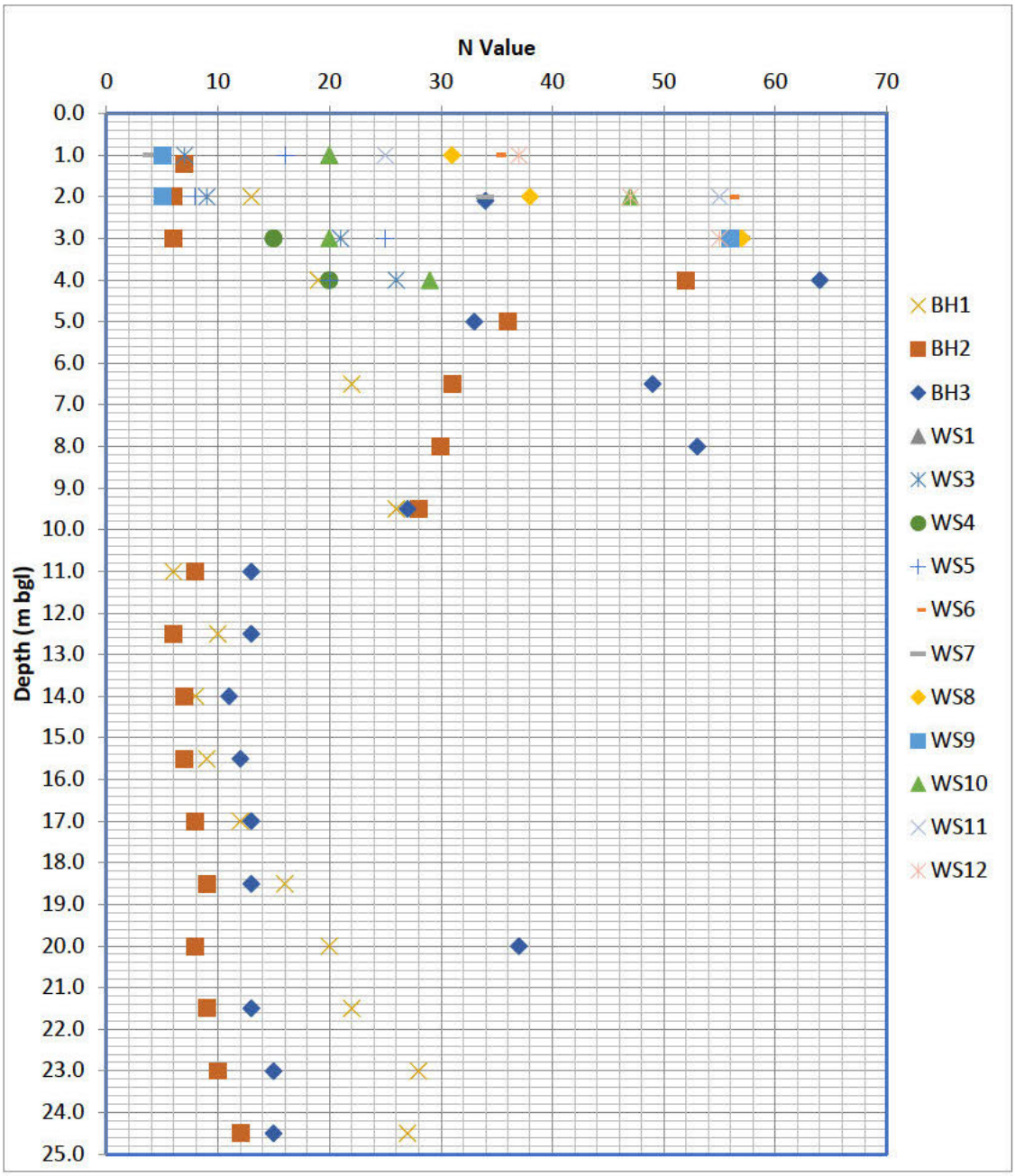
Flow rates (positive or negative) were not encountered in any of the monitoring installations during the four return visits, which were completed under varying atmospheric pressures and conditions.

Overall, limited concentrations of carbon dioxide and organic vapours were identified within the seven monitoring installations with methane not detected above MDL (<0.1% v/v) in any of the positions throughout the programme.

5.7 Geotechnical Testing

5.7.1 In-Situ Geotechnical Testing

The results of in-situ geotechnical testing, are summarised in the graph below.



As can be seen from the above summary, there is a general trend of the recorded 'N' values (and therefore, soil strength) increasing with depth throughout the profile of the Lowestoft Formation and underlying Lewes Nodular & Seaford Chalk Formation. The data returned from the superficial unit is variable, which is expected due to the granular and cohesive nature of the soils encountered.

The interface between the superficial soils and bedrock is evident around 10m bgl, with the in-situ strength reducing notably within the chalk, albeit this material is still considered to be quite consistent and competent. Furthermore, no particularly low strength layers were encountered within the profile of the bedrock, which may have otherwise been an indication of the presence of potential voiding, as a result of dissolution features which have been noted in the local area.

5.7.2 *Laboratory Geotechnical Testing*

The results of geotechnical laboratory testing are summarised in the table below.

Strata	Range of Parameters					
	Moisture Content (%)		Plasticity Index (%)		Undrained Shear Strength (kPa)	
	Min	Max	Min	Max	Min	Max
Lowestoft Formation (cohesive)	11.4	21.8	12 (8)	35	106	166
Lewes Nodular & Seaford Chalk Formation	31.9	32.9	9 (7)	11 (10)	-	

Notes:
() *Indicates plasticity adjusted for granular content*

Strata	Soil Fraction (%)					
	Gravel		Sand		Silt/Clay	
	Min	Max	Min	Max	Min	Max
Lowestoft Formation (granular)	55	67	25	36	2	13

The water content, liquid and plastic limits and plasticity and liquidity indexes were established for twelve samples of predominantly cohesive soils, tested in line with BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:3.2, 4.4, 5.3 and 5.4.

Particle Size Distribution (PSD) tests were carried out on four samples of granular soils in accordance with the test BS1377: Part2: 1990: 9.2.

Triaxial tests (single stage) were completed for five samples of predominantly cohesive soils in accordance with BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 multi-stage loading.

The determination of saturation moisture content and intact dry density was carried out on one sample according to BS1377: Part 2: 1990: 3.3.

Sulphate contents and pH values determinations were carried out by the environmental laboratory for natural soils, the results of which are summarised in Section 6.6.

A geotechnical laboratory analysis testing schedule is presented as Table 2 and all geotechnical sample results obtained from the laboratory are included as Appendix J.

6 GEOTECHNICAL APPRAISAL

The ground conditions have been found to comprise made ground up to around 1.0m thick in the majority of locations, although deposits in excess of roughly 2.5m have been encountered in a limited number of boreholes towards the northern and eastern boundaries. Natural soils beneath have been confirmed as competent superficial Lowestoft Formation (which vary between clay based and granular materials) and progress to around 10.0m bgl, with Lewes Nodular & Seaford Chalk Formation bedrock present at depth.

It should be noted that a significant thickness of infilled soils can be expected beneath the existing garage/ parking structure, and may also be present in other areas of the site which haven't been investigated as part of the intrusive survey.

6.1 Geotechnical Category

Geotechnical Category (BS EN 1997-1:2004)	Definition
GC1	Geotechnical Category 1 (GC1) should only include small and relatively simple structures for which it is possible to ensure that the fundamental requirements will be satisfied on the basis of experience and qualitative geotechnical investigations with negligible risk in terms of overall stability or ground movements and in ground conditions which are known.
GC2	Geotechnical Category 2 (GC2) should include conventional types of structure and foundation with no exceptional risk or difficult or loading conditions. Designs for structures in Geotechnical Category 2 should normally include quantitative geotechnical data and analysis.
GC3	Geotechnical Category 3 (GC3) should include structures or parts of structures, which fall outside the limits of Geotechnical Categories 1 and 2. This may include very large or unusual structures, structures involving abnormal risks, or unusual or exceptionally difficult ground or loading conditions, or structures in areas of probable site instability or persistent ground movements that require separate investigation or special measures.

At the time of writing, it is anticipated the proposed redevelopment will include the construction of several new multi-storey buildings that include parking facilities on the ground floor with residential apartments above. External works are anticipated to include areas of communal soft landscaping and hardstanding. Therefore, the below assessment has been undertaken in accordance with Geotechnical Category 2 (GC2), including conventional types of structure and foundation with no exceptional risk or difficult ground or loading conditions, as defined by BS EN 1997-1:2004.

6.2 Structural Foundations

6.2.1 Spread Foundations

As detailed above, the development is anticipated to comprise several new multi-storey buildings that include parking facilities on the ground floor with residential apartments above. The foundation assessment has therefore been undertaken in accordance with BS EN 1997-1:2004, to take in to account;

- Bearing Pressure (Ultimate Limit State)
- Settlement (Serviceability Limit State)

The ground conditions are considered suitable for the use of conventional spread foundations, either strip footings or pad foundations, bearing upon the Lowestoft Formation (either granular or cohesive), recorded across the proposed development area.

Allowable bearing capacities for strip and pad footings as applicable to the granular or cohesive soils of the Lowestoft Formation are summarised in the table below. The allowable bearing capacity is the permissible increase in vertical stress at the level of the underside of the foundation, above existing overburden pressure, which may be calculated on the basis of a soil density of 19kN/m^3.

Foundation Depth (m bgl)	Allowable Bearing Capacity (kN/m^2)	
	Strip footings	Pad footings
1.0	85	110
1.5	100	125
2.0	110	135
2.5	135	170

At the above allowable bearing capacities, total settlements are considered unlikely to exceed roughly 20-25mm in cohesive soils, but may be limited to 10-15mm where granular soils are encountered at formation level. Settlements in cohesive soils will likely comprise a small amount of immediate settlement and a larger proportion of consolidation settlement, which will occur over a long period of time, whilst settlements in granular soils will occur rapidly as loadings increase. Where foundations cross a change in strata, from cohesive to granular, it would be prudent to incorporate nominal reinforcement to control the effects of differential settlements.

A minimum foundation depth of 0.9m, below existing or proposed ground level is considered suitable for any new buildings, subject to the following provisos:

a) All foundations should fully penetrate any disturbed or made ground and extend a minimum of 150mm into undisturbed natural strata. The same also applies for any shallow natural deposits which are of slightly lower strength (soft/ loose) such as those recorded in WS7 and WS9; positioned towards the south eastern corner of the site. It is recognised a notable thickness of infill material is anticipated beneath the existing garage and car park structure, and locally deeper made ground materials (>2.5m) have already been identified in a few boreholes located towards the northern and eastern boundaries respectively.

b) The cohesive soil (clays) will be subject to volume change, (subsidence and / or heave) due to the presence of trees. Foundation design will therefore need to take into account the presence of trees, both those to remain and those to be planted as well as to be removed from site. The cohesive Lowestoft Formation should be considered as having a 'medium volume change potential' in accordance with NHBC Standards Chapter 4.2 *'Building Near Trees'*.

c) Furthermore, it is recommended that the presence of potential dissolution features is further assessed in the vicinity of the proposed structures. This could be completed by forming a series of dynamic probe boreholes to confirm the strength of the chalk bedrock in these sections of the property, and discount the presence of any voiding, which must be considered further in the context of the proposed foundation solution. Dynamic probes should progress to approximately 20.0m bgl.

Where foundation depths exceed 1.5m due to the presence of trees, full anti-heave precautions will be required.

6.2.2 Piles

Given the anticipated loads associated with the proposed structures, as well as the local presence of shallow clay soils (which will be subject to volume change) and a significant thickness of made ground in certain areas, a deeper foundation solution such as piles may well offer the most appropriate solution for the proposed development.

Piles are considered likely to terminate in the underlying Lewes Nodular & Seaford Chalk Formation and carry their loads in a combination of end bearing and skin friction. It would be unwise to assume any positive contribution to skin friction within any made ground materials or low strength superficial soils.

The ground conditions are considered suitable for the use of bored or driven piles. However, the use of driven piles may cause noise and vibration nuisance to site neighbours/ structures and may ordinarily negate their use.

Piles will need to be designed in full accordance with NHBC Standards and should incorporate reinforcement and full anti-heave precautions where required.

In view of the wide variety of piles sizes available, and the range of installation plant and techniques, the design of the piles should be carried out by, and should remain the responsibility of the specialist piling contractor, who will reflect their own methods, experience and design procedures within their proposals.

6.2.3 Chalk Dissolution

Chalk bedrock was encountered in each of the deep boreholes, from around 10-12m depth. No areas of voiding or particularly low strength soils were identified throughout the bedrock, with in-situ strength testing confirming a general increase in strength with depth throughout its profile. However, the potential for dissolution features is classified as 'moderate' within the Envirocheck data report, with some solution features recorded locally (albeit none on site), which if present could impact overlying soils and therefore proposed structures. As a result, the existence of subsurface voiding cannot be completely discounted.

Therefore, foundation design should take all due regard of the potential for areas of low strength material or voiding to exist in the subsurface, either currently or in the future. Measures to protect shallow foundations (if they are adopted) from such features may include, but are not limited to, reinforcement of foundations and the extension of 'cruciform type' foundations, beyond the building line.

Furthermore, it is also recommended that Local Authority Building Control are consulted to see if they have any other specific requirements for the design of foundations (shallow and/ or deep) to account for the presence of dissolution features within this area. It should be noted that extensive in-situ strength testing completed across the property did not identify any areas of particularly low strength material, to a maximum depth of 25.0mbgl.

6.3 Ground Floor Construction

Given that made ground is present across the site and the near surface soils being likely to be susceptible to volume change, suspended ground floor slabs are recommended for any new buildings, incorporating a sub-floor void suitable for a 'medium volume change potential' soil.

The floor slab design will also need to take in to account the presence of trees/vegetation and should be designed to accommodate any heave/ shrinkage that will be generated.

6.4 Drainage

Falling head infiltration tests were undertaken at four shallow borehole locations across the site, to give an initial indication of the permeability of the underlying soils.

Infiltration rates are summarised in the table below, but should only be treated as a guide/ indicative at this stage:

Borehole Location & Depth (m bgl)	Approximate Infiltration Rate (m/s)	Comments
WS2 (4.0m)	$6.2x10^{-07}$	Notable profile of made ground in this borehole location.
WS5 (4.0m)	Not calculable	No discernible change in water levels over testing period, cohesive soils recovered from borehole.

Borehole Location & Depth (m bgl)	Approximate Infiltration Rate (m/s)	Comments
WS8 (3.0m)	$2.7x10^{-06}$	Granular and cohesive soils recovered from borehole
WS11 (2.0m)	Not calculable	No discernible change in water levels over testing period, cohesive soils recovered from borehole.

The results of the infiltration testing indicate that the clay soils beneath the site are generally not suitable for the adoption of infiltration drainage, with negligible change in water levels throughout the testing periods in WS5 and WS11. This is not unexpected as these soils are typically low permeability.

The calculated rate from the data recovered from WS8 suggests a 'low to medium permeability' soil, which is likely to be the result of higher proportion of granular materials within this position. Therefore, where a greater thickness of granular soils are present within the profile of the Lowestoft Formation (in the south eastern section) for example, they might be suitable for the adoption of soakaways or other sustainable drainage systems. However, this would be subject to formal soakaway testing aligned with the requirements of BRE Digest 365 to inform design.

It should be noted that due to the presence of relatively low density chalk bedrock beneath the site, with a moderate dissolution risk, any soakaway drainage systems would likely need to be located at least 20m away from any existing or proposed structures, to mitigate against the moderate risk of potential chalk dissolution.

6.5 Groundworks

Shallow excavations formed within the underlying clay soils may be stable for short periods, but should not be relied upon over extended periods, particularly where a notable proportion of granular soils are encountered. Given the variability of the shallow soils, it is recommended that temporary shoring of all but the shallowest excavations is undertaken during the groundworks phase. The stability of any made ground or disturbed ground arising from removal of any below ground structures (such as existing building foundations) should not be relied upon in unsupported excavations.

Heavy plant and stockpiles of materials should not be permitted close to the edges of unsupported excavations. Further reference may be made to CIRIA Report No. 97 '*Trenching Practice*' 1992.

Based on the findings of the ground investigation, groundwater ingress is not anticipated within any on-site excavations.

6.6 Concrete Grade

Sulphate contents and pH value determinations were carried out by the environmental laboratory and the results of this testing are summarised in the below table as well as being presented within Appendix H.

Strata	Water Soluble Sulphate 2:1 SO_4 (mg/l)		pH	
	Min	Max	Min	Max
Lowestoft Formation	21.9	186.7	4.97	8.04
Lewes Nodular & Seaford Chalk Formation	14.4	43.8	8.60	8.92

In accordance with Part 1 of the BRE Special Digest 1 'Concrete in Aggressive Ground' 2005, a design sulphate class of DS1 is considered suitable for concrete in direct contact with the superficial Lowestoft Formation and underlying Lewes Nodular & Seaford Chalk Formation, with an aggressive chemical environment for concrete (ACEC) of AC-1s.

7 ENVIRONMENTAL APPRAISAL

The following section outlines the approach applied to assessing the risks posed to human health and groundwater through a Generic Quantitative Risk Assessment, then identifies any sample results found by this investigation which warrant further consideration.

7.1 Human Health

7.1.1 Land Use Setting & Generic Screening Criteria

In order to screen laboratory data for concentrations of contaminants in soil with potential to cause harm to human health, a Public Open Space – Residential (POS_{RESI}) land use setting has been adopted as it is considered the most representative of the anticipated setting and also aligns with the conclusions of the Phase I desk study.

The technical framework used to derive the assessment criteria and the documents in which they are published are summarised as follows:

- *EA Science Reports* (SC050021/SR2, SC050021/SR3, and SC050021/SR7)
- *EA Soil Guideline Value Science Reports*
- *Suitable For Use Levels (S4ULs) for Human Health Risk Assessment* – LQM and CIEH (2015)
- *Soil Generic Assessment Criteria for Human Health Risk Assessment* - EIC/AGS/CL:AIRE (2010)
- *Development of Category 4 Screening Levels for assessment of land affected by contamination* – SP1010 – DEFRA (2013)

Category 4 Screening Levels (C4SLs) provide generic suitable for use screening values for common contaminants in a variety of land uses and are also utilised as appropriate generic screening criteria. For concentrations of Arsenic, Lead and BaP in soil, EPS has used DEFRAs C4SL as an appropriate guide for professional judgement with respect to reasonable 'low risk' levels in the context of this site and its suitability for use.

It is considered reasonable to utilise Benzo(a)pyrene (BaP) as a risk driver or marker representative of genotoxic PAHs (i.e. including dibenzo(ah)anthracene and benzo(b)fluoranthene) given the absence of any 'low risk' (C4SL) equivalent screening values for these compounds.

A summary of the screening criteria and the methodology used to derive them is included in Appendix K.

7.1.2 Assessment of Soil Results

The results of the screening process for on-site human receptors showed that adopted criteria, representative of suitability limits to future site users were not exceeded for any contaminant at any location.

7.2 Controlled Waters

7.2.1 Generic Screening

In addition to screening the recorded concentrations of contaminants to pose risks to human health, EPS has also screened the concentrations for potential to cause harm to water resources. The criteria used for this process were derived by EPS using the following technical guidance:

- *Environment Agency Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination.*

Resource Sensitivity of Area	Basis of Tier 1 Criteria
High Groundwater Resource Potential (HGwRP) - Principal Aquifers	UK Drinking Water Standards (UKDWS)
Low Groundwater Resource Potential (LGwRP) - Secondary Aquifers not being abstracted and Unproductive groundwater strata	UK Environmental Quality Standards (EQS)

Screening criteria for High Groundwater Resource Potential (HGwRP) have been adopted for this site due to the underlying bedrock (chalk) being classified as a Principal Aquifer as well as the site's location within a SPZ.

7.2.2 Assessment of Soil Results – Controlled Waters

The results of the screening process for controlled waters show that screening values for High Groundwater Resource Potential (HGwRP) have been exceeded on a number of occasions, as summarised in the table below.

Contaminant	Screening Criteria (mg/kg)	No. of Exceedances	Highest Exceedance (mg/kg) & Sampling Location (m bgl)
Benzo(a)pyrene	1.44	1	9.60 at WS5 (0.1-0.35) in made ground
Naphthalene	0.02	3	1.81 at WS5 (0.1-0.35) in made ground
TPH CWG Aromatics (C10-C12)	2.76	1	6.3 at BH2 (2.0-2.4) in made ground
TPH CWG Aromatics (C12-C16)	5.5	1	14 at BH2 (2.0-2.4) in made ground
TPH CWG Aromatics (C16-C21)	17.4	2	51 at BH2 (2.0-2.4) in made ground
TPH CWG Aromatics (C21-C35)	138	1	188 at BH2 (2.0-2.4) in made ground

Although the above exceedances of screening criteria protective of controlled waters has been detected in a limited number of the soil samples, that does not necessarily mean an unacceptable risk to controlled waters, primarily groundwater, exists. The generic screening values are by their very nature, extremely conservative and in the first instance an exceedance should lead to qualitative consideration of the risks that may be posed given the context of a specific site.

Whilst BaP and Naphthalene were detected above respective screening criteria on a few occasions, these contaminants are generally known to exhibit low mobility within the environment. In addition, the source of these impacts is anticipated to be asphalt surfacing which has been broken up and inadvertently included with the samples of made ground submitted to the laboratory.

Although several fractions of aromatic TPH have also been analysed at BH2 (2.0-2.4m), in the order of 2-3x the adopted screening criteria, it should be recognised that two further samples were obtained from this same borehole location at 6.5-6.9m and 17.8-18.2m respectively; both of which didn't include any detectable concentrations of similar contaminants of concern. This was supported by the absence of any visual and olfactory contamination during the field works and it should be noted that groundwater has been proven to lie at least 25m below existing surface levels beneath the study area. Furthermore, a significant profile of superficial soils, in the order of 10m thick (a notable proportion of which are cohesive/ low permeability) is also present across the site and above the chalk bedrock. This is anticipated to create a further obstruction/ barrier for any isolated pockets of residual contamination within the made ground (from historic railway infrastructure for example), from impacting the sensitive chalk aquifer at depth. Therefore, no unacceptable risks to controlled waters are considered to have been identified as part of this risk assessment.

7.3 Ground Gas and Organic Vapour Monitoring

7.3.1 Generic Screening

An assessment of the risks posed by ground gas and organic vapour generation has been undertaken through consideration of a conservative maximum individual Gas Screening Value (GSV) or site characteristic hazardous gas flow rate, in accordance with the following guidance:

- CIRIA 665 – *'Assessing Risks Posed by Hazardous Ground Gases to Buildings'*.
- NHBC – *'Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide are Present'* (March 2007).
- British Standard BS8485:2015 – *'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'*.

7.3.2 Assessment of Ground Gas Results

Results of soil gas monitoring undertaken after the initial intrusive investigation are presented in Table 3, along with the calculated GSVs.

Due to the anticipated nature of the proposed development, (construction of several new multi-storey buildings that include parking facilities on the ground floor with residential apartments above), the *'Modified Wilson and Card Classification System'* has been used to assess the risks from ground gases, (in accordance with CIRIA C665).

The maximum individual GSV is calculated by multiplying the maximum borehole flow rate (l/hr) by the maximum gas concentration (%). For example, monitoring data reporting a maximum flow rate of 3.5l/hr and a maximum concentration of 4% methane would have a GSV of 0.14 (4/100 x 3.5).

No 'borehole flow' has been measured within any of the monitoring points, during four return visits, all undertaken during periods of falling atmospheric pressure. The maximum GSVs have been calculated as <0.0001l/hr for methane and <0.0038l/hr for carbon dioxide. The calculated GSVs would typically be considered to be representative of characteristic situation 1 (CS1) conditions, which denotes a 'very low risk' from ground gases to be present at the site.

Furthermore, only negligible concentrations of organic vapours were detected within a few of the monitoring points during one of the return visits on the 25th October 2021 (maximum of 0.1ppmV), and therefore do not warrant further consideration or control measures.

7.4 Summary of Findings

Through consideration of the site's history and environmental setting, the Phase I Desk Study established that a number of plausible contaminant linkages have the potential either to be currently active, or to become active as a result of the proposed development.

These contaminant linkages primarily comprise of human health risks associated with exposure of construction workers and future site users to made ground and potentially contaminated shallow soils due to the anticipated presence of made ground from the existing car park facility as well as more localised impacts from former (on-site) and neighbouring railway infrastructure. Furthermore, potential risks relating to the generation and migration of ground gas from both on-site (historic ground workings) and off-site (local areas of landfilling/ infilling) sources was also established, as well as risks posed to controlled waters.

Intrusive investigations comprised the formation of 15 boreholes to a maximum depth of 25m. The ground conditions were found to comprise a generally limited thickness of made ground although deeper deposits were found in two locations which are anticipated to align with former on-site ground workings and/ or railways embankments, to a maximum depth of 4.3m bgl. Below the infill, a significant thickness of superficial Lowestoft Formation comprising both cohesive and granular soils were encountered to roughly 10m bgl, with chalk bedrock proven beyond the maximum depth of the deep boreholes. Importantly, groundwater wasn't encountered in any of the borehole locations, to 25m bgl.

Despite the presence of made ground, no signs of contamination were recorded in the field, which was largely supported by the findings of the laboratory analysis, with all samples being screened as chemically suitable for use in the anticipated land use/ setting (POS_{RESI}). It should be noted that the above classification is subject to adjustment should finalised development plans reveal more sensitive areas of landscaping then currently anticipated, such as enclosed or private garden areas, albeit this is considered unlikely at this stage.

Potential risks to controlled waters were also highlighted as a result of some limited concentrations of aromatic TPH and selected PAH compounds within a few made ground samples. Although the chalk bedrock is a sensitive receptor, potential risks were discounted on the basis of the nature of the ground profile, depth of the groundwater table and a number of other factors outlined in Section 7.2.2.

Waste classification analysis has identified that the made ground (associated with former ground workings) and natural soils considered representative of superficial Lowestoft Formation and underlying bedrock of the Lewes Nodular & Seaford Chalk Formation can be classified as **Inert** for the purposes of off-site disposal.

Ground gases were also previously identified as a potential risk to any future development and therefore a robust ground gas monitoring programme was undertaken as part of the intrusive works. No significant levels of ground gas / organic vapours were recorded across the four return visits (under falling atmospheric conditions), representative of 'very low risk'/ CS1 scenario conditions, whereby no ground gas protection measures are considered necessary for the new buildings.

7.5 Recommendations

In the context of potentially unacceptable or acceptable risks as outlined within the Environment Agency's *Land Contamination: Risk Management guidance* (LC:RM, 2020), the risks identified by this work will not require further assessment, providing the following control measures are adhered to at the appropriate stage in the redevelopment process:

a) Although the soils in place have been found to be suitable for use in a (POS_{RESI}) setting in terms of chemical quality, given the presence of made ground beneath the surface of the site, it would be prudent to install a simple cover system of **100mm** certified clean imported soils. This would represent an appropriate measure for any areas which are intended as soft landscaping, in order to provide an appropriate growing medium and conform to NHBC standards. It should be noted that this recommendation is made only for soft landscaped areas and there is no such requirement for areas beneath any proposed hardstanding/ building footprints.

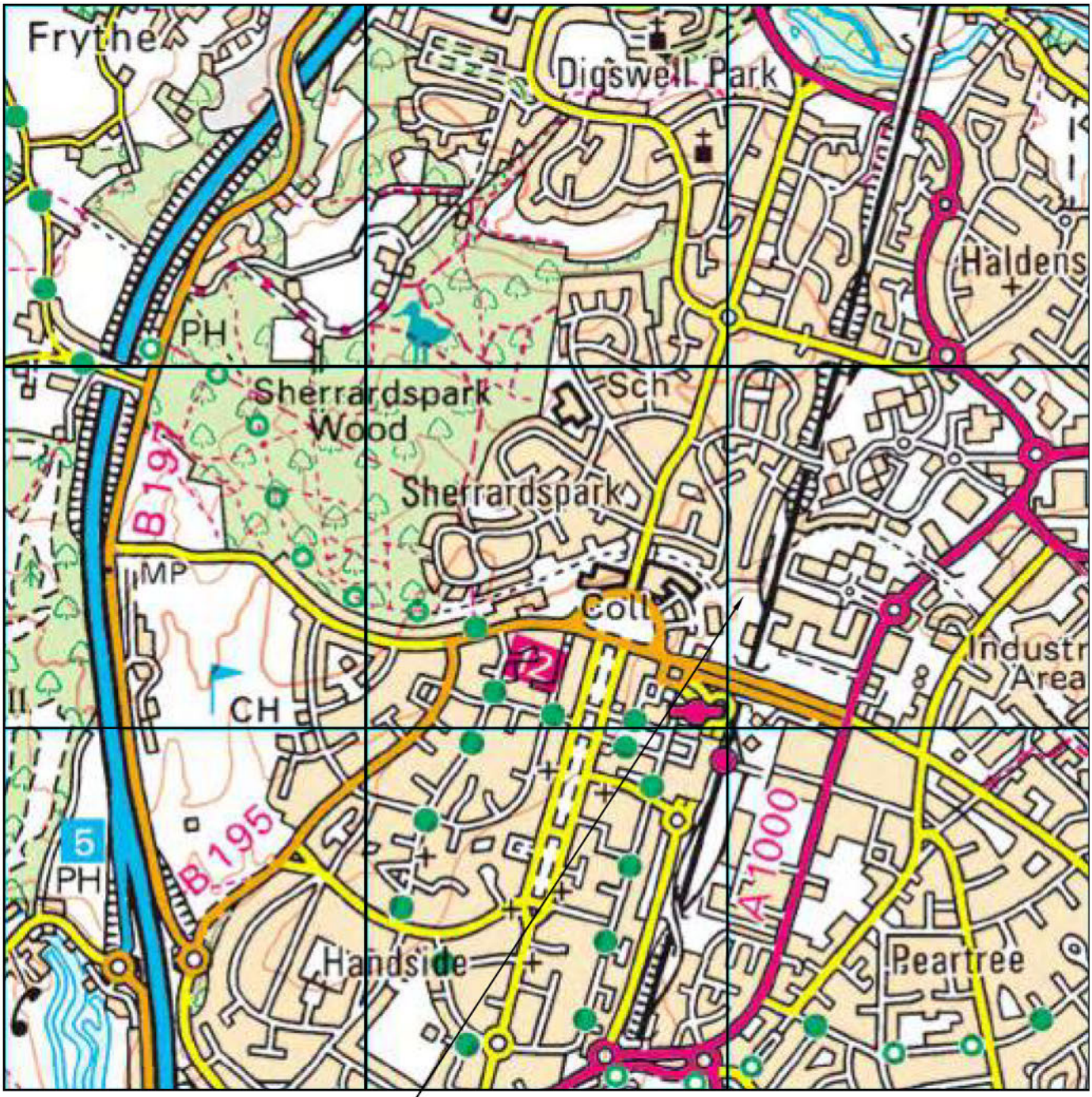
   All imported topsoil/ subsoil for use within the cover system should be accompanied by appropriate laboratory analysis to demonstrate its chemical and physical suitability for use and ensure it meets the requirements of the checklist included in Appendix L. Details of the imported material and photographs of the installation should be provided to the local authority as evidence of completion of the measures. It should be noted that this recommendation is made only for areas of soft landscaping, and there is no such requirement for areas beneath any proposed hardstanding or building footprints.

b) All construction workers operating at the site should be advised of the potential for contact with made ground material within shallow soils. Appropriate health and safety precautions should be adopted during any excavation works to avoid exposure to soils. Reference should be made to relevant health & safety guidance including the following CIRIA document: *R132 Guide to Safe Working on Contaminated Sites*. Consideration should also be given to the potential for dust generation during excavation of the made ground materials and the need for damping down / dust suppression measures.

c) Should any palpable evidence of unexpected contamination be encountered during the redevelopment work, which significantly varies from the conditions described above, it should be reported to EPS so that an inspection can be made and appropriate sampling and assessment work carried out. A method statement for encountering any unexpected contamination is included as Appendix M of this report.

It is also recommended that a copy of this report be provided to the Environmental Health Department of Welwyn Hatfield Council for inclusion in their land quality records.

FIGURES



eps	**Title:**	**Site Location Plan**	
	Project:	North Campus East Car Park, Welwyn Garden City, AL8 6UN	Scale NTS
			Drawn By SC / Approved By BV
	Fig No:	1	Job No UK21 5579
			Dwg No Hertfordshire/1121/01
			Date November 2021

— Approximate Site Boundary

Title: **Current Site Layout Plan**

Project: North Campus East Car Park, Welwyn Garden City, AL8 6UN

Fig No: 2

Scale	NTS
Drawn By	SC
Approved By	BV
Job No	UK21 5579
Dwg No	Hertfordshire/1121/02
Date	November 2021

— Approximate Site Boundary

Title: Aerial Photograph

Project: North Campus East Car Park, Welwyn Garden City, AL8 6UN

Fig No: 3

Scale	NTS
Drawn By	SC
Approved By	BV
Job No	UK21 5579
Dwg No	Hertfordshire/1121/03
Date	November 2021

Approximate Site Boundary
Approximate Shell & Auger Borehole Location
Approximate Window Sample Borehole Location

Title: Borehole Location Plan

Project: North Campus East Car Park, Welwyn Garden City, AL8 6UN

Fig No: 4

Scale	NTS
Drawn By SC	Approved By BV
Job No	UK21 5579
Dwg No	Hertfordshire/1021/04
Date	October 2021

TABLES

Table 1 – Environmental Laboratory Testing Schedule

Sample ID	Sample Depth (m bgl)	EPS Waste Suite	EPS Mini Suite	EPS TPH Suite	pH & Sulphates
BH1	5.45	-	-	-	1
BH2	6.5-6.9	1	-	-	-
BH1	10.3	-	-	-	1
BH1	10.5	-	-	-	1
BH2	17.8-18.2	1	-	-	-
BH2	2.0-2.4	1	-	-	-
BH2	4.7	-	-	-	1
BH2	15.0	-	-	-	1
BH3	1.65	-	-	-	1
BH3	3.45	-	-	-	1
BH3	22.5	-	-	-	1
WS1	0.1-0.45	-	1	1	-
WS1	1.6-1.8	-	-	1	-
WS3	0.1-0.6	-	1	1	-
WS4	0.1-0.45	-	1	-	-
WS5	0.1-0.35	-	1	-	-
WS6	0.1-0.6	-	1	-	-
WS7	0.1-0.6	-	1	1	-
WS8	0.7-0.9	-	-	1	-
WS9	0.15-0.5	-	1	-	-
WS10	0.15-0.3	-	1	1	-
WS11	0.2-0.45	-	1	-	-
WS12	0.1-0.5	-	1	-	-

Notes:

m bgl	meters below ground level	EPS Mini Suite	Organic Matter, Cyanide, Metals, PAH's, Phenols and Asbestos Screen
1	Sample Taken	EPS Waste Suite	Waste Characterisation Suite
-	Sample Not Analysed	EPS TPH Suite	Total Petroleum Hydrocarbons, BTEX compounds and MTBE

Table 2 – Geotechnical Laboratory Testing Schedule

Sample ID	Sample Depth (m bgl)	Atterberg Limits	Moisture Content	PSD	Triaxial	Saturation Moisture Content
BH1	3.0	1	1	-	1	-
BH1	5.0	1	1	-	1	-
BH1	8.0	1	1	-	1	-
BH1	11.7	-	-	1	-	-
BH1	13.3	1	1	-	-	-
BH2	8.0	-	-	1	-	-
BH2	23.8	-	-	-	-	1
BH3	1.2	1	1	-	1	-
BH3	3.0	1	1	-	1	-
BH3	4.0	-	-	1	-	-
BH3	6.5	-	-	1	-	-
BH3	16.4	1	1	-	-	-
WS2	1.8-2.0	1	1	-	-	-
WS3	1.6-1.8	1	1	-	-	-
WS4	1.6-1.8	1	1	-	-	-
WS6	0.8-1.0	1	1	-	-	-
WS7	0.6-0.8	1	1	-	-	-

Notes:

m bgl	meters below ground level
1	Sample Taken
-	Sample Not Analysed
PSD	Particle Size Distribution

Table 3 – Ground Gas Monitoring Well Analysis

BH ID	Flow (l/hr)	CH_4 (%v/v)		CO_2 (%v/v)		O_2 (%v/v)		H_2S (ppm)	VOC (ppmV)	Gas Screening Value (l/hr) (CH_4)	Gas Screening Value (l/hr) (CO_2)
		Peak	Steady	Peak	Steady	Peak	Steady	Peak			
BH1	<0.1	<0.1	<0.1	<0.1	<0.1	20.5	20.5	<0.1	<0.1	<0.0001	<0.0001
BH2	<0.1	<0.1	<0.1	<0.1	<0.1	20.5	20.5	<0.1	<0.1	<0.0001	<0.0001
BH3	<0.1	<0.1	<0.1	<0.1	<0.1	20.5	20.5	<0.1	<0.1	<0.0001	<0.0001
WS1	<0.1	<0.1	<0.1	3.8	3.8	16.6	16.6	<0.1	<0.1	<0.0001	<0.0038
WS3	<0.1	<0.1	<0.1	0.2	0.2	20.4	20.4	<0.1	<0.1	<0.0001	<0.0002
WS6	<0.1	<0.1	<0.1	0.2	0.2	20.5	20.5	<0.1	<0.1	<0.0001	<0.0002
WS12	<0.1	<0.1	<0.1	3.3	3.3	17.6	17.6	<0.1	<0.1	<0.0001	<0.0033

Readings collected at an atmospheric pressure of 1018mbar (falling) to 1017mbar on the 11th October 2021

BH ID	Flow (l/hr)	CH_4 (%v/v)		CO_2 (%v/v)		O_2 (%v/v)		H_2S (ppm)	VOC (ppmV)	Gas Screening Value (l/hr) (CH_4)	Gas Screening Value (l/hr) (CO_2)
		Peak	Steady	Peak	Steady	Peak	Steady	Peak			
BH1	<0.1	<0.1	<0.1	<0.1	<0.1	20.3	20.3	<0.1	<0.1	<0.0001	<0.0001
BH2	<0.1	<0.1	<0.1	<0.1	<0.1	20.6	20.6	<0.1	<0.1	<0.0001	<0.0001
BH3	<0.1	<0.1	<0.1	<0.1	<0.1	20.6	20.6	<0.1	<0.1	<0.0001	<0.0001
WS1	<0.1	<0.1	<0.1	<0.1	<0.1	20.5	20.5	<0.1	<0.1	<0.0001	<0.0001
WS3	<0.1	<0.1	<0.1	<0.1	<0.1	20.6	20.6	<0.1	<0.1	<0.0001	<0.0001
WS6	<0.1	<0.1	<0.1	<0.1	<0.1	20.6	20.6	<0.1	<0.1	<0.0001	<0.0001
WS12	<0.1	<0.1	<0.1	<0.1	<0.1	20.6	20.6	<0.1	<0.1	<0.0001	<0.0001

Readings collected at an atmospheric pressure of 1005mbar (falling) to 1003mbar on the 18th October 2021

BH ID	Flow (1/hr)	CH_4 (%v/v)		CO_2 (%v/v)		O_2 (%v/v)		H_2S (ppm)	VOC (ppmV)	Gas Screening Value (1/hr) (CH_4)	Gas Screening Value (1/hr) (CO_2)
		Peak	Steady	Peak	Steady	Peak	Steady	Peak			
BH1	<0.1	<0.1	<0.1	<0.1	<0.1	20.3	20.3	<0.1	0.1	<0.0001	<0.0001
BH2	<0.1	<0.1	<0.1	<0.1	<0.1	20.5	20.5	<0.1	<0.1	<0.0001	<0.0001
BH3	<0.1	<0.1	<0.1	<0.1	<0.1	20.4	20.4	<0.1	<0.1	<0.0001	<0.0001
WS1	<0.1	<0.1	<0.1	<0.1	<0.1	20.5	20.5	<0.1	0.1	<0.0001	<0.0001
WS3	<0.1	<0.1	<0.1	<0.1	<0.1	20.5	20.5	<0.1	<0.1	<0.0001	<0.0001
WS6	<0.1	<0.1	<0.1	<0.1	<0.1	20.4	20.4	<0.1	0.1	<0.0001	<0.0001
WS12	<0.1	<0.1	<0.1	<0.1	<0.1	20.4	20.4	<0.1	0.1	<0.0001	<0.0001

Readings collected at an atmospheric pressure of 1002mbar (falling) to 1001mbar on the 25th October 2021

BH ID	Flow (1/hr)	CH_4 (%v/v)		CO_2 (%v/v)		O_2 (%v/v)		H_2S (ppm)	VOC (ppmV)	Gas Screening Value (1/hr) (CH_4)	Gas Screening Value (1/hr) (CO_2)
		Peak	Steady	Peak	Steady	Peak	Steady	Peak			
BH1	<0.1	<0.1	<0.1	<0.1	<0.1	20.0	20.0	<0.1	<0.1	<0.0001	<0.0001
BH2	<0.1	<0.1	<0.1	<0.1	<0.1	20.3	20.3	<0.1	<0.1	<0.0001	<0.0001
BH3	<0.1	<0.1	<0.1	<0.1	<0.1	20.3	20.3	<0.1	<0.1	<0.0001	<0.0001
WS1	<0.1	<0.1	<0.1	<0.1	<0.1	20.2	20.2	<0.1	<0.1	<0.0001	<0.0001
WS3	<0.1	<0.1	<0.1	<0.1	<0.1	20.3	20.3	<0.1	<0.1	<0.0001	<0.0001
WS6	<0.1	<0.1	<0.1	<0.1	<0.1	20.3	20.3	<0.1	<0.1	<0.0001	<0.0001
WS12	<0.1	<0.1	<0.1	<0.1	<0.1	20.3	20.3	<0.1	<0.1	<0.0001	<0.0001

Readings collected at an atmospheric pressure of 981mbar (falling) to 980mbar on the 1st November 2021

APPENDICES

APPENDIX A

Selected Site Photographs

— Approximate Site Boundary
(1) Approximate Photo Location

Title: Photo Location Plan

Project: North Campus East Car Park, Welwyn Garden City, AL8 6UN

Appendix: A

Scale	NTS
Drawn By	SC
Approved By	BV
Job No	UK21 5579
Dwg No	Hertfordshire/1121/A
Date	November 2021

Photo 1: View of site facing south west from the north east.	Photo 2: View of roof car park in south west.
	
Photo 3: View from roof car park facing north east.	Photo 4: Soft landscaping adjacent to west of roof car park (facing south).
	
Photo 5: WS1 core material.	Photo 6: WS8 core material.
	

APPENDIX B

Indicative Proposed Development Plan

EXTENT OF MANSARD/DORMER ACCOMMODATION

AFFORDABLE TENURE LOCATIONS

DENOTES M4(3) ACCOMMODATION (GF)

NOTES

This drawing to be read in accordance with the specification/Bills of Quantities and related drawings.

No Dimensions to be scaled from this drawing. All stated dimensions to be verified on site and the Architect notified of any discrepancies.

0 100

Scale bar 100mm at 1:1

Accommodation Schedule - Masterplan

TYPE		UNIT AREA (sq/m)	UNIT AREA (sq/ft)	BLOCK A	B	C	D	E	F	G	H	TOTAL	TOTAL AREA (sq/m)	TOTAL AREA (sq/ft)	MIX
1BED	1.1	50.2	540.2	32	8	0	0	8	0	0	0	48	2409.6	25927	38.2%
	1.2	51.6	555.2	10	0	0	0	0	0	0	0	10	516.0	5552	
	1.3	50.2	540.2	0	11	7	7	0	0	9	11	45	2259.0	24307	
	1.4	56.6	609.0	0	4	0	0	0	0	0	0	4	226.4	2436	
2BED	2.1	73.2	787.6	16	10	0	0	7	0	0	0	33	2415.6	25992	57.9%
	2.2	71.2	766.1	20	5	0	0	4	0	0	0	29	2064.8	22217	
	2.3	61.4	660.7	7	4	0	0	4	0	0	0	15	921.0	9910	
	2.4	71.4	768.3	10	0	0	0	0	0	0	0	10	714.0	7683	
	2.5	67.1	722.0	6	0	0	0	0	0	0	0	6	402.6	4332	
	2.6	72.0	774.7	0	12	7	7	0	8	9	11	54	3888.0	41835	
	2.7	78.2	841.4	0	4	0	0	0	0	0	0	4	312.8	3366	
	2.8	72.0	774.7	0	0	1	1	0	0	1	1	4	288.0	3099	
	2.9	72.2	776.9	0	4	0	0	0	3	0	0	7	505.4	5438	
3BED	3.1	91.2	981.3	7	0	0	0	0	0	0	0	7	638.4	6869	3.9%
	3.2	85.1	915.7	0	4	0	0	0	0	0	0	4	340.4	3663	
BLOCK TOTALS:				108	66	15	15	23	11	19	23	280	:TOTAL UNITS		
BLOCK GIA (m^2):				10215.0	4968.2	1211.6	1211.6	1892.0	1211.6	1353.0	1817.4	23880.4	:TOTAL GIA (m^2)		
(ft^2):				109,913	53,458	13,037	13,037	20,358	13,037	14,558	19,555	256,953	:(ft^2)		
												211	:TOTAL PARKING		
∴												0.75	per UNIT		

UNDERCROFT PARKING PLAN
BLOCK B

UNDERCROFT PARKING PLAN
BLOCK A

PRELIMINARY

REV	DATE	NOTE	IN
-	-	-	-

Project

PROPOSED DEVELOPMENT

CAMPUS EAST
WELWYN GARDEN CITY

Title

PROPOSED SITE LAYOUT

Scale 1:500 @A1 Date DEC 2020

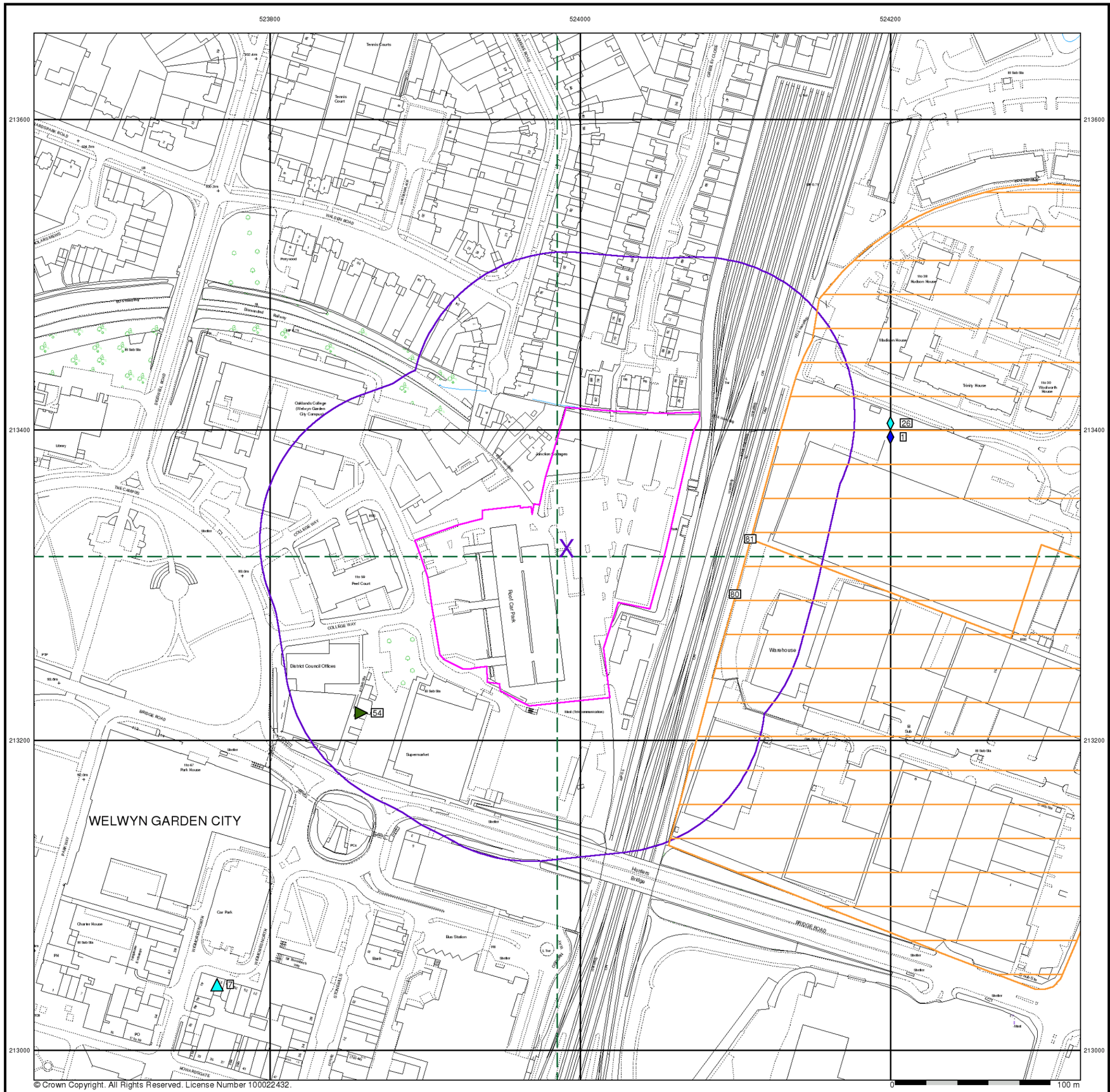
Drawn RC/MB Checked RC/MB

Drawing Number 8375/SK103 Revision -

Saunders
Architecture+Urban Design
saundersarchitects.com | 01707 385300 | London | Manchester | Bristol | Welwyn

APPENDIX C

Surrounding Land Use



General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location
- Pylon
- Overhead Transmission Line

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

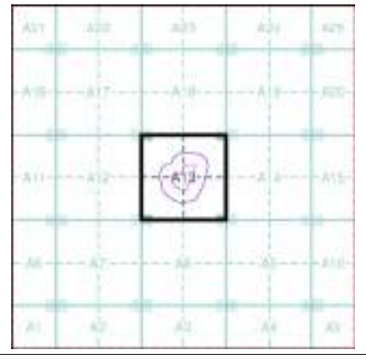
Geological

- BGS Recorded Mineral Site

Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Site Sensitivity Map - Segment A13



Order Details

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Customer Ref:	UK21.5579
National Grid Reference:	523990, 213320
Slice:	A
Site Area (Ha):	2.07
Plot Buffer (m):	100

Site Details

North Campus East Car Park, College Way, Welwyn Garden City, AL8 7PH

Landmark INFORMATION GROUP
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APPENDIX D

Geological Context

Geology 1:50,000 Maps Legends

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	ALV	Alluvium	Clay, Silt, Sand and Gravel	Not Supplied - Holocene
	LOFT	Lowestoft Formation	Diamicton	Not Supplied - Anglian
	KGCA	Kesgrave Catchment Subgroup	Sand and Gravel	Not Supplied - Pleistocene

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	LC	London Clay Formation	Clay, Silt and Sand	Not Supplied - Ypresian
	LMBE	Lambeth Group	Clay, Silt and Sand	Not Supplied - Thanetian
	LESE	Lewes Nodular Chalk Formation and Seaford Chalk Formation (Undifferentiated)	Chalk	Not Supplied - Turonian

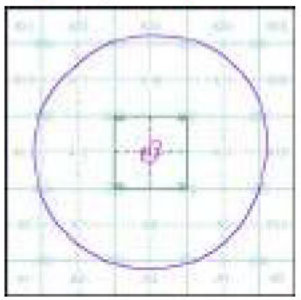
Geology 1:50,000 Maps

This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.
The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

Map ID:	1
Map Sheet No:	239
Map Name:	Hertford
Map Date:	1923
Bedrock Geology:	Available
Superficial Geology:	Available
Artificial Geology:	Available
Faults:	Not Supplied
Landslip:	Not Available
Rock Segments:	Not Supplied

Geology 1:50,000 Maps - Slice A



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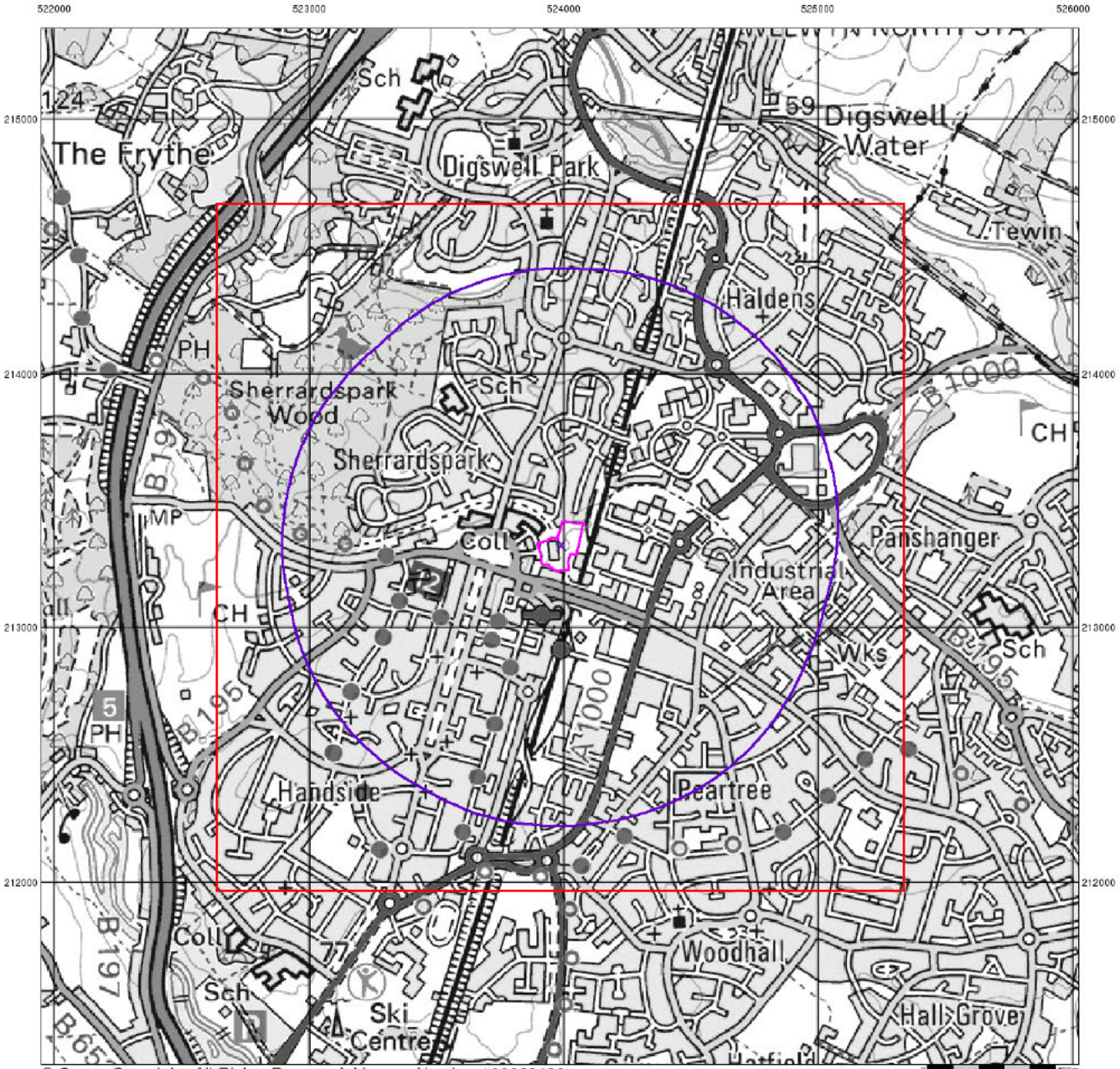
National Grid Reference:	523990, 213320
Slice:	A
Site Area (Ha):	2.07
Search Buffer (m):	1000

Site Details:

North Campus East Car Park, College Way, Welwyn Garden City, AL8 7PH



Artificial Ground and Landslip

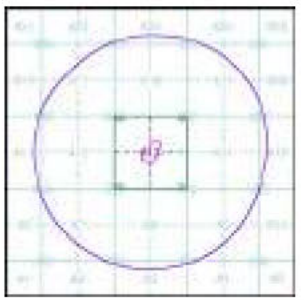
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



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National Grid Reference:	523990, 213320
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Site Area (Ha):	2.07
Search Buffer (m):	1000

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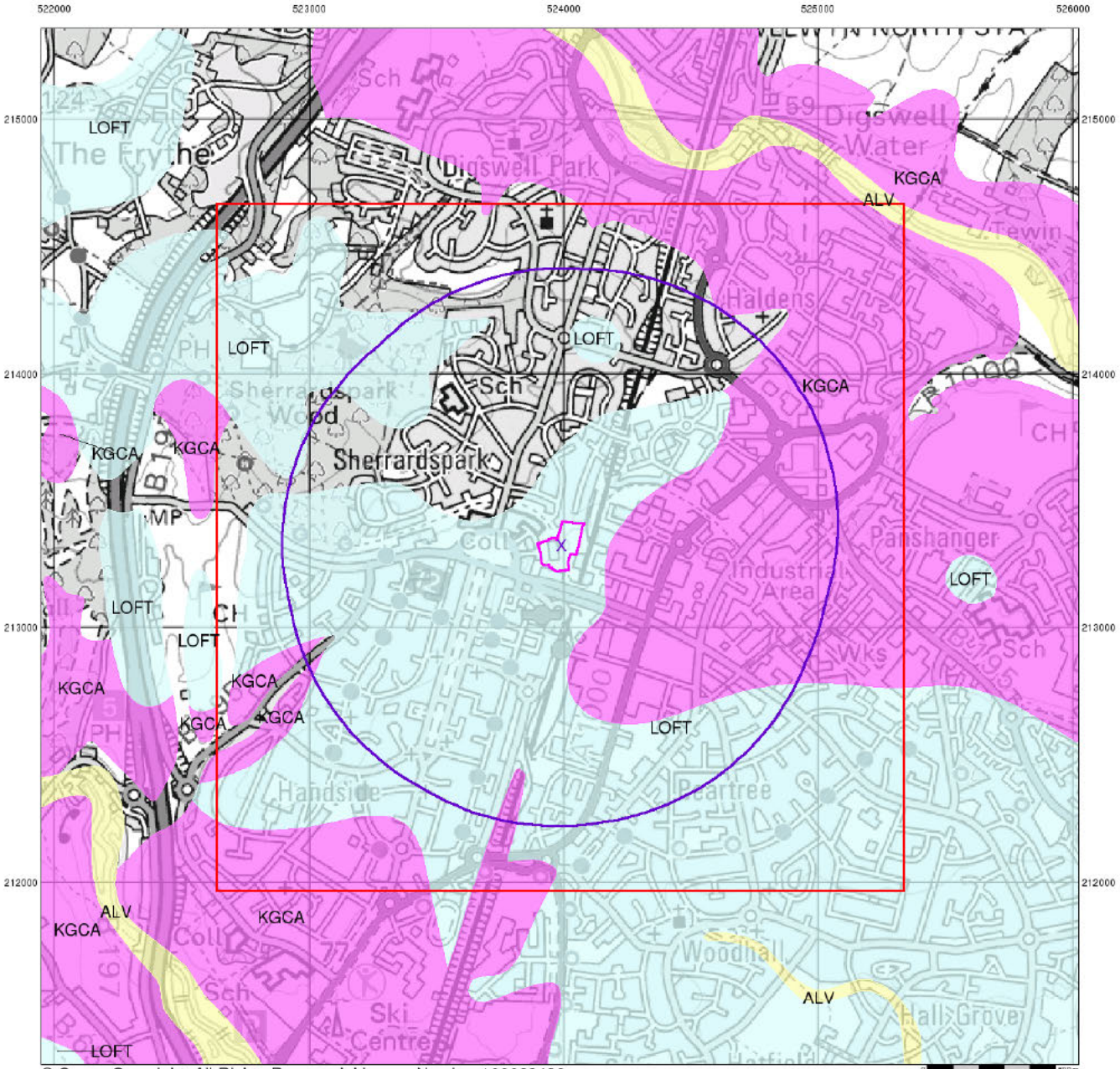


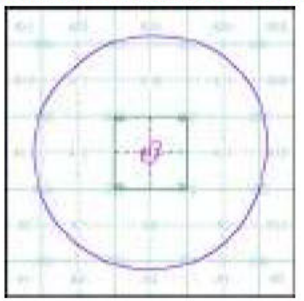
Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



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National Grid Reference:	523990, 213320
Slice:	A
Site Area (Ha):	2.07
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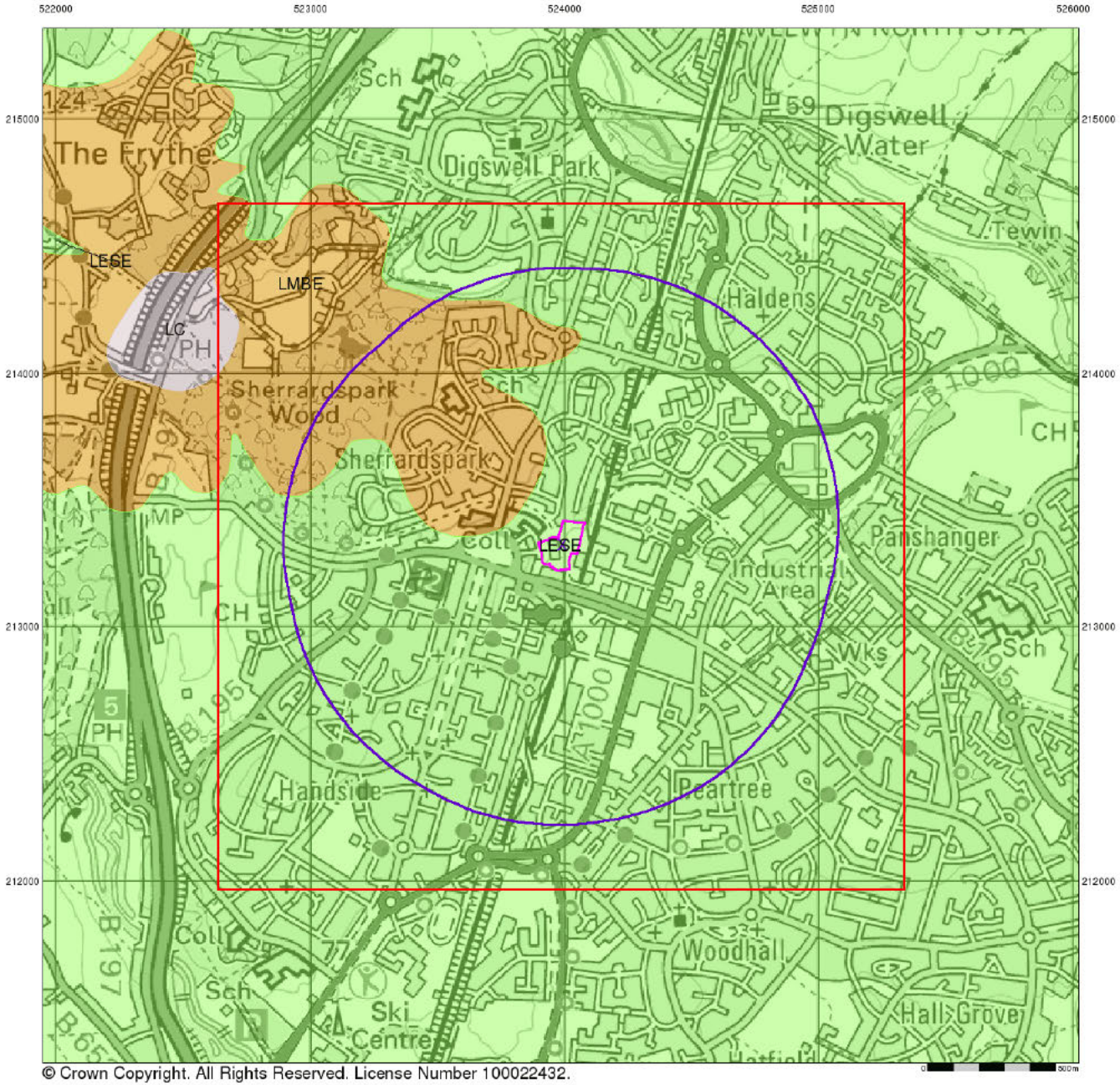


Bedrock and Faults

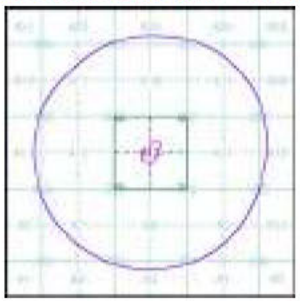
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1 50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

Bedrock and Faults Map - Slice A



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National Grid Reference:	523990, 213320
Slice:	A
Site Area (Ha):	2 07
Search Buffer (m):	1000

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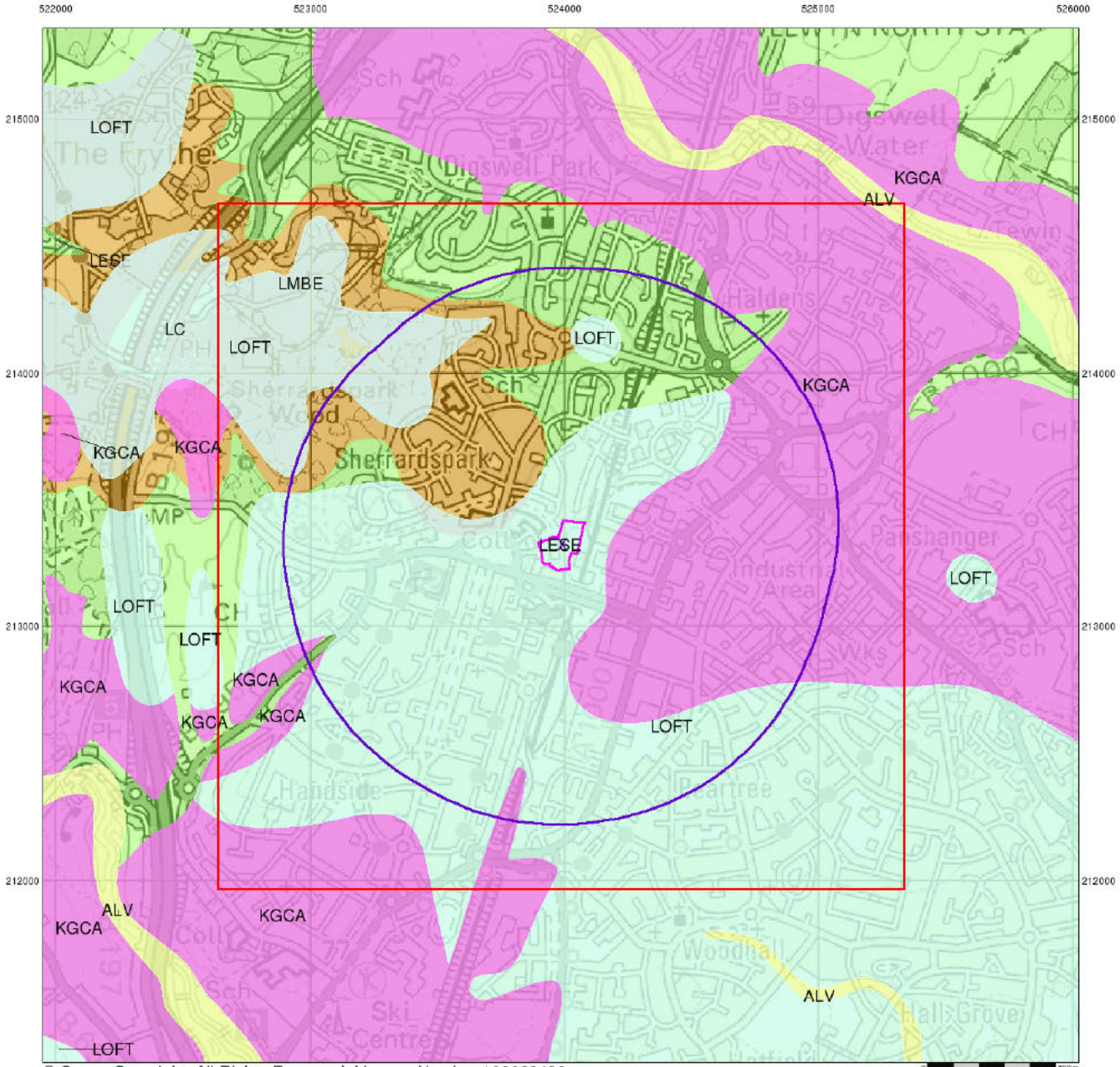


Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

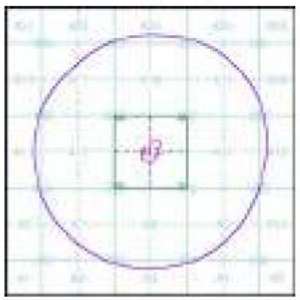
Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs ac uk

Combined Geology Map - Slice A



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National Grid Reference:	523990, 213320
Slice:	A
Site Area (Ha):	2 07
Search Buffer (m):	1000

Site Details:

North Campus East Car Park, College Way, Welwyn Garden City, AL8 7PH

British Geological Survey

Version 2.0.6.3

BGS ID: 533324 : BGS Reference: TL21SW14
British National Grid (27700) : 523730,213070
Report an issue with this borehole

Department of the Environment | Investigation No. FGE/336 | Appendix A
CIVIL ENGINEERING LABORATORY Cordington | Sheet No 2

T. E. Extension — WELWYN GARDEN CITY

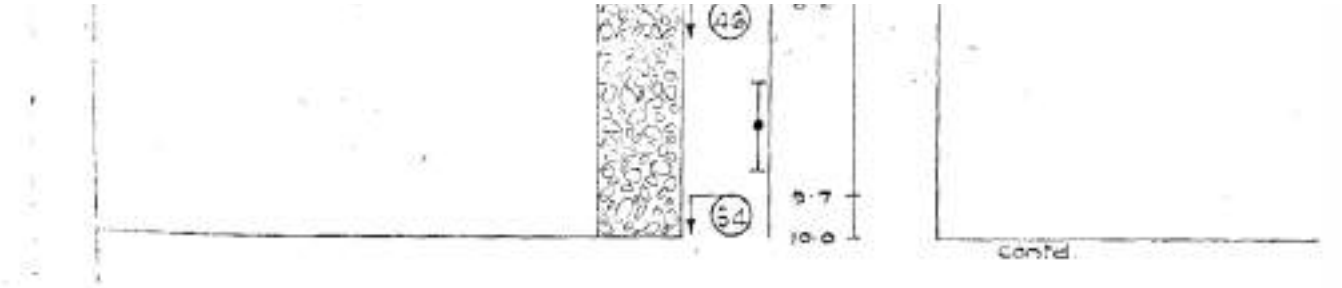
BOREHOLE LOG

TL 21 SW/14
8979 1907

Borehole No 1
Ground Level approx 89.3m A.O.D.
Date 27th - 30th April & 3rd - 6th May 1970

Note:- Standpipe installed to 25.0m depth

Description of Strata	Legend	Sample	Depth (m)	O.D. (m)	Remarks
FILL: Tarmac (0.1m) resting on brick rubble (From archive description)			0	89.3	
			0.4	88.9	
GRAVEL, variably clayey, sandy brown to orange brown; includes flints upto 63mm. Becomes sandier below ca. 1.3m depth.		29	1.2		
			1.5		
		11	2.7		
CLAY, silty, very sandy in places, orange brown with stones, chalk fragments and patches of clayey sand. Contains some flints upto 125mm			3.0	86.3	
			3.5		
			3.9	85.4	
GRAVEL, sandy, silty, slightly clayey brown to orange brown, with occasional patches of clay; includes flints upto 80mm.			4.0		
		36	5.2		
		38	6.7	82.6	* SPT = 38 blows for 150mm, then 50 blows with no further penetration
GRAVEL, sandy, light orange brown; occasionally includes flints upto 200mm.					
			8.3		


48
54
9·7
10·0
contd.

British Geological Survey

Version 2.0.6.3

BGS ID: 533324 : BGS Reference: TL21SW14
British National Grid (27700) : 523730,213070
Report an issue with this borehole

Department of the Environment
CIVIL ENGINEERING LABORATORY Cardington

Investigation No. FGE/330

Appendix A
Sheet No. 3

T. E. Extension

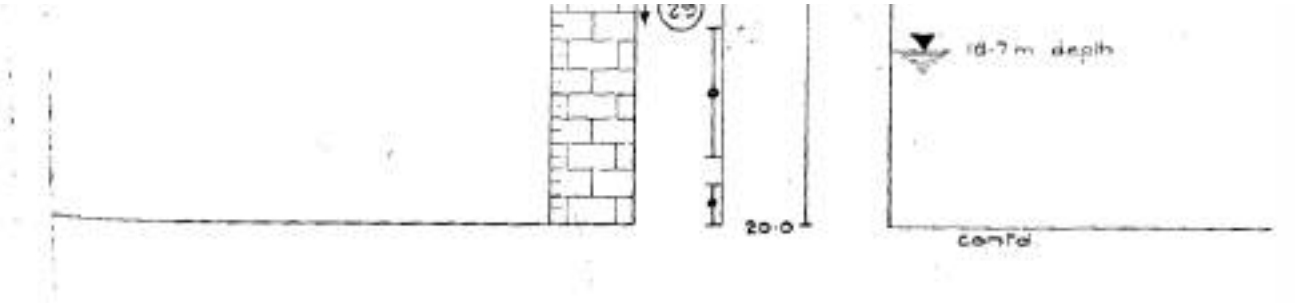
WELWYN GARDEN CITY

BOREHOLE LOG

Borehole No. 1 central
Ground Level.....
Date.....

Note:- 1" 239
TL 21 SW/14
2379 1907

Description of Strata	Legend	Sample	Depth (m)	O.D (m)	Remarks
GRAVEL, sandy from sheet 2			10.0		
CHALK, clayey, friable and rubbly, yellowish buff, with flint fragments [Reworked]			10.6	79.7	
CLAY, silty, dark brown with chalk and flint fragments, patches of sand & gravel, also containing fragments of stiff brown clay. (** see note)		11	11.2	77.6	** Clay fragments possibly derived from London Clay
GRAVEL, with some chalky silt.		12	11.9 12.2	77.4	
CLAY, silty, brown. (from drillers description)			12.4	75.9	
CHALKY, clayey and friable, brownish white with scattered flint fragments [Reworked]		*	13.0 14.2	74.8	* SPT - Equipment sank under own weight from 14.0m to 14.8m depth
CHALK, variably rubbly and blocky with yellowish patches and scattered flints. [In situ bedrock]			17.0 17.5	72.3	


18·7 m depth
20·0
centre

British Geological Survey

Version 2.0.6.3

BGS ID: 533324 : BGS Reference: TL21SW14
British National Grid (27700) : 523730,213070
Report an issue with this borehole

Department of the Environment
CIVIL ENGINEERING LABORATORY Cardington

Investigation No. FGE/336

Appendix A
Sheet No 4

T. E. Extension

WELWYN GARDEN CITY

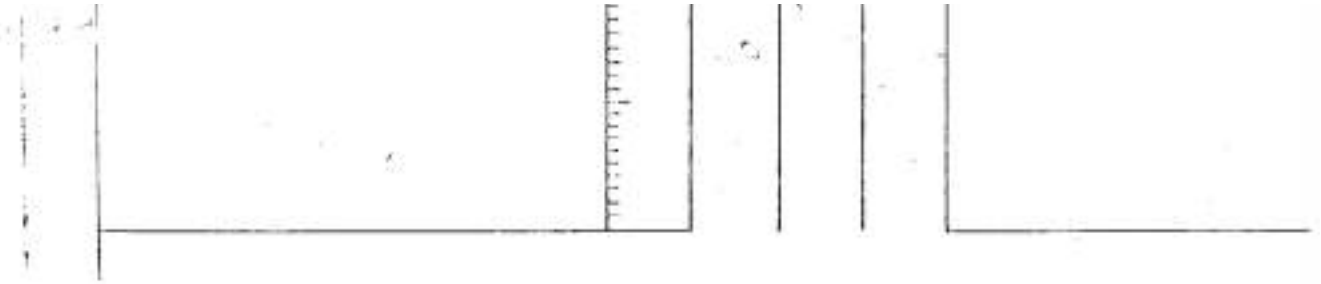
BOREHOLE LOG

1" 239
TL 21 SW/14
2378 1307

Borehole No. 1 cont'd
Ground Level
Date

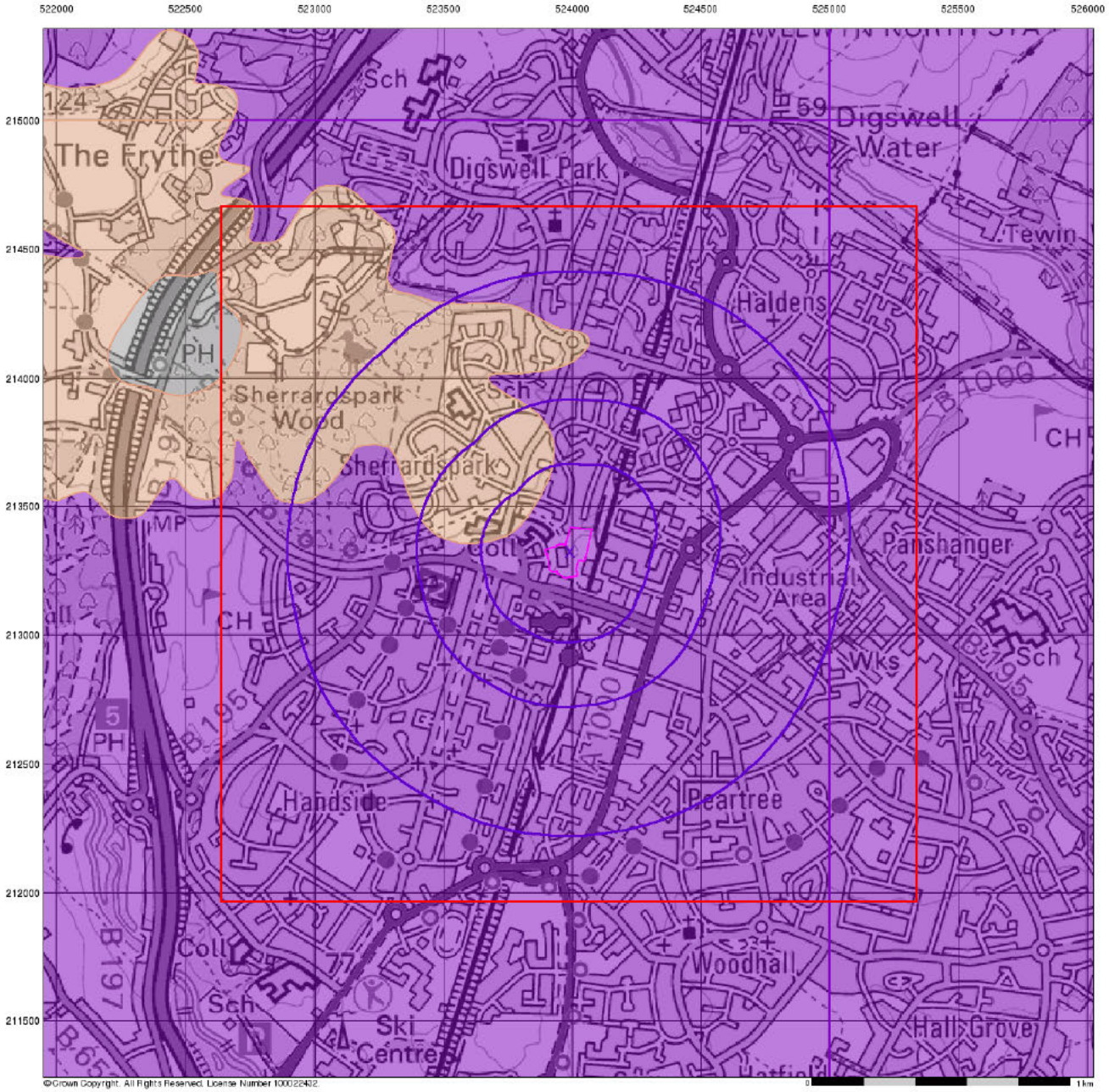
Note:-

Description of Strata	Legend	Sample	Depth (m)	O.D. (m)	Remarks
CHALK, cont'd from Sheet 3		47	20.0		
			20.2		
		37	21.7		
		43	23.2		
		39	25.2		
			25.5	63.8	End of borehole



APPENDIX E

Groundwater Vulnerability and Flood Maps



Bedrock Aquifer Designation

General

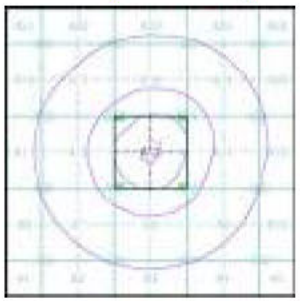
Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



Order Details

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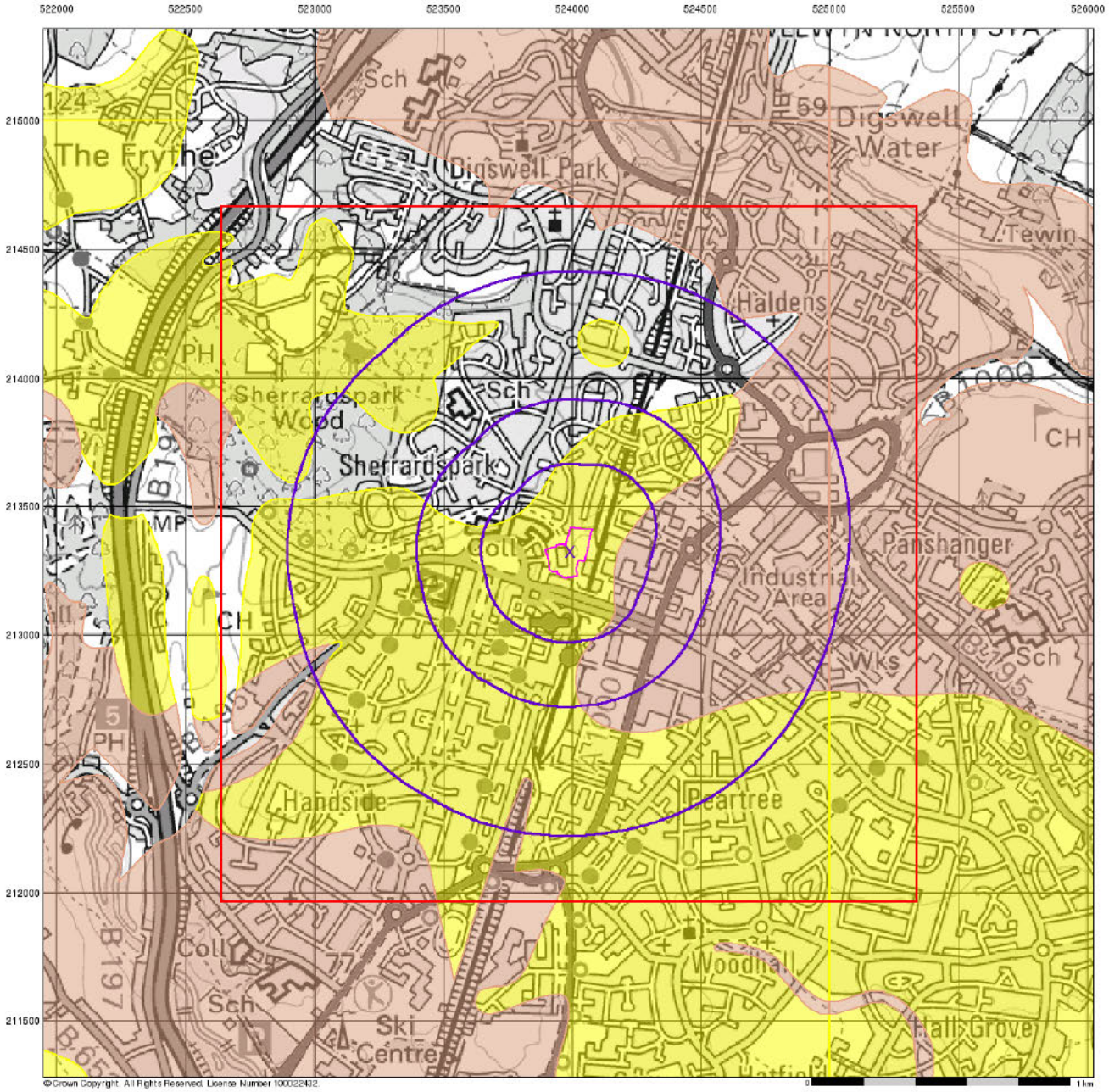
Customer Ref:	UK21.5579
National Grid Reference:	523990, 213320
Slice:	A
Site Area (Ha):	2.07
Search Buffer (m):	1000

Site Details

North Campus East Car Park, College Way, Welwyn Garden City, AL8 7PH



Superficial Aquifer Designation

General

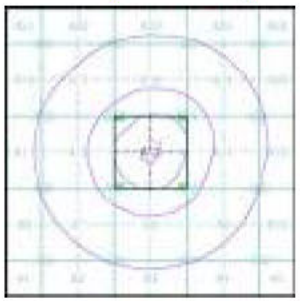
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



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Slice:	A
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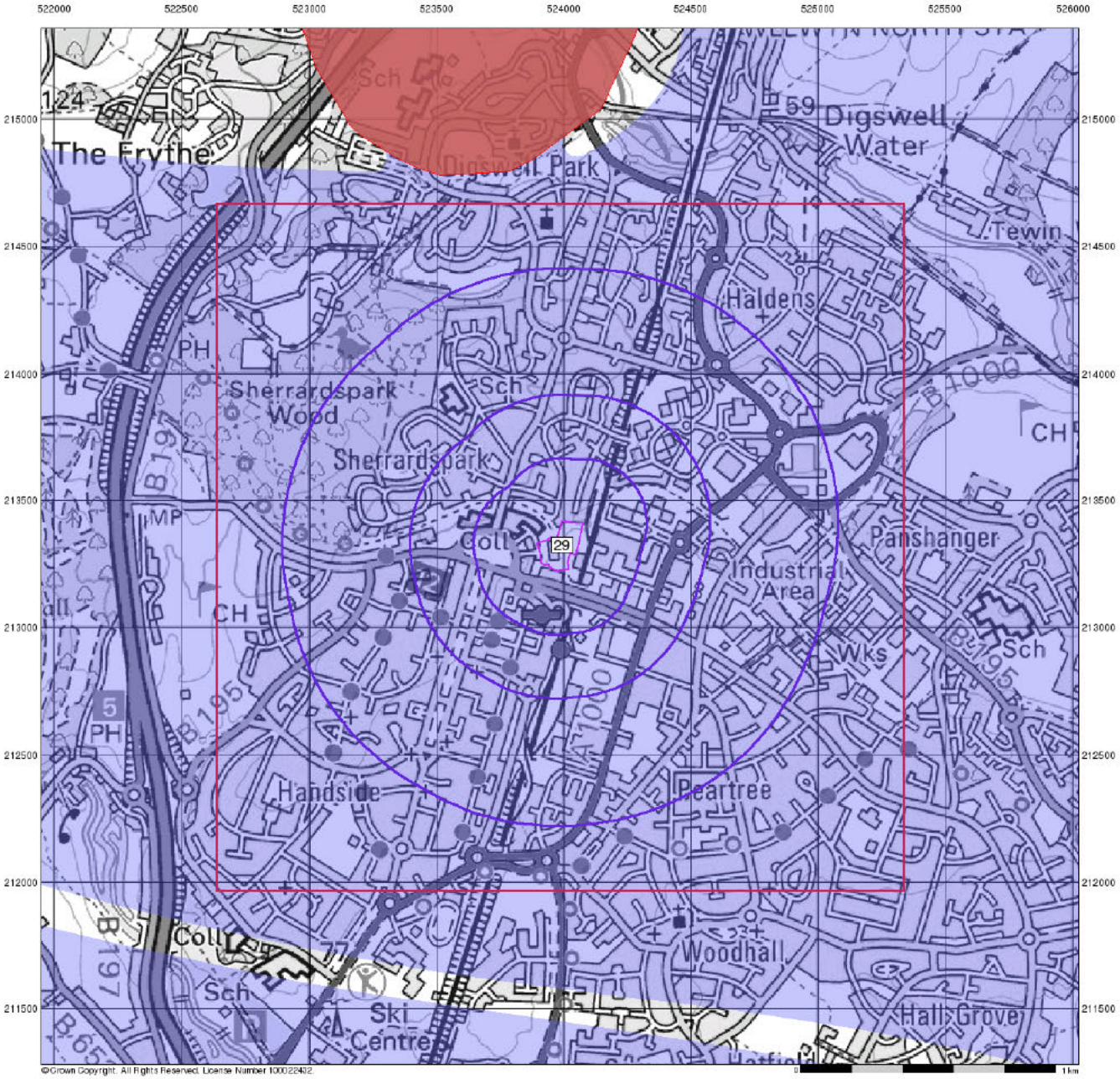


Source Protection Zones

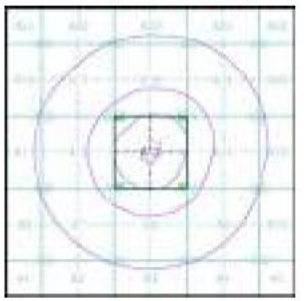
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	284848351_1_1
Customer Ref:	UK21.5579
National Grid Reference:	523990, 213320
Slice:	A
Site Area (Ha):	2.07
Search Buffer (m):	1000

Site Details

North Campus East Car Park, College Way, Welwyn Garden City, AL8 7PH

Landmark INFORMATION GROUP
Tel 0844 844 9952
Fax 0844 844 9951
Web www.envirocheck.co.uk

eps

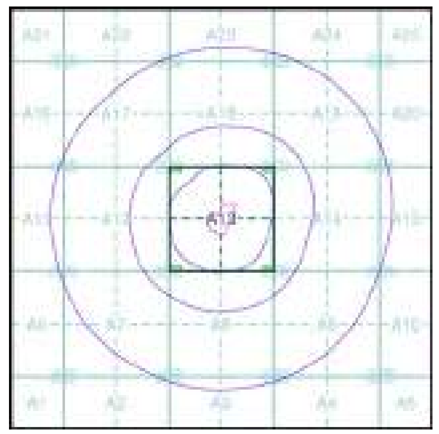
General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A



N

Order Details

Order Number:	284848351_1_1
Customer Ref:	UK21.5579
National Grid Reference:	523990, 213320
Slice:	A
Site Area (Ha):	2.07
Search Buffer (m):	1000

Site Details

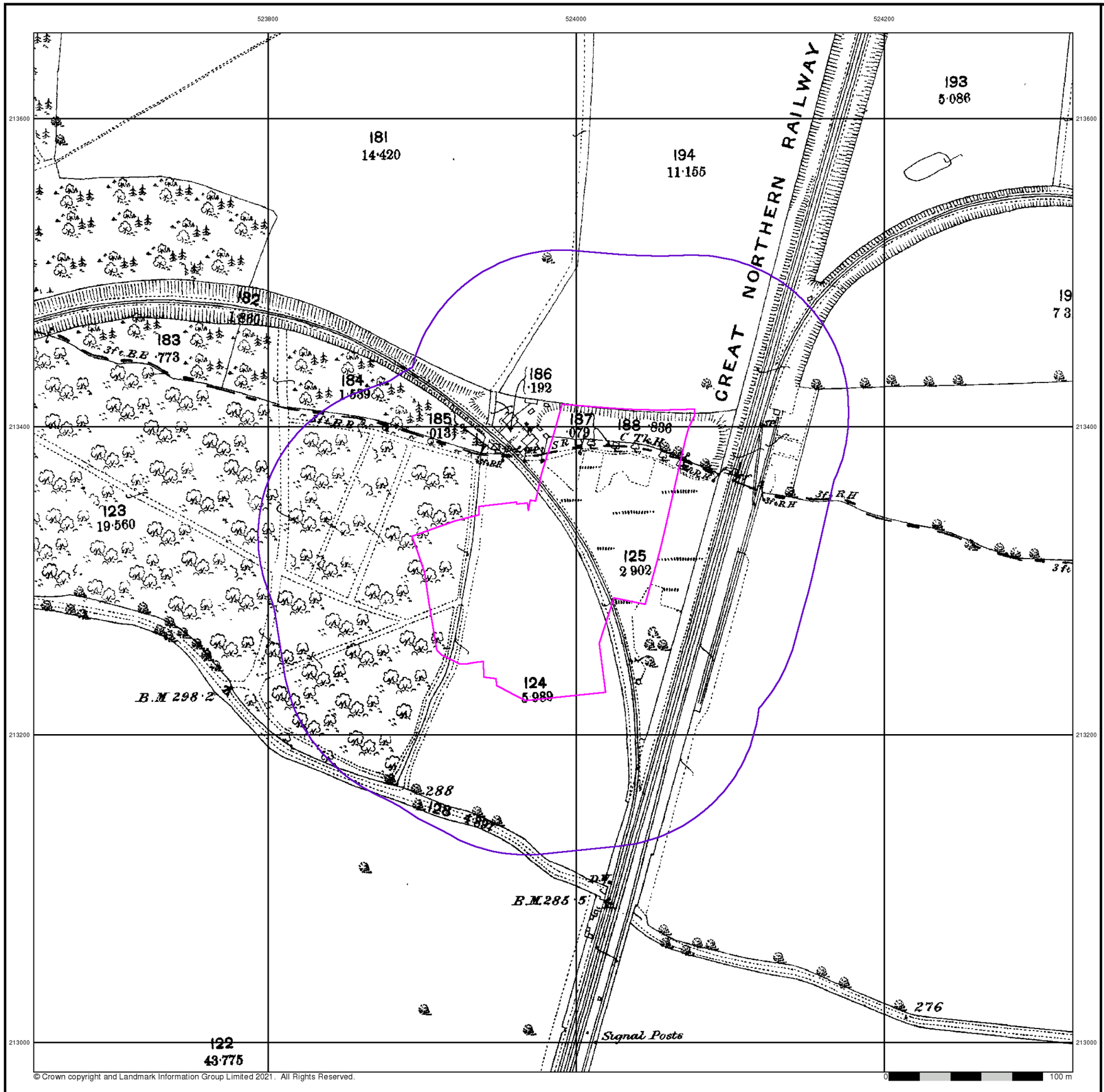
North Campus East Car Park, College Way, Welwyn Garden City, AL8 7PH

Landmark INFORMATION GROUP

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

APPENDIX F

A Selection of Historic Maps



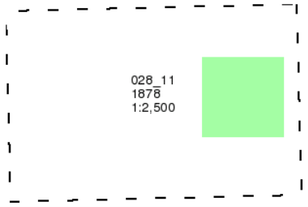
Hertfordshire

Published 1878

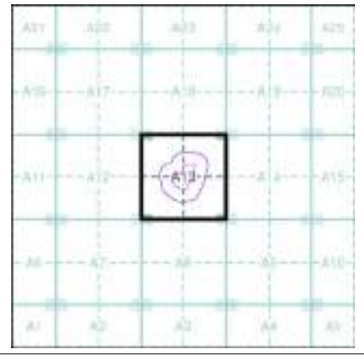
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	284848351_1_1
Customer Ref:	UK21.5579
National Grid Reference:	523990, 213320
Slice:	A
Site Area (Ha):	2.07
Search Buffer (m):	100

Site Details

North Campus East Car Park, College Way, Welwyn Garden City, AL8 7PH

Landmark INFORMATION GROUP
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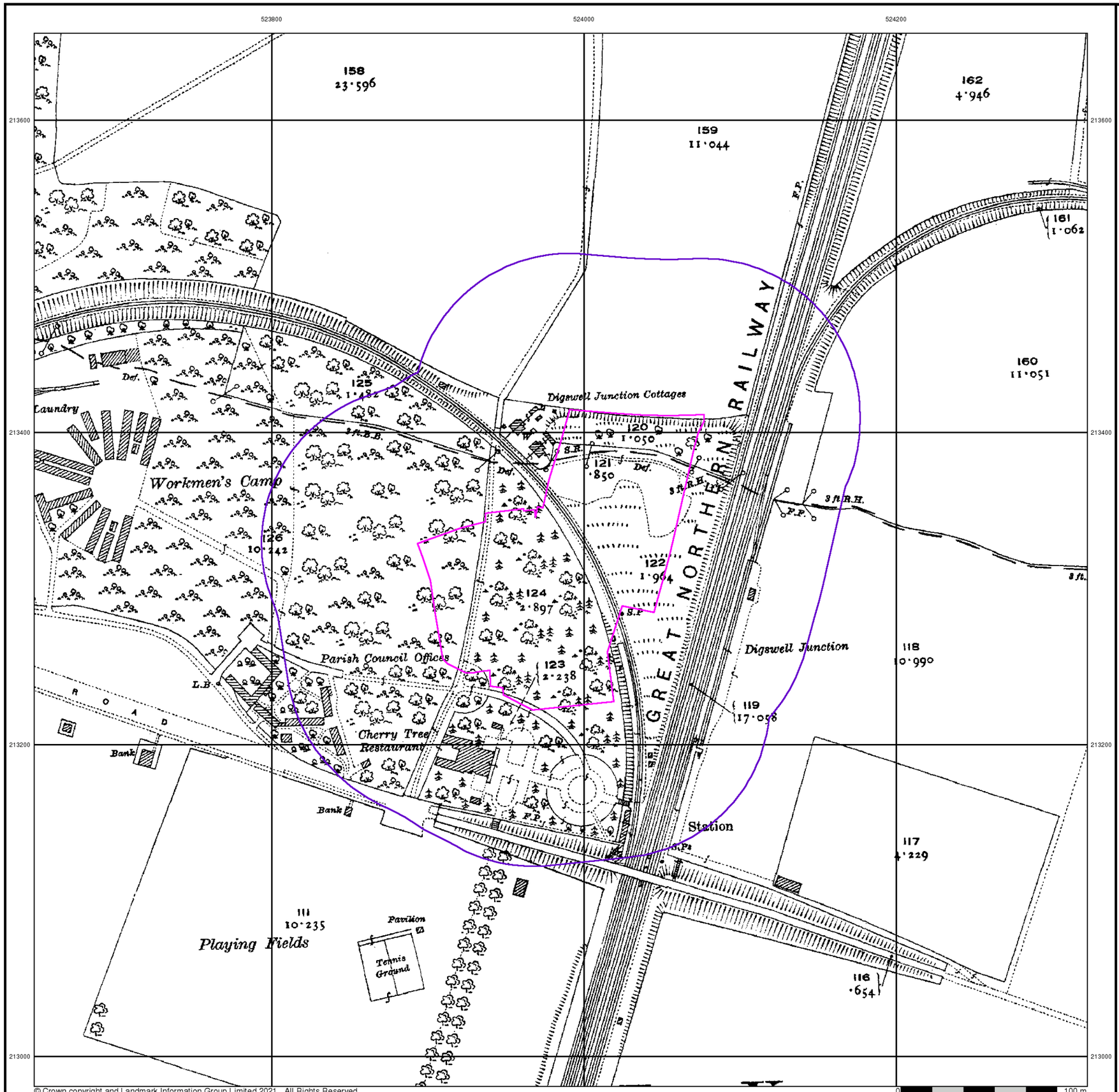
Web: www.envirocheck co uk



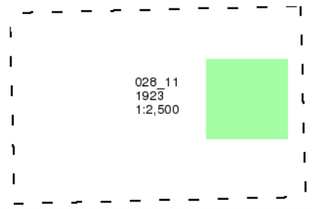
Hertfordshire

Published 1923

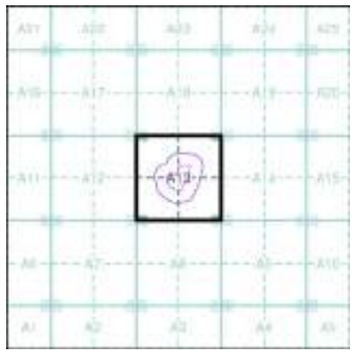
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	284848351_1_1
Customer Ref:	UK21.5579
National Grid Reference:	523990, 213320
Slice:	A
Site Area (Ha):	2.07
Search Buffer (m):	100

Site Details

North Campus East Car Park, College Way, Welwyn Garden City, AL8 7PH

Landmark INFORMATION GROUP
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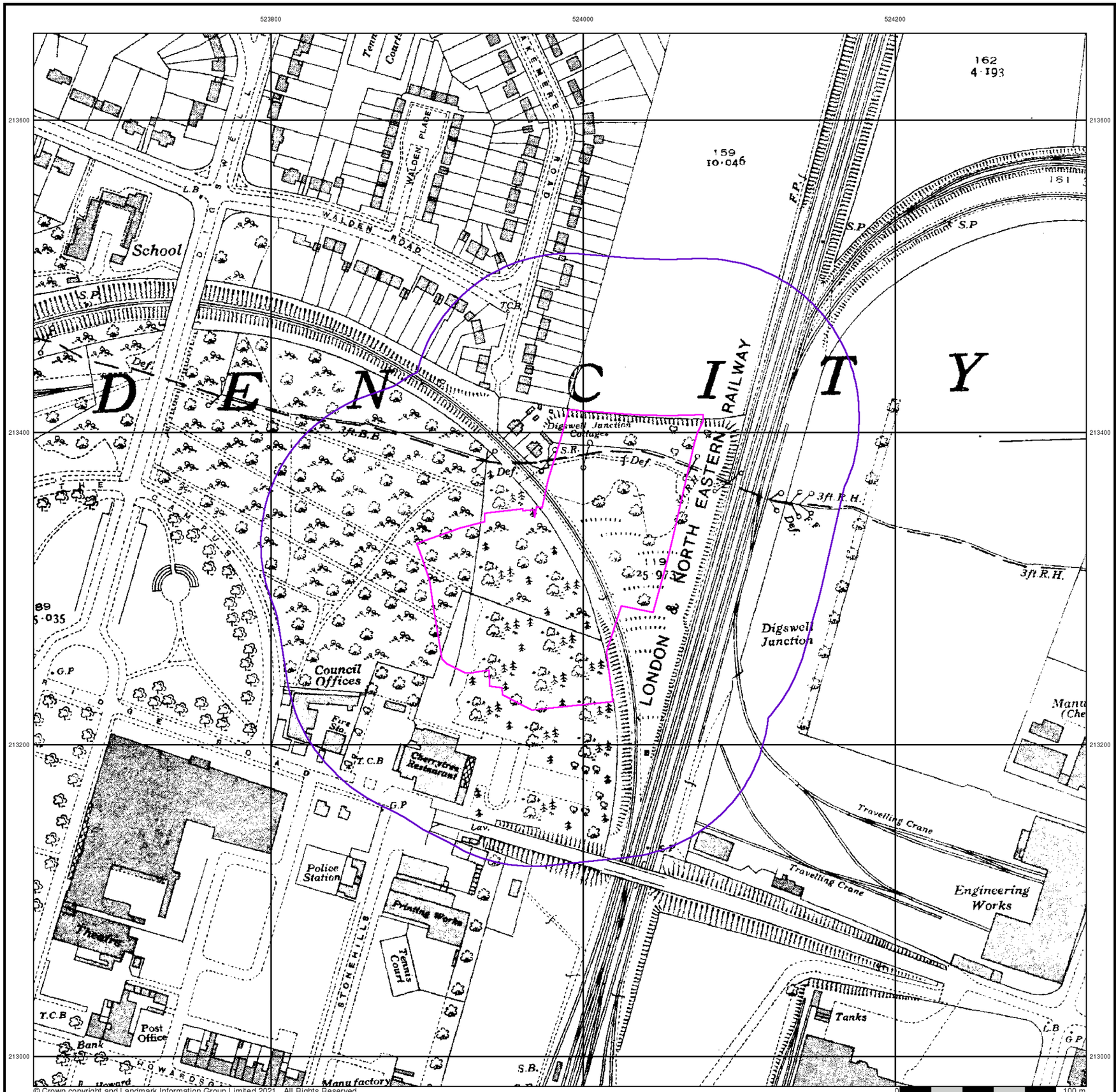
Fax: 0844 844 9951
Web: www.envirocheck co uk



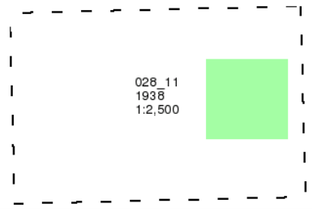
Hertfordshire

Published 1938

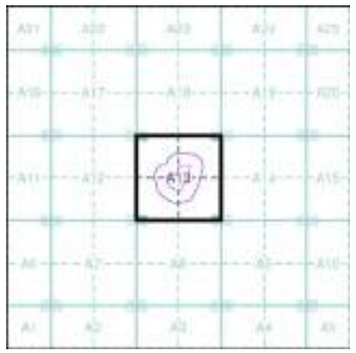
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



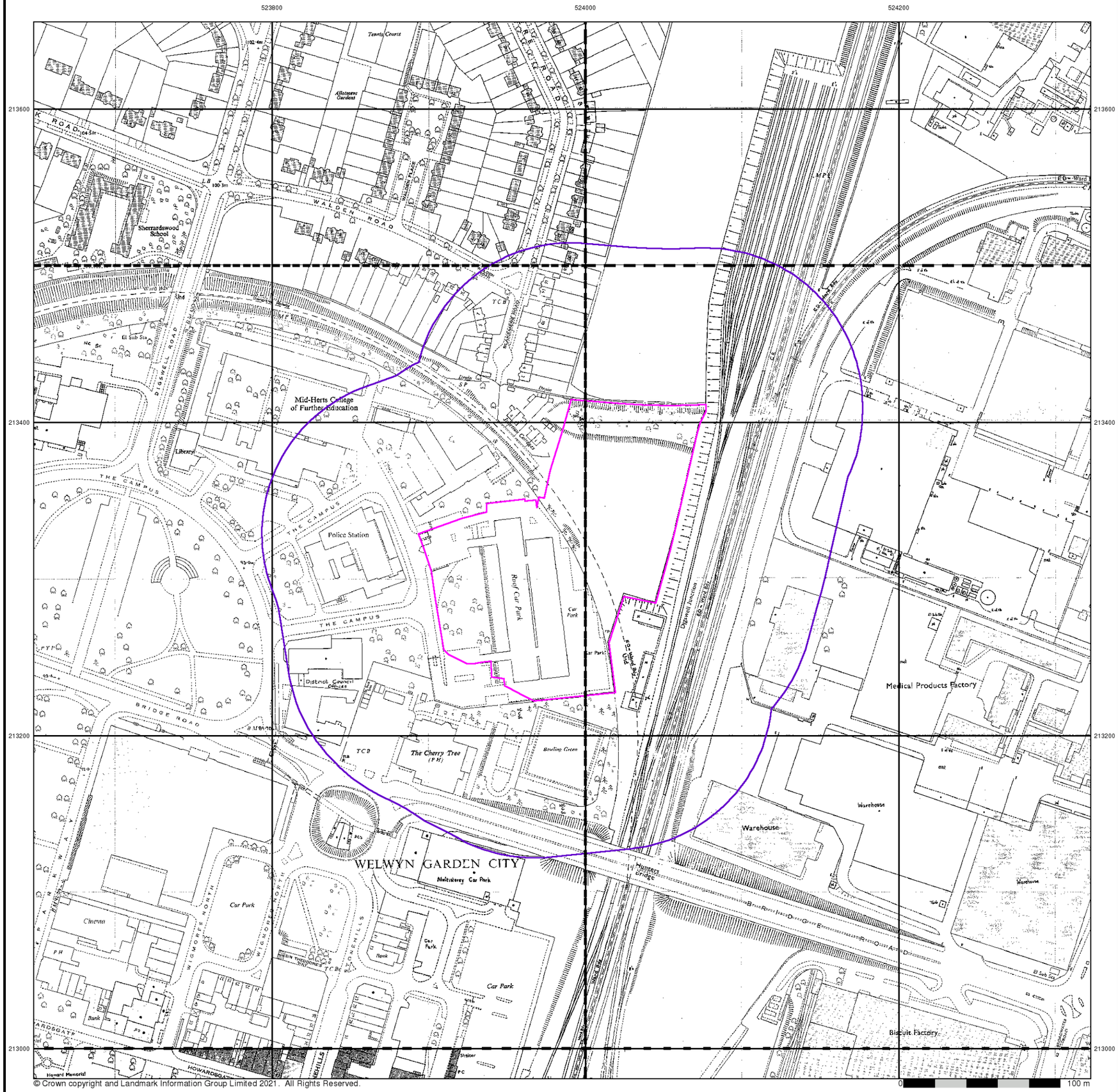
Order Details

Order Number:	284848351_1_1
Customer Ref:	UK21.5579
National Grid Reference:	523990, 213320
Slice:	A
Site Area (Ha):	2.07
Search Buffer (m):	100

Site Details

North Campus East Car Park, College Way, Welwyn Garden City, AL8 7PH

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



Additional SIMs

Published 1961 - 1986

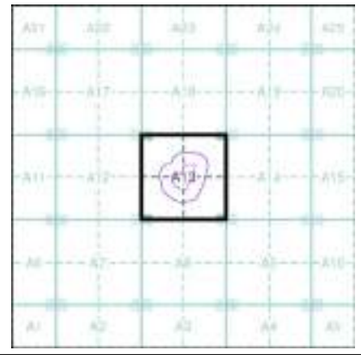
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

TL2313NE 1961 1:1,250	TL2413NW 1978 1:1,250	
TL2313SE 1985 1:1,250	TL2413SW 1978 1:1,250	
TL2312NE 1986 1:1,250	TL2412NW 1986 1:1,250	

Historical Map - Segment A13



Order Details

Order Number:	284848351_1_1
Customer Ref:	UK21.5579
National Grid Reference:	523990, 213320
Slice:	A
Site Area (Ha):	2.07
Search Buffer (m):	100

Site Details

North Campus East Car Park, College Way, Welwyn Garden City, AL8 7PH

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

APPENDIX G

Site Specific Borehole Logs

Borehole Log

Borehole No. **BH1**

Sheet 1 of 1

Project Name:	North Campus East Car Park, Welwyn Garden City	Project No. UK21.5579	Co-ords:	-22593.18 - 6765048.78	Hole Type CP
Location:	College Way, Hertfordshire, AL8 6UN		Level:	93.00	Scale 1:125
Client:	Ardent Consulting		Dates:	04/10/2021 - 04/10/2021	Logged By Shaun Cahill

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.40	D		0.10	92.90		ASPHALT
					0.35	92.65		MADE GROUND: Yellowish brown slightly clayey sandy silty GRAVEL
		0.90	D		0.90	92.10		MADE GROUND: Yellowish red slightly gravelly sandy silty CLAY
		1.20	U					
		1.70	D					
		2.00	D					Firm to stiff yellowish brown and red slightly gravelly sandy silty CLAY with light bluish grey mottling, occasional black staining and fine sand/ silt pockets. Gravel is fine to coarse chert (LOFT)
		2.00		N=13 (3,3/3,3,3,4)				
		3.00	U					
		3.45	D					
		4.00	D					
		4.00		N=19 (3,4/4,4,5,6)				
		5.00	U					
		5.45	D					
		6.00	D					
		6.50	D					
		6.50		N=22 (4,4/5,5,6,6)				
		7.50	D					
		8.00	U					
		8.45	D					
		9.00	D					
		9.50	D		9.40	83.60		Medium dense black brown and white angular to rounded slightly clayey sandy silty chert and quartzite GRAVEL. Sand is orangish and yellowish brown (LOFT)
		9.50		N=26 (4,5/6,6,7,7)				
		10.50	D					
		11.00	D					
		11.00		N=6 (2,1/2,2,1,1)				
		11.70	B					
		12.50	B					
		12.50		N=10 (6,7/3,3,2,2)	12.70	80.30		Structureless CHALK recovered as <10% intact gravel in a white slightly clayey sandy silty matrix representative of a Dm (matrix dominated) grade material (LESE)
		13.10	D					
		13.30	B					
		14.00	D					
		14.00		N=8 (1,1/2,2,2,2)				
		15.00	D					
		15.50	D					
		15.50		N=9 (1,2/3,2,2,2)				
		16.50	D					
		17.00	D					
		17.00		N=12 (2,2/2,3,4,3)				
		18.00	D					
		18.50	D					
		18.50		N=16 (2,2/4,4,4,4)				
		19.30	B					
		20.00	D					
		20.00		N=20 (3,4/4,5,5,6)				
		21.00	D					
		21.50	D					
		21.50		N=22 (4,4/5,5,5,7)				
		22.50	D					
		23.00	D					
		23.00		N=28 (4,3/6,6,8,8)				
		23.80	B					
		24.50	D					
		24.50		N=27 (4,4/5,7,7,8)	25.00	68.00		End of borehole at 25.00 m

Remarks

LOFT = Lowestoft Formation

LESE = Lewes Nodular & Seaford Cha k Formation

Groundwater not encountered

Borehole Log

Borehole No. **BH2**

Sheet 1 of 1

Project Name:	North Campus East Car Park, Welwyn Garden City	Project No. UK21.5579	Co-ords:	-22522.27 - 6764916.63	Hole Type CP
Location:	College Way, Hertfordshire, AL8 6UN		Level:	91.00	Scale 1:125
Client:	Ardent Consulting		Dates:	05/10/2021 - 06/10/2021	Logged By Shaun Cahill

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.40	D		0.10	90.90		ASPHALT
		0.90	D		0.30	90.70		MADE GROUND: Yellowish brown slightly clayey sandy silty GRAVEL
		1.20	B					MADE GROUND: Dark grey slightly gravelly sandy silty CLAY with asphalt and brick fragments
		1.20		N=7 (2,1/2,2,1,2)				
		2.00	B					
		2.00		N=6 (1,1/1,2,1,2)				
		3.00	B		2.90	88.10		MADE GROUND: Dark grey slightly clayey sandy silty GRAVEL with asphalt and brick fragments
		3.00		N=6 (2,2/1,2,1,2)				
		4.00	B					
		4.00		N=52 (4,6/8,8,17,19)	4.30	86.70		Firm to stiff yellowish brown and red slightly gravelly sandy silty CLAY with light bluish grey mottling, occasional black staining and fine sand/ silt pockets. Gravel is fine to coarse chert (LOFT)
		4.70	D		5.00	86.00		
		5.00	B					Medium dense black brown and white angular to rounded slightly clayey sandy silty chert and quartzite GRAVEL. Sand is orangish and yellowish brown (LOFT)
		5.00		36 (18,24/36 for 75mm)				
		6.50	B					
		6.50		31 (21,23/31 for 75mm)				
		8.00	B					
		8.00		N=30 (7,9/8,8,6,8)				
		9.50	B		9.70	81.30		Structureless CHALK recovered as <10% intact gravel in a white slightly clayey sandy silty matrix representative of a Dm (matrix dominated) grade material (LESE)
		9.50		N=28 (5,7/7,5,8,8)				
		10.30	D					
		11.00	D					
		11.00		N=8 (2,1/2,1,2,3)				
		11.80	B					
		12.50	D					
		12.50		N=6 (1,2/1,1,2,2)				
		13.50	D					
		14.00	D					
		14.00		N=7 (1,2/1,2,2,2)				
		15.00	D					
		15.50	D					
		15.50		N=7 (1,2/2,1,1,3)				
		16.50	D					
		17.00	D					
		17.00		N=8 (1,2/2,2,2,2)				
		17.80	B					
		18.50	D					
		18.50		N=9 (2,2/2,2,3,2)				
		19.50	D					
		20.00	D					
		20.00		N=8 (3,4/2,2,2,2)				
		21.00	D					
		21.50	D					
		21.50		N=9 (2,3/2,3,2,2)				
		22.50	D					
		23.00	D					
		23.00		N=10 (5,3/2,2,3,3)				
		23.80	B					
		24.50	D					
		24.50		N=12 (3,2/3,2,3,4)	25.00	66.00		End of borehole at 25.00 m

Remarks

LOFT = Lowestoft Formation

LESE = Lewes Nodular & Seaford Cha k Formation

Groundwater not encountered

Borehole Log

Borehole No. **BH3**

Sheet 1 of 1

Project Name:	North Campus East Car Park, Welwyn Garden City	Project No. UK21.5579	Co-ords:	-22717.64 - 6764814.02	Hole Type CP
Location:	College Way, Hertfordshire, AL8 6UN		Level:	90.00	Scale 1:125
Client:	Ardent Consulting		Dates:	07/10/2021 - 07/10/2021	Logged By Shaun Cahill

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30	D		0.40	89.60		MADE GROUND: Yellowish brown slightly gravelly sandy silty CLAY
		0.50	D					Firm to stiff yellowish brown and red slightly gravelly sandy silty CLAY with light bluish grey mottling, occasional black staining and fine sand/ silt pockets. Gravel is fine to coarse chert (LOFT)
		0.80	D					
		1.20	U					
		1.65	D					
		2.10	D					
		2.10		N=34 (4,5/8,8,9,9)				
		3.00	U					
		3.45	D		3.50	86.50		
		4.00	B					Dense black brown and white angular to rounded slightly clayey sandy silty chert and quartzite GRAVEL. Sand is orangish and yellowish brown (LOFT)
		4.00		N=64 (9,11/12,16,18,18)				
		5.00	B					
		5.00		N=33 (6,7/7,9,8,9)				
		6.50	B					
		6.50		N=49 (8,9/12,12,14,11)				
		8.00	B					
		8.00		N=53 (7,6/11,11,15,16)				
		9.50	B					
		9.50		N=27 (6,4/5,6,8,8)				
		10.20	D		10.20	79.80		Structureless CHALK recovered as <10% intact gravel in a white slightly clayey sandy silty matrix representative of a Dm (matrix dominated) grade material (LESE)
		11.00	D					
		11.00		N=13 (2,2/3,3,3,4)				
		11.70	B					
		12.50	D					
		12.50		N=13 (2,2/3,4,3,3)				
		13.50	D					
		14.00	D					
		14.00		N=11 (2,2/2,3,3,3)				
		15.10	D					
		15.50	D					
		15.50		N=12 (3,2/2,3,4,3)				
		16.40	B					
		17.00	D					
		17.00		N=13 (2,2/3,3,3,4)				
		17.90	D					
		18.50	D					
		18.50		N=13 (2,3/2,3,4,4)				
		19.60	D					
		20.00	D					
		20.00		N=37 (3,2/8,9,9,11)				
		21.00	D					
		21.50	D					
		21.50		N=13 (3,2/3,3,3,4)				
		22.50	D					
		23.00	D					
		23.00		N=15 (3,3/4,3,4,4)				
		23.80	B					
		24.50	D					
		24.50		N=15 (3,4/3,4,4,4)	25.00	65.00		End of borehole at 25.00 m

Remarks

LOFT = Lowestoft Formation

LESE = Lewes Nodular & Seaford Cha k Formation

Groundwater not encountered

Borehole Log

Borehole No. **WS1**

Sheet 1 of 1

Project Name:	North Campus East Car Park, Welwyn Garden City	Project No. UK21.5579	Co-ords:	-22505.13 - 6765027.53	Hole Type WLS
Location:	College Way, Hertfordshire, AL8 6UN		Level:	91.00	Scale 1:20
Client:	Ardent Consulting		Dates:	04/10/2021 - 04/10/2021	Logged By Shaun Cahill

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.45	ES		0.10	90.90		ASPHALT
								MADE GROUND: Yellowish brown slightly clayey sandy silty GRAVEL
					0.45	90.55		Firm to stiff yellowish brown and red slightly gravelly sandy silty CLAY with light bluish grey mottling, occasional black staining and fine sand/ silt pockets. Gravel is fine to coarse chert (LOFT)
		0.60 - 0.80	D					
		1.00		N=20 (3,3/4,5,5,6)				
		1.60 - 1.80	D					
		2.60 - 2.80	D					
		3.60 - 3.80	D					
					4.00	87.00		End of borehole at 4.00 m

1 2 3 4

Remarks
LOFT = Lowestoft Formation
Groundwater not encountered

Borehole Log

Borehole No. **WS2**

Sheet 1 of 1

Project Name:	North Campus East Car Park, Welwyn Garden City	Project No. UK21.5579	Co-ords:	-22529.95 - 6764980.37	Hole Type WLS
Location:	College Way, Hertfordshire, AL8 6UN		Level:	92.00	Scale 1:20
Client:	Ardent Consulting		Dates:	04/10/2021 - 04/10/2021	Logged By Shaun Cahill

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.50	ES		0.10	91.90		ASPHALT
					0.50	91.50		MADE GROUND: Yellowish brown slightly clayey sandy silty GRAVEL
		0.80 - 1.00	D					MADE GROUND: Yellowish brown slightly gravelly sandy silty CLAY with occasional dark grey organic pockets and rare decayed roots. Gravel is fine and medium angular and subangular chert and rare brick fragments
		1.80 - 2.00	D					
					2.30	89.70		Firm to stiff yellowish brown and red slightly gravelly sandy silty CLAY with light bluish grey mottling, occasional black staining and fine sand/ silt pockets. Gravel is fine to coarse chert (LOFT)
		2.80 - 3.00	D					
		3.80 - 4.00	D					
					4.00	88.00		End of borehole at 4.00 m

1 2 3 4

Remarks
LOFT = Lowestoft Formation
Groundwater not encountered

Borehole Log

Borehole No. **WS3**

Sheet 1 of 1

Project Name:	North Campus East Car Park, Welwyn Garden City	Project No. UK21.5579	Co-ords:	-22505.13 - 6764961.10	Hole Type WLS
Location:	College Way, Hertfordshire, AL8 6UN		Level:	91.00	Scale 1:20
Client:	Ardent Consulting		Dates:	04/10/2021 - 04/10/2021	Logged By Shaun Cahill

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.60	ES		0.10	90.90		ASPHALT
								MADE GROUND: Yellowish brown slightly clayey sandy silty GRAVEL
		0.60 - 0.80	D		0.60	90.40		Firm yellowish brown slightly gravelly sandy silty CLAY with occasional dark grey mottling. Gravel is fine and medium angular and subangular chert and chalk (LOFT)
		1.00		N=7 (1,1/2,1,2,2)				
		1.60 - 1.80	D					
		2.00		N=9 (2,2/2,2,2,3)	2.00	89.00		Stiff yellowish brown and red slightly gravelly sandy silty CLAY with light bluish grey mottling, occasional black staining and fine sand/silt pockets. Gravel is fine to coarse chert (LOFT)
		2.60 - 2.80	D					
		3.00		N=21 (4,6/4,5,5,7)				
		3.60 - 3.80	D					
		4.00		N=26 (4,4/5,6,7,8)	4.00	87.00		End of borehole at 4.00 m

Remarks
LOFT = Lowestoft Formation
Groundwater not encountered

Borehole Log

Borehole No. **WS4**

Sheet 1 of 1

Project Name:	North Campus East Car Park, Welwyn Garden City	Project No. UK21.5579	Co-ords:	-22565.13 - 6764951.02	Hole Type WLS
Location:	College Way, Hertfordshire, AL8 6UN		Level:	91.00	Scale 1:20
Client:	Ardent Consulting		Dates:	04/10/2021 - 04/10/2021	Logged By Shaun Cahill

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.45	ES		0.10	90.90		ASPHALT
								MADE GROUND: Yellowish brown slightly clayey sandy silty GRAVEL
					0.45	90.55		Firm olive slightly gravelly sandy silty CLAY with rare recently active roots. Gravel is fine to coarse subangular and subrounded chalk (LOFT)
		0.60 - 0.80	D					
		1.60 - 1.80	D					
					2.40	88.60		Stiff yellowish brown and red slightly gravelly sandy silty CLAY with light bluish grey mottling, occasional black staining and fine sand/silt pockets. Gravel is fine to coarse chert (LOFT)
		2.60 - 2.80	D					
		3.00		N=15 (2,3/3,4,4,4)				
		3.60 - 3.80	D					
		4.00		N=20 (2,3/4,5,5,6)	4.00	87.00		End of borehole at 4.00 m

1 2 3 4

Remarks
LOFT = Lowestoft Formation
Groundwater not encountered

Borehole Log

Borehole No. **WS5**

Sheet 1 of 1

Project Name:	North Campus East Car Park, Welwyn Garden City	Project No. UK21.5579	Co-ords:	-22633.14 - 6764932.66	Hole Type WLS
Location:	College Way, Hertfordshire, AL8 6UN		Level:	91.00	Scale 1:20
Client:	Ardent Consulting		Dates:	05/10/2021 - 05/10/2021	Logged By Shaun Cahill

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.35	ES		0.10	90.90		ASPHALT	
					0.35	90.65		MADE GROUND: Yellowish brown slightly clayey sandy silty GRAVEL	
		0.50 - 0.70	D					Firm to stiff yellowish brown and red slightly gravelly sandy silty CLAY with light bluish grey mottling, occasional black staining and fine sand/ silt pockets. Gravel is fine to coarse chert (LOFT)	
		1.00		N=16 (7,7/1,5,4,6)					1
		1.50 - 1.70	D						
		2.00		N=8 (1,2/2,2,2,2)					2
		2.50 - 2.70	D						
		3.00		N=25 (3,3/6,7,5,7)					3
		3.50 - 3.70	D						
		4.00		N=20 (3,3/5,5,5,5)	4.00	87.00		End of borehole at 4.00 m	4

Remarks
LOFT = Lowestoft Formation
Groundwater not encountered

Borehole Log

Borehole No. **WS6**

Sheet 1 of 1

Project Name:	North Campus East Car Park, Welwyn Garden City	Project No. UK21.5579	Co-ords:	-22581.83 - 6764916.99	Hole Type WLS
Location:	College Way, Hertfordshire, AL8 6UN		Level:	90.00	Scale 1:20
Client:	Ardent Consulting		Dates:	05/10/2021 - 05/10/2021	Logged By Shaun Cahill

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.60	ES		0.10	89.90		ASPHALT
								MADE GROUND: Yellowish brown slightly clayey sandy silty GRAVEL
					0.60	89.40		Firm yellowish brown slightly gravelly sandy silty CLAY. Gravel is fine to coarse angular to subrounded chert (LOFT)
		0.80 - 1.00	D					
		1.00		N=35 (5,7/8,10,8,9)	1.00	89.00		Dense black brown and white angular to rounded slightly clayey sandy silty chert and quartzite GRAVEL. Sand is orangish and yellowish brown (LOFT)
		1.50 - 1.70	D					
		2.00		N=56 (10,15/17,15,14,10)	2.00	88.00		End of borehole at 2.00 m

Remarks

LOFT = Lowestoft Formation

Groundwater not encountered

Borehole terminated at 2.0m due to refusal at 2.0m

Borehole Log

Borehole No. **WS7**

Sheet 1 of 1

Project Name:	North Campus East Car Park, Welwyn Garden City	Project No. UK21.5579	Co-ords:	-22552.44 - 6764876.67	Hole Type WLS
Location:	College Way, Hertfordshire, AL8 6UN		Level:	91.00	Scale 1:20
Client:	Ardent Consulting		Dates:	05/10/2021 - 05/10/2021	Logged By Shaun Cahill

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.60	ES		0.10	90.90		ASPHALT
								MADE GROUND: Yellowish brown slightly clayey sandy silty GRAVEL
					0.50	90.50		
		0.60 - 0.80	D					Soft yellowish brown slightly gravelly sandy silty CLAY with occasional bluish grey mottling and rare decayed roots. Gravel is fine and medium angular to subrounded chalk and chert (LOFT)
		1.00		N=4 (1,1/1,1,1,1)	1.00	90.00		Firm yellowish brown slightly gravelly sandy silty CLAY. Gravel is fine to coarse angular to subrounded chert (LOFT)
		1.60 - 1.80	D					
		2.00		N=34 (8,10/9,8,8,9)	2.00	89.00		Stiff yellowish brown and red slightly gravelly sandy silty CLAY with light bluish grey mottling, occasional black staining and fine sand/silt pockets. Gravel is fine to coarse chert (LOFT)
		2.60 - 2.80	D					
		3.00		N=57 (14,11/14,15,16,12)	3.00	88.00		End of borehole at 3.00 m

Remarks
LOFT = Lowestoft Formation
Groundwater not encountered
Borehole terminated at 3.0m due to refusal at 3.0m

Borehole Log

Borehole No. **WS8**

Sheet 1 of 1

Project Name:	North Campus East Car Park, Welwyn Garden City	Project No. UK21.5579	Co-ords:	-22562.90 - 6764850.56	Hole Type WLS
Location:	College Way, Hertfordshire, AL8 6UN		Level:	91.00	Scale 1:20
Client:	Ardent Consulting		Dates:	05/10/2021 - 05/10/2021	Logged By Shaun Cahill

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.55	ES		0.10	90.90		ASPHALT
								MADE GROUND: Yellowish brown slightly gravelly SAND
					0.55	90.45		
		0.70 - 0.90	D					Firm yellowish brown slightly gravelly sandy silty CLAY. Gravel is fine to coarse angular to subrounded chert (LOFT)
		1.00		N=31 (3,4/5,8,9,9)				
					1.40	89.60		Dense black brown and white angular to rounded slightly clayey sandy silty chert and quartzite GRAVEL. Sand is orangish and yellowish brown (LOFT)
		1.70 - 1.90	D					
		2.00		N=38 (6,8/8,8,10,12)				
					2.50	88.50		Firm to stiff yellowish brown and red slightly gravelly sandy silty CLAY with light bluish grey mottling, occasional black staining and fine sand/ silt pockets. Gravel is fine to coarse chert (LOFT)
		2.70 - 2.90	D					
		3.00		N=57 (9,16/15,17,15,10)	3.00	88.00		End of borehole at 3.00 m

Remarks
LOFT = Lowestoft Formation
Groundwater not encountered
Borehole terminated at 3.0m due to refusal at 3.0m

Borehole Log

Borehole No. **WS9**

Sheet 1 of 1

Project Name:	North Campus East Car Park, Welwyn Garden City	Project No. UK21.5579	Co-ords:	-22571.36 - 6764820.68	Hole Type WLS
Location:	College Way, Hertfordshire, AL8 6UN		Level:	90.00	Scale 1:20
Client:	Ardent Consulting		Dates:	06/10/2021 - 06/10/2021	Logged By Shaun Cahill

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.15 - 0.50	ES		0.15	89.85		ASPHALT
					0.50	89.50		MADE GROUND: Yellowish brown slightly gravelly SAND
		0.70 - 0.90	D					Loose black brown and white angular to rounded slightly clayey sandy silty chert and quartzite GRAVEL. Sand is orangish and yellowish brown (LOFT)
		1.00		N=5 (1,2/1,1,1,2)				
		1.70 - 1.90	D					
		2.00		N=5 (2,1/1,1,1,2)				
		2.70 - 2.90	D		2.70	87.30		Firm to stiff yellowish brown and red slightly gravelly sandy silty CLAY with light bluish grey mottling, occasional black staining and fine sand/ silt pockets. Gravel is fine to coarse chert (LOFT)
		3.00		N=56 (7,9/11,13,15,17)	3.00	87.00		End of borehole at 3.00 m

Remarks
LOFT = Lowestoft Formation
Groundwater not encountered
Borehole terminated at 3.0m due to refusal at 3.0m

Borehole Log

Borehole No. **WS10**

Sheet 1 of 1

Project Name:	North Campus East Car Park, Welwyn Garden City	Project No. UK21.5579	Co-ords:	-22570.81 - 6764768.65	Hole Type WLS
Location:	College Way, Hertfordshire, AL8 6UN		Level:	90.00	Scale 1:20
Client:	Ardent Consulting		Dates:	06/10/2021 - 06/10/2021	Logged By Shaun Cahill

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								CONCRETE	
		0.15 - 0.30	ES		0.15	89.85		MADE GROUND: Dark grey slightly clayey sandy silty GRAVEL	
					0.30	89.70		Medium dense black brown and white angular to rounded slightly clayey sandy silty chert and quartzite GRAVEL. Sand is orangish and yellowish brown (LOFT)	
		0.80 - 1.00	D						
		1.00		N=20 (5,7/4,5,5,6)					1
		1.80 - 2.00	D		1.80	88.20		Firm to stiff yellowish brown and red slightly gravelly sandy silty CLAY with light bluish grey mottling, occasional black staining and fine sand/ silt pockets. Gravel is fine to coarse chert (LOFT)	
		2.00		N=47 (8,9/10,12,12,13)					2
		2.80 - 3.00	D						
		3.00		N=20 (8,7/6,4,4,6)					3
		3.80 - 4.00	D						
		4.00		N=29 (5,5/6,6,8,9)	4.00	86.00		End of borehole at 4.00 m	4

Remarks
LOFT = Lowestoft Formation
Groundwater not encountered

Borehole Log

Borehole No. **WS11**

Sheet 1 of 1

Project Name:	North Campus East Car Park, Welwyn Garden City	Project No. UK21.5579	Co-ords:	-22632.59 - 6764764.69	Hole Type WLS
Location:	College Way, Hertfordshire, AL8 6UN		Level:	90.00	Scale 1:20
Client:	Ardent Consulting		Dates:	06/10/2021 - 06/10/2021	Logged By Shaun Cahill

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20 - 0.45	ES		0.20	89.80		CONCRETE
					0.45	89.55		MADE GROUND: Dark grey slightly gravelly sandy silty CLAY
		0.60 - 0.80	D					Firm to stiff yellowish brown and red slightly gravelly sandy silty CLAY with light bluish grey mottling, occasional black staining and fine sand/ silt pockets. Gravel is fine to coarse chert (LOFT)
		1.00		N=25 (8,7/6,6,6,7)				
		1.60 - 1.80	D					
		2.00		N=55 (10,12/13,13,14,15)	2.00	88.00		End of borehole at 2.00 m

1
2
3
4

Remarks
LOFT = Lowestoft Formation
Groundwater not encountered
Borehole terminated at 2.0m due to refusal at 2.0m

AGS

Borehole Log

Borehole No. **WS12**

Sheet 1 of 1

Project Name:	North Campus East Car Park, Welwyn Garden City	Project No. UK21.5579	Co-ords:	-22716.08 - 6764873.07	Hole Type WLS
Location:	College Way, Hertfordshire, AL8 6UN		Level:	91.00	Scale 1:20
Client:	Ardent Consulting		Dates:	06/10/2021 - 06/10/2021	Logged By Shaun Cahill

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.50	ES					MADE GROUND: Yellowish brown slightly gravelly sandy silty CLAY
					0.50	90.50		Firm to stiff yellowish brown and red slightly gravelly sandy silty CLAY with light bluish grey mottling, occasional black staining and fine sand/ silt pockets. Gravel is fine to coarse chert (LOFT)
		0.70 - 0.90	D					
		1.00		N=37 (6,10/10,10,9,8)				
		1.50 - 1.70	D					
		2.00		N=47 (6,10/10,10,11,16)				
		2.50 - 2.70	D					
		3.00		N=55 (11,13/12,11,15,17)	3.00	88.00		End of borehole at 3.00 m

1 2 3 4

Remarks

LOFT = Lowestoft Formation

Groundwater not encountered

Borehole terminated at 3.0m due to refusal at 3.0m

APPENDIX H

Laboratory Results – Environmental

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

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EPS Ltd
7B Caxton House
Broad Street
Cambourne
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CB23 6JN

Attention :	Shaun Cahill
Date :	20th October, 2021
Your reference :	UK21.5579
Our reference :	Test Report 21/16025 Batch 1
Location :	North Campus East Car Park Welwyn Garden C
Date samples received :	12th October, 2021
Status :	Final Report
Issue :	1

Twelve samples were received for analysis on 12th October, 2021 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

[redacted]

Bruce Leslie
Project Manager

Client Name: EPS Ltd
Reference: UK21.5579
Location: North Campus East Car Park Welwyn Garden City
Contact: Shaun Cahill
EMT Job No: 21/16025

Report : Solid

Solids V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40	LOD/LOR	Units	Method No.
Sample ID	WS1	WS3	WS4	WS5	WS6	WS7	WS9	WS10	WS11	WS12			
Depth	0.10-0.45	0.10-0.60	0.10-0.45	0.10-0.35	0.10-0.60	0.10-0.60	0.15-0.50	0.15-0.30	0.20-0.45	0.10-0.50			
COC No / misc													
Containers	V J	V J	V J	V J	V J	V J	V J	V J	V J	V J			
Sample Date	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021			
Sample Type	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clay	Loamy Sand	Clay	Clay			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021			
Arsenic #M	6.2	7.2	6.3	23 2	6.9	8.3	6.2	12 5	16 9	16 8	<0.5	mg/kg	TM30/PM15
Cadmium #M	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	0.5	<0.1	mg/kg	TM30/PM15
Chromium #M	10.4	15 0	27 5	70 6	12 2	24 6	18 9	58.4	67 8	74 5	<0.5	mg/kg	TM30/PM15
Copper #M	6	4	8	16	4	8	5	78	18	26	<1	mg/kg	TM30/PM15
Lead #M	5	<5	<5	16	6	5	7	53	29	51	<5	mg/kg	TM30/PM15
Mercury #M	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Nickel #M	2.8	3.5	3.5	24 6	3.0	5.9	2.7	33.4	22 3	29 0	<0.7	mg/kg	TM30/PM15
Selenium #M	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	mg/kg	TM30/PM15
Total Sulphate as SO4 #M	450	500	498	1719	500	487	377	2442	240	412	<50	mg/kg	TM50/PM29
Zinc #M	9	10	9	60	9	15	10	70	55	86	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #M	<0.04	<0.04	<0.04	1 81	<0.04	<0.04	<0.04	0 29	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	0.14	<0.03	<0.03	<0.03	0 06	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #M	<0.05	<0.05	<0.05	1 31	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #M	<0.04	<0.04	<0.04	0 82	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #M	<0.03	<0.03	<0.03	9 03	<0.03	<0.03	0 94	0 56	0 03	0 08	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	3 29	<0.04	<0.04	0 33	0 20	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #M	<0.03	<0.03	<0.03	13.97	0 06	<0.03	1.19	1.10	0.10	0 20	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	<0.03	10.86	0 06	<0.03	1 03	1.10	0 09	0.19	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	7 50	<0.06	<0.06	0 54	0 61	0.11	0.13	<0.06	mg/kg	TM4/PM8
Chrysene #M	<0.02	<0.02	<0.02	7 65	0 03	<0.02	0 52	0 67	0 08	0.14	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #M	<0.07	<0.07	<0.07	16.12	<0.07	<0.07	0 89	1 37	0.17	0 32	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	9 60	<0.04	<0.04	0 55	0.72	0.10	0.19	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #M	<0.04	<0.04	<0.04	5 64	<0.04	<0.04	0 33	0.49	0 07	0.17	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	1 06	<0.04	<0.04	0 06	0.12	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	5 29	<0.04	<0.04	0 32	0 51	0 07	0.17	<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6	<0.6	<0.6	94.1	<0 6	<0 6	6.7	7.8	0.8	1.6	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	11.61	<0.05	<0.05	0 64	0 99	0.12	0 23	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	4 51	<0.02	<0.02	0 25	0 38	0 05	0 09	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	91	97	100	93	97	97	98	97	95	95	<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #M	<0.1	<0.1	-	-	-	<0.1	-	<0.1 SV	-	-	<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #M	<0.1	<0.1	-	-	-	<0.1	-	<0.1 SV	-	-	<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	0.2	<0.1	-	-	-	<0.1	-	<0.1 SV	-	-	<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #M	<0.2	<0.2	-	-	-	<0.2	-	<0.2	-	-	<0 2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #M	<4	<4	-	-	-	<4	-	<4	-	-	<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #M	<7	<7	-	-	-	<7	-	<7	-	-	<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #M	<7	<7	-	-	-	<7	-	38	-	-	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35 (EH+HS_CU_1D_AL)	<19	<19	-	-	-	<19	-	38	-	-	<19	mg/kg	M5 M36 M8 M 2 M 4

Please see attached notes for all abbreviations and acronyms

All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Client Name: EPS Ltd
Reference: UK21.5579
Location: North Campus East Car Park Welwyn Garden City
Contact: Shaun Cahill
EMT Job No: 21/16025

Report : Solid

Solids V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40	LOD/LOR	Units	Method No.
Sample ID	WS1	WS3	WS4	WS5	WS6	WS7	WS9	WS10	WS11	WS12			
Depth	0.10-0.45	0.10-0.60	0.10-0.45	0.10-0.35	0.10-0.60	0.10-0.60	0.15-0.50	0.15-0.30	0.20-0.45	0.10-0.50			
COC No / misc													
Containers	V J	V J	V J	V J	V J	V J	V J	V J	V J	V J			
Sample Date	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021			
Sample Type	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clay	Loamy Sand	Clay	Clay			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021			
TPH CWG													
Aromatics													
>C5-EC7 (HS_1D_AR) #	<0.1 +	<0.1 +	-	-	-	<0.1 +	-	<0.1 +	-	-	<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<0.1	<0.1	-	-	-	<0.1	-	<0.1 SV	-	-	<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #M	<0.1	<0.1	-	-	-	<0.1	-	<0.1 SV	-	-	<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<0.2	<0.2	-	-	-	<0.2	-	<0.2	-	-	<0 2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	<4	<4	-	-	-	<4	-	<4	-	-	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	<7	<7	-	-	-	<7	-	19	-	-	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	<7	<7	-	-	-	<7	-	108	-	-	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 (EH+HS_CU_1D_AR) *	<19	<19	-	-	-	<19	-	127	-	-	<19	mg/kg	MS MO6 M8 M 2 M 4
Total aliphatics and aromatics(C5-35) (EH HS_CU_1D_Total)	<38	<38	-	-	-	<38	-	165	-	-	<38	mg/kg	MS MO6 M8 M 2 M 4
MTBE #	<5	<5	-	-	-	<5	-	<5 SV	-	-	<5	ug/kg	TM36/PM12
Benzene #	<5	<5	-	-	-	<5	-	<5 SV	-	-	<5	ug/kg	TM36/PM12
Toluene #	<5	<5	-	-	-	<5	-	<5 SV	-	-	<5	ug/kg	TM36/PM12
Ethylbenzene #	<5	<5	-	-	-	<5	-	<5 SV	-	-	<5	ug/kg	TM36/PM12
m/p-Xylene #	<5	<5	-	-	-	<5	-	<5 SV	-	-	<5	ug/kg	TM36/PM12
o-Xylene #	<5	<5	-	-	-	<5	-	<5 SV	-	-	<5	ug/kg	TM36/PM12
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	12 6	10 5	11.4	18 8	11 2	13 6	7.5	17 5	12 2	18 6	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0 3	<0.3	<0.3	<0.3	<0 3	<0.3	<0.3	<0.3	<0 3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #M	0.0074	0.0059	0.0227	0.0129	0.0105	0.0116	0.0278	1.0312	0.0240	0.0226	<0.0015	g/l	TM38/PM20
Chromium III	10.4	15 0	27 5	70 6	12 2	24 6	18 9	58.4	67 8	74 5	<0 5	mg/kg	NONE/NONE
Total Cyanide #M	<0.5	<0.5	<0 5	<0.5	<0.5	<0.5	<0 5	<0.5	<0.5	<0.5	<0 5	mg/kg	TM89/PM45
Organic Matter	0.2	<0 2	0.2	1.2	0.2	0.3	0.6	15 5	0.9	2.9	<0 2	%	TM21/PM24
pH #M	8 94	9.15	9 09	8 87	9 09	8 96	9 04	7 97	8 62	8 24	<0.01	pH units	TM73/PM11
Sample Type	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clay	Loamy Sand	Clay	Clay		None	PM13/PM0
Sample Colour	Light Brown	Light Brown	Light Brown	Medium Brown	Light Brown	Light Brown	Light Brown	Medium Brown	Medium Brown	Medium Brown		None	PM13/PM0
Other Items	stones	stones	stones	stones	stones	stones	stones and sand	brick fragment and clinker	stones and clinker	stones and roots		None	PM13/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: EPS Ltd

Matrix : Solid

Reference: UK21.5579

Location: North Campus East Car Park Welwyn Garden City

Contact: Shaun Cahill

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
21/16025	1	WS1	0.10-0.45	1-4	No interpretation possible
21/16025	1	WS3	0.10-0.60	5-8	No interpretation possible
21/16025	1	WS7	0.10-0.60	21-24	No interpretation possible
21/16025	1	WS10	0.15-0.30	29-32	PAHs and possible lubricating oil

Client Name: EPS Ltd
Reference: UK21.5579
Location: North Campus East Car Park Welwyn Garden City
Contact: Shaun Cahill

Note

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/16025	1	WS1	0.10-0.45	3	18/10/2021	**General Description (Bulk Analysis)**	Soil/Stones
					18/10/2021	**Asbestos Fibres**	NAD
					18/10/2021	**Asbestos ACM**	NAD
					18/10/2021	**Asbestos Type**	NAD
					18/10/2021	**Asbestos Level Screen**	NAD
21/16025	1	WS3	0.10-0 60	7	18/10/2021	**General Description (Bulk Analysis)**	Soil/Stone
					18/10/2021	**Asbestos Fibres**	NAD
					18/10/2021	**Asbestos ACM**	NAD
					18/10/2021	**Asbestos Type**	NAD
					18/10/2021	**Asbestos Level Screen**	NAD
21/16025	1	WS4	0.10-0.45	11	18/10/2021	**General Description (Bulk Analysis)**	Soil/Stone
					18/10/2021	**Asbestos Fibres**	NAD
					18/10/2021	**Asbestos ACM**	NAD
					18/10/2021	**Asbestos Type**	NAD
					18/10/2021	**Asbestos Level Screen**	NAD
21/16025	1	WS5	0.10-0 35	15	18/10/2021	**General Description (Bulk Analysis)**	Soil/Stone
					18/10/2021	**Asbestos Fibres**	NAD
					18/10/2021	**Asbestos ACM**	NAD
					18/10/2021	**Asbestos Type**	NAD
					18/10/2021	**Asbestos Level Screen**	NAD
21/16025	1	WS6	0.10-0 60	19	18/10/2021	**General Description (Bulk Analysis)**	Soil/Stones
					18/10/2021	**Asbestos Fibres**	NAD
					18/10/2021	**Asbestos ACM**	NAD
					18/10/2021	**Asbestos Type**	NAD
					18/10/2021	**Asbestos Level Screen**	NAD
21/16025	1	WS7	0.10-0 60	23	18/10/2021	**General Description (Bulk Analysis)**	Soil/Stones
					18/10/2021	**Asbestos Fibres**	NAD
					18/10/2021	**Asbestos ACM**	NAD
					18/10/2021	**Asbestos Type**	NAD
					18/10/2021	**Asbestos Level Screen**	NAD
21/16025	1	WS9	0.15-0 50	27	18/10/2021	**General Description (Bulk Analysis)**	Soil/Stones
					18/10/2021	**Asbestos Fibres**	NAD
					18/10/2021	**Asbestos ACM**	NAD

Client Name: EPS Ltd
Reference: UK21.5579
Location: North Campus East Car Park Welwyn Garden City
Contact: Shaun Cahill

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/16025	1	WS9	0.15-0 50	27	18/10/2021	**Asbestos Type**	NAD
					18/10/2021	**Asbestos Level Screen**	NAD
21/16025	1	WS10	0.15-0 30	31	18/10/2021	**General Description (Bulk Analysis)**	Soil/Stones
					18/10/2021	**Asbestos Fibres**	NAD
					18/10/2021	**Asbestos ACM**	NAD
					18/10/2021	**Asbestos Type**	NAD
					18/10/2021	**Asbestos Level Screen**	NAD
21/16025	1	WS11	0.20-0.45	35	16/10/2021	**General Description (Bulk Analysis)**	soil
					16/10/2021	**Asbestos Fibres**	NAD
					16/10/2021	**Asbestos ACM**	NAD
					16/10/2021	**Asbestos Type**	NAD
					16/10/2021	**Asbestos Level Screen**	NAD
21/16025	1	WS12	0.10-0 50	39	14/10/2021	**General Description (Bulk Analysis)**	soil
					14/10/2021	**Asbestos Fibres**	NAD
					14/10/2021	**Asbestos ACM**	NAD
					14/10/2021	**Asbestos Type**	NAD
					14/10/2021	**Asbestos Level Screen**	NAD

Client Name: EPS Ltd
Reference: UK21.5579
Location: North Campus East Car Park Welwyn Garden City
Contact: Shaun Cahill

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/16025						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

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Attention :	Shaun Cahill
Date :	19th October, 2021
Your reference :	UK21.5579
Our reference :	Test Report 21/16045 Batch 1 Schedule A
Location :	North Campus East Car Park Welwyn Garden C
Date samples received :	12th October, 2021
Status :	Final Report
Issue :	1

Thirteen samples were received for analysis on 12th October, 2021 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

[redacted]

Phil Sommerton BSc
Senior Project Manager

Element Materials Technology

Client Name: EPS Ltd
Reference: UK21.5579
Location: North Campus East Car Park Welwyn Garden City
Contact: Shaun Cahill
EMT Job No: 21/16045

Report : Solid

Solids V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1	2	3	4	5	6	7	8	18-19	20-21	LOD/LOR	Units	Method No.
Sample ID	BH3	BH3	BH2	BH1	BH1	BH1	BH2	BH3	WS1	WS8			
Depth	1 65	3.45	4.70	5.45	10 5	15 0	10 3	22 5	1.60-1.80	0.70-0.90			
COC No / misc													
Containers	B	B	B	B	B	B	B	B	V J	V J			
Sample Date	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021			
Sample Type	Clay	Clayey Sand	Clay	Clay	Sand	Clay	Clay	Clay	Clay	Clay			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021			
Sulphur as S	0 03	<0.01	0 02	0 02	<0.01	0 01	0 02	0 02	-	-	<0.01	%	TM30/PM15
Total Sulphate as SO4 #M	833	146	301	494	60	250	391	461	-	-	<50	mg/kg	TM50/PM29
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #M	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #M	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #M	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #M	-	-	-	-	-	-	-	-	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #M	-	-	-	-	-	-	-	-	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #M	-	-	-	-	-	-	-	-	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35 (EH+HS_CU_1D_AL)	-	-	-	-	-	-	-	-	<19	<19	<19	mg/kg	MS MO6 M8 M 2 M 6
Aromatics													
>C5-EC7 (HS_1D_AR) #	-	-	-	-	-	-	-	-	<0.1+	<0.1+	<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #M	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	-	-	-	-	-	-	-	-	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	-	-	-	-	-	-	-	-	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	-	-	-	-	-	-	-	-	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 (EH+HS_CU_1D_AR) #	-	-	-	-	-	-	-	-	<19	<19	<19	mg/kg	MS MO6 M8 M 2 M 6
Total aliphatics and aromatics(C5-35) (EH HS_CU_1D_Total)	-	-	-	-	-	-	-	-	<38	<38	<38	mg/kg	MS MO6 M8 M 2 M 6
MTBE #	-	-	-	-	-	-	-	-	<5	<5	<5	ug/kg	TM36/PM12
Benzene #	-	-	-	-	-	-	-	-	<5	<5	<5	ug/kg	TM36/PM12
Toluene #	-	-	-	-	-	-	-	-	<5	<5	<5	ug/kg	TM36/PM12
Ethylbenzene #	-	-	-	-	-	-	-	-	<5	<5	<5	ug/kg	TM36/PM12
m/p-Xylene #	-	-	-	-	-	-	-	-	<5	<5	<5	ug/kg	TM36/PM12
o-Xylene #	-	-	-	-	-	-	-	-	<5	<5	<5	ug/kg	TM36/PM12
Natural Moisture Content	-	-	-	-	-	-	-	-	12 0	12 8	<0.1	%	PM4/PM0
Sulphate as SO4 (2:1 Ext) #M	0.1712	0.0653	0.1000	0.1867	0.0219	0.0144	0.0286	0.0438	-	-	<0.0015	g/l	TM38/PM20
pH #M	4 97	8 04	7.49	7 04	7 94	8 60	8 81	8 92	-	-	<0.01	pH units	TM73/PM11
Sample Type	Clay	Clayey Sand	Clay	Clay	Sand	Clay	Clay	Clay	Clay	Clay		None	PM13/PM0
Sample Colour	Light Brown	Light Brown	Light Brown	Light Brown	Light Brown	Light Brown	Light Brown	Light Brown	Light Brown	Light Brown		None	PM13/PM0
Other Items	none	none	stones and sand	none	none	chalk	none	none	stones	stones and sand		None	PM13/PM0

Please see attached notes for all abbreviations and acronyms

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: EPS Ltd

Matrix : Solid

Reference: UK21.5579

Location: North Campus East Car Park Welwyn Garden City

Contact: Shaun Cahill

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
21/16045	1	WS1	1.60-1.80	18-19	No interpretation possible
21/16045	1	WS8	0.70-0.90	20-21	No interpretation possible

Client Name: EPS Ltd
Reference: UK21.5579
Location: North Campus East Car Park Welwyn Garden City
Contact: Shaun Cahill

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/16045						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

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Attention :	Shaun Cahill
Date :	18th November, 2021
Your reference :	UK21.5579
Our reference :	Test Report 21/16045 Batch 1 Schedule B
Location :	North Campus East Car Park Welwyn Garden C
Date samples received :	12th October, 2021
Status :	Final Report
Issue :	2

Thirteen samples were received for analysis on 12th October, 2021 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

[redacted]

Bruce Leslie
Project Manager

Element Materials Technology

Client Name: EPS Ltd
Reference: UK21.5579
Location: North Campus East Car Park Welwyn Garden City
Contact: Shaun Cahill
EMT Job No: 21/16045

Report : Solid

Solids V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	9-11	12-14	15-17									
Sample ID	BH2	BH2	BH2									
Depth	2.00-2.40	6.50-6.90	17.8-18.2									
COC No / misc												
Containers	V J T	V J T	V J T									
Sample Date	08/10/2021	08/10/2021	08/10/2021									
Sample Type	Clay	Clay	Clay									
Batch Number	1	1	1									
Date of Receipt	12/10/2021	12/10/2021	12/10/2021									

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
Arsenic #M	15 6	13 8	0.6								<0.5	mg/kg	TM30/PM15
Cadmium #M	<0.1	0.2	0.1								<0.1	mg/kg	TM30/PM15
Chromium #M	80 5	83 6	7.4								<0.5	mg/kg	TM30/PM15
Copper #M	160	16	3								<1	mg/kg	TM30/PM15
Lead #M	63	8	<5								<5	mg/kg	TM30/PM15
Mercury #M	<0.1	<0.1	<0.1								<0.1	mg/kg	TM30/PM15
Nickel #M	19 8	37 0	5.2								<0.7	mg/kg	TM30/PM15
Selenium #M	<1	1	<1								<1	mg/kg	TM30/PM15
Zinc #M	125	40	11								<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #M	0 56	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.14	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Acenaphthene #M	0 07	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Fluorene #M	0 09	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Phenanthrene #M	1 52	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Anthracene #	0 53	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Fluoranthene #M	2 06	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Pyrene #	1 57	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0 95	<0.06	<0.06								<0.06	mg/kg	TM4/PM8
Chrysene #M	1 02	<0.02	<0.02								<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #M	1 85	<0.07	<0.07								<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0 86	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #M	0 57	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.15	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0 56	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Coronene	0.12	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
PAH 16 Total	12 5	<0.6	<0.6								<0.6	mg/kg	TM4/PM8
PAH 17 Total	12.62	<0.64	<0.64								<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	1 33	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0 52	<0.02	<0.02								<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	97	92	94								<0	%	TM4/PM8
Mineral Oil (C10-C40) (EH_CU_1D_AL)	150	<30	<30								<30	mg/kg	TM5/PM8/PM16

Element Materials Technology

Client Name: EPS Ltd
Reference: UK21.5579
Location: North Campus East Car Park Welwyn Garden City
Contact: Shaun Cahill
EMT Job No: 21/16045

Report : Solid

Solids V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	9-11	12-14	15-17									
Sample ID	BH2	BH2	BH2									
Depth	2.00-2.40	6.50-6.90	17.8-18.2									
COC No / misc												
Containers	V J T	V J T	V J T									
Sample Date	08/10/2021	08/10/2021	08/10/2021									
Sample Type	Clay	Clay	Clay									
Batch Number	1	1	1									
Date of Receipt	12/10/2021	12/10/2021	12/10/2021									

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #M	<0.1 SV	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #M	<0.1 SV	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1 SV	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #M	<0.2	<0.2	<0.2								<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #M	10	<4	<4								<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #M	29	<7	<7								<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #M	111	<7	<7								<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35 (EH+HS_CU_1D_AL)	150	<19	<19								<19	mg/kg	M5 M36 M8 M 2 M 6
Aromatics													
>C5-EC7 (HS_1D_AR) #	<0.1 +	<0.1 +	<0.1 +								<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<0.1 SV	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #M	<0.1 SV	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	6.3	<0.2	<0.2								<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	14	<4	<4								<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	51	<7	<7								<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	188	<7	<7								<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 (EH+HS_CU_1D_AR) #	259	<19	<19								<19	mg/kg	M5 M36 M8 M 2 M 6
Total aliphat cs and aromat cs(C5-35) (EH HS_CU_1D_Total)	409	<38	<38								<38	mg/kg	M5 M36 M8 M 2 M 6
MTBE #	<5 SV	<5	<5								<5	ug/kg	TM36/PM12
Benzene #	<5 SV	<5	<5								<5	ug/kg	TM36/PM12
Toluene #	6 SV	<5	<5								<5	ug/kg	TM36/PM12
Ethylbenzene #	<5 SV	<5	<5								<5	ug/kg	TM36/PM12
m/p-Xylene #	<5 SV	<5	<5								<5	ug/kg	TM36/PM12
o-Xylene #	<5 SV	<5	<5								<5	ug/kg	TM36/PM12
PCB 28 #	<5	<5	<5								<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5								<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5								<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5								<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5								<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5								<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5								<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35								<35	ug/kg	TM17/PM8
Natural Moisture Content	15 8	10 2	30.7								<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3								<0.3	mg/kg	TM38/PM20
Chromium III	80 5	83 6	7.4								<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	5 06	0 08	0 04								<0.02	%	TM21/PM24

Element Materials Technology

Client Name: EPS Ltd
Reference: UK21.5579
Location: North Campus East Car Park Welwyn Garden City
Contact: Shaun Cahill
EMT Job No: 21/16045

Report : Solid

Solids V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	9-11	12-14	15-17								LOD/LOR	Units	Method No.
Sample ID	BH2	BH2	BH2										
Depth	2.00-2.40	6.50-6.90	17.8-18.2										
COC No / misc													
Containers	V J T	V J T	V J T										
Sample Date	08/10/2021	08/10/2021	08/10/2021										
Sample Type	Clay	Clay	Clay										
Batch Number	1	1	1										
Date of Receipt	12/10/2021	12/10/2021	12/10/2021										
Loss on Ignition #	4.7	2.4	<1.0								<1.0	%	TM22/PM0
pH #M	8 08	7.77	8 87								<0.01	pH units	TM73/PM11
Sample Type	Clay	Clay	Clay									None	PM13/PM0
Sample Colour	Dark Brown	Medium Brown	White									None	PM13/PM0
Other Items	chalk, stones and roots	stones and sand	chalk									None	PM13/PM0

Please see attached notes for all abbreviations and acronyms

CEN 10:1 LEACHATE RESULTS BS EN 12547-2

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	32.7
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	75.4
Particle Size <4mm =	>95%		

		Landfill Waste Acceptance Criteria Limits		
EMT Job No	**21/16045**			
Sample No	**11**			
Client Sample No	**BH2**	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Depth/Other	**2.00-2.40**			
Sample Date	**08/10/2021**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	5.06	3	5	6
Loss on Ignition (%)	4.7	-	-	10
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	150	500	-	-
PAH Sum of 17(mg/kg)	12.62	100	-	-
pH (pH Units)	8.08	-	>6	-
ANC to pH 7 (mol/kg)	-	-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	-	-	to be evaluated	to be evaluated

Eluate Analysis	**10:1 conc^{n} leached**		**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	C_{10}	**A_{10}**			
	mg/l	**mg/kg**	**mg/kg**		
Arsenic	<0.0025	<0.025	0.5	2	25
Barium	0.053	0.53	20	100	300
Cadmium	<0.0005	<0.005	0.04	1	5
Chromium	<0.0015	<0.015	0.5	10	70
Copper	0.008	0.08	2	50	100
Mercury	<0.001	<0.01	0.01	0.2	2
Molybdenum	0.007	0.07	0.5	10	30
Nickel	<0.002	<0.02	0.4	10	40
Lead	<0.005	<0.05	0.5	10	50
Antimony	0.003	0.03	0.06	0.7	5
Selenium	<0.003	<0.03	0.1	0.5	7
Zinc	<0.003	<0.03	4	50	200
Chloride	0.6	6	800	15000	25000
Fluoride	1.0	10	10	150	500
Sulphate as SO4	34.3	343	1000	20000	50000
Total Dissolved Solids	147	1471	4000	60000	100000
Phenol	<0.01	<0.1	1	-	-
Dissolved Organic Carbon	4	40	500	800	1000

All solid results are expressed on a dry weight basis unless stated otherwise.

CEN 10:1 LEACHATE RESULTS BS EN 12547-2

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	28.0
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	78.1
Particle Size <4mm =	>95%		

		Landfill Waste Acceptance Criteria Limits		
EMT Job No	**21/16045**			
Sample No	**14**			
Client Sample No	**BH2**	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Depth/Other	**6.50-6.90**			
Sample Date	**08/10/2021**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.08	3	5	6
Loss on Ignition (%)	2.4	-	-	10
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30	500	-	-
PAH Sum of 17(mg/kg)	<0.64	100	-	-
pH (pH Units)	7.77	-	>6	-
ANC to pH 7 (mol/kg)	-	-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	-	-	to be evaluated	to be evaluated

Eluate Analysis	**10:1 conc^{n} leached**		**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	C_{10}	**A_{10}**			
	mg/l	**mg/kg**	**mg/kg**		
Arsenic	<0.0025	<0.025	0.5	2	25
Barium	0.005	0.05	20	100	300
Cadmium	<0.0005	<0.005	0.04	1	5
Chromium	<0.0015	<0.015	0.5	10	70
Copper	<0.007	<0.07	2	50	100
Mercury	<0.001	<0.01	0.01	0.2	2
Molybdenum	0.002	0.02	0.5	10	30
Nickel	<0.002	<0.02	0.4	10	40
Lead	<0.005	<0.05	0.5	10	50
Antimony	<0.002	<0.02	0.06	0.7	5
Selenium	<0.003	<0.03	0.1	0.5	7
Zinc	<0.003	<0.03	4	50	200
Chloride	<0.3	<3	800	15000	25000
Fluoride	<0.3	<3	10	150	500
Sulphate as SO4	10.8	108	1000	20000	50000
Total Dissolved Solids	90	900	4000	60000	100000
Phenol	<0.01	<0.1	1	-	-
Dissolved Organic Carbon	<2	<20	500	800	1000

All solid results are expressed on a dry weight basis unless stated otherwise.

CEN 10:1 LEACHATE RESULTS BS EN 12547-2

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	44.6
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	69.1
Particle Size <4mm =	>95%		

		Landfill Waste Acceptance Criteria Limits		
EMT Job No	**21/16045**			
Sample No	**17**			
Client Sample No	**BH2**	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Depth/Other	**17.8-18.2**			
Sample Date	**08/10/2021**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.04	3	5	6
Loss on Ignition (%)	<1.0	-	-	10
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30	500	-	-
PAH Sum of 17(mg/kg)	<0.64	100	-	-
pH (pH Units)	8.87	-	>6	-
ANC to pH 7 (mol/kg)	-	-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	-	-	to be evaluated	to be evaluated

Eluate Analysis	**10:1 conc^{n} leached**		**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	C_{10}	**A_{10}**			
	mg/l	**mg/kg**	**mg/kg**		
Arsenic	<0.0025	<0.025	0.5	2	25
Barium	<0.003	<0.03	20	100	300
Cadmium	<0.0005	<0.005	0.04	1	5
Chromium	<0.0015	<0.015	0.5	10	70
Copper	<0.007	<0.07	2	50	100
Mercury	<0.001	<0.01	0.01	0.2	2
Molybdenum	<0.002	<0.02	0.5	10	30
Nickel	<0.002	<0.02	0.4	10	40
Lead	<0.005	<0.05	0.5	10	50
Antimony	<0.002	<0.02	0.06	0.7	5
Selenium	<0.003	<0.03	0.1	0.5	7
Zinc	<0.003	<0.03	4	50	200
Chloride	<0.3	<3	800	15000	25000
Fluoride	<0.3	<3	10	150	500
Sulphate as SO4	6.2	62	1000	20000	50000
Total Dissolved Solids	39	390	4000	60000	100000
Phenol	<0.01	<0.1	1	-	-
Dissolved Organic Carbon	<2	<20	500	800	1000

Client Name: EPS Ltd

Matrix : Solid

Reference: UK21.5579

Location: North Campus East Car Park Welwyn Garden City

Contact: Shaun Cahill

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
21/16045	1	BH2	2.00-2.40	9-11	Trace degraded diesel, lubricating oil and PAHs
21/16045	1	BH2	6.50-6.90	12-14	No interpretation possible
21/16045	1	BH2	17.8-18.2	15-17	No interpretation possible

Client Name: EPS Ltd
Reference: UK21.5579
Location: North Campus East Car Park Welwyn Garden City
Contact: Shaun Cahill

Note

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/16045	1	BH2	2.00-2.40	10	16/10/2021	**General Description (Bulk Analysis)**	soil
					16/10/2021	**Asbestos Fibres**	NAD
					16/10/2021	**Asbestos ACM**	NAD
					16/10/2021	**Asbestos Type**	NAD
					16/10/2021	**Asbestos Level Screen**	NAD
21/16045	1	BH2	6.50-6 90	13	18/10/2021	**General Description (Bulk Analysis)**	Soil/Stone
					18/10/2021	**Asbestos Fibres**	NAD
					18/10/2021	**Asbestos ACM**	NAD
					18/10/2021	**Asbestos Type**	NAD
					18/10/2021	**Asbestos Level Screen**	NAD
21/16045	1	BH2	17 8-18.2	16	18/10/2021	**General Description (Bulk Analysis)**	Chalk
					18/10/2021	**Asbestos Fibres**	NAD
					18/10/2021	**Asbestos ACM**	NAD
					18/10/2021	**Asbestos Type**	NAD
					18/10/2021	**Asbestos Level Screen**	NAD

Client Name: EPS Ltd
Reference: UK21.5579
Location: North Campus East Car Park Welwyn Garden City
Contact: Shaun Cahill

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/16045						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/16045

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 21/16045

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5 2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5 2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270D v5 2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCF D. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCF D. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCF D. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCF D. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes

EMT Job No: 21/16045

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM17	Modified US EPA method 8270D v5:2014. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.			AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes
TM22	Modified BS1377-3:1990 Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (35C-440C). On request modified ASTM D2974-00 LOI (105C-440C)	PM0	No preparation is required.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev 2, Dec 1996; Modified BS EN ISO 11885:2009: SO LS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112 5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev 2, Dec 1996; Modified BS EN ISO 11885:2009: SO LS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM17	Modified method BS EN12457-2 2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-F D. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-F D. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes

EMT Job No: 21/16045

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-F D. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365 2 (Rev.2 1993), TON 353.1 (Rev 2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365 2 (Rev.2 1993), TON 353.1 (Rev 2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0 2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1 2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	

APPENDIX I

Waste Classification Report

HazWasteOnline™

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and he rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infec ious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

OEFL6-0NVF4-HVHA8

Job name

North East Campus Car Park, Welwyn Garden City (4 of 4)

Description/Comments

Samples collected during a site investigation. (4 of 4)

Project

UK21.5579

Site

North East Campus Car Park, Welwyn Garden City (4 of 4)

Classified by

Name:
Lee Anderson
Date:
03 Nov 2021 09:42 GMT
Telephone:

Company:
Environmental Strategies Ltd EPS

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: CERTIFIED

Course	Date
Hazardous Waste Classification	03 Dec 2020

Next 3 year Refresher due by Dec 2023

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	BH2-08/10/2021-2.00-2.40m	2.0-2.40	Non Hazardous		2
2	BH2-08/10/2021-6.50-6.90m	6.50-6.90	Non Hazardous		5
3	BH2-08/10/2021-17.8-18.2m	17.8-18.2	Non Hazardous		7

Related documents

#	Name	Description
1	EMT-21-16045-Batch-1-Sched-B-202110201343.HWOL	.hwol file used to create the Job

Report

Created by: Lee Anderson

Created date: 03 Nov 2021 09:42 GMT

Classification of sample: BH2-08/10/2021-2.00-2.40m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
BH2-08/10/2021-2.00-2.40m
Sample Depth:
2.0-2.40 m
Moisture content:
15.8%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15.8% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
2	benzene	601-020-00-8	200-753-7	71-43-2		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
3	toluene	601-021-00-3	203-625-9	108-88-3		6 µg/kg		0.0051 mg/kg	0.000000518 %	✓	
4	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		80.5 mg/kg	1.462	101.602 mg/kg	0.0102 %	✓	
6	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<35 µg/kg		<0.035 mg/kg	<0.0000035 %		<LOD
7	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		15.6 mg/kg		13.472 mg/kg	0.00135 %	✓	
8	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
9	copper { copper(II) chloride; copper dichloride }		231-210-2	7447-39-4		160 mg/kg	2.116	292.342 mg/kg	0.0292 %	✓	
10	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	63 mg/kg		54.404 mg/kg	0.00544 %	✓	
11	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
12	nickel { nickel sulfide }	028-006-00-9	240-841-2 [1] 234-349-7 [2] - [3]	16812-54-7 [1] 11113-75-0 [2] 1314-04-1 [3]		19.8 mg/kg	1.546	26.44 mg/kg	0.00264 %	✓	
13	selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		zinc { zinc oxide }				125	mg/kg	1.245	134.36	mg/kg	0.0134 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
15		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
16		naphthalene				0.56	mg/kg		0.484	mg/kg	0.0000484 %	✓	
		601-052-00-2	202-049-5	91-20-3									
17		acenaphthylene				0.14	mg/kg		0.121	mg/kg	0.0000121 %	✓	
			205-917-1	208-96-8									
18		acenaphthene				0.07	mg/kg		0.0604	mg/kg	0.00000604 %	✓	
			201-469-6	83-32-9									
19		fluorene				0.09	mg/kg		0.0777	mg/kg	0.00000777 %	✓	
			201-695-5	86-73-7									
20		phenanthrene				1.52	mg/kg		1.313	mg/kg	0.000131 %	✓	
			201-581-5	85-01-8									
21		anthracene				0.53	mg/kg		0.458	mg/kg	0.0000458 %	✓	
			204-371-1	120-12-7									
22		fluoranthene				2.06	mg/kg		1.779	mg/kg	0.000178 %	✓	
			205-912-4	206-44-0									
23		pyrene				1.57	mg/kg		1.356	mg/kg	0.000136 %	✓	
			204-927-3	129-00-0									
24		benzo[a]anthracene				0.95	mg/kg		0.82	mg/kg	0.000082 %	✓	
		601-033-00-9	200-280-6	56-55-3									
25		chrysene				1.02	mg/kg		0.881	mg/kg	0.0000881 %	✓	
		601-048-00-0	205-923-4	218-01-9									
26		benzo[a]pyrene; benzo[def]chrysene				0.86	mg/kg		0.743	mg/kg	0.0000743 %	✓	
		601-032-00-3	200-028-5	50-32-8									
27		indeno[123-cd]pyrene				0.57	mg/kg		0.492	mg/kg	0.0000492 %	✓	
			205-893-2	193-39-5									
28		dibenz[a,h]anthracene				0.15	mg/kg		0.13	mg/kg	0.000013 %	✓	
		601-041-00-2	200-181-8	53-70-3									
29		benzo[ghi]perylene				0.56	mg/kg		0.484	mg/kg	0.0000484 %	✓	
			205-883-8	191-24-2									
30		coronene				0.12	mg/kg		0.104	mg/kg	0.0000104 %	✓	
			205-881-7	191-07-1									
31		benzo[b]fluoranthene				1.33	mg/kg		1.149	mg/kg	0.000115 %	✓	
		601-034-00-4	205-911-9	205-99-2									
32		benzo[k]fluoranthene				0.52	mg/kg		0.449	mg/kg	0.0000449 %	✓	
		601-036-00-5	205-916-6	207-08-9									
33		TPH (C6 to C40) petroleum group				409	mg/kg		353.195	mg/kg	0.0353 %	✓	
				TPH									
34		pH				8.08	pH		8.08	pH	8.08 pH		
				PH									
35		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0989 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classifica ion

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Sample is solid and therefore flammability is reduced,

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

toluene: (conc.: 5.18e-07%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0353%)

Classification of sample: BH2-08/10/2021-6.50-6.90m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
BH2-08/10/2021-6.50-6.90m
Sample Depth:
6.50-6.90 m
Moisture content:
10.2%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 10.2% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		tert-butyl methyl ether; MTBE; 2-me hoxy-2-methylpropane 603-181-00-X / 216-653-1 / 1634-04-4		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
2		benzene 601-020-00-8 / 200-753-7 / 71-43-2		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
3		toluene 601-021-00-3 / 203-625-9 / 108-88-3		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
4		ethylbenzene 601-023-00-4 / 202-849-4 / 100-41-4		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
5		chromium in chromium(III) compounds { chromium(III) oxide (worst case) } 215-160-9 / 1308-38-9		83.6 mg/kg	1.462	110.877 mg/kg	0.0111 %	✓	
6		polychlorobiphenyls; PCB 602-039-00-4 / 215-648-1 / 1336-36-3		<35 µg/kg		<0.035 mg/kg	<0.0000035 %		<LOD
7		arsenic { arsenic } 033-001-00-X / 231-148-6 / 7440-38-2		13.8 mg/kg		12.523 mg/kg	0.00125 %	✓	
8		cadmium { cadmium compounds, with the excep ion of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } 048-001-00-5	1	0.2 mg/kg		0.181 mg/kg	0.0000181 %	✓	
9		copper { copper(II) chloride; copper dichloride } 231-210-2 / 7447-39-4		16 mg/kg	2.116	30.72 mg/kg	0.00307 %	✓	
10		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6	1	8 mg/kg		7.26 mg/kg	0.000726 %	✓	
11		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
12		nickel { nickel sulfide } 028-006-00-9 / 240-841-2 [1] 234-349-7 [2] - [3] / 16812-54-7 [1] 11113-75-0 [2] 1314-04-1 [3]		37 mg/kg	1.546	51.918 mg/kg	0.00519 %	✓	
13		selenium { selenium } 034-001-00-2 / 231-957-4 / 7782-49-2		1 mg/kg		0.907 mg/kg	0.0000907 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		zinc { zinc oxide }				40	mg/kg	1.245	45.18	mg/kg	0.00452 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
15		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
16		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
17		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
18		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
19		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
20		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
21		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
22		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
23		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
24		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
25		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
26		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
27		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
28		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
29		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
30		coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
31		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
32		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
33		TPH (C6 to C40) petroleum group				<38	mg/kg		<38	mg/kg	<0.0038 %		<LOD
				TPH									
34		pH				7.77	pH		7.77	pH	7.77 pH		
				PH									
35		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0299 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH2-08/10/2021-17.8-18.2m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
BH2-08/10/2021-17.8-18.2m
Sample Depth:
17.8-18.2 m
Moisture content:
30.7%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 30.7% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		tert-butyl methyl ether; MTBE; 2-me hoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
2		benzene	601-020-00-8	200-753-7	71-43-2		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
3		toluene	601-021-00-3	203-625-9	108-88-3		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
4		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
5		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		7.4	mg/kg	1.462	8.275	mg/kg	0.000828 %	✓	
6		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<35	µg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
7		arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		0.6	mg/kg		0.459	mg/kg	0.0000459 %	✓	
8		cadmium { cadmium compounds, with the excep ion of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.1	mg/kg		0.0765	mg/kg	0.00000765 %	✓	
9		copper { copper(II) chloride; copper dichloride }		231-210-2	7447-39-4		3	mg/kg	2.116	4.857	mg/kg	0.000486 %	✓	
10		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD
11		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
12		nickel { nickel sulfide }	028-006-00-9	240-841-2 [1] 234-349-7 [2] - [3]	16812-54-7 [1] 11113-75-0 [2] 1314-04-1 [3]		5.2	mg/kg	1.546	6.152	mg/kg	0.000615 %	✓	
13		selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		zinc { zinc oxide }				11	mg/kg	1.245	10.476	mg/kg	0.00105 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
15		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
16		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
17		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
18		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
19		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
20		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
21		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
22		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
23		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
24		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
25		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
26		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
27		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
28		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
29		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
30		coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
31		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
32		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
33		TPH (C6 to C40) petroleum group				<38	mg/kg		<38	mg/kg	<0.0038 %		<LOD
				TPH									
34		pH				8.87	pH		8.87	pH	8.87 pH		
				PH									
35		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.00757 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H332 , Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Resp. Sens. 1 H334 , Skin Sens. 1 H317 , Repr. 1B H360FD , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

polychlorobiphenyls; PCB (EC Number: 215-648-1, CAS Number: 1336-36-3)

CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

arsenic (EC Number: 231-148-6, CAS Number: 7440-38-2)

CLP index number: 033-001-00-X
Description/Comments: Worst Case: IARC considers arsenic Group 1; Carcinogenic to humans
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex

CLP index number: 048-001-00-5
Description/Comments: Worst Case: IARC considers cadmium compounds Group 1; Carcinogenic to humans
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

copper(II) chloride; copper dichloride (EC Number: 231-210-2, CAS Number: 7447-39-4)

Description/Comments:
Data source: https://echa.europa.eu/substance-information/-/substanceinfo/100.028.373
Data source date: 03 Nov 2016
Hazard Statements: Skin Irrit. 2 H315 , Acute Tox. 4 H302 , Eye Dam. 1 H318 , Acute Tox. 4 H312 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 3 H301 , Acute Tox. 4 H332 , Aqua ic Acute 1 H400 , Aquatic Chronic 1 H410

lead compounds with the exception of those specified elsewhere in this Annex (worst case)

CLP index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following CLP protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

- **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H302 , Acute Tox. 1 H330 , Acute Tox. 1 H310 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315

- **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Aquatic Acute 1 H400 , Aqua ic Chronic 1 H410 , Aquatic Chronic 2 H411

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Carc. 2 H351 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Skin Irrit. 2 H315

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Aqua ic Acute 1 H400 , Aquatic Chronic 1 H410

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Aquatic Acute 1 H400 , Aqua ic Chronic 1 H410

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

- **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **coronene** (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2 H371

- **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3 H226 , Asp. Tox. 1 H304 , STOT RE 2 H373 , Muta. 1B H340 , Carc. 1B H350 , Repr. 2 H361d , Aquatic Chronic 2 H411

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

Appendix B: Rationale for selection of metal species

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Standard Aproach

arsenic {arsenic}

Standard Approach

cadmium {cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex}

Standard Approach

copper {copper(II) chloride; copper dichloride}

Standard Approach

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Standard Approach

mercury {mercury dichloride}

Standard Approach

nickel {nickel sulfide}

Standard Approach

selenium {selenium}

Standard Approach

zinc {zinc oxide}

Standard Approach

chromium in chromium(VI) compounds {chromium(VI) oxide}

Standard Approach

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2021.293.4891.9295 (20 Oct 2021)
HazWasteOnline Database: 2021.293.4891.9295 (20 Oct 2021)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2019 - UK: 2019 No. 720 of 27th March 2019
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
POPs Regulation 2019 - Regulation (EU) 2019/1021 of 20 June 2019

HazWasteOnline™

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and he rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infec ious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

5OV76-UIVVE-42E0X

Job name

UK21.5579 North East Campus Car Park, Welwyn Garden City (3 of 4)

Description/Comments

Samples collected during a site investigation.

Project

UK21.5579

Site

North East Campus Car Park, Welwyn Garden City (3 of 4)

Classified by

Name:
Lee Anderson
Date:
03 Nov 2021 09:48 GMT
Telephone:

Company:
Environmental Strategies Ltd EPS

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: CERTIFIED

Course	Date
Hazardous Waste Classification	03 Dec 2020

Next 3 year Refresher due by Dec 2023

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS1-08/10/2021-0.10-0.45m	0.10-0.45	Non Hazardous		2
2	WS3-08/10/2021-0.10-0.60m	0.10-0.60	Non Hazardous		4
3	WS4-08/10/2021-0.10-0.45m	0.10-0.45	Non Hazardous		6
4	WS5-08/10/2021-0.10-0.35m	0.10-0.35	Non Hazardous		8
5	WS6-08/10/2021-0.10-0.60m	0.10-0.60	Non Hazardous		10
6	WS7-08/10/2021-0.10-0.60m	0.10-0.60	Non Hazardous		12
7	WS9-08/10/2021-0.15-0.50m	0.15-0.50	Non Hazardous		14
8	WS10-08/10/2021-0.15-0.30m	0.15-0.30	Non Hazardous		16
9	WS11-08/10/2021-0.20-0.45m	0.20-0.45	Non Hazardous		19
10	WS12-08/10/2021-0.10-0.50m	0.10-0.15	Non Hazardous		21

Related documents

#	Name	Description
1	EMT-21-16025-Batch-1-202110201342.HWOL	.hwol file used to create the Job

Report

Created by: Lee Anderson

Created date: 03 Nov 2021 09:48 GMT

Classification of sample: WS1-08/10/2021-0.10-0.45m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS1-08/10/2021-0.10-0.45m
Sample Depth:
0.10-0.45 m
Moisture content:
12.6%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12.6% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
2		benzene	601-020-00-8	200-753-7	71-43-2		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
3		toluene	601-021-00-3	203-625-9	108-88-3		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
4		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
5		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		10.4	mg/kg	1.462	13.499	mg/kg	0.00135 %	✓	
6		arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		6.2	mg/kg		5.506	mg/kg	0.000551 %	✓	
7		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
8		copper { copper(II) chloride; copper dichloride }		231-210-2	7447-39-4		6	mg/kg	2.116	11.274	mg/kg	0.00113 %	✓	
9		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	5	mg/kg		4.44	mg/kg	0.000444 %	✓	
10		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
11		nickel { nickel sulfide }	028-006-00-9	240-841-2 [1] 234-349-7 [2] - [3]	16812-54-7 [1] 11113-75-0 [2] 1314-04-1 [3]		2.8	mg/kg	1.546	3.845	mg/kg	0.000385 %	✓	
12		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
13		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		9	mg/kg	1.245	9.949	mg/kg	0.000995 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
15		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
16		acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
17		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
18		fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
19		phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
20		anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21		fluoranthene		205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22		pyrene		204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
23		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
24		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
25		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
27		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
28		benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
29		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
30		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
31		TPH (C6 to C40) petroleum group			TPH		<38	mg/kg		<38	mg/kg	<0.0038 %		<LOD
32		pH			PH		8.94	pH		8.94	pH	8.94 pH		
33		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
34		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.00915 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classifica ion

Classification of sample: WS3-08/10/2021-0.10-0.60m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS3-08/10/2021-0.10-0.60m
Sample Depth:
0.10-0.60 m
Moisture content:
10.5%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 10.5% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
2		benzene	601-020-00-8	200-753-7	71-43-2		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
3		toluene	601-021-00-3	203-625-9	108-88-3		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
4		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
5		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		15	mg/kg	1.462	19.84	mg/kg	0.00198 %	✓	
6		arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		7.2	mg/kg		6.516	mg/kg	0.000652 %	✓	
7		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
8		copper { copper(II) chloride; copper dichloride }		231-210-2	7447-39-4		4	mg/kg	2.116	7.659	mg/kg	0.000766 %	✓	
9		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD
10		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
11		nickel { nickel sulfide }	028-006-00-9	240-841-2 [1] 234-349-7 [2] - [3]	16812-54-7 [1] 11113-75-0 [2] 1314-04-1 [3]		3.5	mg/kg	1.546	4.898	mg/kg	0.00049 %	✓	
12		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
13		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		10	mg/kg	1.245	11.264	mg/kg	0.00113 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
15		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
16		acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
17		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
18		fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
19		phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
20		anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21		fluoranthene		205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22		pyrene		204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
23		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
24		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
25		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
27		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
28		benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
29		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
30		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
31		TPH (C6 to C40) petroleum group			TPH		<38	mg/kg		<38	mg/kg	<0.0038 %		<LOD
32		pH			PH		9.15	pH		9.15	pH	9.15 pH		
33		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
34		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.00981 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classifica ion

Classification of sample: WS4-08/10/2021-0.10-0.45m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS4-08/10/2021-0.10-0.45m
Sample Depth:
0.10-0.45 m
Moisture content:
11.4%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11.4% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		27.5 mg/kg	1.462	36.08 mg/kg	0.00361 %	✓	
2	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		6.3 mg/kg		5.655 mg/kg	0.000566 %	✓	
3	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
4	copper { copper(II) chloride; copper dichloride }		231-210-2	7447-39-4		8 mg/kg	2.116	15.194 mg/kg	0.00152 %	✓	
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	<5 mg/kg		<5 mg/kg	<0.0005 %		<LOD
6	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
7	nickel { nickel sulfide }	028-006-00-9	240-841-2 [1] 234-349-7 [2] - [3]	16812-54-7 [1] 11113-75-0 [2] 1314-04-1 [3]		3.5 mg/kg	1.546	4.858 mg/kg	0.000486 %	✓	
8	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
9	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		9 mg/kg	1.245	10.056 mg/kg	0.00101 %	✓	
10	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
12	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
13	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
15		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
16		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
17		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
18		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
19		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
21		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
22		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
23		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
24		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
25		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
26		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
27		pH				9.09	pH		9.09	pH	9.09 pH		
				PH									
28		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
		006-007-00-5											
										Total:	0.00818 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classifica ion

Classification of sample: WS5-08/10/2021-0.10-0.35m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS5-08/10/2021-0.10-0.35m
Sample Depth:
0.10-0.35 m
Moisture content:
18.8%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18.8% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		70.6 mg/kg	1.462	86.857 mg/kg	0.00869 %	✓	
2	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		23.2 mg/kg		19.529 mg/kg	0.00195 %	✓	
3	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
4	copper { copper(II) chloride; copper dichloride }		231-210-2	7447-39-4		16 mg/kg	2.116	28.496 mg/kg	0.00285 %	✓	
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	16 mg/kg		13.468 mg/kg	0.00135 %	✓	
6	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
7	nickel { nickel sulfide }	028-006-00-9	240-841-2 [1] 234-349-7 [2] - [3]	16812-54-7 [1] 11113-75-0 [2] 1314-04-1 [3]		24.6 mg/kg	1.546	32.02 mg/kg	0.0032 %	✓	
8	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
9	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		60 mg/kg	1.245	62.864 mg/kg	0.00629 %	✓	
10	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
11	naphthalene	601-052-00-2	202-049-5	91-20-3		1.81 mg/kg		1.524 mg/kg	0.000152 %	✓	
12	acenaphthylene		205-917-1	208-96-8		0.14 mg/kg		0.118 mg/kg	0.0000118 %	✓	
13	acenaphthene		201-469-6	83-32-9		1.31 mg/kg		1.103 mg/kg	0.00011 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		fluorene				0.82	mg/kg		0.69	mg/kg	0.000069 %	✓	
			201-695-5	86-73-7									
15		phenanthrene				9.03	mg/kg		7.601	mg/kg	0.00076 %	✓	
			201-581-5	85-01-8									
16		anthracene				3.29	mg/kg		2.769	mg/kg	0.000277 %	✓	
			204-371-1	120-12-7									
17		fluoranthene				13.97	mg/kg		11.759	mg/kg	0.00118 %	✓	
			205-912-4	206-44-0									
18		pyrene				10.86	mg/kg		9.141	mg/kg	0.000914 %	✓	
			204-927-3	129-00-0									
19		benzo[a]anthracene				7.5	mg/kg		6.313	mg/kg	0.000631 %	✓	
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				7.65	mg/kg		6.439	mg/kg	0.000644 %	✓	
		601-048-00-0	205-923-4	218-01-9									
21		benzo[a]pyrene; benzo[def]chrysene				9.6	mg/kg		8.081	mg/kg	0.000808 %	✓	
		601-032-00-3	200-028-5	50-32-8									
22		indeno[123-cd]pyrene				5.64	mg/kg		4.747	mg/kg	0.000475 %	✓	
			205-893-2	193-39-5									
23		dibenz[a,h]anthracene				1.06	mg/kg		0.892	mg/kg	0.0000892 %	✓	
		601-041-00-2	200-181-8	53-70-3									
24		benzo[ghi]perylene				5.29	mg/kg		4.453	mg/kg	0.000445 %	✓	
			205-883-8	191-24-2									
25		benzo[b]fluoranthene				11.61	mg/kg		9.773	mg/kg	0.000977 %	✓	
		601-034-00-4	205-911-9	205-99-2									
26		benzo[k]fluoranthene				4.51	mg/kg		3.796	mg/kg	0.00038 %	✓	
		601-036-00-5	205-916-6	207-08-9									
27		pH				8.87	pH		8.87	pH	8.87 pH		
				PH									
28		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
		006-007-00-5											
										Total:	0.0327 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classifica ion

Classification of sample: WS6-08/10/2021-0.10-0.60m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS6-08/10/2021-0.10-0.60m
Sample Depth:
0.10-0.60 m
Moisture content:
11.2%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11.2% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		12.2	mg/kg	1.462	16.035	mg/kg	0.0016 %	✓	
2	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		6.9	mg/kg		6.205	mg/kg	0.000621 %	✓	
3	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
4	copper { copper(II) chloride; copper dichloride }		231-210-2	7447-39-4		4	mg/kg	2.116	7.611	mg/kg	0.000761 %	✓	
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	6	mg/kg		5.396	mg/kg	0.00054 %	✓	
6	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
7	nickel { nickel sulfide }	028-006-00-9	240-841-2 [1] 234-349-7 [2] - [3]	16812-54-7 [1] 11113-75-0 [2] 1314-04-1 [3]		3	mg/kg	1.546	4.172	mg/kg	0.000417 %	✓	
8	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
9	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		9	mg/kg	1.245	10.074	mg/kg	0.00101 %	✓	
10	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
12	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
13	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			201-695-5	86-73-7									
15		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			201-581-5	85-01-8									
16		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			204-371-1	120-12-7									
17		fluoranthene				0.06	mg/kg		0.054	mg/kg	0.0000054 %	✓	
			205-912-4	206-44-0									
18		pyrene				0.06	mg/kg		0.054	mg/kg	0.0000054 %	✓	
			204-927-3	129-00-0									
19		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				0.03	mg/kg		0.027	mg/kg	0.0000027 %	✓	
		601-048-00-0	205-923-4	218-01-9									
21		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
22		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			205-893-2	193-39-5									
23		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
24		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			205-883-8	191-24-2									
25		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
26		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
27		pH				9.09	pH		9.09	pH	9.09 pH		
				PH									
28		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
		006-007-00-5											
										Total:	0.00545 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classifica ion

Classification of sample: WS7-08/10/2021-0.10-0.60m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS7-08/10/2021-0.10-0.60m
Sample Depth:
0.10-0.60 m
Moisture content:
13.6%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 13.6% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
2	benzene	601-020-00-8	200-753-7	71-43-2		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
3	toluene	601-021-00-3	203-625-9	108-88-3		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
4	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		24.6	mg/kg	1.462	31.65	mg/kg	0.00316 %	✓	
6	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		8.3	mg/kg		7.306	mg/kg	0.000731 %	✓	
7	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
8	copper { copper(II) chloride; copper dichloride }		231-210-2	7447-39-4		8	mg/kg	2.116	14.9	mg/kg	0.00149 %	✓	
9	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	5	mg/kg		4.401	mg/kg	0.00044 %	✓	
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
11	nickel { nickel sulfide }	028-006-00-9	240-841-2 [1] 234-349-7 [2] - [3]	16812-54-7 [1] 11113-75-0 [2] 1314-04-1 [3]		5.9	mg/kg	1.546	8.031	mg/kg	0.000803 %	✓	
12	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
13	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		15	mg/kg	1.245	16.435	mg/kg	0.00164 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
15		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
16		acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
17		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
18		fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
19		phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
20		anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21		fluoranthene		205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22		pyrene		204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
23		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
24		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
25		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
27		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
28		benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
29		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
30		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
31		TPH (C6 to C40) petroleum group			TPH		<38	mg/kg		<38	mg/kg	<0.0038 %		<LOD
32		pH			PH		8.96	pH		8.96	pH	8.96 pH		
33		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
34		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.0126 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classifica ion

Classification of sample: WS9-08/10/2021-0.15-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS9-08/10/2021-0.15-0.50m
Sample Depth:
0.15-0.50 m
Moisture content:
7.5%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 7.5% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		18.9 mg/kg	1.462	25.696 mg/kg	0.00257 %	✓	
2	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		6.2 mg/kg		5.767 mg/kg	0.000577 %	✓	
3	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.1 mg/kg		0.093 mg/kg	0.0000093 %	✓	
4	copper { copper(II) chloride; copper dichloride }		231-210-2	7447-39-4		5 mg/kg	2.116	9.841 mg/kg	0.000984 %	✓	
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	7 mg/kg		6.512 mg/kg	0.000651 %	✓	
6	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
7	nickel { nickel sulfide }	028-006-00-9	240-841-2 [1] 234-349-7 [2] - [3]	16812-54-7 [1] 11113-75-0 [2] 1314-04-1 [3]		2.7 mg/kg	1.546	3.884 mg/kg	0.000388 %	✓	
8	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
9	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		10 mg/kg	1.245	11.579 mg/kg	0.00116 %	✓	
10	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
12	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
13	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			201-695-5	86-73-7									
15		phenanthrene				0.94	mg/kg		0.874	mg/kg	0.0000874 %	✓	
			201-581-5	85-01-8									
16		anthracene				0.33	mg/kg		0.307	mg/kg	0.0000307 %	✓	
			204-371-1	120-12-7									
17		fluoranthene				1.19	mg/kg		1.107	mg/kg	0.000111 %	✓	
			205-912-4	206-44-0									
18		pyrene				1.03	mg/kg		0.958	mg/kg	0.0000958 %	✓	
			204-927-3	129-00-0									
19		benzo[a]anthracene				0.54	mg/kg		0.502	mg/kg	0.0000502 %	✓	
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				0.52	mg/kg		0.484	mg/kg	0.0000484 %	✓	
		601-048-00-0	205-923-4	218-01-9									
21		benzo[a]pyrene; benzo[def]chrysene				0.55	mg/kg		0.512	mg/kg	0.0000512 %	✓	
		601-032-00-3	200-028-5	50-32-8									
22		indeno[123-cd]pyrene				0.33	mg/kg		0.307	mg/kg	0.0000307 %	✓	
			205-893-2	193-39-5									
23		dibenz[a,h]anthracene				0.06	mg/kg		0.0558	mg/kg	0.00000558 %	✓	
		601-041-00-2	200-181-8	53-70-3									
24		benzo[ghi]perylene				0.32	mg/kg		0.298	mg/kg	0.0000298 %	✓	
			205-883-8	191-24-2									
25		benzo[b]fluoranthene				0.64	mg/kg		0.595	mg/kg	0.0000595 %	✓	
		601-034-00-4	205-911-9	205-99-2									
26		benzo[k]fluoranthene				0.25	mg/kg		0.233	mg/kg	0.0000233 %	✓	
		601-036-00-5	205-916-6	207-08-9									
27		pH				9.04	pH		9.04	pH	9.04 pH		
				PH									
28		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
		006-007-00-5											
										Total:	0.0074 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classifica ion

Classification of sample: WS10-08/10/2021-0.15-0.30m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS10-08/10/2021-0.15-0.30m
Sample Depth:
0.15-0.30 m
Moisture content:
17.5%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17.5% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
2	benzene	601-020-00-8	200-753-7	71-43-2		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
3	toluene	601-021-00-3	203-625-9	108-88-3		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
4	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		58.4 mg/kg	1.462	72.642 mg/kg	0.00726 %	✓	
6	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		12.5 mg/kg		10.638 mg/kg	0.00106 %	✓	
7	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.1 mg/kg		0.0851 mg/kg	0.00000851 %	✓	
8	copper { copper(II) chloride; copper dichloride }		231-210-2	7447-39-4		78 mg/kg	2.116	140.455 mg/kg	0.014 %	✓	
9	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	53 mg/kg		45.106 mg/kg	0.00451 %	✓	
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.1 mg/kg	1.353	0.115 mg/kg	0.0000115 %	✓	
11	nickel { nickel sulfide }	028-006-00-9	240-841-2 [1] 234-349-7 [2] - [3]	16812-54-7 [1] 11113-75-0 [2] 1314-04-1 [3]		33.4 mg/kg	1.546	43.955 mg/kg	0.0044 %	✓	
12	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
13	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		70 mg/kg	1.245	74.153 mg/kg	0.00742 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<**LOD**
		024-001-00-0	215-607-8	1333-82-0									
15		naphthalene				0.29	mg/kg		0.247	mg/kg	0.0000247 %	✓	
		601-052-00-2	202-049-5	91-20-3									
16		acenaphthylene				0.06	mg/kg		0.0511	mg/kg	0.00000511 %	✓	
			205-917-1	208-96-8									
17		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-469-6	83-32-9									
18		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			201-695-5	86-73-7									
19		phenanthrene				0.56	mg/kg		0.477	mg/kg	0.0000477 %	✓	
			201-581-5	85-01-8									
20		anthracene				0.2	mg/kg		0.17	mg/kg	0.000017 %	✓	
			204-371-1	120-12-7									
21		fluoranthene				1.1	mg/kg		0.936	mg/kg	0.0000936 %	✓	
			205-912-4	206-44-0									
22		pyrene				1.1	mg/kg		0.936	mg/kg	0.0000936 %	✓	
			204-927-3	129-00-0									
23		benzo[a]anthracene				0.61	mg/kg		0.519	mg/kg	0.0000519 %	✓	
		601-033-00-9	200-280-6	56-55-3									
24		chrysene				0.67	mg/kg		0.57	mg/kg	0.000057 %	✓	
		601-048-00-0	205-923-4	218-01-9									
25		benzo[a]pyrene; benzo[def]chrysene				0.72	mg/kg		0.613	mg/kg	0.0000613 %	✓	
		601-032-00-3	200-028-5	50-32-8									
26		indeno[123-cd]pyrene				0.49	mg/kg		0.417	mg/kg	0.0000417 %	✓	
			205-893-2	193-39-5									
27		dibenz[a,h]anthracene				0.12	mg/kg		0.102	mg/kg	0.0000102 %	✓	
		601-041-00-2	200-181-8	53-70-3									
28		benzo[ghi]perylene				0.51	mg/kg		0.434	mg/kg	0.0000434 %	✓	
			205-883-8	191-24-2									
29		benzo[b]fluoranthene				0.99	mg/kg		0.843	mg/kg	0.0000843 %	✓	
		601-034-00-4	205-911-9	205-99-2									
30		benzo[k]fluoranthene				0.38	mg/kg		0.323	mg/kg	0.0000323 %	✓	
		601-036-00-5	205-916-6	207-08-9									
31		TPH (C6 to C40) petroleum group				165	mg/kg		140.426	mg/kg	0.014 %	✓	
				TPH									
32		pH				7.97	pH		7.97	pH	7.97 pH		
				PH									
33		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
		006-007-00-5											
34		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0538 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classifica ion

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Sample is solid and therefore flammability is reduced.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.014%)

Classification of sample: WS11-08/10/2021-0.20-0.45m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS11-08/10/2021-0.20-0.45m
Sample Depth:
0.20-0.45 m
Moisture content:
12.2%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12.2% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		67.8 mg/kg	1.462	88.319 mg/kg	0.00883 %	✓	
2	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		16.9 mg/kg		15.062 mg/kg	0.00151 %	✓	
3	cadmium { cadmium compounds, with the excep ion of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
4	copper { copper(II) chloride; copper dichloride }		231-210-2	7447-39-4		18 mg/kg	2.116	33.944 mg/kg	0.00339 %	✓	
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	29 mg/kg		25.847 mg/kg	0.00258 %	✓	
6	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
7	nickel { nickel sulfide }	028-006-00-9	240-841-2 [1] 234-349-7 [2] - [3]	16812-54-7 [1] 11113-75-0 [2] 1314-04-1 [3]		22.3 mg/kg	1.546	30.733 mg/kg	0.00307 %	✓	
8	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		1 mg/kg	2.554	2.276 mg/kg	0.000228 %	✓	
9	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		55 mg/kg	1.245	61.015 mg/kg	0.0061 %	✓	
10	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
12	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
13	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
15		phenanthrene				0.03	mg/kg		0.0267	mg/kg	0.00000267 %	✓	
			201-581-5	85-01-8									
16		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
17		fluoranthene				0.1	mg/kg		0.0891	mg/kg	0.00000891 %	✓	
			205-912-4	206-44-0									
18		pyrene				0.09	mg/kg		0.0802	mg/kg	0.00000802 %	✓	
			204-927-3	129-00-0									
19		benzo[a]anthracene				0.11	mg/kg		0.098	mg/kg	0.0000098 %	✓	
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				0.08	mg/kg		0.0713	mg/kg	0.00000713 %	✓	
		601-048-00-0	205-923-4	218-01-9									
21		benzo[a]pyrene; benzo[def]chrysene				0.1	mg/kg		0.0891	mg/kg	0.00000891 %	✓	
		601-032-00-3	200-028-5	50-32-8									
22		indeno[123-cd]pyrene				0.07	mg/kg		0.0624	mg/kg	0.00000624 %	✓	
			205-893-2	193-39-5									
23		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
24		benzo[ghi]perylene				0.07	mg/kg		0.0624	mg/kg	0.00000624 %	✓	
			205-883-8	191-24-2									
25		benzo[b]fluoranthene				0.12	mg/kg		0.107	mg/kg	0.0000107 %	✓	
		601-034-00-4	205-911-9	205-99-2									
26		benzo[k]fluoranthene				0.05	mg/kg		0.0446	mg/kg	0.00000446 %	✓	
		601-036-00-5	205-916-6	207-08-9									
27		pH				8.62	pH		8.62	pH	8.62 pH		
				PH									
28		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
		006-007-00-5											
										Total:	0.026 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS12-08/10/2021-0.10-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS12-08/10/2021-0.10-0.50m
Sample Depth:
0.10-0.15 m
Moisture content:
18.6%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18.6% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		74.5 mg/kg	1.462	91.809 mg/kg	0.00918 %	✓	
2	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		16.8 mg/kg		14.165 mg/kg	0.00142 %	✓	
3	cadmium { cadmium compounds, with the excep ion of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.5 mg/kg		0.422 mg/kg	0.0000422 %	✓	
4	copper { copper(II) chloride; copper dichloride }		231-210-2	7447-39-4		26 mg/kg	2.116	46.384 mg/kg	0.00464 %	✓	
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	51 mg/kg		43.002 mg/kg	0.0043 %	✓	
6	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
7	nickel { nickel sulfide }	028-006-00-9	240-841-2 [1] 234-349-7 [2] - [3]	16812-54-7 [1] 11113-75-0 [2] 1314-04-1 [3]		29 mg/kg	1.546	37.81 mg/kg	0.00378 %	✓	
8	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
9	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		86 mg/kg	1.245	90.258 mg/kg	0.00903 %	✓	
10	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
12	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
13	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
15		phenanthrene				0.08	mg/kg		0.0675	mg/kg	0.00000675 %	✓	
			201-581-5	85-01-8									
16		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
17		fluoranthene				0.2	mg/kg		0.169	mg/kg	0.0000169 %	✓	
			205-912-4	206-44-0									
18		pyrene				0.19	mg/kg		0.16	mg/kg	0.000016 %	✓	
			204-927-3	129-00-0									
19		benzo[a]anthracene				0.13	mg/kg		0.11	mg/kg	0.000011 %	✓	
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				0.14	mg/kg		0.118	mg/kg	0.0000118 %	✓	
		601-048-00-0	205-923-4	218-01-9									
21		benzo[a]pyrene; benzo[def]chrysene				0.19	mg/kg		0.16	mg/kg	0.000016 %	✓	
		601-032-00-3	200-028-5	50-32-8									
22		indeno[123-cd]pyrene				0.17	mg/kg		0.143	mg/kg	0.0000143 %	✓	
			205-893-2	193-39-5									
23		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
24		benzo[ghi]perylene				0.17	mg/kg		0.143	mg/kg	0.0000143 %	✓	
			205-883-8	191-24-2									
25		benzo[b]fluoranthene				0.23	mg/kg		0.194	mg/kg	0.0000194 %	✓	
		601-034-00-4	205-911-9	205-99-2									
26		benzo[k]fluoranthene				0.09	mg/kg		0.0759	mg/kg	0.00000759 %	✓	
		601-036-00-5	205-916-6	207-08-9									
27		pH				8.24	pH		8.24	pH	8.24 pH		
				PH									
28		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
		006-007-00-5											
										Total:	0.033 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H332 , Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Resp. Sens. 1 H334 , Skin Sens. 1 H317 , Repr. 1B H360FD , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

arsenic (EC Number: 231-148-6, CAS Number: 7440-38-2)

CLP index number: 033-001-00-X
Description/Comments: Worst Case: IARC considers arsenic Group 1; Carcinogenic to humans
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex

CLP index number: 048-001-00-5
Description/Comments: Worst Case: IARC considers cadmium compounds Group 1; Carcinogenic to humans
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

copper(II) chloride; copper dichloride (EC Number: 231-210-2, CAS Number: 7447-39-4)

Description/Comments:
Data source: https://echa.europa.eu/substance-information/-/substanceinfo/100.028.373
Data source date: 03 Nov 2016
Hazard Statements: Skin Irrit. 2 H315 , Acute Tox. 4 H302 , Eye Dam. 1 H318 , Acute Tox. 4 H312 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 3 H301 , Acute Tox. 4 H332 , Aqua ic Acute 1 H400 , Aquatic Chronic 1 H410

lead compounds with the exception of those specified elsewhere in this Annex (worst case)

CLP index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following CLP protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H302 , Acute Tox. 1 H330 , Acute Tox. 1 H310 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Aquatic Chronic 2 H411

fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Carc. 2 H351 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Skin Irrit. 2 H315

anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Aqua ic Acute 1 H400 , Aquatic Chronic 1 H410

pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Aquatic Acute 1 H400 , Aqua ic Chronic 1 H410

indeno[123-cd]pyrene (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3 H226 , Asp. Tox. 1 H304 , STOT RE 2 H373 , Muta. 1B H340 , Carc. 1B H350 , Repr. 2 H361d , Aquatic Chronic 2 H411

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

CLP index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Data source: Commission Regulation (EC) No 790/2009 - 1st Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP1)
Additional Hazard Statement(s): EUH032 >= 0 2 %
Reason for additional Hazards Statement(s):
14 Dec 2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

Appendix B: Rationale for selection of metal species

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Standard Aproach

arsenic {arsenic}

Standard Approach

cadmium {cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex}

Standard Approach

copper {copper(II) chloride; copper dichloride}

Standard Approach

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Standard Approach

mercury {mercury dichloride}

Worst case

nickel {nickel sulfide}

Worst case

selenium {nickel selenate}

Worst case

zinc {zinc oxide}

Standard Approach

chromium in chromium(VI) compounds {chromium(VI) oxide}

Standard Approach

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Standard Approach

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2021.293.4891.9295 (20 Oct 2021)
HazWasteOnline Database: 2021.293.4891.9295 (20 Oct 2021)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2019 - UK: 2019 No. 720 of 27th March 2019
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
POPs Regulation 2019 - Regulation (EU) 2019/1021 of 20 June 2019

HazWasteOnline™

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and he rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infec ious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

QHK9N-R98XV-NO6T3

Job name

UK 21.5579 North Campus East Car Park, Welwyn Garden City (2 of 4)

Description/Comments

Samples Collected during site investigation (2 of 4)

Project

UK21.5579

Site

North Campus East Car Park, Welwyn Garden City (2 of 4)

Classified by

Name:
Lee Anderson
Date:
03 Nov 2021 09:37 GMT
Telephone:

Company:
Environmental Strategies Ltd EPS

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: CERTIFIED

Course	Date
Hazardous Waste Classification	03 Dec 2020

Next 3 year Refresher due by Dec 2023

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS1-08/10/2021-1.60-1.80m	1.60-1.80	Non Hazardous		2
2	WS8-08/10/2021-0.70-0.90m	0.70-0.90	Non Hazardous		3

Related documents

#	Name	Description
1	EMT-21-16045-Batch-1-Sched-A-202110191159.HWOL	.hwol file used to create the Job

Report

Created by: Lee Anderson

Created date: 03 Nov 2021 09:37 GMT

Classification of sample: WS1-08/10/2021-1.60-1.80m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS1-08/10/2021-1.60-1.80m
Sample Depth:
1.60-1.80 m
Moisture content:
12%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
2		benzene				<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
3		toluene				<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
4	•	ethylbenzene				<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
5	•	TPH (C6 to C40) petroleum group				<38	mg/kg		<38	mg/kg	<0.0038 %		<LOD
				TPH									
6		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0038 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

Classification of sample: WS8-08/10/2021-0.70-0.90m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS8-08/10/2021-0.70-0.90m
Sample Depth:
0.70-0.90 m
Moisture content:
12.8%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12.8% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		tert-butyl methyl ether; MTBE; 2-me hoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
2		benzene	601-020-00-8	200-753-7	71-43-2		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
3		toluene	601-021-00-3	203-625-9	108-88-3		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
4	•	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
5	•	TPH (C6 to C40) petroleum group			TPH		<38	mg/kg		<38	mg/kg	<0.0038 %		<LOD
6		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.0038 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

Appendix A: Classifier defined and non CLP determinands

- **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

- **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3 H226 , Asp. Tox. 1 H304 , STOT RE 2 H373 , Muta. 1B H340 , Carc. 1B H350 , Repr. 2 H361d , Aquatic Chronic 2 H411

Appendix B: Rationale for selection of metal species

None used in this classification

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2021.293.4891.9295 (20 Oct 2021)
HazWasteOnline Database: 2021.293.4891.9295 (20 Oct 2021)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2019 - UK: 2019 No. 720 of 27th March 2019
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
POPs Regulation 2019 - Regulation (EU) 2019/1021 of 20 June 2019

APPENDIX J

Laboratory Results - Geotechnical

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 25/10/2021

0998

Contract	**UK21.5579 - North Campus East Car Park, Welwyn Garden City**
Serial No.	**39534_1**

Client:

Environmental Protection Strategies Ltd
Unit 7
Caxton House
Broad Street
Great Cambourne
Cambridge
CB23 6JN

Soil Property Testing Ltd

15, 16, 18 Halcyon Court, St Margaret's Way, Stukeley Meadows, Huntingdon, Cambridgeshire, PE29 6DG

Tel: 01480 455579
Email: enquiries@soilpropertytesting.com
Website: www.soilpropertytesting.com

Samples Submitted By:

Environmental Protection Strategies Ltd

Samples Labelled:

UK21.5579 - North Campus East Car Park, Welwyn Garden City

Approved Signatories:

☑ **J.C. Garner B.Eng (Hons) FGS**
Technical Director & Quality Manager

☐ **W. Johnstone**
Materials Lab Manager

☐ **D. Sabnis**
Operations Manager

[redacted]

Date Received: 11/10/2021 **Samples Tested Between:** 11/10/2021 **and** 25/10/2021

Remarks:

For the attention of Shaun Cahill
Your Reference No: UK21.5579
Your Order No: 27543

Notes:

1. All remaining samples or remnants from this contract will be disposed of after 21 days from today, unless we are notified to the contrary.
2. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
3. Tests marked "NOT UKAS ACCREDITED" in this test report are not included in the UKAS Accreditation Schedule for this testing laboratory.
4. This test report may not be reproduced other than in full except with the prior written approval of the issuing laboratory.
5. The results within this report only relate to the items tested or sampled.

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 25/10/2021

0998

Contract	**UK21.5579 - North Campus East Car Park, Welwyn Garden City**		
Serial No.	**39534_1**	**Target Date**	25/10/2021
Scheduled By	Environmental Protection Strategies Ltd		

Schedule Remarks

Bore Hole No.	Type	Sample Ref.	Top Depth	Water Content (BSEN)	Liquid/Plastic Limits	Wet Sieve Preparation	Triaxial Test	Particle Size Distribution (BS1377)	Saturation Moisture Content													Sample Remarks
BH1	U	2	3.00	1	1		1															
BH1	U	3	5.00	1	1		1															
BH1	U	4	8.00	1	1		1															
BH1	B	1	11.70					1														
BH1	B	3	13.30	1	1	1																
BH2	B	7	8.00					1														
BH2	B	11	23.80						1													
BH3	U	1	1.20	1	1	1	1															
BH3	U	2	3.00	1	1	1	1															
BH3	B	1	4.00					1														
BH3	B	3	6.50					1														
BH3	B	7	16.40	1	1	1																
WS2	D	6	1.80	1	1	1																
WS3	D	10	1.60	1	1	1																
WS4	D	14	1.60	1	1	1																
WS6	D	21	0.80	1	1	1																
WS7	D	23	0.60	1	1	1																
Totals				**12**	**12**	**9**	**5**	**4**	**1**													**End of Schedule**

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 25/10/2021

0998

Contract	UK21.5579 - North Campus East Car Park, Welwyn Garden City
Serial No.	39534_1

SUMMARY OF WATER CONTENT, LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole /Pit No.	Depth (m)	Type	Ref.	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasti-city Index (%)	Liquid-ity Index	Sample Preparation				Description	Class
									Method	Ret'd 0.425mm (%)	Corr'd W/C <0.425mm	Curing Time (hrs)		
BH1	3.00	U	2	18.8	56	21	35	-0.06	From Natural	0 (A)		26	Stiff (high strength) yellowish red CLAY with light bluish grey mottling, rare fine sand/silt pockets and decayed roots	CH
BH1	5.00	U	3	17.6	37	16	21	0.08	From Natural	0 (A)		26	Very stiff (very high strength) mottled very pale brown and yellowish brown silty CLAY with occasional black staining and fine sand/silt pockets	CI
BH1	8.00	U	4	15.6	31	15	16	0.04	From Natural	0 (A)		27	Very stiff (very high strength) brown silty CLAY with rare pale bluish grey mottling and black staining	CL
BH1	13.30	B	3	32.9	35	24	11	0.81	Wet Sieved	8 (M)	N/R*	22	White structureless CHALK with occasional orange staining, harder intact chalk fragments from fine to coarse gravel size and black flint gravel	CL/CI/ML /MI
BH3	1.20	U	1	11.4	44	17	27	-0.21	Wet Sieved	26 (M)	15.4*	24	Very stiff (very high strength) dark yellowish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium chert	CI
BH3	3.00	U	2	17.4	57	19	38	-0.04	Wet Sieved	24 (M)	22.9*	24	Very stiff (very high strength) dark yellowish brown slightly gravelly slightly sandy CLAY with bluish grey mottling. Gravel is fine to coarse chert	CH
BH3	16.40	B	7	31.9	32	23	9	0.99	Wet Sieved	20 (M)	N/R*	24	White structureless CHALK with occasional orange staining, harder intact chalk fragments from fine to coarse gravel size and black flint gravel	CL/ML
WS2	1.80 - 2.00	D	6	19.8	40	19	21	0.04	Wet Sieved	17 (M)	23.9*	24	Stiff yellowish brown slightly gravelly slightly sandy silty CLAY with occasional dark grey organic pockets and rare decayed roots. Gravel is fine and medium angular and subangular chert and rare brick fragments	CI

Method Of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:4.2

Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:3.2, 4.4, 5.3, 5.4

Type of Sample Key: U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

Comments: *Corrected water content assume material greater than 0.425mm is non-porous. See BS1377: Part 2: 1990 Clause 3 Note 1. Where N/R, corrected water content is not reported due to material type.

Table Notation: Ret'd 0.425mm: (A) = Assumed, (M) = Measured

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 25/10/2021

0998

Contract	UK21.5579 - North Campus East Car Park, Welwyn Garden City
Serial No.	39534_1

SUMMARY OF WATER CONTENT, LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole /Pit No.	Depth (m)	Type	Ref.	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasti-city Index (%)	Liquid-ity Index	Sample Preparation				Description	Class
									Method	Ret'd 0.425mm (%)	Corr'd W/C <0.425mm	Curing Time (hrs)		
WS3	1.60 - 1.80	D	10	11.8	39	15	24	-0.14	Wet Sieved	22 (M)	15.1*	25	Hard yellowish brown slightly gravelly slightly sandy silty CLAY with occasional dark grey mottling. Gravel is fine and medium angular and subangular chert and chalk	CI
WS4	1.60 - 1.80	D	14	21.8	33	17	16	0.30	Wet Sieved	35 (M)	33.6*	46	Soft olive slightly gravelly slightly sandy silty CLAY with rare recently active roots. Gravel is fine to coarse subangular and subrounded chalk	CL
WS6	0.80 - 1.00	D	21	15.0	30	18	12	-0.25	Wet Sieved	34 (M)	22.8*	46	Soft yellowish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse angular to subrounded chert	CL
WS7	0.60 - 0.80	D	23	15.9	45	17	28	-0.04	Wet Sieved	21 (M)	20.1*	24	Very stiff yellowish brown slightly gravelly slightly sandy silty CLAY with occasional bluish grey mottling and rare decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	CI

Method Of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:4.2

Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:3.2, 4.4, 5.3, 5.4

Type of Sample Key: U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

Comments: *Corrected water content assume material greater than 0.425mm is non-porous. See BS1377: Part 2: 1990 Clause 3 Note 1.

Table Notation: Ret'd 0.425mm: (A) = Assumed, (M) = Measured

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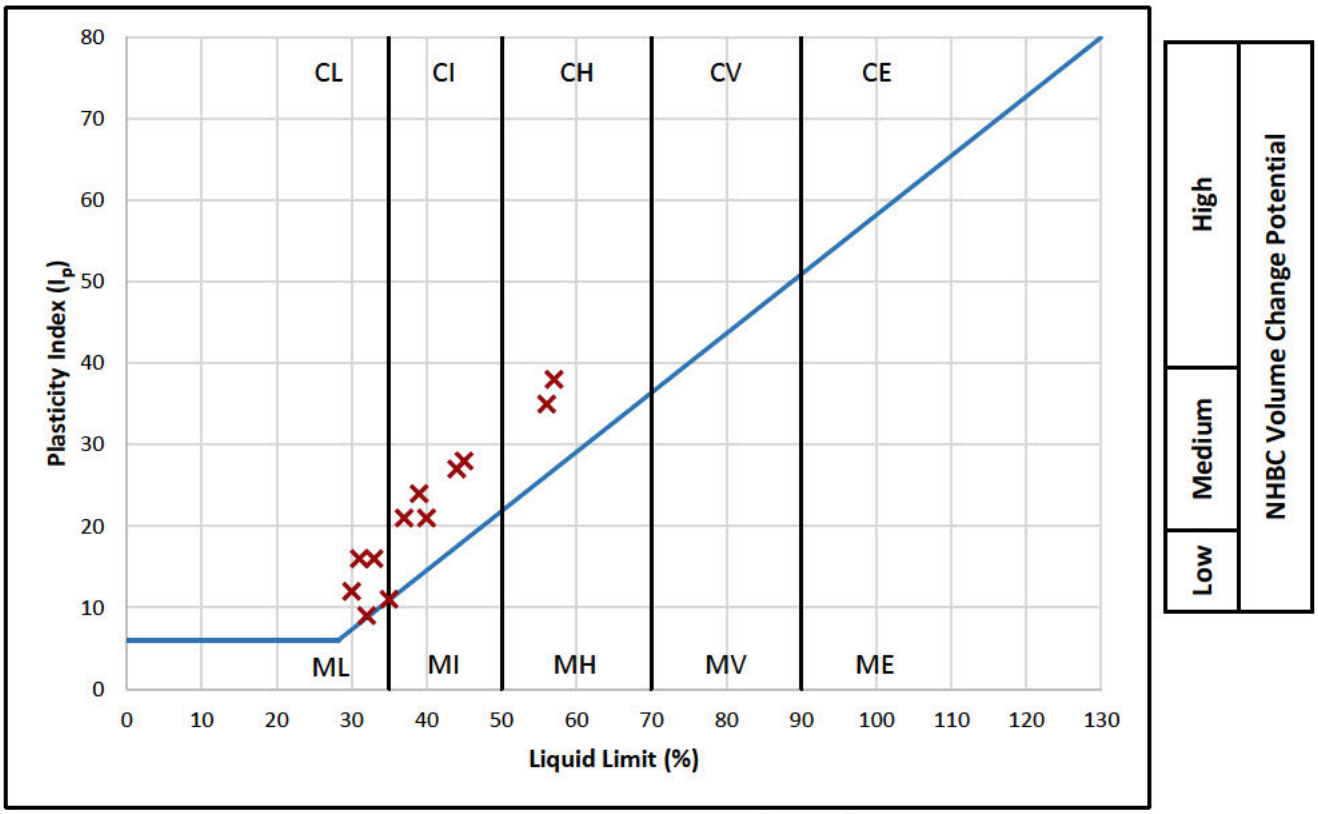
PLOT OF PLASTICITY INDEX AGAINST LIQUID LIMIT USING CASAGRANDE CLASSIFICATION CHART

Plasticity				
Low	Medium	High	Very High	Extremely High



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS 1377: Part 2: 1990: 4.2
Method of Test:	BS1377: Part 2: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index

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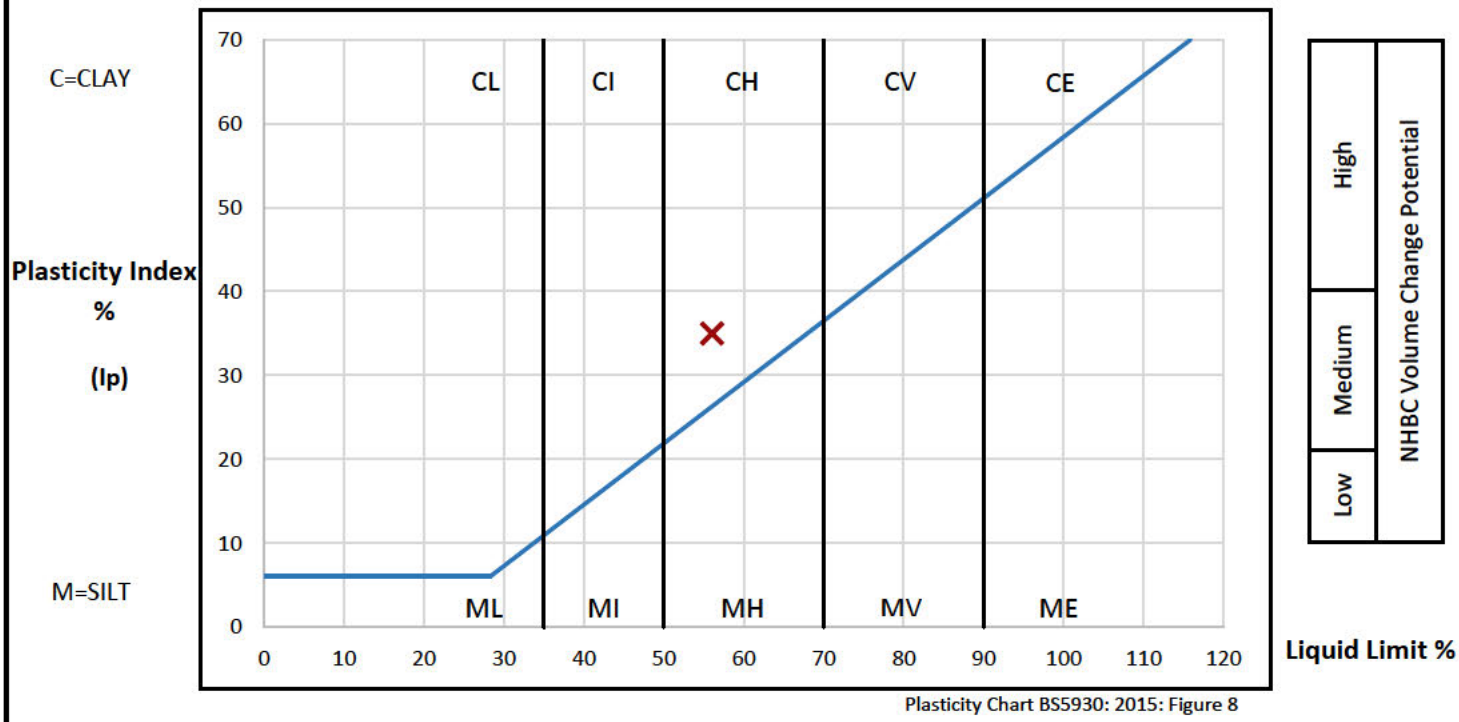
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH1	3.00	U	2	18.8	Stiff (high strength) yellowish red CLAY with light bluish grey mottling, rare fine sand/silt pockets and decayed roots	

PREPARATION				Liquid Limit	56 %
Method of preparation		From natural		Plastic Limit	21 %
Sample retained 0.425mm sieve	(Assumed)	0 %		Plasticity Index	35 %
Corrected water content for material passing 0.425mm				Liquidity Index	-0.06
Sample retained 2mm sieve	(Assumed)	0 %		NHBC Modified (I'p)	n/a
Curing time	26 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2

Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4

Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter

Comments:

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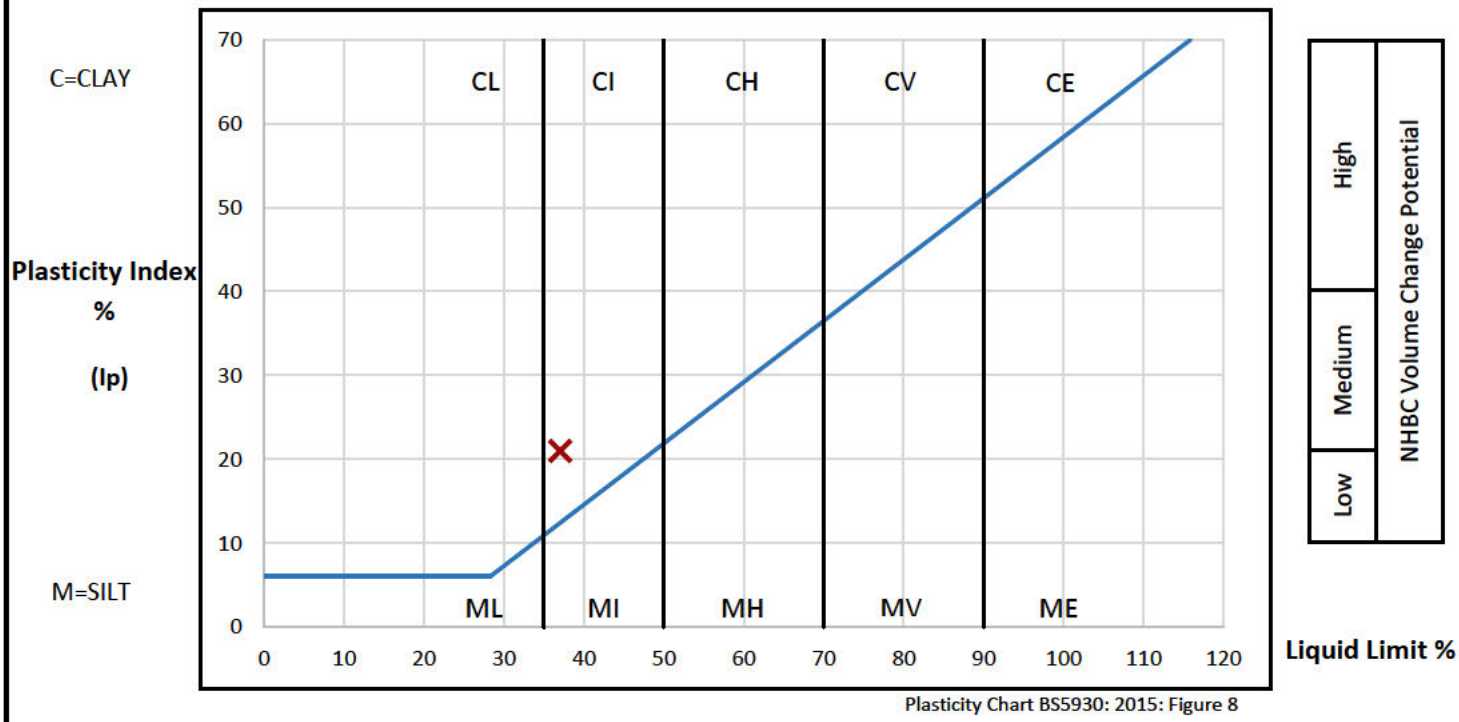
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH1	5.00	U	3	17.6	Very stiff (very high strength) mottled very pale brown and yellowish brown silty CLAY with occasional black staining and fine sand/silt pockets	

PREPARATION				Liquid Limit	37 %
Method of preparation		From natural		Plastic Limit	16 %
Sample retained 0.425mm sieve	(Assumed)	0 %		Plasticity Index	21 %
Corrected water content for material passing 0.425mm				Liquidity Index	0.08
Sample retained 2mm sieve	(Assumed)	0 %		NHBC Modified (I'p)	n/a
Curing time	26 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	

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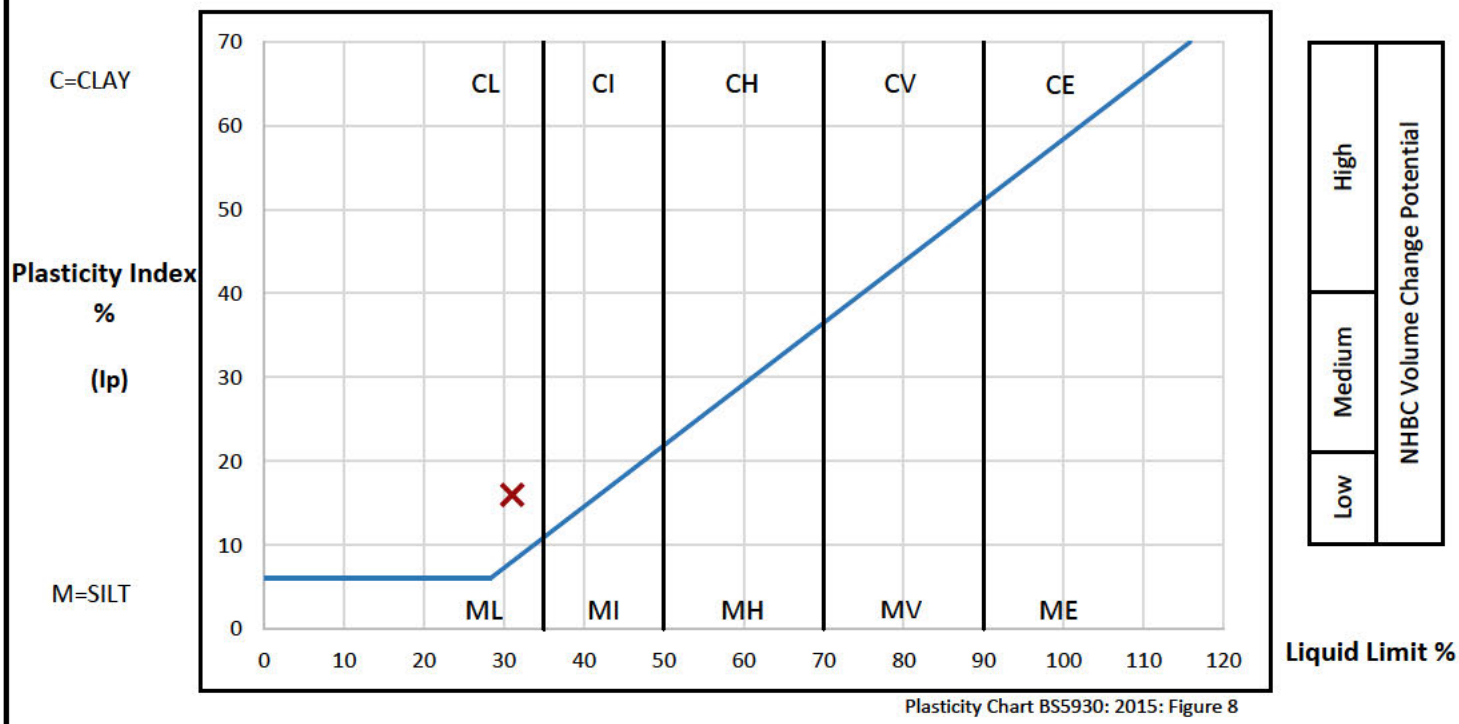
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH1	8.00	U	4	15.6	Very stiff (very high strength) brown silty CLAY with rare pale bluish grey mottling and black staining	

PREPARATION				Liquid Limit	31 %
Method of preparation		From natural		Plastic Limit	15 %
Sample retained 0.425mm sieve	(Assumed)	0 %		Plasticity Index	16 %
Corrected water content for material passing 0.425mm				Liquidity Index	0.04
Sample retained 2mm sieve	(Assumed)	0 %		NHBC Modified (I'p)	n/a
Curing time	27 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	

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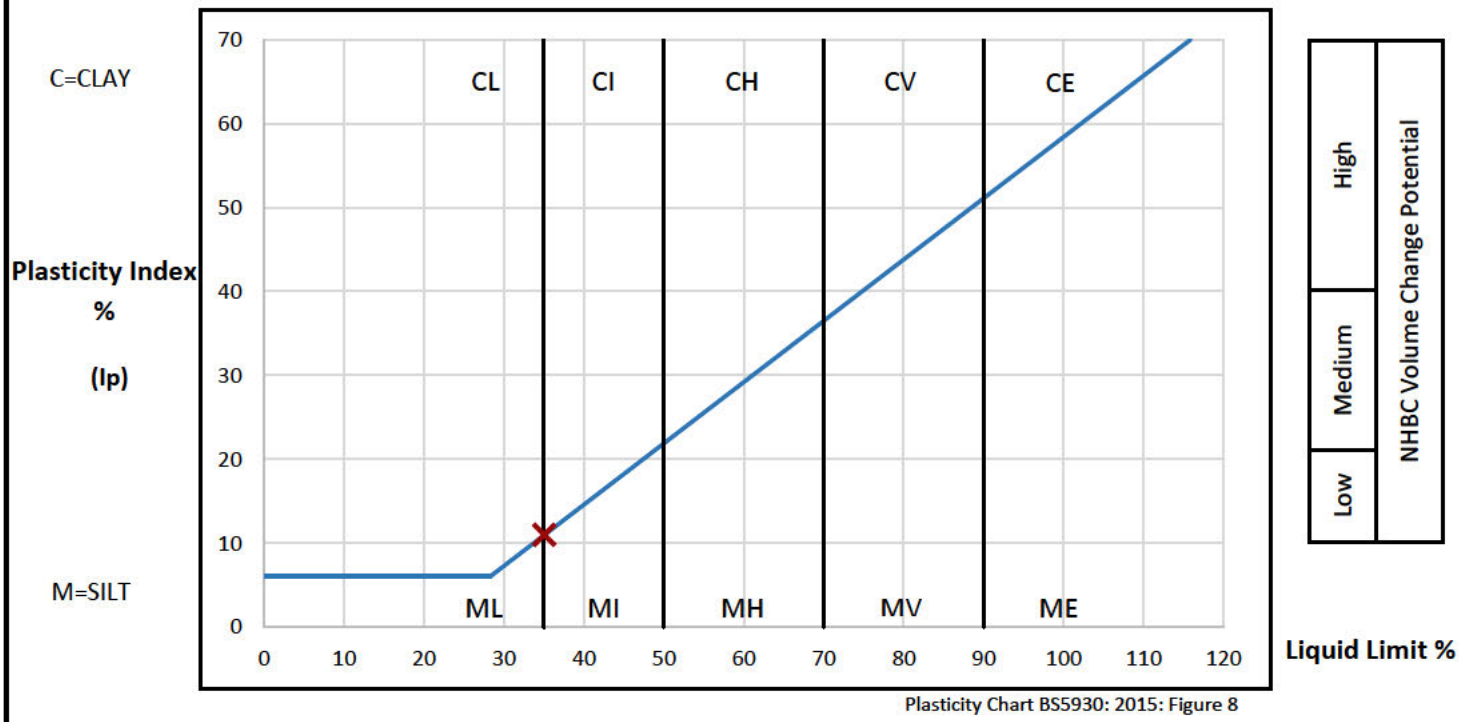
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH1	13.30	B	3	32.9	White structureless CHALK with occasional orange staining, harder intact chalk fragments from fine to coarse gravel size and black flint gravel	

PREPARATION				Liquid Limit	35 %
Method of preparation	Wet sieved over 0.425mm sieve			Plastic Limit	24 %
Sample retained 0.425mm sieve	(Measured)	8 %		Plasticity Index	11 %
Corrected water content for material passing 0.425mm	Not reported			Liquidity Index	0.81
Sample retained 2mm sieve	(Measured)	7 %		NHBC Modified (I'p)	10 %
Curing time	22 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content not reported due to material type. Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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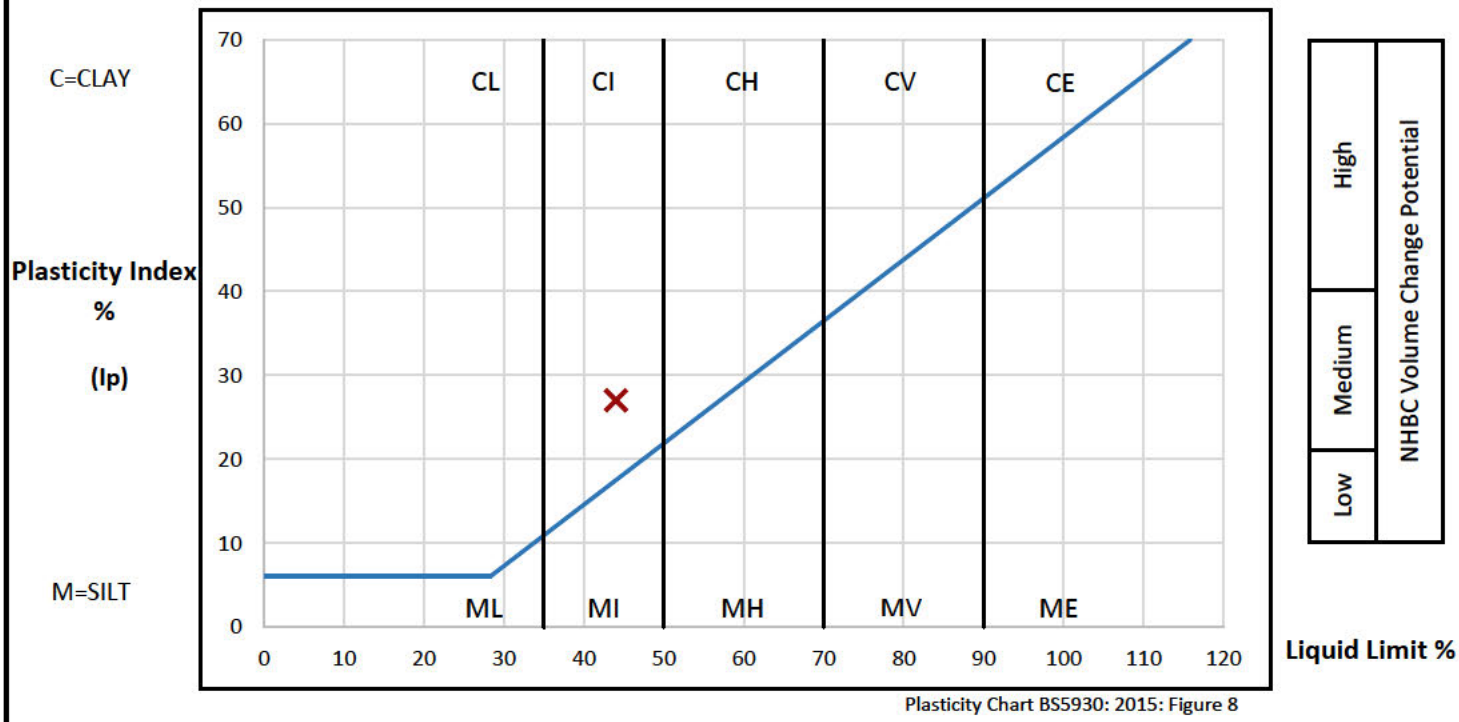
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH3	1.20	U	1	11.4	Very stiff (very high strength) dark yellowish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium chert	

PREPARATION				Liquid Limit	44 %
Method of preparation	Wet sieved over 0.425mm sieve			Plastic Limit	17 %
Sample retained 0.425mm sieve	(Measured)	26 %		Plasticity Index	27 %
Corrected water content for material passing 0.425mm		15.4 %		Liquidity Index	-0.21
Sample retained 2mm sieve	(Measured)	20 %		NHBC Modified (I'p)	20 %
Curing time	24 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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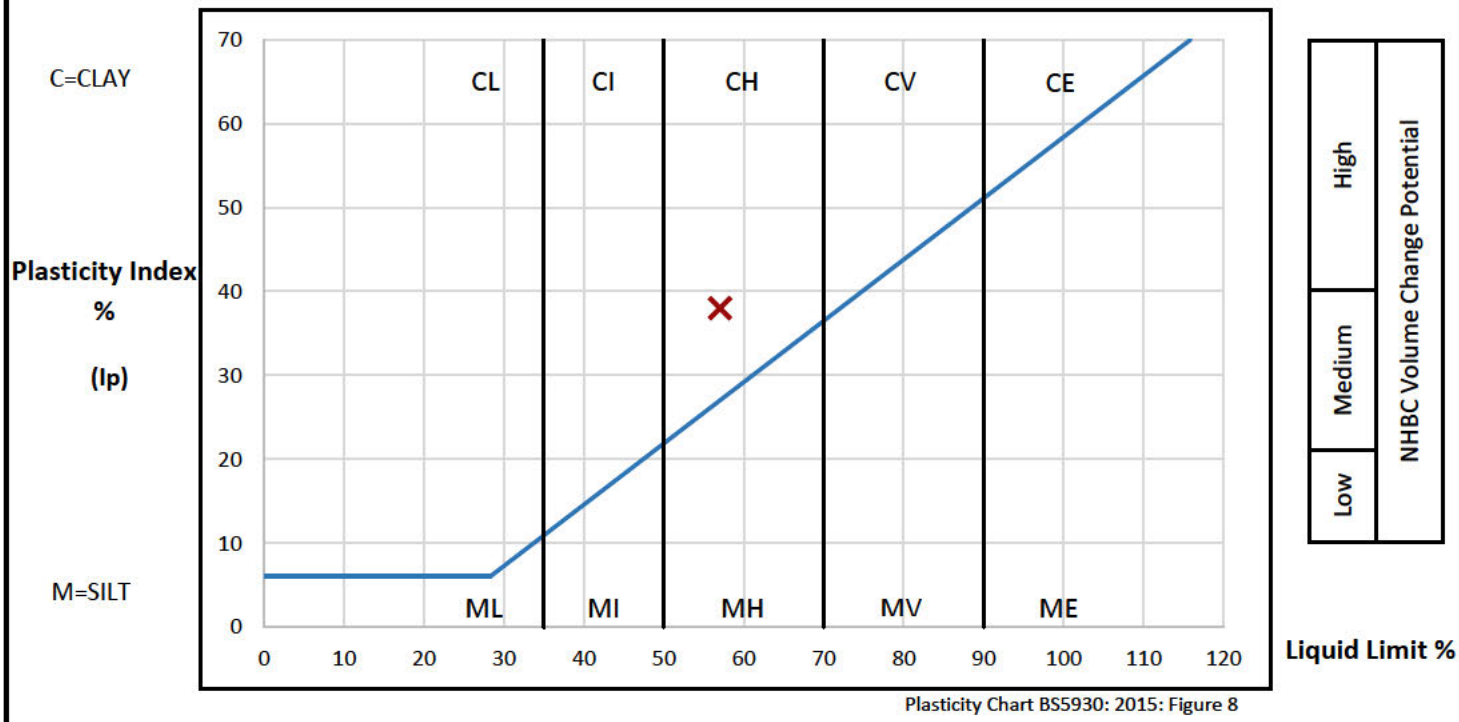
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH3	3.00	U	2	17.4	Very stiff (very high strength) dark yellowish brown slightly gravelly slightly sandy CLAY with bluish grey mottling. Gravel is fine to coarse chert	

PREPARATION				Liquid Limit	57 %
Method of preparation		Wet sieved over 0.425mm sieve		Plastic Limit	19 %
Sample retained 0.425mm sieve	(Measured)	24 %		Plasticity Index	38 %
Corrected water content for material passing 0.425mm		22.9 %		Liquidity Index	-0.04
Sample retained 2mm sieve	(Measured)	17 %		NHBC Modified (I'p)	29 %
Curing time	24 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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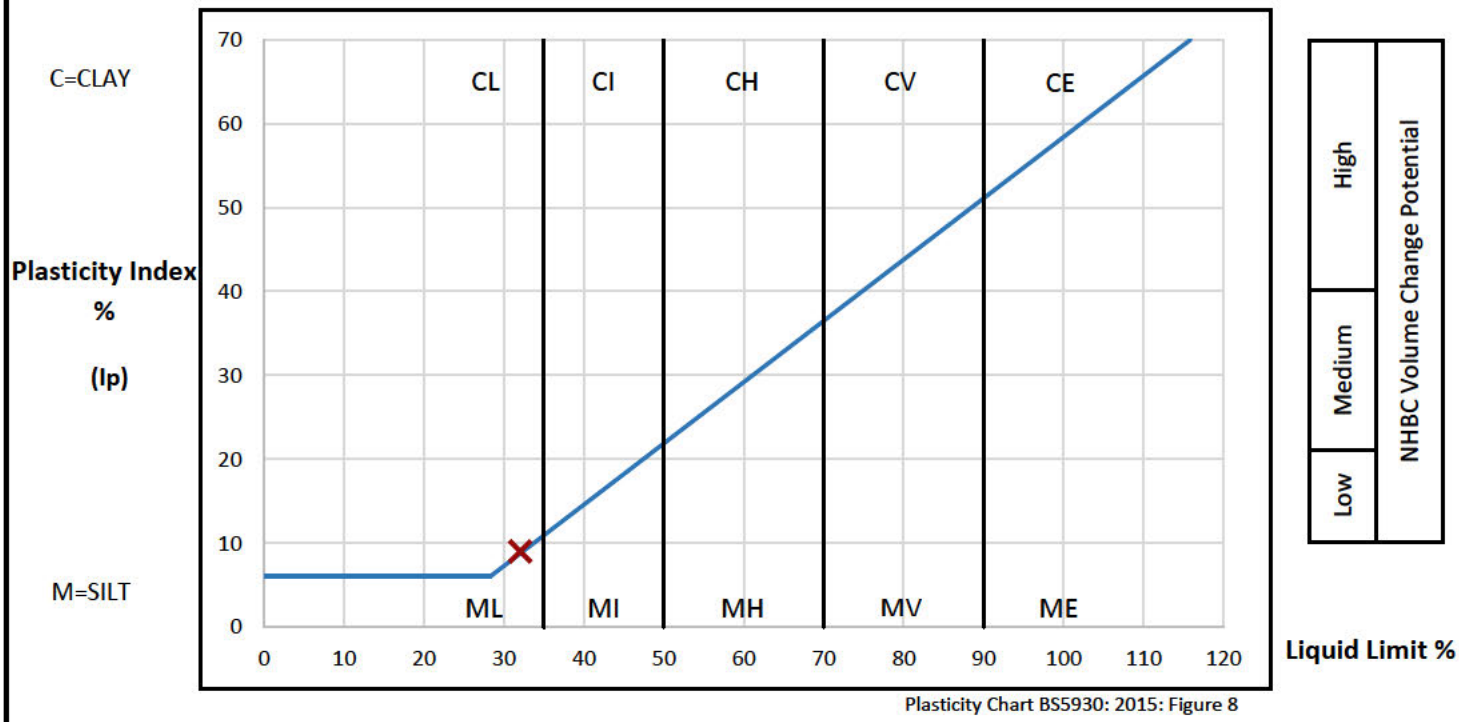
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH3	16.40	B	7	31.9	White structureless CHALK with occasional orange staining, harder intact chalk fragments from fine to coarse gravel size and black flint gravel	

PREPARATION				Liquid Limit	32 %
Method of preparation	Wet sieved over 0.425mm sieve			Plastic Limit	23 %
Sample retained 0.425mm sieve	(Measured)	20 %		Plasticity Index	9 %
Corrected water content for material passing 0.425mm	Not reported			Liquidity Index	0.99
Sample retained 2mm sieve	(Measured)	19 %		NHBC Modified (I'p)	7 %
Curing time	24 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content not reported due to material type. Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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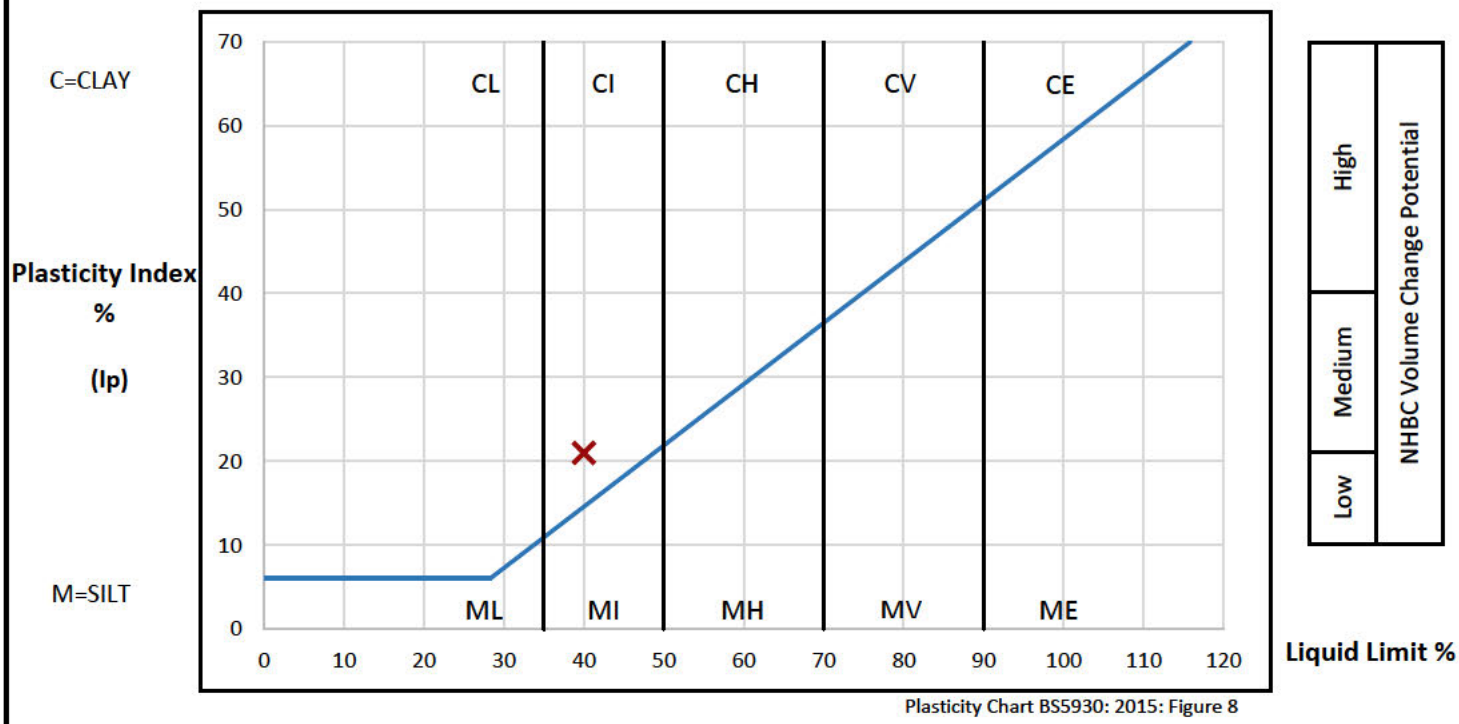
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS2	1.80 - 2.00	D	6	19.8	Stiff yellowish brown slightly gravelly slightly sandy silty CLAY with occasional dark grey organic pockets and rare decayed roots. Gravel is fine and medium angular and subangular chert and rare brick fragments	

PREPARATION				Liquid Limit	40 %
Method of preparation		Wet sieved over 0.425mm sieve		Plastic Limit	19 %
Sample retained 0.425mm sieve	(Measured)	17 %		Plasticity Index	21 %
Corrected water content for material passing 0.425mm		23.9 %		Liquidity Index	0.04
Sample retained 2mm sieve	(Measured)	15 %		NHBC Modified (I'p)	17 %
Curing time	24 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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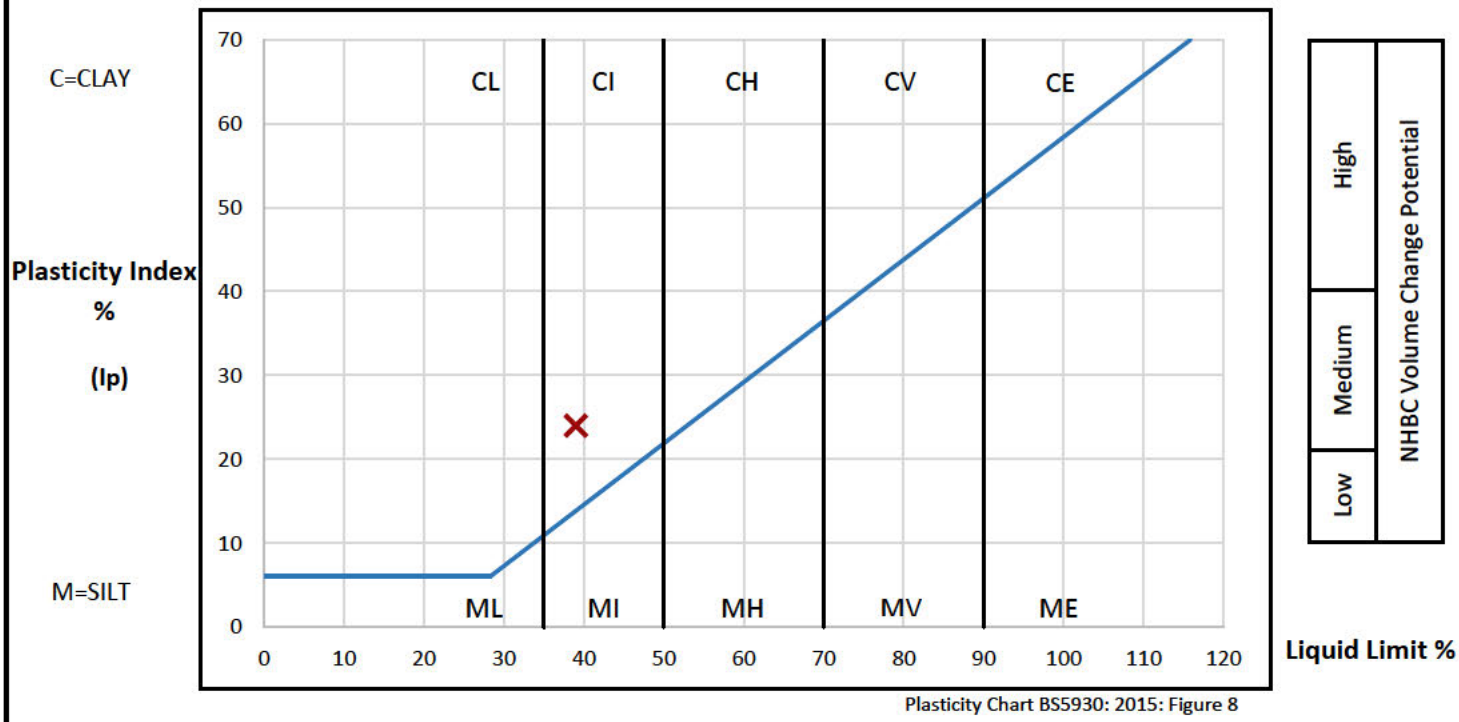
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS3	1.60 - 1.80	D	10	11.8	Hard yellowish brown slightly gravelly slightly sandy silty CLAY with occasional dark grey mottling. Gravel is fine and medium angular and subangular chert and chalk	

PREPARATION			Liquid Limit	39 %
Method of preparation	Wet sieved over 0.425mm sieve		Plastic Limit	15 %
Sample retained 0.425mm sieve	(Measured)	22 %	Plasticity Index	24 %
Corrected water content for material passing 0.425mm		15.1 %	Liquidity Index	-0.14
Sample retained 2mm sieve	(Measured)	11 %	NHBC Modified (I'p)	19 %
Curing time	25 hrs	Clay Content: Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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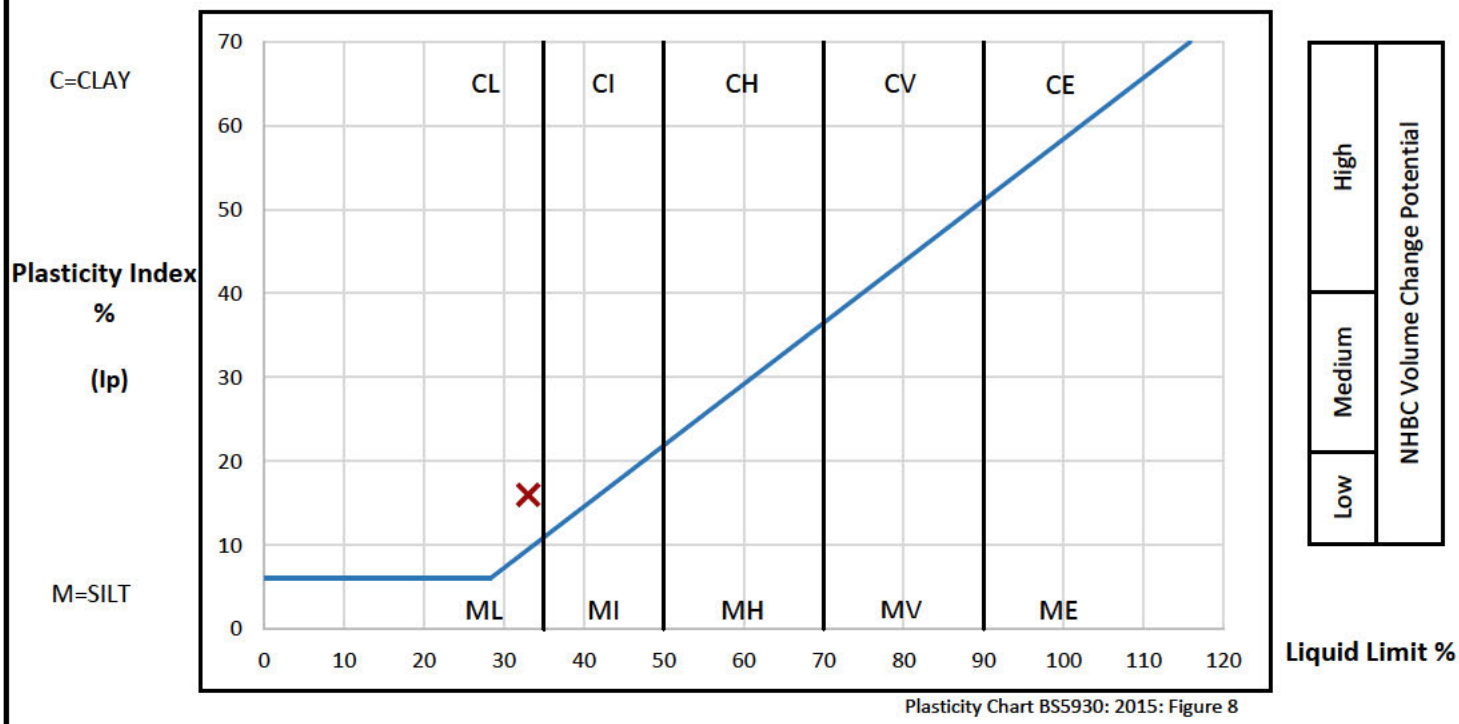
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS4	1.60 - 1.80	D	14	21.8	Soft olive slightly gravelly slightly sandy silty CLAY with rare recently active roots. Gravel is fine to coarse subangular and subrounded chalk	

PREPARATION				Liquid Limit	33 %
Method of preparation	Wet sieved over 0.425mm sieve			Plastic Limit	17 %
Sample retained 0.425mm sieve	(Measured)	35 %		Plasticity Index	16 %
Corrected water content for material passing 0.425mm		33.6 %		Liquidity Index	0.30
Sample retained 2mm sieve	(Measured)	31 %		NHBC Modified (I'p)	10 %
Curing time	46 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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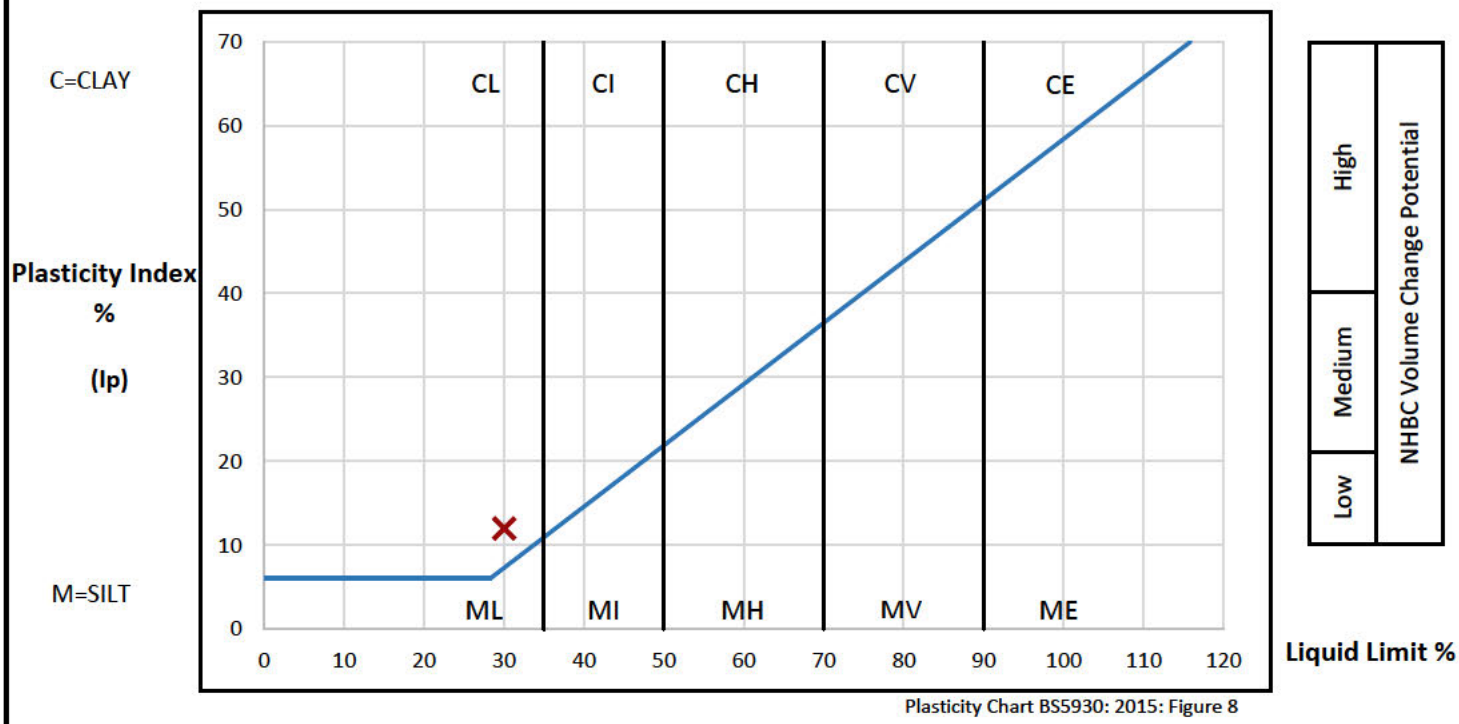
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS6	0.80 - 1.00	D	21	15.0	Soft yellowish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse angular to subrounded chert	

PREPARATION				Liquid Limit	30 %
Method of preparation	Wet sieved over 0.425mm sieve			Plastic Limit	18 %
Sample retained 0.425mm sieve	(Measured)	34 %		Plasticity Index	12 %
Corrected water content for material passing 0.425mm		22.8 %		Liquidity Index	-0.25
Sample retained 2mm sieve	(Measured)	27 %		NHBC Modified (I'p)	8 %
Curing time	46 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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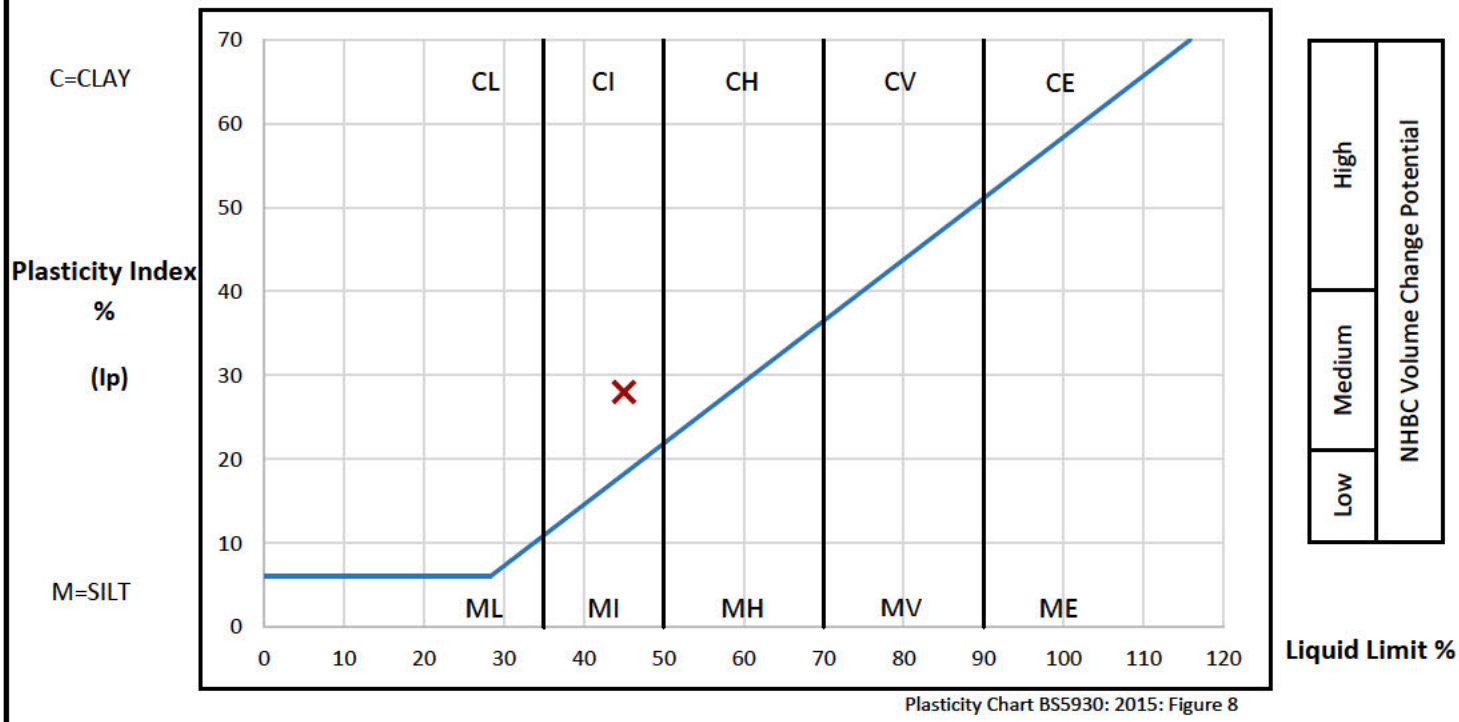
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS7	0.60 - 0.80	D	23	15.9	Very stiff yellowish brown slightly gravelly slightly sandy silty CLAY with occasional bluish grey mottling and rare decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	

PREPARATION		Liquid Limit	45 %
Method of preparation	Wet sieved over 0.425mm sieve	Plastic Limit	17 %
Sample retained 0.425mm sieve (Measured)	21 %	Plasticity Index	28 %
Corrected water content for material passing 0.425mm	20.1 %	Liquidity Index	-0.04
Sample retained 2mm sieve (Measured)	15 %	NHBC Modified (I'p)	22 %
Curing time 24 hrs	Clay Content Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

TEST REPORT

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DATE ISSUED: 25/10/2021

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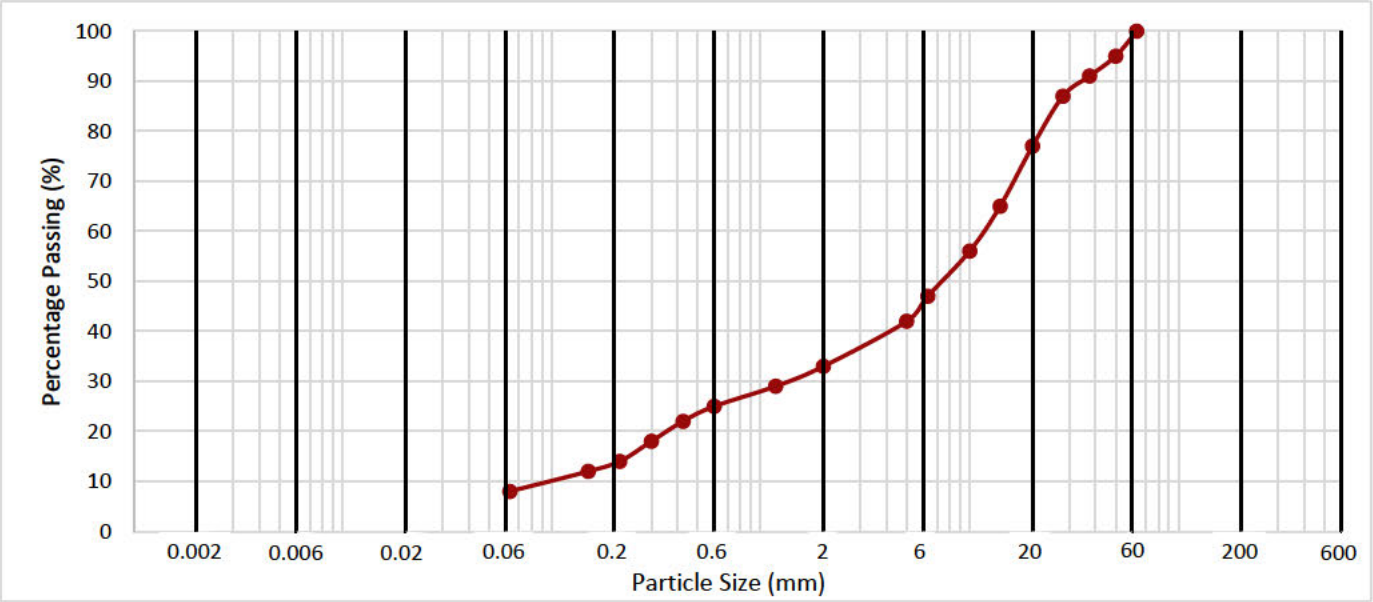
Contract	UK21.5579 - North Campus East Car Park, Welwyn Garden City
Serial No.	39534_1

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Pit No.	Depth (m)	Sample Type	Sample Reference	Description	Remarks
BH1	11.70	B	1	Black, brown and white angular to rounded chert and white and brown rounded and subrounded quartzite slightly silty sandy GRAVEL with occasional firm organish brown sandy clay lumps. Sand is orangish brown	

Method of Test:	Wet Sieve	**Method of Pretreatment:**	Not required



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Hydrometer	Particle Size (mm)	Passing (%)	Silt by Dry Mass (%)
			Clay by Dry Mass (%)

Sieve Size (mm)	Passing (%)	Sand By Dry Mass (%)
2.00	33	25
1.18	29	
0.600	25	
0.425	22	
0.300	18	
0.212	14	
0.150	12	
0.063	8	

Fines By Dry Mass (%)	
<0.063mm	8

Sieve Size (mm)	Passing (%)	2mm+ By Dry Mass (%)
300		67
125		
90		
63	100	
50	95	
37.5	91	
28	87	
20	77	
14	65	
10	56	
6.3	47	
5	42	

Method of Preparation: BS1377: Part 1: 2016: 8.3 & 8.4.5
Method of test: BS1377: Part 2: 1990: 9.2
Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:

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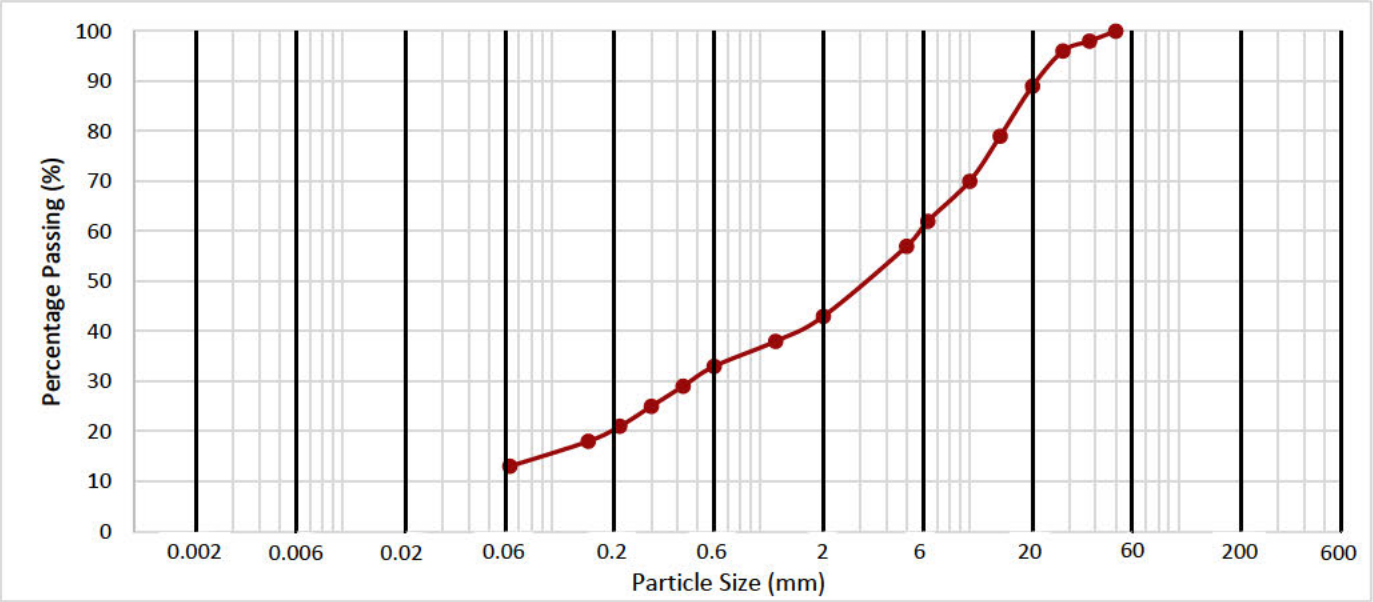
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Pit No.	Depth (m)	Sample Type	Sample Reference	Description	Remarks
BH2	8.00	B	7	Brown, black and white angular to rounded chert and occasional brown and white rounded to subangular quartzite clayey very sandy GRAVEL. Sand is dark brown	

Method of Test:	Wet Sieve	**Method of Pretreatment:**	Not required



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Hydrometer	Particle Size (mm)	Passing (%)	Silt by Dry Mass (%)
			Clay by Dry Mass (%)

Sieve Size (mm)	Passing (%)	Sand By Dry Mass (%)
2.00	43	30
1.18	38	
0.600	33	
0.425	29	
0.300	25	
0.212	21	
0.150	18	
0.063	13	

Fines By Dry Mass (%)	
<0.063mm	13

Sieve Size (mm)	Passing (%)	2mm+ By Dry Mass (%)
300		57
125		
90		
63		
50	100	
37.5	98	
28	96	
20	89	
14	79	
10	70	
6.3	62	
5	57	

Method of Preparation: BS1377: Part 1: 2016: 8.3 & 8.4.5
Method of test: BS1377: Part 2: 1990: 9.2
Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:

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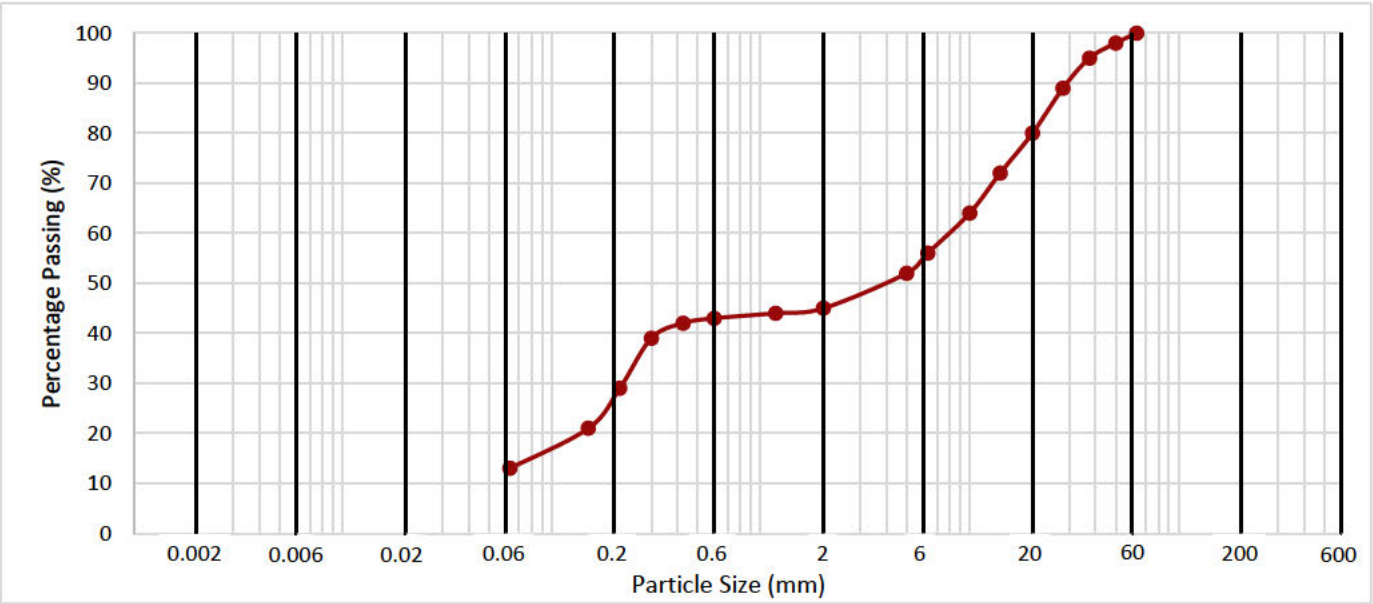
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Pit No.	Depth (m)	Sample Type	Sample Reference	Description	Remarks
BH3	4.00	B	1	Black, brown and white angular to rounded chert and occasional brown and white rounded and subrounded quartzite clayey very sandy GRAVEL. Sand is yellowish brown	

Method of Test:	Wet Sieve	**Method of Pretreatment:**	Not required



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Hydrometer	Particle Size (mm)	Passing (%)	Silt by Dry Mass (%)
			Clay by Dry Mass (%)

Sieve Size (mm)	Passing (%)	Sand By Dry Mass (%)
2.00	45	32
1.18	44	
0.600	43	
0.425	42	
0.300	39	
0.212	29	
0.150	21	
0.063	13	

Fines By Dry Mass (%)	
<0.063mm	13

Sieve Size (mm)	Passing (%)	2mm+ By Dry Mass (%)
300		55
125		
90		
63	100	
50	98	
37.5	95	
28	89	
20	80	
14	72	
10	64	
6.3	56	
5	52	

Method of Preparation: BS1377: Part 1: 2016: 8.3 & 8.4.5
Method of test: BS1377: Part 2: 1990: 9.2
Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:

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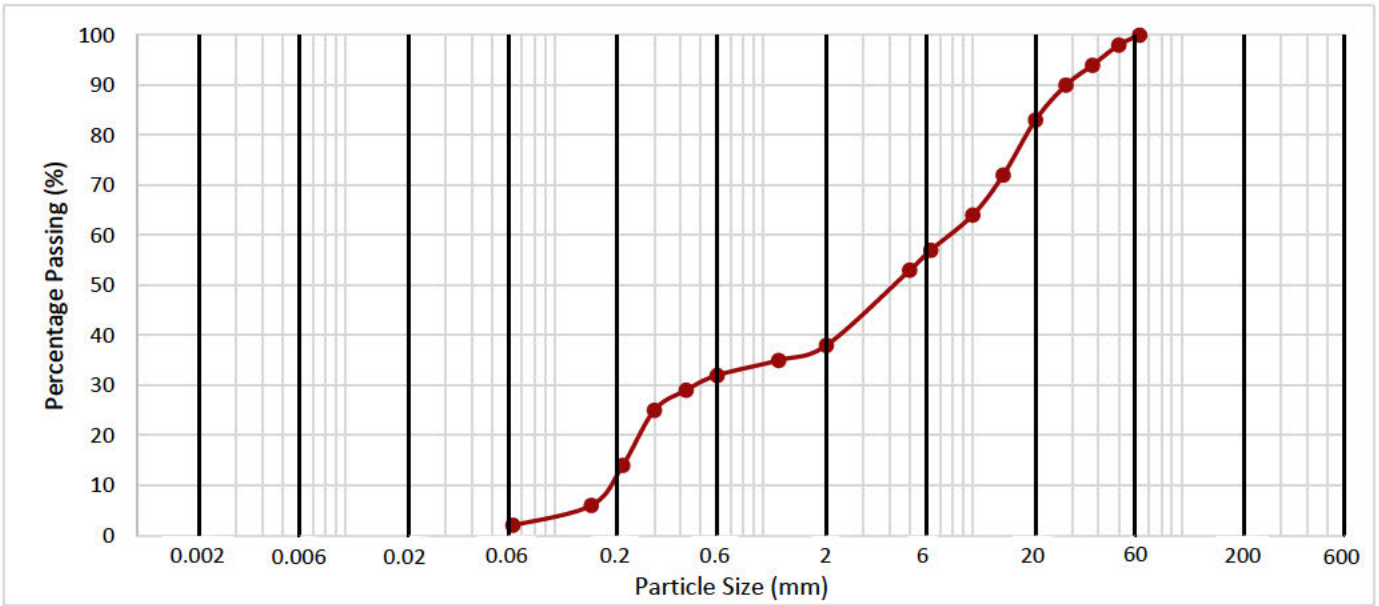
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Pit No.	Depth (m)	Sample Type	Sample Reference	Description	Remarks
BH3	6.50	B	3	Black, brown and white angular to rounded chert and occasional white and brown rounded and subrounded quartzite slightly silty very sandy GRAVEL. Sand is orangish brown	

Method of Test:	Wet Sieve	**Method of Pretreatment:**	Not required



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Hydrometer	Particle Size (mm)	Passing (%)	Silt by Dry Mass (%)	Clay by Dry Mass (%)

Sieve Size (mm)	Passing (%)	Sand By Dry Mass (%)
2.00	38	36
1.18	35	
0.600	32	
0.425	29	
0.300	25	
0.212	14	
0.150	6	
0.063	2	

Fines By Dry Mass (%)	
<0.063mm	2

Sieve Size (mm)	Passing (%)	2mm+ By Dry Mass (%)
300		62
125		
90		
63	100	
50	98	
37.5	94	
28	90	
20	83	
14	72	
10	64	
6.3	57	
5	53	

Method of Preparation: BS1377: Part 1: 2016: 8.3 & 8.4.5
Method of test: BS1377: Part 2: 1990: 9.2
Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:

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Contract	UK21.5579 - North Campus East Car Park, Welwyn Garden City
Serial No.	39534_1

DETERMINATION OF DENSITY, WATER CONTENT AND UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASURMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)	Lateral Pressure (kPa)	Deviator Stress (kPa)	Shear Stress (kPa)	Mohrs Circle Analysis Cu (kPa)	Mohrs Circle Analysis Ø degrees	Description
BH1	3.06	U	2	18.8	2.05	1.73	60	212	106			Stiff (high strength) yellowish red CLAY with light bluish grey mottling, rare fine sand/silt pockets and decayed roots
BH1	5.07	U	3	17.6	2.05	1.74	101	321	161			Very stiff (very high strength) mottled very pale brown and yellowish brown silty CLAY with occasional black staining and fine sand/silt pockets
BH1	8.04	U	4	15.6	2.09	1.81	162	323	162			Very stiff (very high strength) brown silty CLAY with rare pale bluish grey mottling and black staining
BH3	1.30	U	1	11.4	2.12	1.90	28 55 79	546 586 623	273 293 312	166	24.1	Very stiff (very high strength) dark yellowish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium chert
BH3	3.04	U	2	17.4	2.07	1.76	63 123 182	409 452 474	205 226 237	159	11.6	Very stiff (very high strength) dark yellowish brown slightly gravelly slightly sandy CLAY with bluish grey mottling. Gravel is fine to coarse chert

Method of Preparation:	BS 1377: Part 1: 1990: 7.4.2 & 8, Part 2: 1990: 7.2, Part 7: 1990: 8.3
Method of Test:	BS 1377: Part 2: 1990:3 Determination of Moisture Content, Part2: 1990:7 Determination of Density, Part 7: 1990: 8 Undrained Shear Strenth, 9 Multistage Loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	
Remarks to Include:	Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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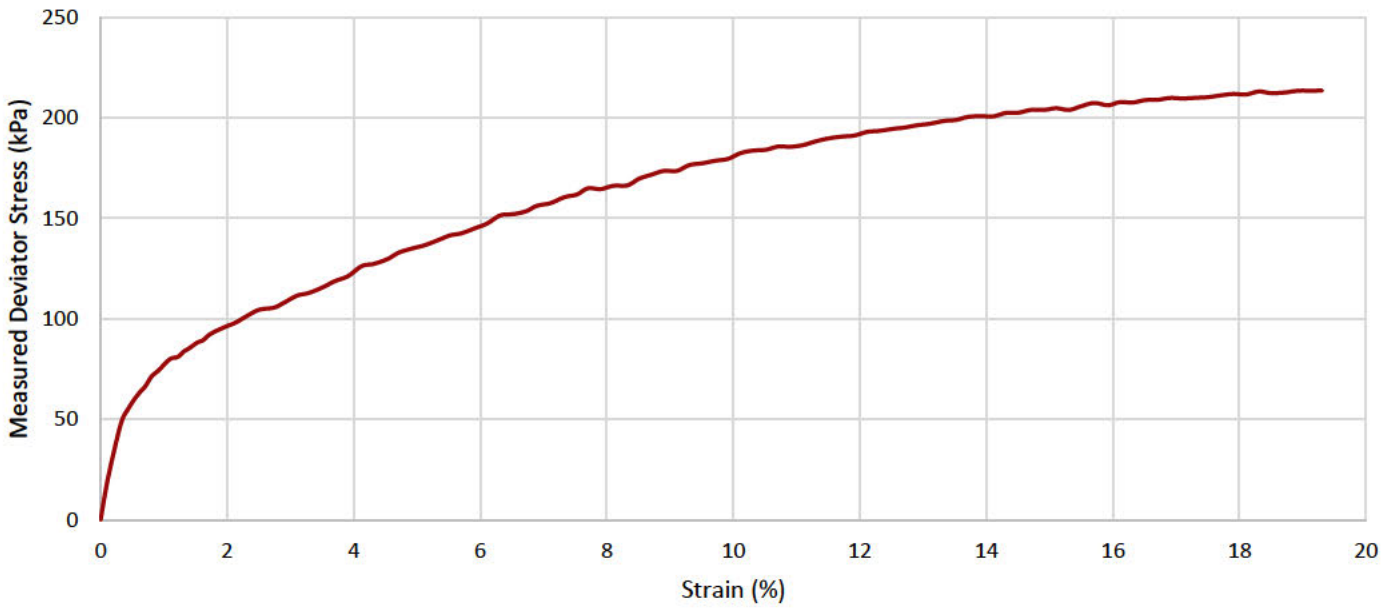
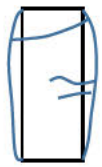
DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH1	3.00	U	2	Stiff (high strength) yellowish red CLAY with light bluish grey mottling, rare fine sand/silt pockets and decayed roots	

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
Depth of Top of Specimen (m) 3.06	199.0	102.8	3392	18.8	2.05	1.73

TEST INFORMATION Rate of Strain 1.0 % per Min | Rubber Membrane Thickness 0.3 mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	60	19.3	1.1	\	212	106		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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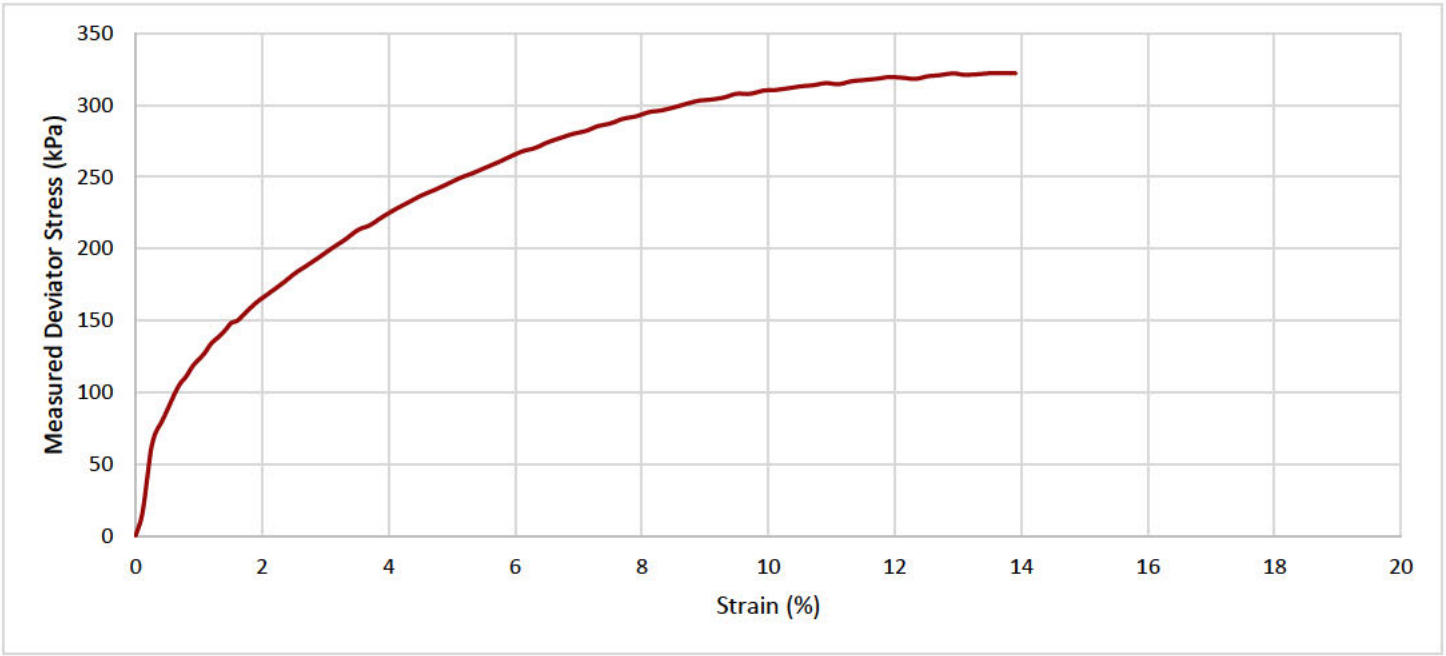
Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH1	5.00	U	3	Very stiff (very high strength) mottled very pale brown and yellowish brown silty CLAY with occasional black staining and fine sand/silt pockets	

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m^3)	Dry Density (Mg/m^3)
Depth of Top of Specimen (m) 5.07	199.1	103.2	3413	17.6	2.05	1.74

TEST INFORMATION Rate of Strain 1.0 % per Min | Rubber Membrane Thickness 0.3 mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	101	13.7	0.8	\	321	161		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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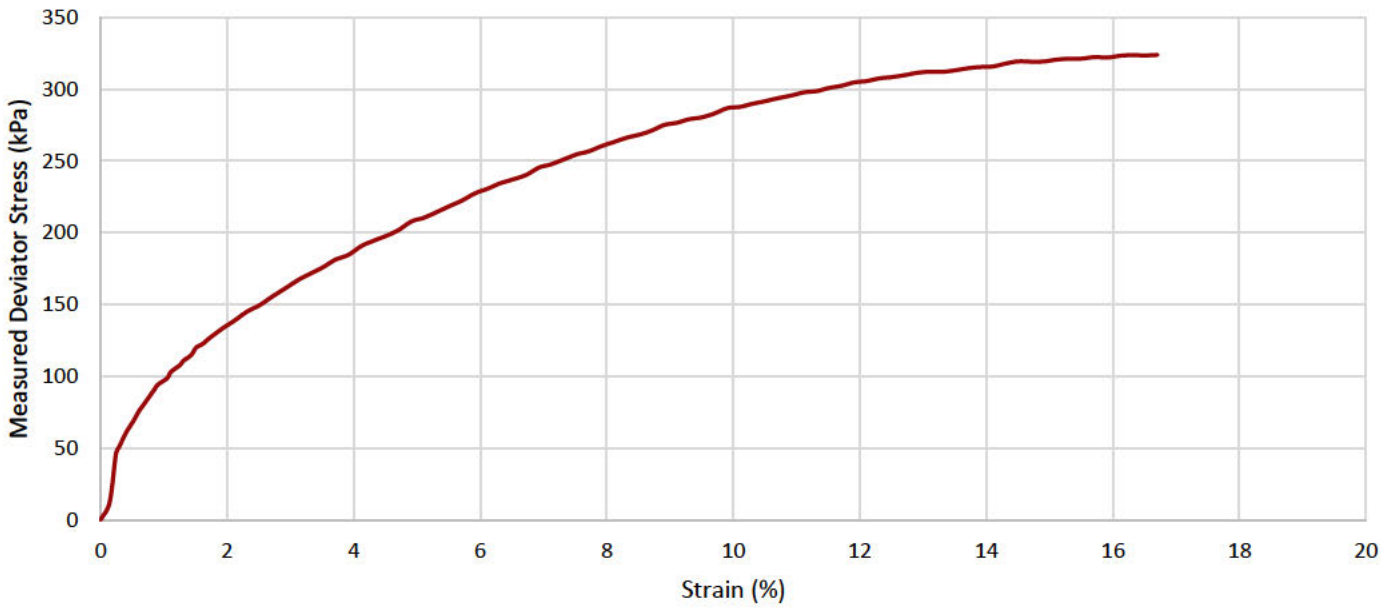
Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH1	8.00	U	4	Very stiff (very high strength) brown silty CLAY with rare pale bluish grey mottling and black staining	

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m^3)	Dry Density (Mg/m^3)
Depth of Top of Specimen (m) 8.04	198.9	103.3	3479	15.6	2.09	1.81

TEST INFORMATION Rate of Strain 1.0 % per Min | Rubber Membrane Thickness 0.3 mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	162	16.7	1.0	\	323	162		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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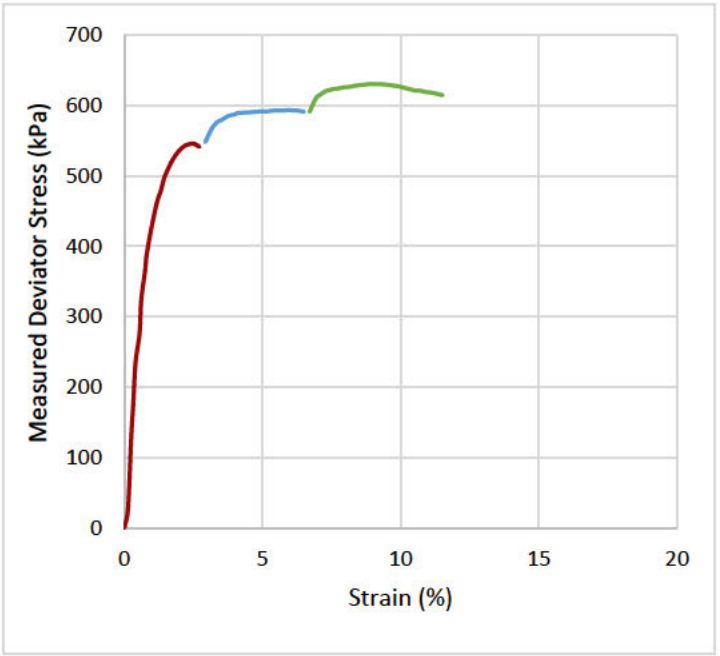
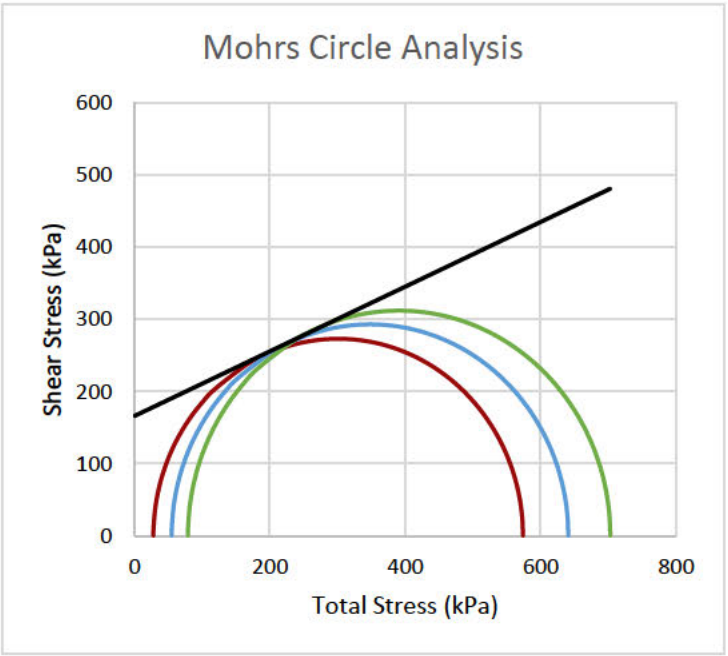
DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH3	1.20	U	1	Very stiff (very high strength) dark yellowish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium chert	

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
Depth of Top of Specimen (m) 1.30	199.7	104.2	3614	11.4	2.12	1.90

TEST INFORMATION Rate of Strain 1.8 % per Min | Rubber Membrane Thickness 0.6 mm





Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	28	2.5	0.4	/	546	273		
	55	5.9	0.9	6.6	586	293	166	24.1
	79	8.9	1.2	7.0	623	312		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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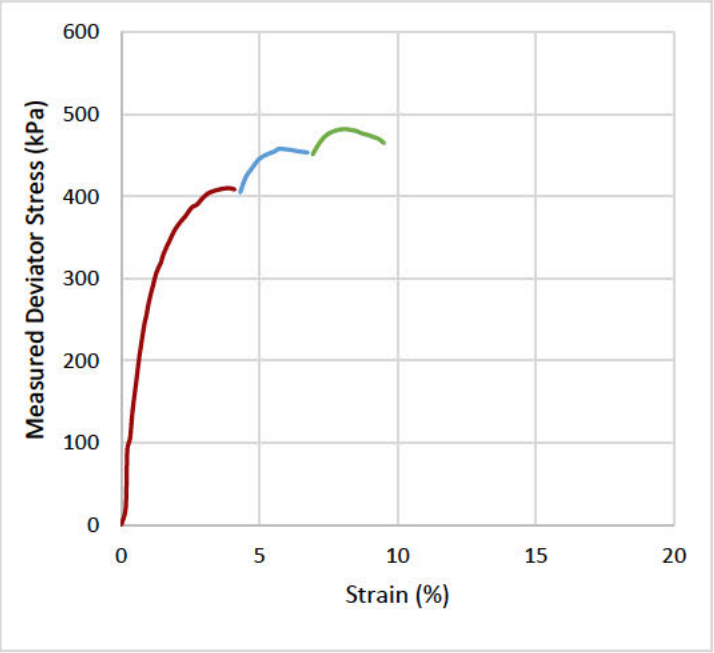
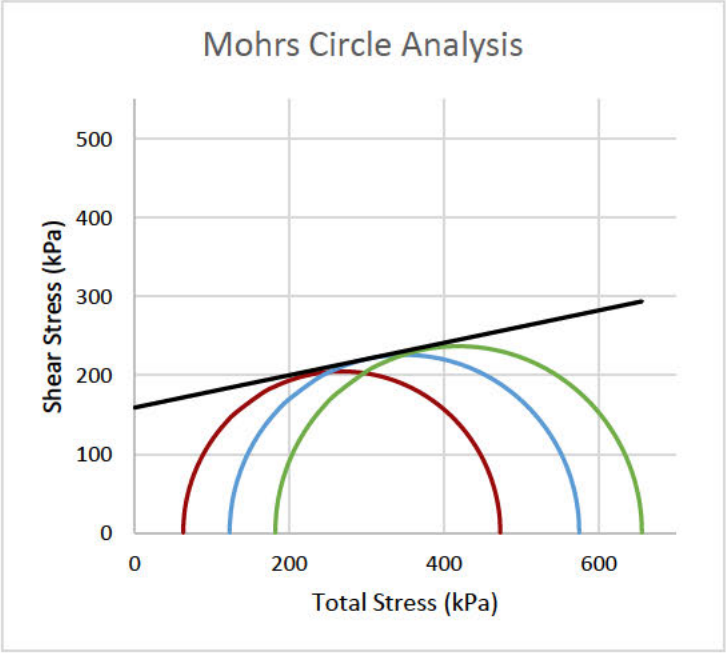
DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH3	3.00	U	2	Very stiff (very high strength) dark yellowish brown slightly gravelly slightly sandy CLAY with bluish grey mottling. Gravel is fine to coarse chert	

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m^3)	Dry Density (Mg/m^3)
Depth of Top of Specimen (m) 3.04	198.9	99.7	3209	17.4	2.07	1.76

TEST INFORMATION	Rate of Strain	1.9	% per Min	Rubber Membrane Thickness	0.6	mm





Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	63	3.9	0.6	/	409	205		
	123	5.7	0.9	5.5	452	226	159	11.6
	182	8.1	1.2	7.1	474	237		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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Contract	**UK21.5579 - North Campus East Car Park, Welwyn Garden City**
Serial No.	**39534_1**

DETERMINATION OF SATURATION MOISTURE CONTENT AND INTACT DRY DENSITY

Borehole /Pit No.	Depth (m)	Sample		Water Content (%)	Bulk Density (Mg/m^3)	Dry Density (Mg/m^3)	Saturation Moisture Content(%)	Description	Remarks
		Type	Reference						
				Specimen 1					
BH2	23.8	B	11	31.7	1.92	**1.46**	**31**	White intact CHALK fragments of coarse gravel size with occasional orange staining	Volume of test specimen less than the required 300ml.
				Specimen 2					
				28.5	1.97	**1.53**	**28**		

Method of Preparation:	BS1377: Part 1: 2016: 8
Method of Test:	BS1377: Part 2: 1990: 3.3
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J - Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	
Remarks to Include:	Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110°C.

APPENDIX K

Summary of Screening Criteria

EPS Generic Quantitative Risk Assessment

Generic Screening Criteria (C4SLs) - All Land Uses

Contaminant	Soil Targets					
	Residential		Allotments	Commercial	Public Open Spaces	
	With Home Grown Produce	Without Home Grown Produce			Residential	Parks
Unit	mg/kg					
Arsenic	37	40	49	640	79	168
Benzene	0.87	3.3	0.18	98	140	230
Benzo(a)pyrene	5	5.3	5.7	76	10	21
Cadmium	26	149	4.9	410	220	880
Chromium (VI)	21	21	170	49	23	250
Lead	200	310	80	2330	630	1300
Chloroethene (Vinyl Chloride)	0.017	0.029	0.0058	2.2	7.8	19
Trichloroethene (TCE)	0.043	0.045	0.16	3.4	79	69
Tetrachloroethene (PCE)	1.6	1.6	11	130	3400	2500

Notes:

Targets for Human Health have been taken from the publicly available Category 4 Screening Levels (C4SLs) for assessment of land affected by contamination issued by DEFRA/CL:AIRE in December 2013 and May 2021.

Within the modelling for C4SLs, a Soil Organic Matter content of 6% has been used. Reference to site-specific data should be made where possible.

The C4SLs for the contaminant benzene along with the three chlorinated solvents are the most susceptable to changes in SOM.

EPS Generic Quantitative Risk Assessment - Public Open Space (Residential)

Contaminant	Tier 1 Soil Targets			Tier 1 Groundwater Targets	
	Human Health	Controlled Waters		Controlled Waters	
		LGwRP	HGwRP	LGwRP	HGwRP
Unit	mg/kg			ug/l	
Arsenic	See C4SL	n/c	n/c	50	10
Cadmium	See C4SL	n/c	n/c	5	5
Chromium III	1500	n/c	n/c	250	50
Chromium VI	See C4SL	n/c	n/c	n/c	n/c
Copper	12000	n/c	n/c	28	28
Mercury (elemental)	16	n/c	n/c	1	1
Nickel	230	n/c	n/c	200	50
Lead	See C4SL	n/c	n/c	250	10
Selenium	1100	n/c	n/c	10	10
Zinc	81000	n/c	n/c	500	500
Benzene	See C4SL	0.252	0.008	30	1
Toluene	56000	1.17	1.17	50	50
Ethylbenzene	24000	15.0	10.0	300	200
Xylene (para)	41000	0.885	0.885	30	30
MTBE#	73	0.138	0.0276	75	15
Benzo(a)Pyrene	See C4SL	10	1.44	0.7	0.1
Naphthalene	4900f	0.934	0.02	10	0.1
Dibenz(ah)anthracene	0.57	n/c	n/c	n/c	n/c
Aliphatic C5-C6	570000(304)**	5.27	1.05	50	10
Aliphatic C6-C8	600000	23.2	4.64	50	10
Aliphatic C8-C10	13000	175	35.1	50	10
Aliphatic C10-C12	13000	1380	276	50	10
Aliphatic C12-C16	13000	27500	5490	50	10
Aliphatic C16-C35	250000f	3.46E+06	6.91E+05	50	10
Aromatic C8-C10	5000	8.74	1.75	50	10
Aromatic C10-C12	5000	13.8	2.76	50	10
Aromatic C12-C16	5100	27.5	5.5	50	10
Aromatic C16-C21	3800f	86.9	17.4	50	10
Aromatic C21-C35	3800f	690	138	50	10

Notes:

LGwRP - Low Groundwater Resource Potential HGwRP - High Groundwater Resource Potential

f = Oral, dermal and inhalation exposure compared with oral HCV N/C = Not Calculated

* = S4UL exceeds vapour saturation limit (in brackets) ** = S4UL exceeds solubility saturation limit (in brackets)

Soil Targets

Targets for Human Health have been taken from *S4ULs 'Suitable For Use Levels for Human Health Risk Assessment' – LQM and CIEH (2014)* derived using standard sandy loam soil with 1% SOM, except (#) = *EIC/AGS/CL:AIRE GAC 'Soil Generic Assessment Criteria' (2010)* . For sites where ground conditions differ significantly from sandy loam or site-specific SOM and pH are available, the generic human health targets may be revised.

Targets for Controlled waters have been derived using EA Remedial Targets Worksheet (v3.1) - using standard Sandy Loam ground conditions as described in Science Report SC050021/SR3, assuming no degradation for a 10m compliance distance with criteria of EQS or UKDWS for LGwRP and HGwRP respectively (see notes for GW targets).

Groundwater Targets

For LGwRP, targets have been taken as Freshwater EQS where available. For Ethylbenzene and BaP the WHO Health limit has been used and for MTBE and individual TPH fractions a 5 times multiplier of taste threshold and UKDWS has been taken repectively.

For HGwRP, targets have been taken as UKDWS where available, with the exception of Copper and Zinc where the EQS is lower than the DWS and therefore the EQS has been used as the groundwater target. For Ethlylbenzene the upper WHO ATO limit has been used. For Toluene and Xylene, the WHO ATO limit is higher than the EQS and so the lower value has been taken. For MTBE the taste threshold has been taken.

Work carried out to calculate generic screening criteria for concentrations of contaminant in groundwater with respect of risks to Human Health has generally found that criteria far exceed (by at least 2 orders of magnitude) those listed for the protection of either LGwRP and HGwRP receptors. On this basis, the above Groundwater criteria are also considered protective of human health and further evaluation of these risks should be considered alongside any detailed quantitative risk assessments carried out for groundwater on a site specific basis.

APPENDIX L

Cover Soil Checklist

ADVISORY NOTE

SOILS FOR USE IN COVER SYSTEMS

This note applies where there is a need for a control measure in the form of a defined thickness of clean soil to be used in gardens and soft landscaped areas in order to reduce risks from underlying contamination (a 'cover system'). Where a specific thickness has been presented, it is what EPS consider sufficient provided the soil forming the cover system is good quality, as it is assumed that over time this soil will become intermixed with the underlying soils and therefore needs to have the necessary 'dilution' effect. The aim being that an acceptable reduction in exposure to contamination is achieved, rather than absolute prevention.

These simple cover systems are designed in general accordance with the BRE 2004 guidance *'Cover Systems for Land Regeneration, Thickness of Cover Systems for Contaminated Land'*. In many cases guidance from a Local Planning Authority or NHBC/Approved Inspector may also apply and need to be taken into account. In most cases, to design the cover system EPS have to assume a certain quality of cover soils in advance. In these circumstances, we utilise what we consider to represent 'good quality soil' in that the soil could never be considered 'contaminated' but is also pragmatic and does not represent an unrealistic or unsustainable objective for much of the soils in the UK. In numerical terms, this standard typically equates to soil containing contaminants at around 25% of their adopted screening values in the risk assessment.

For the cover system itself, EPS would usually carry out a verification process of your site to demonstrate the control measure has been implemented as intended to satisfy all interested parties such as planning authorities, the NHBC and the future property owner. To document this process, EPS will prepare a Verification Report. If you wish for EPS to do this, we will need the following points confirmed relating to the soils preferably before they are installed in gardens.

If there are any queries, please contact EPS before purchasing any soil.

EPS Contact Details:

Tel: 01954 710666

Email: info@epstrategies.co.uk

Pre-Verification Cover System Checklist		Yes?
Soil Source	The soil must not be a waste. Has it been confirmed that the soil is not a waste and has never been deemed as such in the past?	
	Has the source of the soil been provided?	
	Have all the delivery notes confirming the source, volume and type of soil been provided for all that is to be used? Where suppliers such as British Sugar are used, the soils should be delivered direct to site (not via an intermediary depot).	
Soil Quality	The soils are free of invasive plant species such as Japanese Knotweed, and have not been sourced from an affected area?	
	Do the soils look clean and of a high quality? I.e. the soil must not have an odour or contain any visual evidence of contamination, including oils, asbestos, glass, plastic, rubble, metal, ash, sharp objects or tarmac/bitumen?	
	Testing to 'BS 3882:2015 *Specification for topsoil and requirements for use*' is preferable but generally not essential for public health regulation, provided you can confirm the soils comply with the above points, are suitable for their intended purpose and will provide an adequate growing medium?	
	Has the soil been chemically tested prior to it arriving at site? Any soil test results presented to EPS by a third party must be current and clearly relate to the soil used, i.e. the testing must generally be dated within 6 weeks of delivery. The quantity of testing will be dependent on how much confidence is generated in the quality of the material, as well any specific local regulatory requirements. If the soil is clean soil from an established source such as British Sugar, the testing they provide at source may be sufficient alone without further testing (by EPS). For other soils, EPS can advise on the likely testing frequencies but as a rule of thumb, anticipate at least one sample per average-sized plot. The testing would usually comprise the following: Heavy Metals, Poly Aromatic Hydrocarbons, Asbestos and Total Petroleum Hydrocarbons at an accredited lab. If adequate testing has not been completed, then EPS will need to test it from stockpiles prior to installation. Installing the soils into gardens without any testing data is not advised, as it may need to all be removed later.	
Cover Thickness	Are all excavations ready which will allow the necessary thickness of cover soils to be installed?	
	If yes, can you provide waste transfer documentation for any excavated soils?	

APPENDIX M

Method Statement for Encountering Unexpected Contamination

METHOD STATEMENT

ACTIONS TO BE TAKEN IN THE EVENT OF DISCOVERING UNEXPECTED CONTAMINATION DURING INTRUSIVE GROUNDWORKS

If at any point during intrusive groundworks at a site, evidence of unforeseen contamination is encountered in the form of significant noxious odours, discolouration, or instability within soils or sheen/ discolouration in groundwater, the following actions will be taken:

- Intrusive works in the immediate area of the impacted ground will be suspended and the continuation of work in other areas of the site will be considered within the context of the site specific health & safety plan.
- Environmental Protection Strategies Ltd (EPS) will be contacted and appraised of the situation so that arrangements can be made to characterise the impact and determine what action may be necessary in addition to the scheduled site works. Where possible / health & safety plan permits, digital photographs of the impacted ground will be taken and emailed to EPS at the address below to assist in the initial assessment
- It may well be necessary for EPS to attend site to undertake visual inspection and obtain samples for field and/or laboratory analysis, although the actions taken will be dependent on the nature of what is encountered
- In cases where EPS consider the unforeseen contamination likely to pose a significant risk of significant harm to adjacent site users or local environmental receptors, the local authority and the Environment Agency will be informed of the situation and the actions being taken
- Once appropriate action has been agreed and undertaken, a written summary will be produced by EPS for submission to the Local Authority, (and where relevant, the Environment Agency) in accordance with planning requirements. The submission will include details of work undertaken, analytical results of investigative and validation samples obtained and conclusions and recommendations for any further actions considered necessary
- Where regulatory bodies have been involved, site works should only recommence following their agreement and in all cases should only recommence when the site manager considers it safe to do so within the context of the site specific health & safety plan.

EPS Contact Details:

Marcus Bell	Associate Director	Tel: [redacted]
Will Evans	Director	Tel: [redacted]
Steve Bullock	Director	Tel: [redacted]

Email: info@epstrategies.co.uk (Automatically forwarded to the above and office-based personnel)

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