geotechnical and environmental consultants

ground&water

Phase II Site Investigation Report

2 - 6 Seagull Lane, Emsworth PO10 7QH

On behalf of Nyetimber Management Ltd

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EXECUTIVE SUMMARY	
PROPOSED DEVELOPMENT	At the time of reporting, November 2023, the proposed development was understood to comprise the demolition of the majority of the existing buildings on-site and the construction of eight new commercial units varying in size from 100-120m^2 with new access roads onto the site as well as new car parking spaces. A bin store was noted on the northern portion of the site near the proposed site entranceway. The existing office building located on the centre of the site is to remain.
GEOLOGY AND HYDROGEOLOGY	The British Geological Survey Solid and Drift Geology Map for the Emsworth area (Fareham Sheet No. 316) revealed that the site was underlain by superficial River Terrace Deposits on the western portion of the site, Head Deposits on the central and eastern portion of the site and possible alluvial deposits located on the eastern boundary/near the eastern boundary of the site with bedrock deposits of the London Clay Formation. No areas of Made Ground or Reworked Ground were noted within a 250m radius. A study of the aquifer maps on the DEFRA website revealed the site was underlain by a Secondary A Aquifer comprising the superficial River Terrace Deposits and Head Deposits, underlain by Unproductive Strata comprising bedrock deposits of the London Clay Formation. Examination of the Environment Agency records showed that the site did not fall within a Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater. The nearest surface water feature was the River Ems located ~50m east of the site and was flowing in a north to south direction. Emsworth harbour was noted 630m south of the site. From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered at shallow to moderate depths within the River Terrace Deposits/Head Deposits. Some amounts of groundwater however may be present at shallower depths within Made ground. It was considered that groundwater was flowing in an easterly direction toward the River Ems in line with local topography.
VOLUME CHANGE POTENTIAL	Foundations should be designed in accordance with soils of High-volume change potential.
FOUNDATION DESIGN	Within the area of WS1, WS2 and WS4 detailed geotechnical analysis was undertaken, with the results shown in section 6.2. Shallow Foundations across the rest of the site should be taken through any Made Ground and extend 300mm below root penetrated soils, before founding onto competent, moisture stable soils of the Head Deposits/River Terrace Deposits at depths of at least 1.00m bgl, subject to deepening based on trees or other factors, like soft zones. Foundations constructed at 1.00m bgl can be designed based on an allowable bearing capacity of 100 - 125kN/m2. This is based on trial hole records, the results of in-situ testing, inspection of samples recovered, and referral to BS 8004:2015, Code of Practice for Foundations, and based on a 5m long by 1m wide foundation

	and a maximum settlement of 25mm. Settlements on loading are likely to be moderate.
SUB-SURFACE CONCRETE	The water-soluble sulphates in the Made Ground were noted to be 19.1 – 535mg/l, with a pH of 8.32-11.1, from chemical and geotechnical laboratory testing. The total potential sulphate (3x total sulphur) was 0.1317%, from chemical laboratory testing. According to BRE Special Digest 1, 2005, 'Concrete in Aggressive Ground' a Sulphate Design Class of DS-2 could be used for sub-surface concrete in contact with the Made Ground. Table C1 of the Digest indicated an ACEC (Aggressive Chemical Environment for Concrete) classification of AC-2. The water-soluble sulphates in the Head Deposits were noted to be 194mg/l, with a pH of 8.71, from chemical laboratory testing. According to BRE Special Digest 1, 2005, 'Concrete in Aggressive Ground' a Sulphate Design Class of DS-1 could be used for sub-surface concrete in contact with the Head Deposits. Table C1 of the Digest indicated an ACEC (Aggressive Chemical Environment for Concrete) classification of AC-1. The water-soluble sulphates in the London Clay Formation were noted to be 88.9mg/l, with a pH of 9, from chemical laboratory testing. The total potential sulphate (3x total sulphur) was <0.06%, from chemical laboratory testing. According to BRE Special Digest 1, 2005, 'Concrete in Aggressive Ground' a Sulphate Design Class of DS-1 could be used for sub-surface concrete in contact with the London Clay Formation. Table C1 of the Digest indicated an ACEC (Aggressive Chemical Environment for Concrete) classification of AC-1.
CONTAMINATION AND REMEDIATION	Based on the results of the intrusive works, chemical analyses and risk assessments undertaken, the following has been identified that requires further action: • Gas protection measures are required in line with the requirements of Characteristic Situation CS2 at this stage. • It is considered that there is a risk to groundwater on site from the site. Groundwater testing and a Level 2 risk assessment should be carried out. • Basic radon protective measures are required for the report area. This can be in alignment / covered by gas and vapour measures. • For risk to water supply pipes and concrete please see relevant sections. • A specific capping system is not required for soft landscaped areas. However, a nominal capping system of 100-150mm of topsoil should be placed in soft landscaped areas as a growing medium. • Groundworkers during the construction stage will require full personal protective equipment. If any contamination is recorded during the construction phase, works should stop and the source and extent of any contamination be further investigated by a component and qualified person.

1. INTRODUCTION

1.1. General

Ground and Water Limited were instructed by Nyetimber Management Limited on the 27th June 2023 to conduct an updated Phase 2 Site Investigation on the site at 2 - 6 Seagull Lane, Emsworth PO10 7QH. The scope of the investigation was detailed within the fee proposal GW-2086 rev2, dated the 22nd June 2023.

1.2. Aims of the Investigation

The aim of this report was to supply the client and their designers with information regarding the ground conditions underlying the site to assist them in preparing an appropriate scheme for development.

The investigation was to be undertaken to provide parameters for the design of foundations by means of in-situ and laboratory geotechnical testing undertaken on soil samples recovered from trial holes.

A contamination assessment was to be undertaken following chemical laboratory testing on soil samples recovered from the site to enable recommendations for the safe redevelopment of the site and the protection of site workers, end-users and the public from any potential contamination identified.

An additional investigation and report was completed on site to determine the gas and vapour protection measures and remedial works required on site.

This Site Investigation Report must be read in conjunction with the Desk Study Report referenced GWPR5385/DS/June 2023 and the Phase 2 Site investigation report GWPR5385/SIR/June 2023.

The techniques adopted for the investigation were chosen considering the requirements of the client, anticipated ground conditions, and bearing in mind the nature of the site, limitations to site access and other logistical limitations.

1.3. Conditions and Limitations

This report has been prepared based on the terms, conditions and limitations outlined within Appendix A.

This report has superseded the previously issued report GWPR5475/August 2023.

1.4. Technical Glossary

Generic technical terms and their description can be viewed within the glossary provided within Appendix B.

2. SITE SETTING

2.1. Site Location

The site comprised a ~2,800m^2 roughly rectangular shaped plot of land, orientated in a west to east direction, along the southern side of Seagull Lane. The site was located in the northern portion of the town of Emsworth in the county of Hampshire.

The national grid reference for the centre of the site was approximately SU 74955 06184. A site location plan is given within Figure 1. The site development plan is show in figure 2 with an aerial photograph shown in figure 3.

2.2. Site Description

A Site Walkover was undertaken on the 12th May 2023. A description of the site, as noted during the Site Walkover, is tabulated below.

Site Description Sheet	
Use of site	At the time of the site walkover, 12th May 2023, the site comprised old abandoned warehouse and works buildings as well as an office building located on the central area of the site. The office was still in use.
Site topography	The site was sloping gently from the west to the east.
Area topography	The site environs were sloping gently from the west to the east.
Structures onsite	A mixture of office buildings (in use) and derelict warehouses, works and other buildings in varying states of repair across the entire site area.
Structures off-site	Residential flats and houses were noted to the north and west of the site, works buildings were noted to the east. The land directly to the south was undeveloped but residential houses and a works were also noted further to the south of the site.
Use of surrounding ground	Mainly residential land use with some areas of industrial land associated with works to the east and south of the site.
Boundary features	Northern Boundary: Seagull Lane with residential houses beyond. Eastern Boundary: Brick wall with works buildings beyond. Southern Boundary: Brick wall with undeveloped land directly to the south of the south. Western Boundary: Brick wall with residential houses beyond.
Site covering	The majority of the site was covered with concrete hardstanding, in some areas bushes and grass had grown in cracks of the concrete hardstanding or in corners of the site close to certain buildings.
Contamination sources onsite	An oil interceptor was noted on the south-east corner of the site. General industrial setting including fly tipped material across the western portion of the site.
Contamination sources off-site	Works buildings were noted to the east of the site. The undeveloped land to the south of the site had old foundations for a gas holder.
Vegetation onsite	Vegetation was limited on site to small buses, weeds and small patches of grass which was overgrown and coming from cracks in the concrete hardstanding and around derelict buildings.
Vegetation off-site	Mature trees were noted to the north-east of the site. Semi-mature trees and shrubs were noted along the northern and southern boundary walls.
Services	Oil Interceptor was noted in the south-east corner of the site. Electricity and gas was noted going into the office building in the centre of the site, Electricity and water was noted to be underneath the eastern portion of the site.

2.3. Proposed Development

At the time of reporting, November 2023, the proposed development was understood to comprise the demolition of the majority of the existing buildings on-site and the construction of eight new commercial units varying in size from 100-120m^2 with new access roads onto the site as well as new

car parking spaces. A bin store was noted on the northern portion of the site near the proposed site entranceway. The existing office building located on the centre of the site is to remain.

The proposed development plan can be seen within Figures 4-8.

2.4. Geology

The British Geological Survey Solid and Drift Geology Map for the Emsworth area (Fareham Sheet No. 316) revealed that the site was underlain by superficial River Terrace Deposits on the western portion of the site, Head Deposits on the central and eastern portion of the site and possible alluvial deposits located on the eastern boundary/near the eastern boundary of the site with bedrock deposits of the London Clay Formation. No areas of Made Ground or Reworked Ground were noted within a 250m radius.

Superficial deposits (Drift) are the youngest geological deposits formed during the most recent period of geological time. They rest on older deposits or rocks referred to as bedrock (Solid), which are the main mass forming the Earth. Bedrock is present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

River Terrace Deposits

The rivers of the south-east of England, including the River Thames and its tributaries, have been subject to at least three changes of level since Pleistocene times. One result has been the formation of a complex series of River Terrace Gravels. These terraces represent ancient floodplain deposits that became isolated as the river cut downwards to lower levels. The Lower River Terraces are numbered one to four, the lowest and most recent being number one. The composition of the River Terrace Gravel varies greatly, depending on the source material available in the river's catchment. Deposits generally consist of sand and gravel of roughly bedded flint or chert commonly in a matrix of silt and

Head Deposits

The majority of Head Deposits are clay-dominated, derived from the London Clay. Generally, less than 2m thick, they probably accumulated in shallow mudslides of softened brecciated bedrock in the active layer. They consist of soft, ochreous brown silty clay with blue-grey mottling in places and angular, frost-shattered fragments of flint occur sporadically throughout. At the base of these deposits and interbedded in places, there is a bed of pebbly clay, generally less than 0.2m thick, with well-rounded flint pebbles derived from nearby outcrops of 'high level' gravel such as Stanmore Gravel.

Alluvium

Most small streams in the region are bordered by narrow alluvial strips. The alluvial sequences of small streams in the district are variable in detail but typically consist of up to 1.5m of clayey sands and silty clays, locally with scattered flints, resting on up to 1.5m of flint gravel.

London Clay Formation

The London Clay Formation comprises stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. Crystals of Gypsum (Selenite) are often found within the weathered part of the London Clay Formation, and precautions against sulphate attack to concrete are sometimes required. The lowest

part of the formation is a sandy bed with black rounded gravel and occasional layers of sandstone and is known as the Basement Bed.

A BGS borehole (SU70NE/100) located ~90m north-east of the site revealed a 0.15m capping of Topsoil over a clayey Sand and Gravel (potential Made Ground) down to 0.30m bgl. From 0.30-0.80m a soft to firm light to dark brown organic Clay, with a very soft organic peaty Clay to 1.00m bgl. A light grey Clay was recorded below to 1.90m with a loose flint gravel below to 2.20m. From 2.20-6.00m (base of the borehole) a stiff dark grey fissured silty Clay with thin partings of silt and fine sand. Groundwater was noted at 1.10m bgl.

2.5. Hydrogeology and Hydrology

A study of the aquifer maps on the DEFRA website revealed the site was underlain by a **Secondary A Aquifer** comprising the superficial River Terrace Deposits and Head Deposits, underlain by **Unproductive Strata** comprising bedrock deposits of the London Clay Formation.

Examination of the Environment Agency records showed that the site **did not** fall within a Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater.

The nearest surface water feature was the River Ems located ~50m east of the site and was flowing in a north to south direction. Emsworth harbour was noted 630m south of the site.

From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered at shallow to moderate depths within the River Terrace Deposits/Head Deposits. Some amounts of groundwater however may be present at shallower depths within Made ground. It was considered that groundwater was flowing in an easterly direction toward the River Ems in line with local topography.

Examination of the Environment Agency records showed that the site was located within a Flood Zone 1, i.e. an area with a low probability of fluvial/coastal flooding.

The datasheets also revealed the eastern portion of the site was at high risk of groundwater flooding, while the central and western portions had a moderate to moderate to high risk.

2.6. Radon

A review of the freely available UK Health Security Agency radon database, UK Radon, indicated that the site was located within a 1km grid square, where the maximum radon potential of 5 – 10% was recorded. Radon protection measures are required in areas where more than 3% of houses are at or above the Action Level.

The site was in an area where a risk assessment was required.

The UKHSA advises that radon gas should be measured in all properties within radon Affected Areas and that homes with radon levels at or above the Action Level (200 Bq m-3) should be remediated. Householders with levels between the Target Level (100 Bq m-3) and Action Level should seriously consider reducing their radon level, especially if they are at greater risk, such as if they are current or ex smokers. Whether or not a home is in fact above or below the Action Level or Target Level can only be established by having the building tested.

Based on the report, the property is in a radon affected area where 5 to 10% of homes are estimated to be at or above the action level.

Basic radon protective measures are required for the report area.

The BGS Radon report can be viewed in Appendix I.

2.7. Internet Search (Site Setting)

2.7.1. Available Unexploded Ordnance (UXO) Map Review

A review of the data available on www.zeticauxo.com/ revealed the site was located within a moderate-risk area associated with unexploded ordnance (UXO), as indicated by having 15 – 49 bombs dropped per 1000 acres.

2.7.2. Historical Landfill Tool Review

A review of the data available on www.groundsure.io/ revealed no areas of Historical or authorised Landfilling within a 500m radius of the site.

2.8. Preliminary Risk Assessment

The tabulated Conceptual Site Model developed as part of the Ground and Water Ltd Desk Study (GWPR5385/DS/June 2023) is outlined overleaf. For ease of reference and understanding, the risks have been classified within this risk assessment against four possible levels / categories, summarised in the table below. Any risk deemed to be negligible within the Preliminary Risk Assessment have been excluded from this report.

Risk Categories used in the Tabulated CSM	
Low Risk	Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is not considered to be an unacceptable risk to receptors. However, it is considered that further investigation to confirm this is recommended.
Moderate Risk	Regarding this potential SPR linkage, the site may not be suitable for the proposed end-use in its current condition and there may be an unacceptable risk to receptors. Further investigation is required to confirm this.
High Risk	Regarding this potential SPR linkage, the site is probably or certainly not suitable for proposed end-use and there is likely to be an unacceptable risk to receptors. Contaminants probably or certainly present and urgent action required in the short term.

Tabulated Conceptual Site Model – Pollutant Linkage Summary (On-Site Sources)			
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Made Ground from construction/ demolition activities, gas works, unspecified tanks, works, garage site: • Asbestos, • PAHs, • TPHs, • VOCs, • Sulphates, and • Metals.	• Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Inhalation of dust (indoors and outdoors) with elevated concentration of determinands • Direct ingestion of groundwater • Inhalation of volatile vapour (indoors and outdoors)	**Human Health** • End Users (Future site visitors) • Construction workers during development • Site operatives during maintenance works • Neighbours and public	**Moderate**
	• Direct uptake of groundwater • Direct uptake of determinands in the soil	**Flora and Fauna** • Vegetation within soft landscaped areas	**Moderate**
	• Anthropogenic (man-made) pathways • Vertical and lateral migration in permeable strata • Surface water runoff	**Controlled Waters** • Secondary A Aquifer (Head Deposits and River Terrace Deposits) • River Ems	**Moderate**
Electricity Sub-Station PCB oils and other cable/transformer oils	• Migration through anthropogenic & natural pathways	**Human Health** End Users (Residents/Future site visitors)	**Low**
Aggressive ground conditions with Made Ground and natural ground, including groundwater: • Sulphates, • PAH/TPH.	• Direct contact with aggressive ground conditions	**Building Materials and Services** • Buried Concrete • Underground services (water pipes)	**Moderate**
Ground gases generated by Made Ground, gas works and industrial land: • Methane, • Carbon Dioxide, • Hydrogen Sulphide, and • Carbon Monoxide.	• Migration through anthropogenic & natural pathways • Inhalation of Asphyxiating gases • Explosion (methane only)	**Human Health** • End Users (Future site visitors) • Construction workers during development (especially in confined spaces) • Site operatives during maintenance works in confined spaces • Neighbours and public	**Moderate**
	• Migration through anthropogenic & natural pathways • Explosion (methane only)	**Building Materials and Services** • Buildings • Confined spaces • Underground services	**Low**
Radon	• Inhalation	**Human Health**	**Moderate**

		• End Users (Future site visitors) • Construction workers during development (especially in confined spaces) • Site operatives during maintenance works in confined spaces • Neighbours and public	

Tabulated Conceptual Site Model – Pollutant Linkage Summary (Off-Site Sources)			
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Made Ground from nearby works, Gas works: • Asbestos, • PAHs, • TPHs, • VOCs, • Sulphates, and • Metals.	• Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Inhalation of dust (indoors and outdoors) with elevated concentration of determinands • Direct ingestion of groundwater • Inhalation of volatile vapour (indoors and outdoors)	**Human Health** • End Users (Future site visitors) • Construction workers during development • Site operatives during maintenance works	**Moderate**
	• Direct uptake of groundwater	**Flora and Fauna** • Vegetation within soft landscaped areas	**Moderate**
Aggressive ground conditions associated with impacted groundwater; • Sulphates, • PAH/TPH.	• Direct contact with aggressive ground conditions	**Building Materials and Services** • Buried Concrete • Underground services (water pipes)	**Low**
Ground gases generated by Made Ground, gas works and other industrial land: • Methane, • Carbon Dioxide, • Hydrogen Sulphide, and • Carbon Monoxide.	• Migration through anthropogenic & natural pathways • Inhalation of Asphyxiating gases • Explosion (methane only)	**Human Health** • End Users (Future site visitors) • Construction workers during development (especially in confined spaces) • Site operatives during maintenance works in confined spaces	**Moderate**
	• Migration through anthropogenic & natural pathways • Explosion (methane only)	**Building Materials and Services** • Buildings • Confined spaces • Underground services	**Low**

3. SITE WORKS

3.1. Scope of Works

Site works were undertaken on 15th May 2023 and comprised the drilling of 5No. Windowless Sampler Boreholes (WS1-WS5) to a depth of 5.00m bgl. Standard Penetration Tests were carried out at 1.00m intervals within the boreholes. A combined ground-gas/groundwater monitoring standpipe, with an internal diameter of 50mm, was installed to depths of between 3.50-5.00m bgl within WS1, WS3 and WS5, with a response zone between 1.00 – 5.00m bgl. The installation details can be viewed within the table below.

Combined Ground-gas and Groundwater Monitoring Well Construction					
Trial Hole	Depth of Installation (m bgl)	Thickness of slotted piping with gravel filter pack (m)	Depth of plain piping with bentonite seal (m bgl)	Response Zone (m bgl)	Piping internal diameter (mm)
WS1	3.50	2.50	1.00	1.00 – 3.50	50
WS3	4.50	3.50	1.00	1.00 – 4.50	50
WS5	5.00	4.00	1.00	1.00 – 5.00	50

The location of the trial hole locations can be seen within Figure 9.

Prior to commencing the ground investigation, a walkover survey was carried out to identify the presence of underground services and drainage. Where underground services/drainage were suspected and/or positively identified, the exploratory position was relocated away from these areas.

As a further precautionary measure, the borehole was hand excavated to 1.20m below the local ground level (bgl) and scanned with a Cable Avoidance Tool (CAT scanner) to minimise the risk to services.

Upon completion of the drilling works, the trial holes were backfilled and made good, in relation to the surrounding area.

3.2. Sampling Procedures

Small disturbed samples and environmental samples were recovered from the trial holes at the depths shown on the trial hole records. Soil samples were generally retrieved from each change of strata and/or at specific areas of concern. Samples were also taken at approximately 0.5m intervals during broad homogenous soil horizons.

A selection of samples were despatched to a laboratory for both geotechnical and chemical testing purposes.

4. ENCOUNTERED GROUND CONDITIONS

4.1. Soil Conditions

The trial holes were logged by a Ground and Water Limited representative, generally in accordance with BS EN 14688 'Geotechnical Investigation and Testing – Identification and Classification of Soil'.

The ground conditions encountered within the trial holes constructed on the site did generally conform to that anticipated from examination of the geology map. A capping of Made Ground was noted to overlie the superficial Head Deposits and River Terrace Deposits and the bedrock London Clay Formation.

The succession of conditions and description of soils encountered in the trial holes in descending order is tabulated below.

Summary of Strata Encountered (BH01 – BH02)			
Strata	**Top Depth (m bgl)**	**Base Depth (m bgl)**	**Thickness (m)**
MADE GROUND: Concrete	GL	0.10-0.30	0.10-0.30
MADE GROUND: Dark brown black slightly sandy gravelly CLAY/ gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse sub-angular to sub-rounded flint, glass, Ash, brick and concrete. Strong hydrocarbon odour in WS1 and WS5. To see the percentage of various fragments within the Made Ground, please refer to logs found within Appendix D.	0.10-0.30	1.00 – 1.60	0.80 – 1.45
HEAD DEPOSITS (WS1, WS2, WS4, WS5): Light brown very sandy gravelly CLAY/ sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse sub-angular to sub-rounded flint.	1.00 – 1.60	2.20->5.00	1.10->4.00
RIVER TERRACE DEPOSITS (WS3 Only): Brown, grey, orange, slightly gravelly CLAY. Gravel is fine to coarse sub-angular to sub-rounded flint.	1.10	2.50	1.40
LONDON CLAY FORMATION: Mottled grey, brown, slightly gravelly CLAY with selenite crystals. Gravel is fine sub-angular to sub-rounded flint.	2.20-3.40	>5.00	>1.60 – >2.80

For details of the composition of the soils encountered at particular points, reference must be made to the individual trial hole logs within Appendix D of this report. A trial hole location plan can also be viewed within Figure 9.

4.2. Roots Encountered

Fresh Roots were noted to a proved depth of 1.50m bgl within WS5.

Decayed roots were noted to a proved depth of 3.00m bgl within WS3 and WS4. These roots were interpreted as being decayed/dead and were therefore not likely to be uptaking moisture from the soils on-site; therefore these roots were not anticipated to cause the shrinking/swelling of soils of volume change potential and did not pose a risk to the serviceability of foundations.

A summary of the depth of root penetration can be viewed below.

Root Depth		
Trial Hole	**Fresh Root Penetration (m bgl)**	**Decayed Root Penetration (m bgl)**
WS1	None	None
WS2	None	None
WS3	None	3.00
WS4	-	3.00
WS5	1.50	-

It must be noted that the chance of determining actual depth of root penetration through a narrow diameter borehole is low. Roots may be found to greater depths at other locations on the site, particularly close to trees and/or trees that have been removed both within the site and its close environs.

4.3. Groundwater Conditions

Groundwater strikes were noted between 0.70-1.23m bgl within WS1, WS3-WS5. It should be noted that groundwater strikes may be obscured by the drilling/excavation process. A summary of the groundwater observations during site works has been provided below.

Groundwater Depth	
Trial Hole	**Groundwater Depth (m bgl)**
WS1	0.90
WS2	None
WS3	1.23
WS4	0.70
WS5	1.12

Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. The investigation was undertaken in May 2023 when groundwater levels are likely to be falling from their annual maximum (highest elevation). Exact groundwater levels may only be determined through long term measurements from monitoring wells installed on-site.

Groundwater monitoring was undertaken on two occasions to date. The results can be seen tabulated below.

Groundwater Observations			
Date	**Trial Hole**	**Water Level**	**Final Well Depth**
26/05/2023	WS1	0.60	3.50
	WS3	0.50	4.40
	WS5	0.30	4.60
08/06/2023	WS1	0.70	3.40
	WS3	0.90	4.40
	WS5	0.40	4.60

4.4. Obstructions

No artificial or natural sub-surface obstructions were noted during construction of the trial holes.

5. IN-SITU AND LABORATORY TESTING

5.1. In-situ Strength Testing

Standard Penetration Tests (SPTs) were undertaken as part of the site investigation. The results of the SPT's have not been amended to consider hammer efficiency, rod lengths and overburden pressure in accordance with Eurocode 7. The test results are presented on the borehole logs within Appendix D. An interpretation of the in-situ geotechnical testing results is given in the table below.

Interpretation of In-situ Geotechnical Testing Results					
Strata	**SPT "N" Blow Counts and Equivalent SPT "N Value from DP**	**Equivalent Undrained Shear Strength (Cu) (kPa) (Stroud (1974))**	**Soil Type**		**Trial Hole/s**
			Granular (Density)	**Cohesive (Cu)**	
Head Deposits (Soft Spots)	4-6	20-	-	Low Cu	WS4/1.00-1.45 WS5/1.00-1.45
River Terrace Deposits (Cohesive)	19-29	95-145	-	High Cu	WS3/1.00 – 2.45
Head Deposits (Cohesive)	10	50		Medium Cu	WS5/2.00 – 2.45
	8-15	40-75	-	Medium Cu	WS2/1.00 – 5.45
	10	50	-	Medium Cu	WS5/2.00 – 2.45
London Clay Formation (Cohesive) (Soft Spots)	7	35	-	Low Cu	WS5/4.00-4.45
London Clay Formation (Cohesive)	11-12	55-60		Medium Cu	WS1/4.00 – 5.45
	11-18	55-90	-	Medium to High Cu	WS3/3.00 – 5.45
	10-11	50-55	-	Medium Cu	WS4/2.00-5.45
	9	45	-	Medium Cu	WS5/3.00-3.45 WS5/5.00-5.45

It must be noted that field measurements of undrained shear strength (Cu) are dependent on a number of variables including disturbance of sample, method of investigation and also the size of specimen or test zone.

5.2. Geotechnical Laboratory Testing

A programme of geotechnical laboratory testing, scheduled by Ground and Water Limited and carried out by an accredited geotechnical testing laboratory was undertaken on samples recovered. Details of the specific tests used in each case are given below.

Standard Methodology for Laboratory Geotechnical Testing		
Test	**Standard**	**Number of Tests**
Atterberg Limit Tests	BS1377:2016:Part 2:Clauses 3.2, 4.3 & 5	7
Particle Size Distribution Tests	BS1377:2016:Part 2:Clause 9	1
Water Soluble Sulphate and pH Test	BS1377:2018:Part 3:Clause 5	1
BRE Special Digest 1 Tests	BRE Special Digest 1 "Concrete in Aggressive Ground (BRE, 2005).	2

5.2.1. Atterberg Limit Testing

A précis of Atterberg limit testing undertaken can be seen tabulated below. The test results are presented within Appendix E.

Atterberg Limit Tests Results Summary							
Stratum	**Moisture Content (%)**	**Passing 425 µm sieve (%)**	**Modified PI (%)**	**Soil Class**	**Consistency Index (Ic)**	**Volume Change Potential**	
						BRE	**NHBC**
Head Deposits	14-31	56-100	16.24-44.00	CI-CH and MI	Firm to Very Stiff	Low to High	Low to High
River Terrace Deposits	20	100	28.00	CI	Stiff	Medium	Medium
London Clay Formation	29-31	100	33.00-44.00	CI-CH	Firm to Stiff	Medium to High	Medium to High

- **NP – Non-plastic**
- **BRE Volume Change Potential refers to BRE Digest 240 (based on Atterberg results)**
- **Soil Classification based on British Soil Classification System.**
- **Consistency Index (Ic) based on BS EN IS0 14688-2:2018.**

5.2.2. Moisture Deficit Assessment

The results of the Atterberg Limit tests were analysed to determine the Liquidity Index of the samples, to give an indication as to whether the samples recovered showed a moisture deficit as well assessing their degree of consolidation. Liquid Limit analyses was undertaken to assess whether there were any potentially significant moisture deficits within the samples tested.

A potential moisture deficit, caused by lithology, was noted within WS2 at 1.50m bgl and WS4/1.50m bgl.

5.2.3. Particle Size Distribution Testing

The results of particle size distribution (PSD) testing undertaken show that the sample at 2.00m within WS1 has volume change potential in accordance with BRE240 but not with NHBC Standards Chapter 4.2. The results of the PSD testing can be viewed within Appendix E, and summarised below.

Particle Size Distribution Results Summary			
Stratum	**Range Passing 63µm Sieve (%)**	**Volume Change Potential**	
		BRE	**NHBC**
Head Deposits (WS1/2.00m)	19	Yes	No

- **Volume Change Potential refers to BRE Digest 240 (based on Grading test results).**
- **Shrinkability refers to NHBC Standards Chapter 4.2 (based on Grading test results).**
- **BRE 240 states that a soil has a volume change potential when the clay fraction exceeds 15%. Only the silt and clay combined fraction are determined by sieving therefore the volume change potential is estimated from the percentage passing the 63µm sieve.**
- **NHBC Standards Chapter 4.2 states that a soil is shrinkable if the percentage of silt and clay passing the 63µm sieve is greater than 35% and the Plasticity Index is greater than 10%.**

6. ENGINEERING CONSIDERATIONS

6.1. Soil Characteristics and Foundation Considerations

A summary of the soil characteristics following the intrusive site investigation and laboratory testing and the relevant foundation considerations has been provided below. The following information from the ground investigation was considered pertinent to the design of foundations.

- Foundations should be taken through any Made Ground and either into, or onto a suitable underlying natural stratum of adequate bearing characteristics.
- Foundations should be designed in accordance with soils of high-volume change potential. A single design VCP is proposed.
- Given the presence of cohesive soils at shallow depth, special foundation precautions may be required to prevent possible future shrinkage/swelling of the soils affecting the integrity of the faces of foundations (underfloor void diameter/compressible material/void formers etc.). A compressible layer must be provided to accommodate potential seasonal movement.
- The loads of proposed foundations should not exceed the allowable bearing capacity of the soils they are founding upon.
- If soft spots are encountered, they should be bypassed.
- Care should be taken not to overdig foundations as this may stress underlying soft spots, should they be present.
- Foundations must not be placed within fresh root penetrated and/or desiccated soils with volume change potential. It is recommended that foundations are taken at least 300mm into non-fresh root penetrated strata if the soils have volume change potential, or into soils of no volume change potential.
- The influence of trees on or surrounding the site will need to be taken into account in final design.
- Any water ingress must be prevented from entering foundation trenches and excavations must be kept dry and either concreted or blinded as soon after excavation as possible. If water were allowed to accumulate within the excavation for even a short period of time, an increase in heave occur. The shear strength will also be reduced, resulting in lower bearing capacities, resulting in increased settlements. Instability issues may arise within the foundation trenches, in case of perched water being present.

6.2. Shallow Foundations

Based on the previous section, foundations should bypass any Made Ground/Topsoil and soft spots/loose granular soils, before extending 300mm below the proved depth of root penetration. Foundations would therefore be constructed on competent, moisture stable soils of the Head Deposits/River Terrace Deposits/London Clay Formation. A tabulated summary showing the minimum foundation depth based on each trial hole can be viewed below.

Summary of Minimum Foundation Depths			
Trial Hole	**Minimum Foundation Depth (m bgl)**	**Founding Geological Formation**	**Reason**
WS1	1.60	Cohesive Head Deposits	Foundations should bypass Made Ground/Topsoil before founding on competent soils at a moisture stable depth.
WS2	1.10	Cohesive Head Deposits	Foundations should bypass Made Ground/Topsoil before founding on competent soils at a moisture stable depth, also taking into consideration the volume change of the soils.
WS3	1.10	Cohesive River Terrace Deposits	Foundations should bypass Made Ground/Topsoil before founding on competent soils at a moisture stable depth, also taking into consideration the volume change of the soils. Decayed roots were noted at 3.00m bgl but no significant trees were noted on this part of the site and the risk of shrinking and swelling within the soils is considered to be low.
WS4	2.00	Cohesive Head Deposits/London Clay Formation	Foundations should bypass Made Ground/Topsoil and the soft spot at 1.00m bgl, before founding on competent soils at a moisture stable depth. Decayed roots were noted at 3.00m bgl but no significant trees were noted on this part of the site and the risk of shrinking and swelling within the soils is considered to be low.
WS5	2.00	Cohesive Head Deposits	Foundations should bypass Made Ground/Topsoil and the soft spot at 1.00m bgl, before founding on competent soils at a moisture stable depth.

The following allowable bearing capacities and load induced settlements were anticipated for foundations at varying depths across the site, based on the soil profiles within WS1, WS2 and WS4.

Allowable Bearing Capacities Calculated				
Foundation Depth (m bgl)	**Foundation Type**	**Limit State**	**Serviceability State**	
		Allowable Bearing Capacity (kN/m²)	**Load (kN/m²)**	**Settlement (mm)**
1.60 (WS1)	5.00m long by 0.75m wide strip foundation	105.59	100	13.3
	5.00m long by 1.00m wide strip foundation	107.56	100	16.45
	1.50m square pad foundation	122.35	115	17.29
1.10 (WS2)	5.00m long by 0.75m wide strip foundation	137.1	130	19.49
	5.00m long by 1.00m wide strip foundation	134.86	130	23.23
	1.50m square pad foundation	149.11	145	23.13
2.00 (WS4)	5.00m long by 0.75m wide strip foundation	107.39	100	12.44
	5.00m long by 1.00m wide strip foundation	108.32	100	14.97
	1.50m square pad foundation	121.76	115	13.62

Shallow Foundations across the rest of the site should be taken through any Made Ground and extend 300mm below root penetrated soils, before founding onto competent, moisture stable soils of the Head Deposits/River Terrace Deposits at depths of at least 1.00m bgl, subject to deepening based on trees or other factors, like soft zones.

Foundations constructed at 1.00m bgl can be designed based on an allowable bearing capacity of 100 - 125kN/m^2. This is based on trial hole records, the results of in-situ testing, inspection of samples

recovered, and referral to BS 8004:2015, Code of Practice for Foundations, and based on a 5m long by 1m wide foundation and a maximum settlement of 25mm. Settlements on loading are likely to be moderate.

Additional Comments
A number of comments and recommendations has been provided below.

- It is prudent to avoid having a foundation spanning across materials of different consistency, like clay and gravel, in order to avoid potential differential settlements. If unavoidable, foundations must be reinforced to allow for such potential differential movement. It should be noted that differential settlement may also occur between strip and isolated pad foundations.
- Foundation excavations must be carefully bottomed out and any loose soil or soft spots removed prior to the foundation concrete or blinding being placed. Failure to ensure that foundation excavations are suitably bottomed out could result in additional settlements.
- Inspection of foundation excavations, prior to concreting, must be made by a competent and suitably qualified person to check for soft spots and to check for the presence of roots.
- Foundations must not be cast over foundations of former structures and/or other hard spots.
- Given soils of volume change potential were encountered and Made Ground was noted to be deeper than 0.60m bgl, a suspended slab is recommended.
- Isolated Pad Foundations must be at least 1.5 times the width of the widest pad apart to keep to the anticipated settlements.
- Final designs for the foundations should be carried out by a suitably qualified Engineer based on the findings of this investigation and with reference to the anticipated loadings, serviceability requirements for the structure and the developments proximity to former, present, and proposed trees. Where trees are mentioned in the text this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

6.3. Piled Foundation

Based on the results of the intrusive investigation, a piled foundation scheme was unlikely to be required.

6.4. Excavations and Stability

Shallow excavations in the Made Ground and Head Deposits/River Terrace Deposits are likely to be marginally stable at best. Long, deep excavations, through these strata and into the underlying London Clay Formation are likely to become unstable.

Unsupported earth faces formed during excavation may be liable to collapse without warning and suitable safety precautions should therefore be taken to ensure that such earth faces are adequately supported before excavations are entered by personnel.

6.5. Sub-Surface Concrete Design

Concrete to be placed in contact with soil or groundwater must be designed in accordance with the recommendations of Building Research Establishment Special Digest 1, 2005, *'Concrete in Aggressive*

Ground' considering the pH of the soils. For the classification given below, the "mobile" and "brownfield" case was adopted given the geology encountered and the existing use of the site. This assessment was based on the results of laboratory testing summarised within Section 5, specifically relating to sulphates, pH and other water soluble chemicals.

Made Ground

The water-soluble sulphates in the Made Ground were noted to be 19.1 – 535mg/l, with a pH of 8.32-11.1, from chemical and geotechnical laboratory testing. The total potential sulphate (3x total sulphur) was 0.1317%, from chemical laboratory testing.

According to BRE Special Digest 1, 2005, 'Concrete in Aggressive Ground' a Sulphate Design Class of DS-2 could be used for sub-surface concrete in contact with the Made Ground. Table C1 of the Digest indicated an ACEC (Aggressive Chemical Environment for Concrete) classification of AC-2.

Head Deposits

The water-soluble sulphates in the Head Deposits were noted to be 194mg/l, with a pH of 8.71, from chemical laboratory testing.

According to BRE Special Digest 1, 2005, 'Concrete in Aggressive Ground' a Sulphate Design Class of DS-1 could be used for sub-surface concrete in contact with the Head Deposits. Table C1 of the Digest indicated an ACEC (Aggressive Chemical Environment for Concrete) classification of AC-1.

London Clay Formation

The water-soluble sulphates in the London Clay Formation were noted to be 88.9mg/l, with a pH of 9, from chemical laboratory testing. The total potential sulphate (3x total sulphur) was <0.06%, from chemical laboratory testing.

According to BRE Special Digest 1, 2005, 'Concrete in Aggressive Ground' a Sulphate Design Class of DS-1 could be used for sub-surface concrete in contact with the London Clay Formation. Table C1 of the Digest indicated an ACEC (Aggressive Chemical Environment for Concrete) classification of AC-1.

It is prudent to note that pyrite nodules may be present within the London Clay Formation. Pyrite can oxidise to gypsum and this normally only occurs in the upper weathered layer, but excavation allows faster oxidation and water-soluble sulphate values can rapidly increase during construction. Therefore, rising sulphate values should be considered should ferruginous staining/pyrite nodules be encountered within the London Clay Formation.

6.6. Roads and Hardstanding Design

This section provides information relating to the construction of roads and hardstanding, for each strata encountered.

6.6.1. Anticipated CBR Values and Frost Susceptibility

Made Ground

Where roads and hardstanding are to be founded on Made Ground, a CBR value of 1% should be adopted, as a result of the variable nature of Made Ground in terms of consistency, strength and compressibility.

River Terrace Deposits -Cohesive

Roads and hardstanding constructed on the cohesive River Terrace Deposits should be designed based on a CBR value of 4.0%. This is based on reference to Table C1 of TRL1132 and average construction conditions. Based on wet conditions a CBR of 2.5% should be adopted, with dry conditions a CBR of 4.5% being applicable. These clay-based soils (poorly drained) with plasticity indexes generally greater 20% are likely to be non-frost susceptible. Due to their granular content however, they should be treated as frost susceptible in design.

Head Deposits -Cohesive

Roads and hardstanding constructed on the cohesive Head Deposits should be designed based on a CBR value of 4.0%. This is based on reference to Table C1 of TRL1132 and average construction conditions. Based on wet conditions a CBR of 2.5% should be adopted, with dry conditions a CBR of 4.5% being applicable. The Head Deposits samples that were tested had very low plasticity index values and were a mixture of granular/cohesive bands and therefore should be treated as frost susceptible.

6.7. Surface Water Disposal

Soakaway testing in accordance with BRE365 was beyond the scope of this investigation.

It was noted that groundwater levels were high during both the site works and during the groundwater monitoring visits. It is envisaged therefore that soakaways on site are unlikely to work due to the high groundwater levels.

Any soakaways should be located sufficiently away from buildings and infrastructure, in order to prevent undermining of foundations.

The submission of a Sustainable Urban Drainage Scheme (SUDS) is unlikely to be required for this site due to the proposed development remaining the same or decreasing the amounts of hardstanding.

Consultation with the Environment Agency must be sought regarding any use that may have an impact on groundwater resources, abstractions and surface water features/watercourses.

7. CONTAMINATION RISK ASSESSMENT

7.1. Results of the Preliminary Risk Assessment

The tabulated Conceptual Site Model (CSM) developed by the Ground and Water Desk Study (ref. GWPR5385/DS/June 2023) is reproduced in section 2.8. For the complete information please see the Desk Study report.

No additional source of contamination, pathway or receptor was identified between the desk study and the ground investigation and as such, it was not necessary to modify the CSM.

In the UK, the assessment of risk from contamination follows the source-pathway-receptor (SPR) approach. For a risk to be present there must be a source of contamination, a receptor or receptors, and a pathway for contaminants to migrate or be absorbed. If there is a linkage between any given source and receptor, then a quantitative risk assessment is used to assess the significance or impact of the pollutant linkage.

7.2. Sampling Locations

The synopsis for the trial hole locations and their final depth can be seen tabulated below. A trial hole location plan is provided within Figure 9. The table also indicates whether any locations targeted a source of contamination as well as the proposed end-use. The proposed development can be seen in Figures 4-8.

Trial Hole Location Synopsis		
Trial Hole/Final Depth	**Sampling Strategy**	**Proposed End-Use**
WS1/5.00m	Random	Footprint of Proposed Building
WS2/5.00m	Random	Hard Landscaping
WS3/5.00m	Random	Hard Landscaping
WS4/5.00m	Random	Hard Landscaping
WS5/5.00m	Random	Hard Landscaping

The investigation area totals approximately 2,800m^2 and with five sampling locations, given an unknown hotspot shape, the sampling density means that a hotspot with an area of approximately 840m^2 and a radius of approximately 16.3m would be encountered (CLR 4).

7.3. Soil Risk Assessment

Sampling depths were chosen to reflect the receptor of concern (e.g. human health, controlled waters and vegetation). Samples where olfactory or visual evidence of contamination was present underwent targeted scheduling. The remaining samples were scheduled under a random strategy. The receptors relevant to the sampling depths are tabulated below.

Summary of Receptors per Sample Depth	
Depth	**Receptors**
Shallow Samples (< 0.75m bgl)	• End Users (Future site visitors) • Construction workers during development • Site operatives during maintenance works • Neighbours and public • Vegetation within soft landscaped areas (shallow rooted) • Secondary A Aquifer (Head Deposits and River Terrace Deposits) • Buried Concrete

	• Receiving landfill
Moderate Samples (0.75 – 1.50m bgl)	• Construction workers during development • Site operatives during maintenance works • Vegetation within soft landscaped areas (deep rooted) • Secondary A Aquifer (Head Deposits and River Terrace Deposits) • Buried Concrete • Receiving landfill • Underground services (water pipes)
Deep Samples (> 1.50m bgl)	• Construction workers during development • Secondary A Aquifer (Head Deposits and River Terrace Deposits) • Buried Concrete • Receiving landfill

Chemical laboratory testing, scheduled by Ground and Water Limited, and carried out by ALS Laboratories UK Limited, was undertaken on five samples of the Made Ground. The samples were subjected to a combination of analysis that comprised:

- Asbestos screen;
- Semi-metals and heavy metals incl. Arsenic, Cadmium, Chromium (incl. Hexavalent Chromium), Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc;
- Polycyclic Aromatic Hydrocarbons (PAH's) incl. Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, Benzo(ghi)perylene;
- Speciated TPH including full aliphatic/aromatic split;
- BTEX compounds (Benzene, Toluene, Ethylbenzene, Xylene) and MTBE – used as marker compounds for Volatile Organic Compounds (VOCs);
- Volatile Organic Compounds (VOCs);

A breakdown of the number of tests undertaken for each determinand is discussed in further sections. The chemical laboratory results are presented in Appendix F.

7.3.1. Soil Assessment Criteria and Results

At the time of reporting, June 2023, the proposed development was understood to comprise the demolition of the majority of the existing buildings on-site and the construction of eight new commercial units varying in size from 100-120m^2 with new access roads onto the site as well as new car parking spaces. A bin store was noted on the northern portion of the site near the proposed site entranceway. The existing office building located on the centre of the site is to remain.

Proposed site plans are provided as Figures 4-8.

Based on the proposed development, the results of the chemical laboratory testing were compared to the Generic Assessment Criteria (GAC) for a ***'Commercial'*** land-use scenario, as this was considered the most appropriate land-use scenario.

Where a contaminant of concern's GAC varies according to the Soil's Organic Matter (SOM), the SOM recorded for each uncontaminated soil type was used to derive the appropriate GAC for each soil type. A SOM value of 1%, the most conservative value, was utilised.

A summary of the analytical results and the comparison to the determinands adopted screening value are presented in the table below and overleaf.

Soil Contamination Test Results and Screening Values					
Determinand	**Number of Samples**	**Minimum Concentration (mg/kg)**	**Maximum Concentration (mg/kg)**	**Adopted Screening Value (mg/kg)**	**Was the adopted screening value exceeded for relevant land-use scenario?**
INORGANICS					
Asbestos	5	ND	ND	ND	No
Cyanide (total)	5	< 1	< 1	24	No
Phenols	5	<0.035	<0.035	760	No
METALS					
Arsenic	5	6.56	14.6	640	No
Boron	5	1.31	6.68	240000	No
Cadmium	5	0.198	0.59	190	No
Chromium (III)	5	16	37	8600	No
Chromium (Hexavalent)	5	<0.6	<0.6	33	No
Copper	5	23.4	41.5	68000	No
Lead	5	29.2	358	2300	No
Mercury	5	<0.1	0.175	58	No
Nickel	5	12.2	40.7	980	No
Selenium	5	<1	<1	12000	No
Vanadium	5	19.4	53.9	9000	No
Zinc	5	93.5	319	730000	No
TOTAL PETROLEUM HYDROCARBONS (TPHs)					
Aliphatic >C5 - C6	2	0.01	0.0175	3200	No
Aliphatic >C6 - C8	2	0.124	0.214	7800	No
Aliphatic >C8 - C10	2	0.574	1.72	2000	No
Aliphatic >C10 - C12	2	8.98	10.7	9700	No
Aliphatic >C12 - C16	2	27.6	61.9	59000	No
Aliphatic >C16 - C21	2	17.4	94.8		No
Aliphatic >C21 - C35	2	6.84	75.2	1600000	
Aliphatic >C35 – C44	2	<1	8.83	1600000	No
Aromatic >C5 - C7	2	<0.01	<0.01	56000	No
Aromatic >C7 - C8	2	0.383	1.14	3500	No
Aromatic >C8 - C10	2	<1	4.39	16000	No
Aromatic >C10 - C12	2	12.4	51.2	36000	No
Aromatic >C12 - C16	2	14.4	41.8	28000	No
Aromatic >C16 - C21	2	2.04	70.6	28000	No
Aromatic >C21 - C35	2	<0.01	<0.01	56000	No
Benzene	2	<0.009	<0.009	27	No
Toluene	2	<0.007	<0.007	56000	No
Ethylbenzene	2	<0.004	<0.004	5700	No
m,p-Xylene	2	<0.01	<0.01	5900	No

o-Xylene	2	<0.01	<0.01	6600	No
POLYCYCLIC-AROMATIC HYDROCARBONS					
Acenapthene	5	<0.008	0.102	84000	No
Acenapthylene	5	<0.012	0.151	83000	No
Anthracene	5	<0.016	0.41	520000	No
Benzo(a)anthracene	5	<0.014	1.3	170	No
Benzo(a)pyrene	5	<0.015	1.25	35	No
Benzo(b)fluoranthene	5	<0.015	1.67	44	No
Benzo(ghi)perylene	5	<0.024	0.752	3900	No
Benzo(k)fluoranthene	5	<0.014	0.694	1200	No
Chrysene	5	<0.01	1.48	350	No
Dibenzo(a,h)anthracene	5	<0.023	0.155	3.5	No
Fluoranthene	5	<0.017	2.59	23000	No
Fluorene	5	<0.01	0.308	63000	No
Indeno(1,2,3-cd)pyrene	5	<0.018	0.753	500	No
Naphthalene	5	<0.009	0.112	190	No
Phenanthrene	5	<0.015	1.55	22000	No
Pyrene	5	<0.015	2.18	54000	No
MARKER FOR VOLATILE ORGANIC COMPOUND					
Methyl tert-butyl ether (MTBE)	2	< 0.01	< 0.01	7900	No
The derivation of the Soil Assessment Criteria used within this report can be seen within Appendix G. The soil concentrations were typically compared to the LQM/CIEH Suitable for Use Levels (S4UL) (2014), based upon the assumption of 1% soil organic matter. A screening value for Lead is based on the Category 4 Screening Levels (C4SLs). Where no S4UL or C4SL is available for Cyanide, a SoBRA acute GAC is assigned. Where no S4UL or C4SL is available for MTBE, a CL:AIRE 2010 GAC is assigned. Where exceedances are noted, the trial hole and depth of sample is recorded.					

The VOC, and SVOC results will be discussed later in the report, in the vapour section.

The proposed development includes areas of soft-landscaping, where shallow rooted vegetation may be exposed to aggressive ground conditions. The previous table compares the results of the laboratory analysis to GAC that is protective of Human Health and therefore different GAC is required for vegetation.

Soil Contamination Test Results and Screening Value					
Determinand	**Number of Samples**	**Minimum Concentration (mg/kg)**	**Maximum Concentration (mg/kg)**	**Adopted Screening Value (mg/kg)**	**Was the adopted screening value exceeded for relevant land-use scenario?**
Copper	5	23.4	41.5	100	No
Nickel	5	12.2	40.7	60	No
Zinc	5	93.5	319	200	Yes
The derivation of the Soil Assessment Criteria used within this report can be seen within Appendix G. The soil concentrations were compared to BS3882:2015 *Specification for Topsoil* and based on differing pH. For the purpose of conservatism, the pH of the soils have been assumed to be below 6 within this table. Where exceedances are noted, the trial hole and depth of sample is recorded.					

7.3.2. Soil Assessment

Chemical laboratory testing of the Made Ground did not reveal any elevated levels of determinands above the guideline levels for a 'Commercial' land-use scenario.

The intrusive investigation did reveal two trial holes that had olfactory evidence to suggest potential hydrocarbon-type contamination. The chemical laboratory results have verified that no elevated concentrations of aliphatic/aromatic hydrocarbons (C5-C35) or BTEX compounds are present in the soils underlying the site. The VOC and SVOC results will be discussed later in the report, in the vapour section for the vapour risk assessment.

In areas of soft landscaping where vegetation is to planted, a 150mm growing medium of clean topsoil is required due to slightly elevated Zinc concentrations within the soils.

Given the low levels of determinands noted during the chemical laboratory testing, it was considered that no remediation was required within the soils for the end users of the site.

Asbestos

No asbestos has been identified during the testing, however, an **Asbestos Management Strategy** should be put in place so that any potentially asbestos containing materials are identified and removed from site in a suitable manner to prevent cross-contamination.

7.3.3. Water Supply Pipe Risk Assessment

As part of the proposed development it is expected that new water supply pipes will be installed at the site. Water supply pipes have the potential to be exposed to contaminants in the ground that can lead to unacceptable concentrations within the drinking water. If a risk is identified, specialist pipes that are protective of the drinking water are required.

A pipe selection risk assessment should be submitted to the water supply company as part of the development based on the supplier's assessment criteria. An indication of whether there is likely to be a risk can be seen tabulated below, where the PE pipe thresholds are based on *UKWIR Contaminated Land Assessment Guidance, 2014*.

Pipe Selection Risk Assessment			
Determinand	**PE Pipe Threshold (mg/kg)**	**Laboratory Analysis Range (mg/kg)**	**Was the Threshold Exceeded?**
Total BTEX and MTBE	0.1	LOD	No
Total VOCs	0.5	0.00794	No
Total SVOCs	2	0.35	No
Phenols	2	<0.035	No
TPH EC5 – EC10 (aliphatics and aromatics)	2	4.155	Yes
TPH EC10 – EC16 (aliphatics and aromatics)	10	177.17	Yes
TPH EC16 – EC40 (aliphatics and aromatics)	500	343.31	No
Naphthalene	5	0.112	No

The Water Supply pipe risk assessment indicated that the use of PE pipes is inappropriate at the site due to the concentrations of TPH within the soils.

7.4. Groundwater Risk Assessment

In the UK, the water environment is protected under a number of regulatory regimes, mainly governed by the Environment Agency. The Environment Agency is consulted when there may be a risk to Controlled Waters, or where a pollution incident has occurred historically. The Water Framework Directive is implemented in various guises covering groundwater, surface water and drinking water supply.

The soil samples analysed as part of the risk assessments in section 7.3 have been used to undertake a Level 1 (soils) Controlled Waters risk assessment. At Level 1 (soils), the conceptual site model and the determinand concentrations of the soils are used to indicate whether the concentrations are sufficient to impact the receptor. At this stage, dilution, dispersion and attenuation along the pathway are not considered.

A study of the aquifer maps on the DEFRA website revealed the site was underlain by a **Secondary A Aquifer** comprising the superficial River Terrace Deposits and Head Deposits, underlain by **Unproductive Strata** comprising bedrock deposits of the London Clay Formation.

Examination of the Environment Agency records showed that the site **did not** fall within a Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater.

The nearest surface water feature was the River Ems located ~50m east of the site and was flowing in a north to south direction. Emsworth harbour was noted 630m south of the site.

From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered at shallow to moderate depths within the River Terrace Deposits/Head Deposits. Some amounts of groundwater however may be present at shallower depths within Made ground. It was considered that groundwater was flowing in an easterly direction toward the River Ems in line with local topography.

During the site investigation, Made Ground was encountered to 1.60m bgl, overlying sandy clay and sandy Gravel of the Head Deposits and River Terrace Deposits with the London Clay Formation below to the base of the boreholes (5.00m bgl). A hydrocarbon odour was noted in the Made Ground in WS1 and WS5. Groundwater was recorded at depths of between 0.70-1.23m bgl.

Comparison between the soil laboratory analysis and the derived Level 1 (soils) target concentrations indicate that some determinands have the theoretical potential to pose a risk to Controlled Waters. It should be noted that a number of determinands at laboratory limit of detection exceed the target concentration for a Level 1 (soils) risk assessment. Where a determinand is identified at the laboratory limit of detection, no further assessment is considered necessary.

It is considered that the Level 1 risk assessment does not consider dilution, dispersion or attenuation. However, as a result of the industrial history of the site and the immediate surrounding area, the site being on a secondary A aquifer and the nearest surface water receptor being the River Ems, 50m east of the site, there is a potential risk from the site to controlled water receptors. It is recommended that

a level 2 (groundwater) risk assessment has been undertaken on the results from the investigation and has identified numerous exceedances within the groundwater at the site.

The findings of this risk assessment should be agreed with the Environment Agency.

7.5. Ground Gas Risk Assessment

A review of the Phase I desk study, has identified a source of ground gas on-site or within influencing distance of the site that warrants investigation through ground gas monitoring.

The investigation undertaken to date have identified the main sources of ground gases to be associated with the degradation of putrescible material within deep Made Ground both on-site and off-site, where the off-site sources include the presence of a historical gas works and general industrial use. Ground gases have the potential to migrate vertically through preferential pathways and build up within the proposed development, especially enclosed spaces on the ground floor. Based on the preceding information, ground gas monitoring was undertaken at the site.

7.5.1. Available Data

Soils

An alternative approach to ground gas risk assessment is presented within the CL:AIRE research bulletin RB17 and included within Annex D of BS8485:2015+A1:2019. The method considers the gas generation potential of the soils from data that is not subject to external influences, for example atmospheric pressure can change the recorded flow and concentrations of ground gas during spot monitoring, or a rising groundwater level can displace ground gases in pore spaces. Determination of the characteristic situation is based on the total organic carbon (TOC) of the soils, coupled with any organic-rich material identified within the borehole logs, such as wood gravels. TOC is easily analysed by the laboratory and can also be calculated by the equation outlined below.

Total Organic Carbon (TOC) = 0.58 x Soil Organic Matter (SOM) = 1.33 x Degradable Organic Carbon (DOC)

As part of the ground investigation works, five samples of the Made Ground were submitted to the laboratory for analysis, which identified TOC to vary between 0.402 and 3.69% in the Made Ground. The trial hole logs identified the gravels within the Made Ground to comprise; flint, glass, bituminous material, ash brick and concrete. Made Ground was identified to a maximum depth between 1.00m and 1.60m bgl.

Gas Monitoring

In order to assess the ground-gas risk, three combined ground-gas/groundwater monitoring standpipes were installed to a maximum depth of 5.00m bgl. The construction of the wells has been tabulated below.

Monitoring Well Construction				
Trial Hole	**Piping internal diameter (mm)**	**Depth of Installation (m bgl)**	**Response Zone (m bgl)**	**Response Zone Strata**
WS1	50	3.50	1.00 – 3.50	Made Ground, Head Deposits and London Clay Formation
WS3	50	4.50	1.00 – 4.50	Made Ground, River Terrace Deposits and London Clay Formation

WS5	50	5.00	1.00 – 5.00	Made Ground, Head Deposits and London Clay Formation

Ground-gas monitoring has been undertaken on two occasions by a representative of Ground and Water Limited using a GasData GFM436 landfill gas analyser, where monitoring was undertaken during a combination of atmospheric pressures and pressure trends. During monitoring the borehole flow, as well as concentrations of methane, carbon dioxide, carbon monoxide and hydrogen sulphide were recorded. In addition to the borehole readings, a reading was taken from the ambient air of the site to ensure that the gas analyser was functioning correctly.

The results of the ground-gas monitoring have been tabulated below and the full Ground and Water Limited monitoring results are provided within Appendix J. Where the reliability of the monitoring results will require consideration in line with CIRIA C665 and BS8485:2015+A1:2019, the table has been highlighted orange.

Ground-Gas Monitoring Results							
Trial Hole	**Highest CH_4 (% v/v)**	**Highest CO_2 (% v/v)**	**Lowest O_2 (% v/v)**	**Highest H_2S (ppm)**	**Highest CO (ppm)**	**Highest Flow Rate (l/hr)**	**Shallowest Groundwater (m BGL)**
Ambient Air	0.00	0.10[1]	20.40[1]	0	0	n/a	n/a
WS1	31.00[2]	3.90[2]	0.10[2]	0	0	0.00	0.60[1]
WS3	0.00	0.40[2]	19.60[2]	0	0	0.00	0.50[1]
WS5	0.00	0.70[1,2]	19.80[1]	0	0	0.00	0.30[1]
Notes: Number [1,2 etc.] indicates monitoring round when recorded.							

Methane was only encountered in WS1 at concentrations of 21.20-31.00%v/v. Carbon dioxide was encountered in all boreholes at a maximum concentration of 3.90%v/v. Zero flow was encountered within all three boreholes. **All three wells however were noted to be flooded during both monitoring rounds and that may have created a piston effect.**

7.5.2. Data Quality

A review was made of the quality of the available data for the site, which can be viewed in the table below. CIRIA Report C665 (2007), BS 8485:2015+A1:2019 and BS 8576:2013 stress the need for risk assessments to be based on good quality data and give guidance as to best practice in this respect.

Review of Data Quality			
Data Type	**Current Understanding**	**UK Practice**	**Recommendation**
Geological and hydro-geological conditions	The CSM identified the site to be located on Made Ground (>1.00 – 1.60m), overlying both permeable and impermeable strata of the Head Deposits and River Terrace Deposits. Groundwater has been encountered at shallow depth during drilling and during the monitoring.	CIRA C665 & C659, Wilson and Card (1999) and BS 8485 recommend that geology and hydrogeology be fully understood.	The geological and hydrogeological model is understood to a standard that will not compromise the findings of the risk assessment. **No further action required.**
Soil Laboratory Analysis	A dataset of soil analysis from 5No. samples have identified a	CL:AIRE RB17 outlines an approach to ground gas risk assessment away from the	The TOC concentrations are below the limit of 6% in order to use the soil derived

Review of Data Quality			
	range of TOC concentrations between 0.402% and 3.69%.	influences that directly affect ground gas monitoring. It should typically be used on sites with limited sources identified in the CSM and Made Ground with average thickness <3m and maximum thickness <5m. TOC should be < 6%.	approach for the risk assessment. **No further action required.**
Monitoring period	The monitoring has been undertaken on a total of two occasions to date. Monitoring has been undertaken during periods of steady pressure.	CIRIA C665 and BS 8576 recommends monitoring over a range of weather conditions. Concentrations of ground gas are likely to be highest during falling pressures, with sharp falls providing the worst-case results. In line with BS8576 a minimum of 4No. monitoring visits are required.	Monitoring should be undertaken over a 2 month period with between weekly and fortnightly readings. Monitoring has been undertaken during atmospheric pressures of between 1013.3 and 1027.3 mbar **Additional 4No. monitoring visits were proposed to be completed however consideration was given to the very shallow groundwater and it was determined that gas cannister samples and Groundwater samples be taken instead of additional ground gas readings.**
Gas data sets	Methane was detected at concentrations up to 31%v/v. Carbon dioxide concentrations were recorded up to 3.90%. No hydrogen sulphide or carbon monoxide has been detected during monitoring. Monitoring did not detect any flow.	Borehole flow velocity and borehole gas volume (methane and carbon dioxide) are required for ground gas flux categorisation. Modified Wilson and Card classification, CIRIA C665 (2007), BS8485:2015+A1:2019.	2No. suitable gas datasets are available for the risk assessment, where a minimum of 4No. is deemed necessary. **Additional 4No. monitoring visits were proposed to be completed however consideration was given to the very shallow groundwater and it was determined that gas cannister samples and Groundwater samples be taken instead of additional ground gas readings.**

7.5.3. Risk Assessment

Soil Derived Method

The intrusive investigation has revealed a maximum thickness of Made Ground of 1.60m overlying Head Deposits and River Terrace Deposits comprising cohesive and granular soils. Site has undergone a previous phase of construction and limited degradable material has been identified. The introduction of oxygen to the Made Ground through redevelopment may lead to an initial increase of ground gas generation as degradable material within the soils present on-site may act as source of ground gas. The soils at the site are considered to be of variable permeability (low to high) in nature and pathways for ground gas migration will be present.

An alternative approach for ground gas risk assessment (CL:AIRE RB17) can be considered utilising measured concentrations from soil parameters that are independent of influencing factors such as atmospheric pressure and groundwater level. Total Organic Carbon (TOC) was tested on 5No. samples with the analytical results ranging between 0.402 and 3.69%.

Using the soil derived method, it is considered that a TOC value of <1% within soil is unlikely to pose an unacceptable risk from ground gases and the site can be characterised as Characteristic Situation CS1. Any value between 3 and 6 % warrants classification as a Characteristic Situation CS3. Any value over 6% requires investigation through ground gas monitoring. Any site with Made Ground <1.00m bgl will have a limited gas generation potential from the organic carbon present and consideration should be given to this thickness within the risk assessment.

Based on the soil derived method outlined and the maximum TOC concentration encountered, the soils from site would warrant classification as Characteristic Situation CS3. It should be noted that Made Ground thickness was generally limited, however, therefore gas monitoring or other means may provide a more realistic classification. It should be noted that this only represents the assessment from an on-site source.

Gas Monitoring Data

The ground gas monitoring undertaken to date has been reviewed and following any omissions caused by contradiction of the UK guidance (e.g. flooded wells), is deemed suitable for use in the risk assessment. The monitoring undertaken recorded methane concentrations of up to 31.00%v/v, carbon dioxide concentrations of up to 3.90%v/v and the maximum steady-state flow rate recorded was 0.0l/hr.

Based on the documentation presented in BS 8485:2015+A1:2019 “Code of practice for the characterisation and remediation from ground gas in affected developments”, the *hazardous gas flow rate (Q_{hg})* should be calculated for each borehole using the equation below.

$$Q_{hg}=(C_{hg}/100) * q$$

Where: Q_{hg} is the measured hazardous gas concentration (in percentage volume-by-volume);
q is the flow rate (in litres per hour) of combined gases found by direct measurement.

The hazardous gas flow rate has been calculated for each borehole, referred to as the Gas Screening Value (GSV) using the worst-case steady-state concentration and flow, from all monitoring to date. The results are presented within the table below. Following the generation of the GSV, a ground gas

characteristic situation can be assigned to the borehole. This has also been included within the table below.

Hazardous Gas Flow Rate Assessment							
Trial Hole	**CH_4 (%v/v)**	**CO_2 (%v/v)**	**Flow Rate (l/hr)**	**CH_4 GSV (l/hr)**	**Characteristic Situation**	**CO_2 GSV (l/hr)**	**Characteristic Situation**
WS1	31.00	3.90	0.0[3]	0.031	CS1	0.0039	CS1
WS3	0.0[1]	0.40	0.0[3]	0.0002	CS1	0.0004	CS1
WS5	0.0[1]	0.70	0.0[3]	0.0002	CS1	0.0007	CS1

[1]Where a value of 0.0 %v/v is detected the detection error is to be used of 0.2%v/v for methane.

[2]Where a value of 0.0 %v/v is detected the detection error is to be used of 0.1%v/v for carbon dioxide.

[3]Where a value of 0.0 l/hr is detected the detection error is to be used of 0.1 l/hr for flow.

[4]CS1 typically when <1% methane and <5% carbon dioxide otherwise *consider* an increase to CS2.

Based upon the available ground gas monitoring to date, the risk from ground gas is considered to be very low (CS1), in accordance with BS8485:2015+A1:2019, based on the flows of zero. Carbon monoxide and hydrogen sulphide was not detected at a concentration to warrant further assessment.

Consideration is required to any GSV that falls into the CS1 category, however the methane concentration is greater than 1% and/or the carbon dioxide concentration is greater than 5%. These locations are typical of sites where the hazardous gas concentration is significant, however marginal flow has been recorded during monitoring. It should be noted that consideration does not indicate that an increase is required.

With regards to the site, high methane was detected. It should be noted however that groundwater was very shallow in both rounds and results should not really be taken directly into consideration. **However, they can be used as a guide to consider other methods like testing for dissolved gasses in groundwater and gas cannisters.**

The site at this stage should be classified as CS2, meaning gas protection measures are required. Please note that these measures should also align with any other protection measures needed for radon.

Boreholes can act as preferential pathways for ground gas and therefore prior to construction, all boreholes should be suitably decommissioned in line with Environment Agency guidance. This usually comprises pumping liquid grout down a tremie pipe to the base of the borehole, raising as the borehole fills.

7.6. Dissolved Ground Gases in Groundwater

7.6.1. Dissolved Gases Results

Groundwater Dissolved Gases Test Results	
Determinand	**Concentration (µg/l)**
Methane Dissolved	<1-4.50
Ethene Dissolved	<1
Ethane Dissolved	<1
Carbon Dioxide Dissolved	16,700-64,300

Propane Dissolved	<1

The Ground Gas Information Sheet No 2 Paper 2.0 31/8/2018 written by Sarah Haines and Steve Wilson suggests the following with regards to dissolved gases:

Methane is widely present in groundwater. It is present in non-polluted aquifers at relatively low concentrations (up to 1500µg/l) that are not likely to significantly influence gas monitoring results.

Elevated concentrations of dissolved methane are only likely to pose a risk if the water discharges into a confined space. The presence of high dissolved concentrations in groundwater below a building will not normally pose a risk because there is no significant change in pressure and migration to the surface is driven by diffusion. Unless the groundwater is at the underside of the building it cannot migrate quickly enough to pose a risk. There are no published cases where dissolved methane has partitioned to soil gas and migrated through soil into buildings.

It is not considered the concentration of Methane identified within the groundwater would be cause for concern given it is less than standard background levels. However, given there is no assessment value given for Carbon Dioxide and the concentration of 16,700-64,300µg/l it is considered carbon dioxide may still pose a risk.

7.6.2. Dissolved Gases Risk Assessment

Gas primarily migrates via either pressure driven (advective) flow or diffusive flow. Within Made Ground, the primary mechanism for migration of gases is generally dependent on the gas generation potential and stage of decomposition of the fill.

The direction and speed of travel will depend on the dominant migration mechanism, and the nature and location of preferential pathways. Gas migrating by diffusive flow will diffuse through the soils forming a continuum between the source and ground level, with only minor concentrations of gas reaching ground level, and no perceivable flow.

Given the use of the surrounding land comprising former gas works and the presence of Alluvial deposits to the east of the site, it is considered that the primary source of gas on this site is from dissolved gases in groundwater. The release of these gases is dependent on concentration, pressure and temperature. Once gases are released into the overlying material, it will migrate very slowly by diffusion towards the surface.

The gas monitoring visits recorded methane at concentrations of up to 31.00% and carbon dioxide up to 3.90%v/v. The gas canister test recorded 40.5% methane and carbon dioxide at 3.83%. The groundwater testing results recorded 4.5ug/l dissolved Methane and 16,700-64,300 ug/l dissolved Carbon Dioxide. It is considered likely the disparity in the results is due to the gases being dissolved within the groundwater, as carbon dioxide more readily dissolves within the groundwater than methane.

In the surrounding soil the surface tension provided by capillary water in the soils will limit the free movement of methane and carbon dioxide, and in practice the high concentrations of gas are limited

to a zone just above the groundwater. Biodegradation by methanotrophs and dilution by atmospheric oxygen quickly reduce methane concentrations in the soil above the water.

7.6.3. Borehole Monitoring

Gas cannister samples were taken from all three standpipes on the 3rd July 2023 and water samples were taken from all three boreholes on the 13th July 2023. The results for both the gas cannister and water samples can be viewed in Appendix K.

Gas Cannister Bulk Gas results	
Determinand	**Concentration (µg/l)**
Methane	<0.05-40.5%
Oxygen	1.41-25.8%
Nitrogen	54.2-93.8%
Carbon Dioxide	<0.05-3.83%

7.6.4. Ground-gas Risk Assessment Summary

Four methods of ground gas risk assessment have been applied to the site following site investigation, comprising a review of organic content of soils, ground gas monitoring, gas cannister sampling and dissolved gases in Groundwater.

A soil derived approach identified soils of the Made Ground was considered to pose an unacceptable ground gas risk at the site and warrant classification of Characteristic Situation CS3.

Based on the results of the dissolved gas testing, as well as the gas cannister results, a C**haracteristic Situation CS2** is recommended for the site.

Boreholes can act as preferential pathways for ground gas and therefore prior to construction, all boreholes should be suitably decommissioned in line with Environment Agency guidance. This usually comprises pumping liquid grout down a tremie pipe to the base of the borehole, raising as the borehole fills.

The gas protection methods are outlined in BS8485:2015+A1:2019 and should be installed in line with CIRIA C735. The protection measures required are summarised within Section 8.3.

7.7. Vapour Risk Assessment

The CSM identified a source of contamination that may pose an unacceptable risk to receptors through vapours. Best practice is to assess multiple lines of evidence to identify any vapours that may be present.

7.7.1. Soil Assessment

In order to assess the potential for a vapour risk at the site, soil samples were sent to the laboratory for analysis (Appendix G). The testing suites included contaminants that may be present in the vapour phrase (Mercury, Napthalene, TPHs and volatile Organic Compounds (VOCs)) taken within Made Ground samples. No elevated values of Mercury, Naphthalene, TPHs or BTEX were noted within all samples tested.

The samples scheduled for direct volatile testing (2No. of the Made Ground) identified the majority of the VOCs at concentrations lower than the laboratory limit of detection. Some concentrations of SVOC's were recorded in WS1/0.20m bgl, which included 2-Methynaphthalene and VOC concentrations of Isopropybenzene, 1,2,4,-Trimethylbenzene, and sec-Butylbenzene were recorded in the same sample. The concentrations within WS1/0.20m for VOC's Isopropybenzene 0.00794mg/kg and 1,2,4,-Trimethylbenzene 0.177mg/kg were both significantly below the commercial threshold limited of 1400mg/kg and 42mg/kg. PAHs were also noted but not elevated.

7.7.2. Borehole Monitoring

During the monitoring of the boreholes installed, an oil-water interface probe and Photoionization Detector (PID) was utilised. The interface probe did identify any dense or light non-aqueous phase liquids (DNAPL / LNAPL) during any of the monitoring visits. The highest PID reading was 412.6ppm.

It should be noted that the PID result will provide an indication on the total VOC concentration and will not speciate the determinands. The phase 2 report issued in June 2023 recommended that a gas cannister sample be taken to assist the risk assessment in regards to vapours. At the time of reporting in June 2023 a risk from vapours was considered to be present and vapour protection measures are required based partially on soil samples and mainly due to PID monitoring results so far.

Direct Sampling

During the monitoring regime, VOC sampling through vacuum canisters were undertaken on 1No. occasion from WS1, WS3 and WS5 on the 3rd July 2023. Worst case falling conditions were not captured during the gas canister testing.

Samples were obtained in line with the laboratory sampling guidance and submitted within a coolbox to the laboratory. There are limited assessment criteria available for the direct comparison of volatile organic compounds in the air and ultimately posing a vapour risk. As a result, numerous sources of criteria are considered in order to provide a reflective assessment value that can be used within the vapour risk assessment. In-house assessment criteria have been generated, for various VOCs when directly measured in their vapour phases within the soil gas, from here in referred to as vGAC. This is based upon the framework for assessing the risk posed to a site's receptors outlined within CIRIA C682. The methodology for the derivation of this criteria is presented within Appendix L.

The results of the canister sampling are within Appendix M and tabulated below. Only determinands above the limit of detection and with data to derive a vGAC have been included.

Canister Risk Assessment			
Determinand	**Laboratory Analysis Range (mg/m^3)**	**vGAC (mg/m^3)**	**Was the vGAC Exceeded?**
Benzene	0.00561-<0.118	2.06	No
Toluene	0.00155-0.602	2060	No
Ethyl Benzene	<0.00587-0.412	109	No
m/p Xylene	0.00702-0.374	88.3	No
O-Xylene	0.00617-0.187	88.3	No
Aliphatic (C4-C6)	0.435-28.6	7358	No
Aliphatic (C6-C8)	0.30-33.7	7358	No
Aliphatic (C8-C10)	0.223-77.2	427	No

Canister Risk Assessment			
Determinand	**Laboratory Analysis Range (mg/m^3)**	**vGAC (mg/m^3)**	**Was the vGAC Exceeded?**
Aliphatic (C10-C12)	0.315-34.0	427	No
Aromatic (EC5-EC7)	0.00581-0.118	2215	No
Aromatic (EC7-EC8)	0.00602-0.203	2370	No
Aromatic (EC8-EC10)	0.0435-3.51	88.3	No
Aromatic (EC10-EC12)	0.0707-2.23	88.3	No
Trichloromethane (Chloroform)	0.00659-0.210	58.9	No
Tetrachloroethene	0.00920-0.293	83.9	No
Acetone + Propanol	0.0388-0.205	10.5	No
Carbon disulphide	0.256-1.15	42.1	No
1,2,3-Trimethylbenzene	0.00665-0.212	78.7	No
1,2,4-Trimethylbenzene	0.00665-0.212	3.38	No
1,2-Dichlorobenzene	0.00814-0.259	63.3	No
1,3,5-Trimethylbenzene	0.00665-0.212	78.7	No
1-Propanol	0.00332-0.106	500	No
Butanal	0.00399-0.127	5322	No
Cyclohexane	0.00465-1.31	7867	No
Hexane	0.00498-0.538	918	No
Methylene Chloride	0.00471-0.150	198	No
Naphthalene	0.00709-0.226	1.27	No
Pentane	0.00417-1.090	1311	No
Styrene	0.0157-3.09	353	No
vGAC calculated in line with methodology in Appendix J, using Health Criteria Values outline within UK guidance documents CL:AIRE GAC, CLEA 1.07 and LQM S4UL. Where UK Health Criteria Values are not available for the determinand, US EPA values have been adopted. The values are considered to be the most relevant to the proposed development.			

The results of the canister testing have identified numerous VOCs within the borehole at the site. A comparison of these against a site-specific vapour assessment criteria has indicated that all VOCs are significantly below the adopted screening value. The response zone of WS1 has targeted the Made Ground so shows a reflection of the on site and off site migration of gases affected the site. Both WS3 and WS5's response zones are within the cohesive soils. The results from the testing show that the clay is limiting the migration of gases.

One vapour GAC with a concentration above the laboratory limit of detection could not be generated due to the absence of readily available information pertinent to the Health Criteria Value (HCV), used within the calculation. The determinands (Isobutene) is not featured within the UK or US guidance / research. The HCVs are guidance levels dictated by specialists based on exposure from occupational and epidemiological studies, animal studies as well as modelling from the chemicals. Within this assessment only HCV relevant to the inhalation pathway have been considered. In the absence of HCV for the chemical the following has been identified from an internet search to aid the assessment:

- Isobutene – A hydrocarbon which is present as a colourless flammable gas that is insoluble. It's most common use is as a fuel additive. Known acute health effects include irritation to eyes, nose and throat, headache, dizziness, light-headedness and fatigue. No testing for chronic effects has been undertaken. A laboratory test undertaken on rats identified an acute toxicity effect above a concentration of 550,000 mg/m^3 for 4 hours.

Although the value is not directly comparable, given the significant disparity between the measured concentration at the site (0.00324-5.36mg/m^3) and the acute toxicity encountered within rats (550,000 mg/m^3), the concentrations at the site are considered to have a negligible effect on human health.

7.7.3. Vapour Risk Assessment Summary

Three methods of Vapour risk assessment have been applied to the site following site investigation, comprising a review of PID readings, Soil samples and gas cannister sampling.

No elevated values of Mercury, Naphthalene, TPHs or BTEX were noted within all soil samples tested. The samples scheduled for direct volatile testing (2No. of the Made Ground) identified the majority of the VOCs at concentrations lower than the laboratory limit of detection. SVOC concentrations of Isopropybenzene, 1,2,4,-Trimethylbenzene, and sec-Butylbenzene were all noted but were not significantly elevated. The concentrations within WS1/0.20m for VOC's Isopropybenzene 0.00794mg/kg and 1,2,4,-Trimethylbenzene 0.177mg/kg were both significantly below the commercial threshold limited of 1400mg/kg and 42mg/kg. PAHs were also noted but not elevated.

During the monitoring of the boreholes installed the interface probe did not identify any dense or light non-aqueous phase liquids (DNAPL / LNAPL) during any of the monitoring visits. The highest PID reading was 412.6ppm.

The results of the canister testing have identified numerous VOCs within the borehole at the site. A comparison of these against a site-specific vapour assessment criteria has indicated that all VOCs are significantly below the adopted screening value. The response zone of WS1 has targeted the Made Ground so shows a reflection of the on site and off site migration of gases affected the site. Both WS3 and WS5's response zones are within the cohesive soils. The results from the testing show that the clay is limiting the migration of gases.

7.8. Updated Conceptual Site Model

Following completion of the Phase 2 Site Investigation, the CSM, inclusive of associated risk, within Section 2.8 of this report was re-evaluated.

For ease of reference and understanding, the risks have been re-assigned within this risk assessment against three possible levels / categories, summarised in the table below.

Risk Categories used in the Tabulated CSM	
Low Risk	Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is not considered to be an unacceptable risk to receptors.
Moderate Risk	Regarding this potential SPR linkage, the site is suitable for the proposed end-use however remediation and/or further investigation is required.
High Risk	Regarding this potential SPR linkage, the site is not suitable for proposed end-use and there is an unacceptable risk to receptors. Urgent action required in the short term.

Tabulated Conceptual Site Model – Pollutant Linkage Summary (On-Site Sources)			
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Made Ground from construction/ demolition activities, gas works, unspecified tanks, works, garage site: • Asbestos, • PAHs, • TPHs, • VOCs, • Sulphates, and • Metals.	• Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Inhalation of dust (indoors and outdoors) with elevated concentration of determinands • Direct ingestion of groundwater • Inhalation of volatile vapour (indoors and outdoors)	**Human Health** • End Users (Future site visitors) • Construction workers during development • Site operatives during maintenance works • Neighbours and public	**Moderate** Groundworkers require protection.
	• Direct uptake of groundwater • Direct uptake of determinands in the soil	**Flora and Fauna** • Vegetation within soft landscaped areas	**Moderate** Elevated concentrations of Zinc recorded
	• Anthropogenic (man-made) pathways • Vertical and lateral migration in permeable strata • Surface water runoff	**Controlled Waters** • Secondary A Aquifer (Head Deposits and River Terrace Deposits) • River Ems	**Moderate** Groundwater monitoring recommended
Electricity Sub-Station PCB oils and other cable/transformer oils	• Migration through anthropogenic & natural pathways	**Human Health** End Users (Residents/Future site visitors)	**Low**
Aggressive ground conditions with Made Ground and natural ground, including groundwater: • Sulphates, • PAH/TPH.	• Direct contact with aggressive ground conditions	**Building Materials and Services** • Buried Concrete • Underground services (water pipes)	**Moderate** DS-2 AC-2 category required
Ground gases generated by Made Ground, gas works and industrial land: • Methane, • Carbon Dioxide, • Hydrogen Sulphide, and • Carbon Monoxide.	• Migration through anthropogenic & natural pathways • Inhalation of Asphyxiating gases • Explosion (methane only)	**Human Health** • End Users (Future site visitors) • Construction workers during development (especially in confined spaces) • Site operatives during maintenance works in confined spaces • Neighbours and public	**Moderate** CS2 Gas protection measures required
	• Migration through anthropogenic & natural pathways • Explosion (methane only)	**Building Materials and Services** • Buildings • Confined spaces	**Moderate** CS2 Gas protection measures required

		• Underground services	
Radon	• Inhalation	**Human Health** • End Users (Future site visitors) • Construction workers during development (especially in confined spaces) • Site operatives during maintenance works in confined spaces Neighbours and public	**Moderate** Basic protection against radon is required

Tabulated Conceptual Site Model – Pollutant Linkage Summary			**(Off-Site Sources)**
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Made Ground from nearby works, Gas works: • Asbestos, • PAHs, • TPHs, • VOCs, • Sulphates, and • Metals.	• Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Inhalation of dust (indoors and outdoors) with elevated concentration of determinands • Direct ingestion of groundwater • Inhalation of volatile vapour (indoors and outdoors)	**Human Health** • End Users (Residents/Future site visitors) • Construction workers during development • Site operatives during maintenance works	**Moderate**
	• Direct uptake of groundwater	**Flora and Fauna** • Vegetation within soft landscaped areas	**Moderate**
Aggressive ground conditions associated with impacted groundwater; • Sulphates, • PAH/TPH.	• Direct contact with aggressive ground conditions	**Building Materials and Services** • Buried Concrete • Underground services (water pipes)	**Low**
Ground gases generated by Made Ground, gas works and other industrial land: • Methane, • Carbon Dioxide, • Hydrogen Sulphide, and • Carbon Monoxide.	• Migration through anthropogenic & natural pathways • Inhalation of Asphyxiating gases • Explosion (methane only)	**Human Health** • End Users (Residents/Future site visitors) • Construction workers during development (especially in confined spaces) • Site operatives during maintenance works in confined spaces	**Moderate** CS2 Gas protection measures required
	• Migration through anthropogenic & natural pathways • Explosion (methane only)	**Building Materials and Services** • Buildings	**Moderate**

Tabulated Conceptual Site Model – Pollutant Linkage Summary (Off-Site Sources)			
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
		• Confined spaces • Underground services	CS2 Gas protection measures required

8. CONTAMINATION RECOMMENDATIONS AND REMEDIATION STRATEGY

Based on the results of the intrusive works, chemical analyses and risk assessments undertaken, the following has been identified that requires further action:

- Gas protection measures are required in line with the requirements of Characteristic Situation CS2 at this stage.
- It is considered that there is a risk to groundwater from the site. It is recommended that a level 2 (groundwater) risk assessment has been undertaken on the results from the investigation and has identified numerous exceedances within the groundwater at the site.
- Basic radon protective measures are required for the report area. This can be in alignment / covered by gas measures.
- For risk to water supply pipes and concrete please see relevant sections.
- A specific capping system is not required for soft landscaped areas. However, a nominal capping system of 100-150mm of topsoil should be placed in soft landscaped areas as a growing medium.
- Groundworkers during the construction stage will require full personal protective equipment. If any contamination is recorded during the construction phase, works should stop and the source and extent of any contamination be further investigated by a component and qualified person.

An Asbestos Management Strategy should be put in place so that any potentially asbestos containing materials are identified and removed from site in a suitable manner to prevent cross-contamination.

The contamination testing results recorded no exceedances within the soils for the end users of the site. However, groundworkers during the construction stage will require full personal protective equipment and will need to maintain good personal hygiene, e.g. regular hand washing. If any contamination including Asbestos is recorded during the construction phase, works should stop and the source and extent of any contamination be further investigated by a component and qualified person.

8.1.1. Water Supply Pipes

The Water Supply pipe risk assessment indicated that the use of PE pipes is inappropriate at the site due to the concentrations of TPH within the soils. It is therefore recommended that the use of Metal or Barrier pipes are implemented as part of the design in order to prevent an unacceptable risk to future receptors.

8.2. Groundwater

Comparison between the soil laboratory analysis and the derived Level 1 (soils) target concentrations indicate that some determinands have the theoretical potential to pose a risk to Controlled Waters. It should be noted that a number of determinands at laboratory limit of detection exceed the target concentration for a Level 1 (soils) risk assessment. Where a determinand is identified at the laboratory limit of detection, no further assessment is considered necessary.

It is considered that the Level 1 risk assessment does not consider dilution, dispersion or attenuation. However, as a result of the industrial history of the site and the immediate surrounding area, the site

being on a secondary A aquifer and the nearest surface water receptor being the River Ems, 50m east of the site, there is a potential risk from the site to controlled water receptors. It is recommended that a level 2 (groundwater) risk assessment has been undertaken on the results from the investigation and has identified numerous exceedances within the groundwater at the site.

8.3. Radon, Ground Gas and Vapours

Based on risk assessment undertaken, the site warrants classification as **Characteristic Situation CS2**, where precautions to prevent the ingress of ground-gas are necessary. Type C buildings on CS2 classified sites require **2.5 points** worth of protection, in accordance with BS8485:2015+A1:2019. Points must be made up through a structural barrier and a membrane, where at least two methods are incorporated.

8.3.1. Verification

- Following completion of the protection system, verification should be carried out and a report should be submitted to the local authority for approval. This should include as a minimum, verification photographs of the visual checks.

Basic radon protection measures are required, it should be checked that any membrane installed will protect against both ground-gases and radon.

8.4. Discovery Strategy

There may be areas of contamination that have not been identified during the course of the intrusive investigation (e.g. underground storage tanks). Such occurrences may be discovered during the construction phases for the redevelopment of the site.

Groundworkers should be instructed to report to the Site Manager any evidence for such contamination; this may comprise visual indicators, such as fibrous materials within the soil, discolouration, or odours and emission. Upon discovery advice must be taken from a suitably qualified person and then the Local Authority will need to be informed.

8.5. Imported Material

Any soil which is to be imported onto the site must undergo chemical analysis to prove that it is suitable for the purpose for which it is intended.

The soil must be fit for purpose and must either be supplied with traceable chemical laboratory test certificates or be tested, prior to placing (ideally) and after placing, to ensure that the future receptors (human health and vegetation) cannot come into contact with compounds that could be detrimental to their health. The compounds that are to be tested for are those given in the Generic Assessment Criteria, which can be viewed in Appendix G of this report.

8.6. Waste Disposal

The excavation of foundations and other soils is likely to produce waste which will require classification and then recycling or removal from site.

Under the Landfill (England and Wales) Regulations 2002 (as amended), prior to disposal, all waste must be classified as either: Inert; Non-hazardous; or Hazardous.

The Environment Agency's Hazardous Waste Technical Guidance (WM3) document outlines the methodology for classifying wastes. Once classified the waste can be removed to the appropriately licensed facilities, with some waste requiring pre-treatments prior to disposal.

Following the investigation, 5No. samples of the Made Ground were submitted to the analytical laboratory to undergo a suite of testing for contamination testing, as discussed in the previous sections. Sampling depths were chosen to reflect the receptor of concern, human health, and typically comprised a surface or near surface sample and periodically to 1.00m bgl. Any horizon where olfactory or visual evidence of contamination was present was also sampled.

Based on a risk phase analysis of the chemical laboratory test results, in accordance with EC Hazardous Waste Directive and undertaken by Ground and Water Limited, all soil samples of Made Ground encountered on-site were NON-HAZARDOUS. The results of the assessment are given within Appendix H.

It is important to note that whilst we consider our in-house assessment tool to be an accurate interpretation of the requirements of WM3, therefore producing an initial classification in accordance with the guidance, this method classifies soils as either non-hazardous or hazardous and landfill operators have their own assessment tools and can often come to different conclusions. As a result, some landfill operators could refuse to take apparently suitable waste. It is recommended that the receiving landfill views the results of this assessment and the chemical laboratory results to determine their own classification.

In addition to the samples described above, 1No. sample of the Made Ground were scheduled to undergo Waste Acceptance Criteria (WAC) testing with single batch leachate from samples with a range of depths. The results indicate that WS1/0.20m were classified as non-inert as a result of high concentrations of Total Organic Carbon (TOC), Mineral Oil and Antinomy.

Where contaminated soils are to be removed, they should be placed on an impermeable membrane (visqueen or similar) to ensure that no cross-contamination of soils occurs.

8.7. Duty of Care

Groundworkers must maintain a good standard of personal hygiene including the wearing of overalls, boots, gloves and eye protectors and the use of dust masks during periods of dry weather.

To prevent exposure to airborne dust by both the general public and construction personnel the site should be kept damp during dry weather and at other times when dust would be generated as a result of construction activities.

The site should be securely fenced at all times to prevent unauthorised access. Washing facilities should be provided and eating restricted to mess huts.

FIGURES

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

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Site Location

2 - 6 Seagull Lane, Emsworth PO10 7QH	
Nyetimber Management Ltd	**November 2023**
Figure 1 – Site Location Plan	**GWPR5475**

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Site Boundary

2 - 6 Seagull Lane, Emsworth PO10 7QH

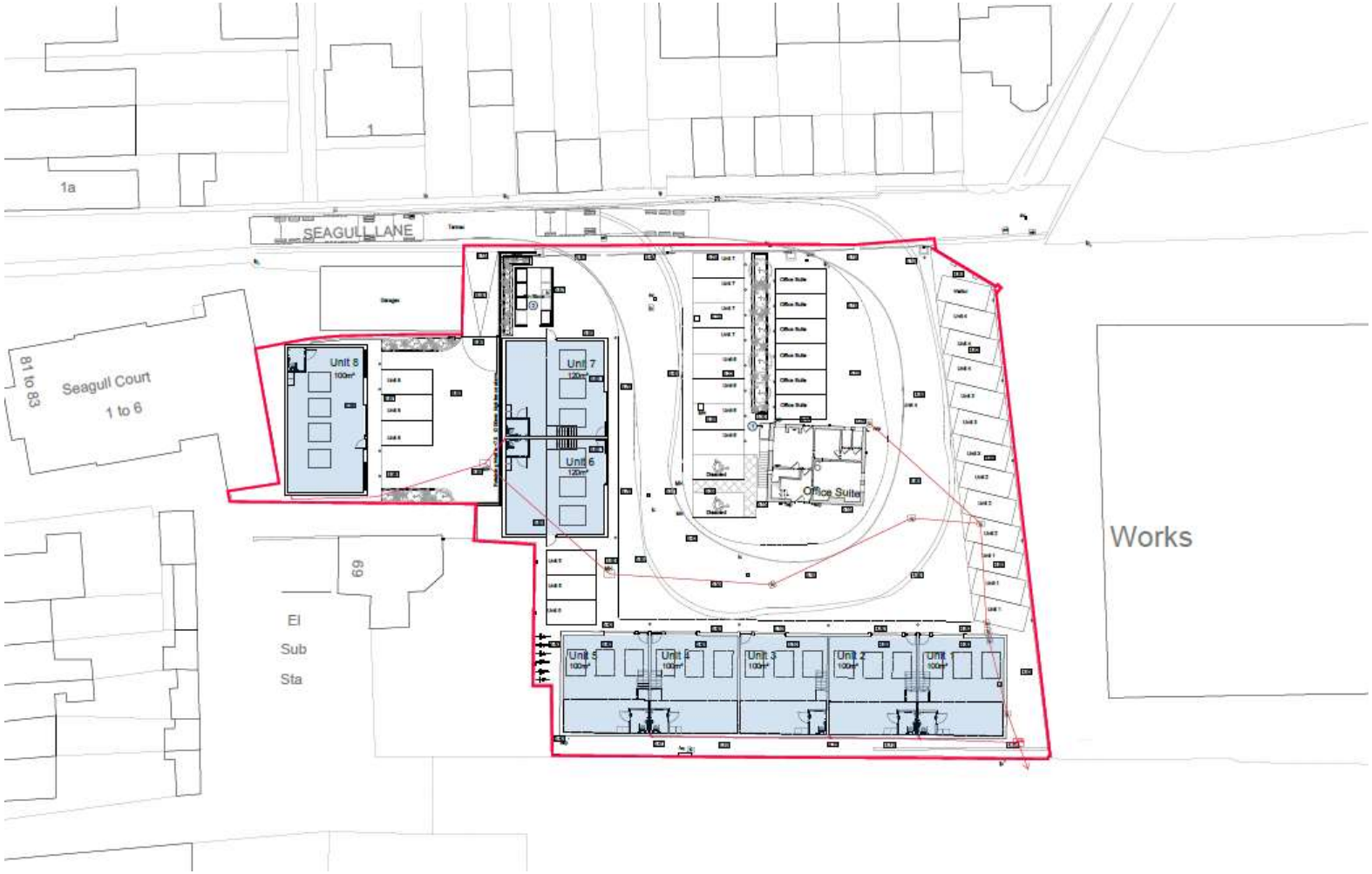
Nyetimber Management Ltd	**November 2023**
Figure 2 – Site Development Area	**GWPR5475**

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NTS

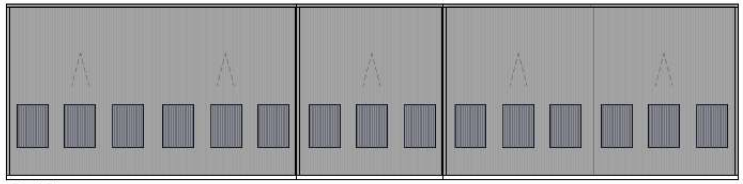
2 - 6 Seagull Lane, Emsworth PO10 7QH	
Nyetimber Management Ltd	**November 2023**
Figure 3 – Aerial Photograph	**GWPR5475**



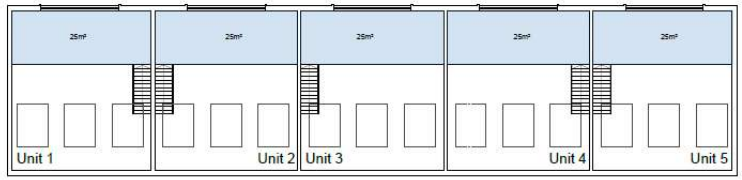
NTS

2 - 6 Seagull Lane, Emsworth PO10 7QH	
Nyetimber Management Ltd	**November 2023**
Figure 4 – Proposed site development plan	**GWPR5475**

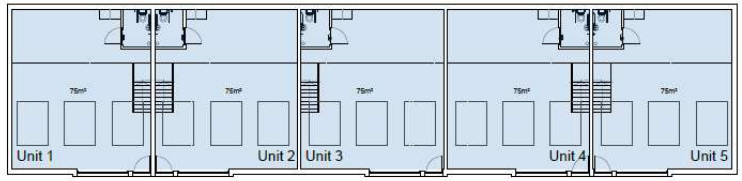
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Roof Plan



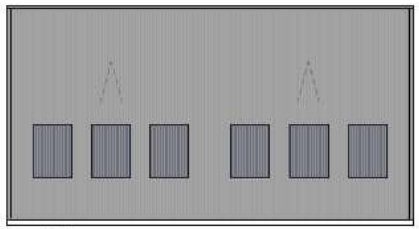
Mezzanine Level



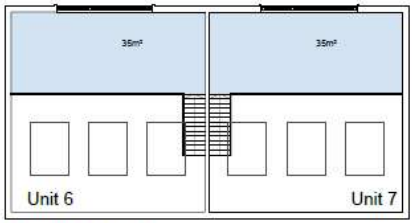
Ground Floor

NTS

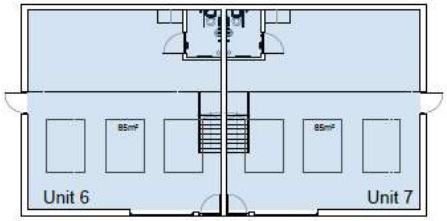
2 - 6 Seagull Lane, Emsworth PO10 7QH	
Nyetimber Management Ltd	**November 2023**
Figure 5 – Proposed Development Plans Floor plans Units 1-5	**GWPR5475**



Roof Plan



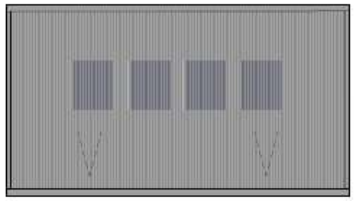
Mezzanine Level



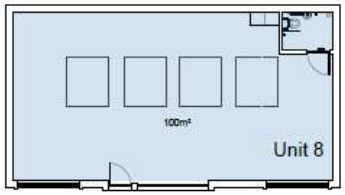
Ground Floor

NTS

2 - 6 Seagull Lane, Emsworth PO10 7QH	
Nyetimber Management Ltd	**November 2023**
Figure 6 – Proposed Development Plans Floor plans Units 6-7	**GWPR5475**



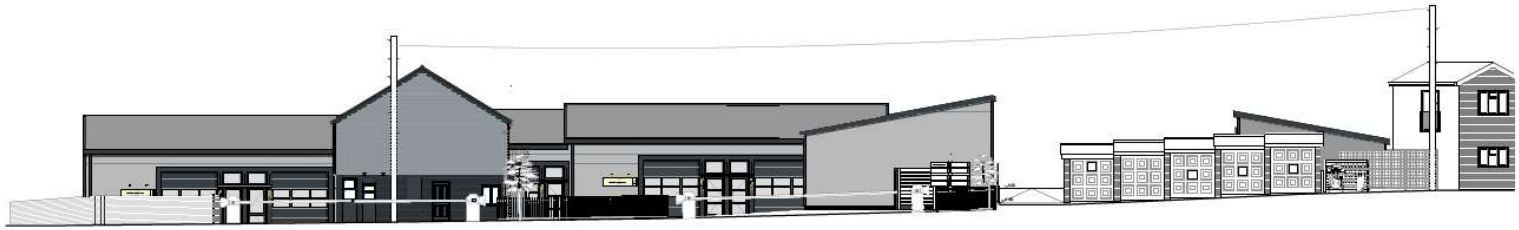
Roof Plan



Ground Floor

NTS

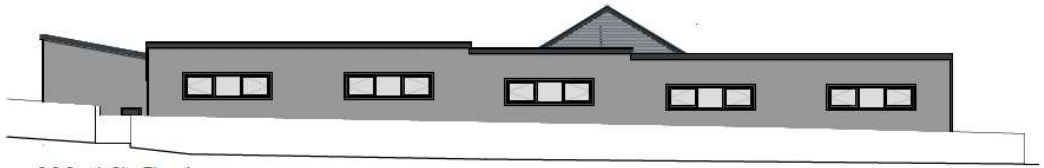
2 - 6 Seagull Lane, Emsworth PO10 7QH	
Nyetimber Management Ltd	**November 2023**
Figure 7 – Proposed Development Plans Floor plans Units 8	**GWPR5475**



1-1 North Site Elevation



2-2 East Site Elevation



3-3 South Site Elevation



notes:

revisions: A | 10.02.2022 | PT | General update to align with proposed elevation changes, issued for planning revisions:

NOTE: The contractor is responsible for checking all site dimensions and levels. These should be checked prior to the ordering of any components and before the commencement of the works. All discrepancies should be brought to the attention of the Contract Administrator.

M&M Hall Family Pension Trust

Seagull Lane

Emsworth, Hampshire, PO10 7QH

drawing information title : Proposed Site Elevations

status : Information

date : November 21

scale : 1:100 @ A1

drawn : PT

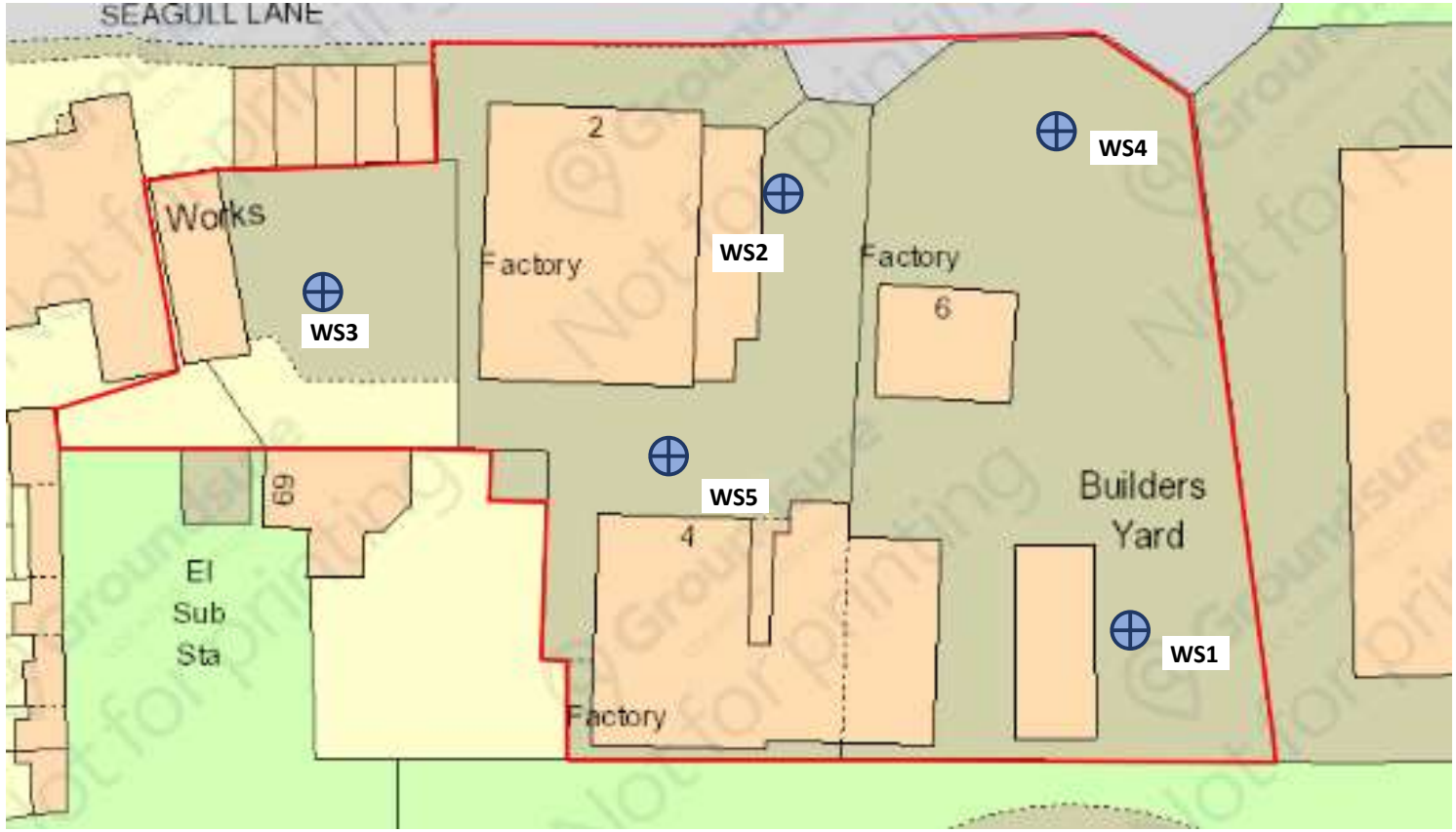
checked : IV

job no 5807 dwg no 3006 rev A

NTS

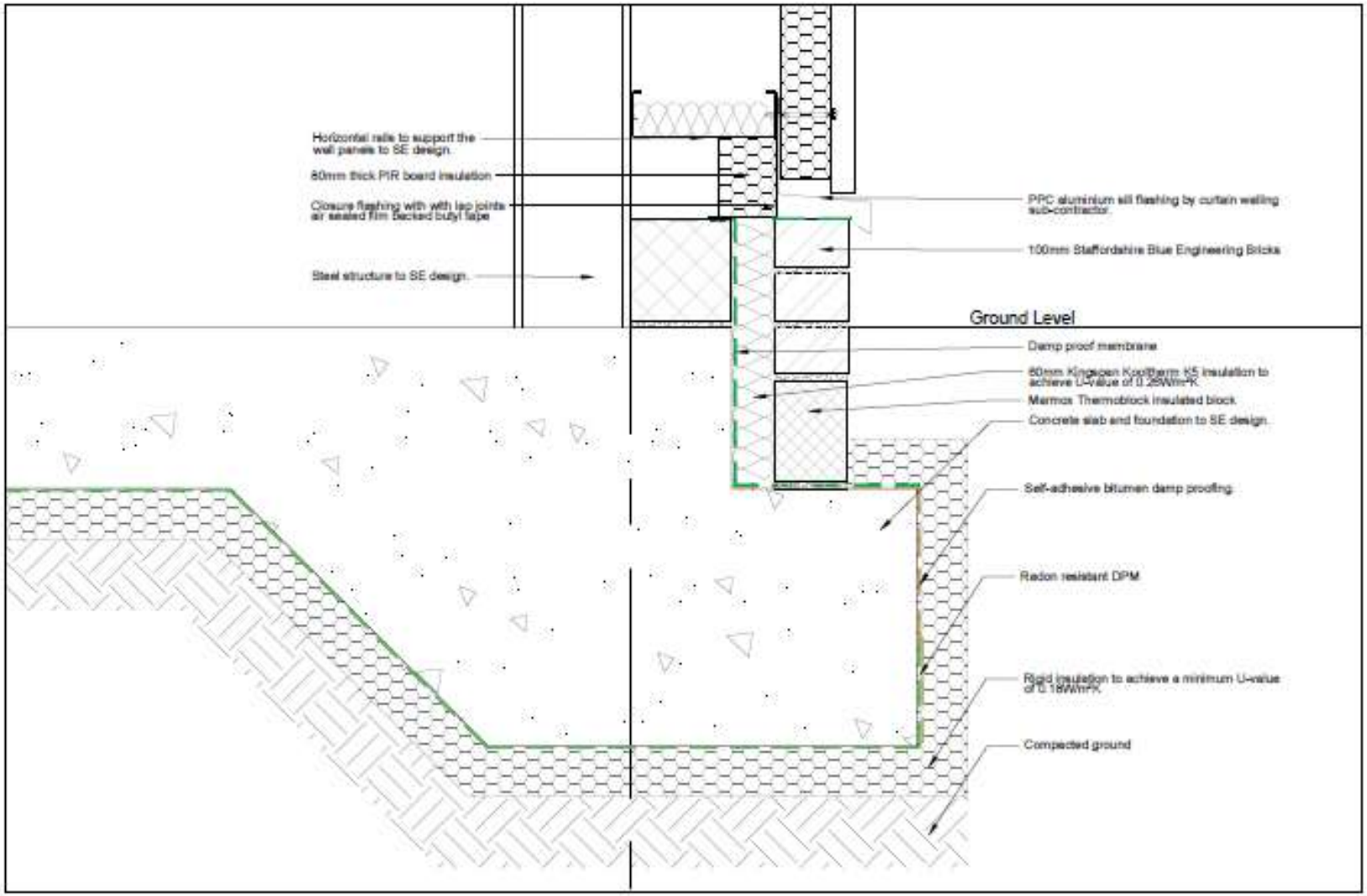
2 - 6 Seagull Lane, Emsworth PO10 7QH	
Nyetimber Management Ltd	**November 2023**
Figure 8 – Proposed Development Plans Site elevations	**GWPR5475**

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2 - 6 Seagull Lane, Emsworth PO10 7QH	
Nyetimber Management Ltd	**November 2023**
Figure 9 – Trial Hole Location Plan	**GWPR5475**



1. Standard plinth detail Units 1-8.

2 - 6 Seagull Lane, Emsworth PO10 7QH	
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Figure 10 – Proposed Slab Construction	**GWPR5475**

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APPENDIX A: Conditions and Limitations

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
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The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The report has been prepared on the basis of information, data and materials which were available at the time of writing. Accordingly, any conclusions, opinions or judgements made in the report should not be regarded as definitive or relied upon to the exclusion of other information, opinions and judgements.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief; as such these do not necessarily address all aspects of ground behaviour at the site. No liability is accepted for any reliance placed on it by others unless specifically agreed in writing.

Any decisions made by you, or by any organisation, agency or person who has read, received or been provided with information contained in the report ("you" or "the Recipient") are decisions of the Recipient and we will not make, or be deemed to make, any decisions on behalf of any Recipient. We will not be liable for the consequences of any such decisions.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Any Recipient must take into account any other factors apart from the Report of which they and their experts and advisers are or should be aware. The information, data, conclusions, opinions and judgements set out in the report may relate to certain contexts and may not be suitable in other contexts. It is your responsibility to ensure that you do not use the information we provide in the wrong context.

This report is based on readily available geological records, the recorded physical investigation, the strata observed in the works, together with the results of completed site and laboratory tests. Whilst skill and care has been taken to interpret these conditions likely between or below investigation points, the possibility of other characteristics not revealed cannot be discounted, for which no liability can be accepted. The impact of our assessment on other aspects of the development required evaluation by other involved parties.

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous in ground activities. The ground conditions have been sampled or monitored in recorded locations and tests for some of the more common chemicals generally expected. Other concentrations of types of chemicals may exist.

The conclusions and recommendations relate to 2 - 6 Seagull Lane, Emsworth PO10 7QH.

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sampler borehole implies the specific technique used to produce a trial hole.

The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation on a plot-by-plot basis prior to the construction of foundations. Where trees are mentioned in the text this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

Ownership of copyright of all printed material including reports, laboratory test results, trial pit and borehole log sheets, including drillers log sheets, remain with Ground and Water Limited. Licence is for the sole use of the client and may not be assigned, transferred or given to a third party.

Only our client may rely on this report and should this report or any information contained in it be provided to any third party we accept no responsibility to the third party for the contents of this report save to the extent expressly outlined by us in writing in a reliance letter addressed from us to the third party.

Recipients are not permitted to publish this report outside of their organisation without our express written consent.

APPENDIX B: Technical Glossary

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TECHNICAL GLOSSARY

The list of possible definitions within the report may be seen below. Please note that some definitions may not be relevant to this report.

HYDROGEOLOGY:

A **Principal Aquifer** is a layer of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Secondary (A) Aquifers consist of deposits with permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as Minor Aquifers.

Secondary (B) Aquifers consist of deposits with predominantly lower permeability layers with may stoke and yield limited amounts of groundwater due to localised features such as fissures, think permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

Secondary Aquifers (Undifferentiated) are assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both a minor aquifer and non-aquifer in different locations due to the variable characteristics of the rock type.

Unproductive Strata are rock layers with low permeability that have negligible significance for water supply or river base flow. These were formerly classified as non-aquifers.

FLOOD ZONES:

Environment Agency Flood Zone 2, defined as; land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.

Environment Agency Flood Zone 3 shows the extent of a river flood with a 1 in 100 (1%0 or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year.

Environment Agency Flood Zone 3 area that benefits from flood defences, defined as; land and property in this flood zone would have a high probability of flooding without the local flood defences. These protect the area against a river flood with a 1% chance of happening each year, or a flood from the sea with a 0.5% chance of happening each year.

GROUNDWATER SOURCE PROTECTION ZONES (SPZS):

Inner Zone (SPZ1): This zone is 50 day travel time of pollutant to source with a 50 metres default minimum radius.

Outer Zone (SPZ2): This zone is 400 day travel time of pollutant to source. This has a 250 or 500 metres minimum radius around the source depending on the amount of water taken.

Total Catchment (SPZ3): This is the area around a supply source within which all the groundwater ends up at the abstraction point. This is the point from where the water is taken. This could extend some distance from the source point.

Zone of Special Interest (SPZ4): This zone is where local conditions require additional protection.

IN-SITU STRENGTH GEOTECHNICAL TESTING:

Windowless Sample and/or Cable Percussion and/or Rotary Boreholes provide samples of the ground for assessment but they do not give any engineering data. The standard penetration test (SPT) is an in-situ dynamic penetration test designed to provide information on the geotechnical engineering properties of soil. The test uses a thick-walled sample tube, with an outside diameter of 50mm and an inside diameter of 35mm, and a length of around 650mm. This is driven into the ground at the bottom of a borehole by blows from a slide hammer with a weight of 63.5kg falling through a distance of 760mm. The sample tube is driven 150mm into the ground and then the number of blows needed for the tube to penetrate each 75mm up to a depth of 450mm is recorded. The sum of the number of blows is termed the "standard penetration resistance" or the "N-value".

Dynamic Probing involves the driving of a metal cone into the ground via a series of steel rods. These rods are driven from the surface by a hammer system that lifts and drops a 63.5kg (SHDP) hammer onto the top of the rods through a set height, thus ensuring a consistent energy input. The number of hammer blows that are required to drive the cone down by each 100mm increment are recorded. These blow counts then provide a comparative assessment from which correlations have been published, based on dynamic energy, which permits engineering parameters to be generated. (The Dynamic Probe 'Super Heavy' (SHDP) Tests were conducted in accordance with BS 1377; 1990; Part 9, Clause 3.2).

APPENDIX C:
Groundsure
Historical Mapping

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
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Groundsure INSIGHTS

Site Details:

2, SEAGULL LANE, EMSWORTH,
PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

Map date: **1869**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1869
Revised 1869
Edition N/A
Copyright N/A
Levelled N/A

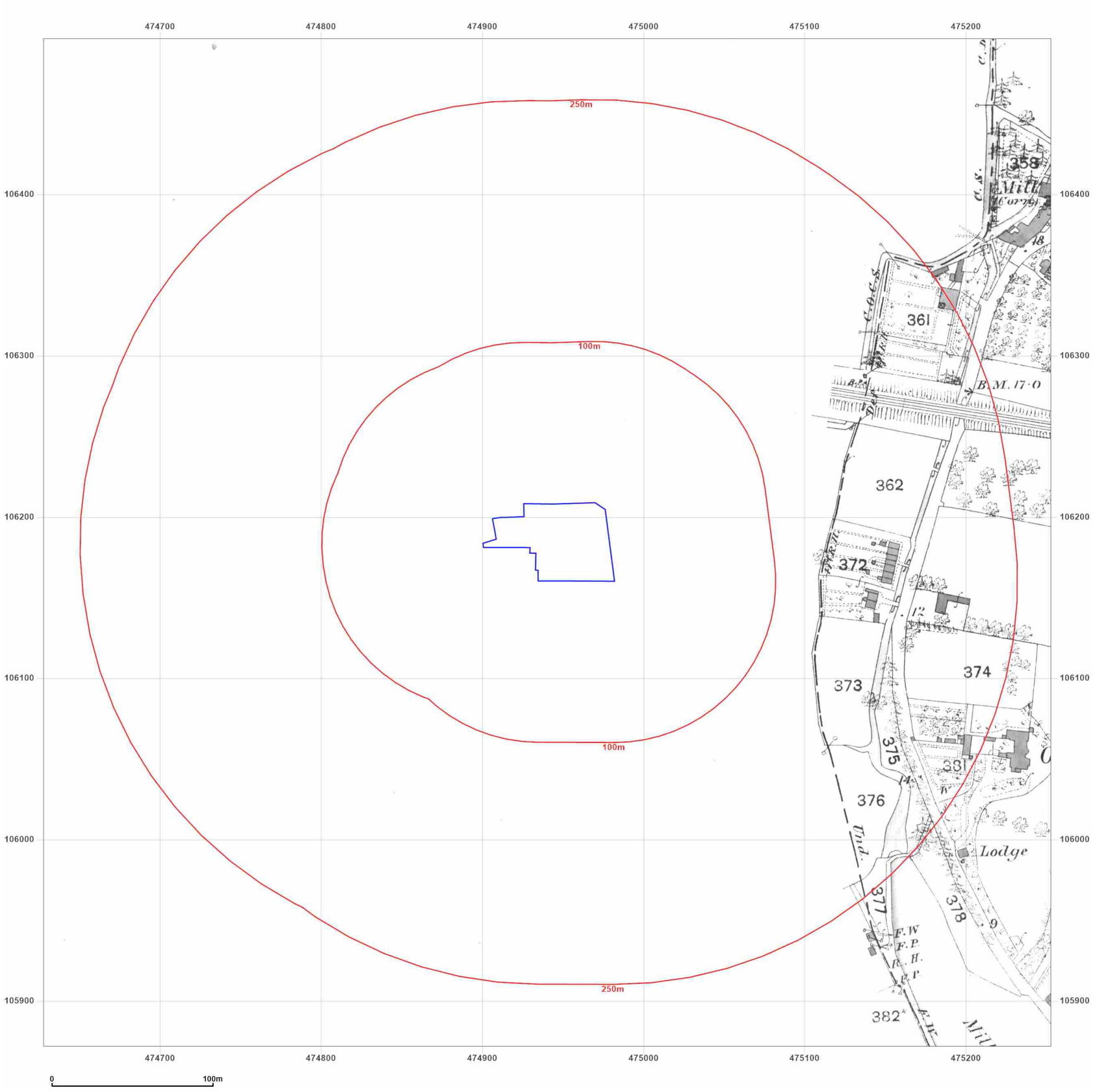
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Production date: 11 May 2023

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

2, SEAGULL LANE, EMSWORTH,
PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

Map date: **1874**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1874
Revised 1874
Edition N/A
Copyright N/A
Levelled N/A

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Groundsure INSIGHTS

Site Details:

2, SEAGULL LANE, EMSWORTH,
PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

Map date: **1897**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1897
Revised 1897
Edition N/A
Copyright N/A
Levelled N/A

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PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

Map date: **1898**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1898
Revised 1898
Edition N/A
Copyright N/A
Levelled N/A

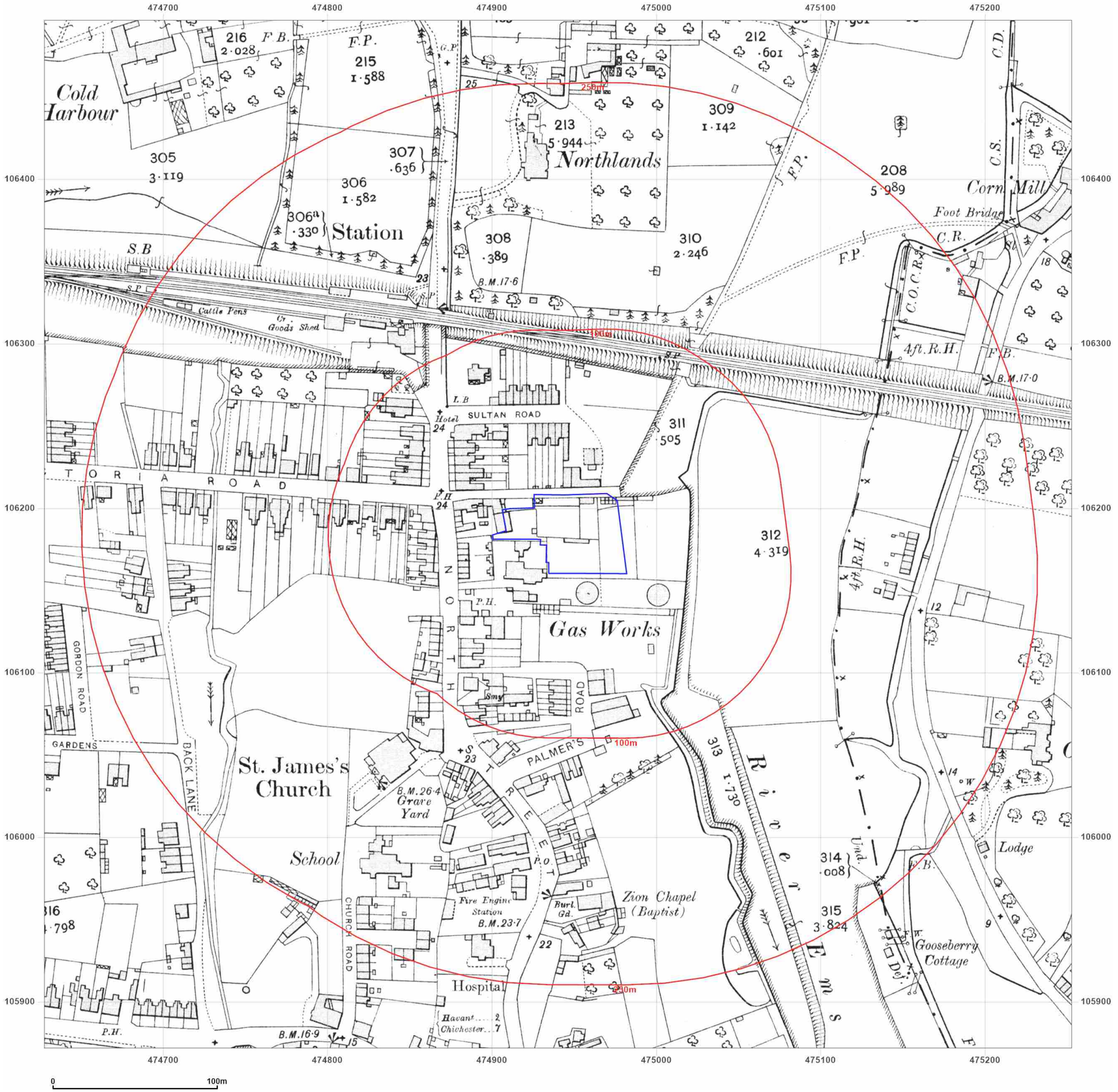
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PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

Map date: **1908**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1908
Revised 1908
Edition N/A
Copyright N/A
Levelled N/A

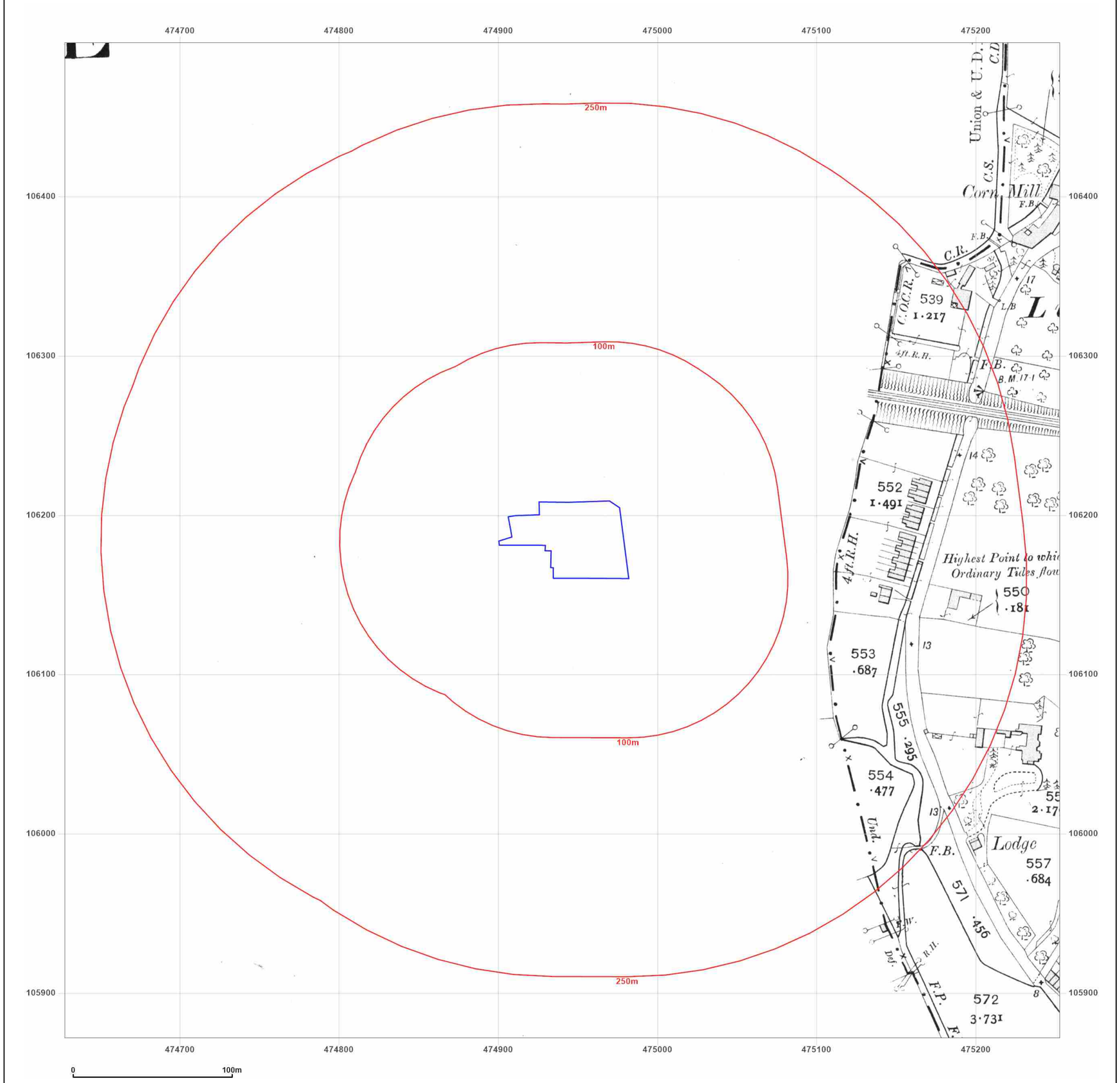
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PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

Map date: **1912**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1912
Revised 1912
Edition N/A
Copyright N/A
Levelled N/A

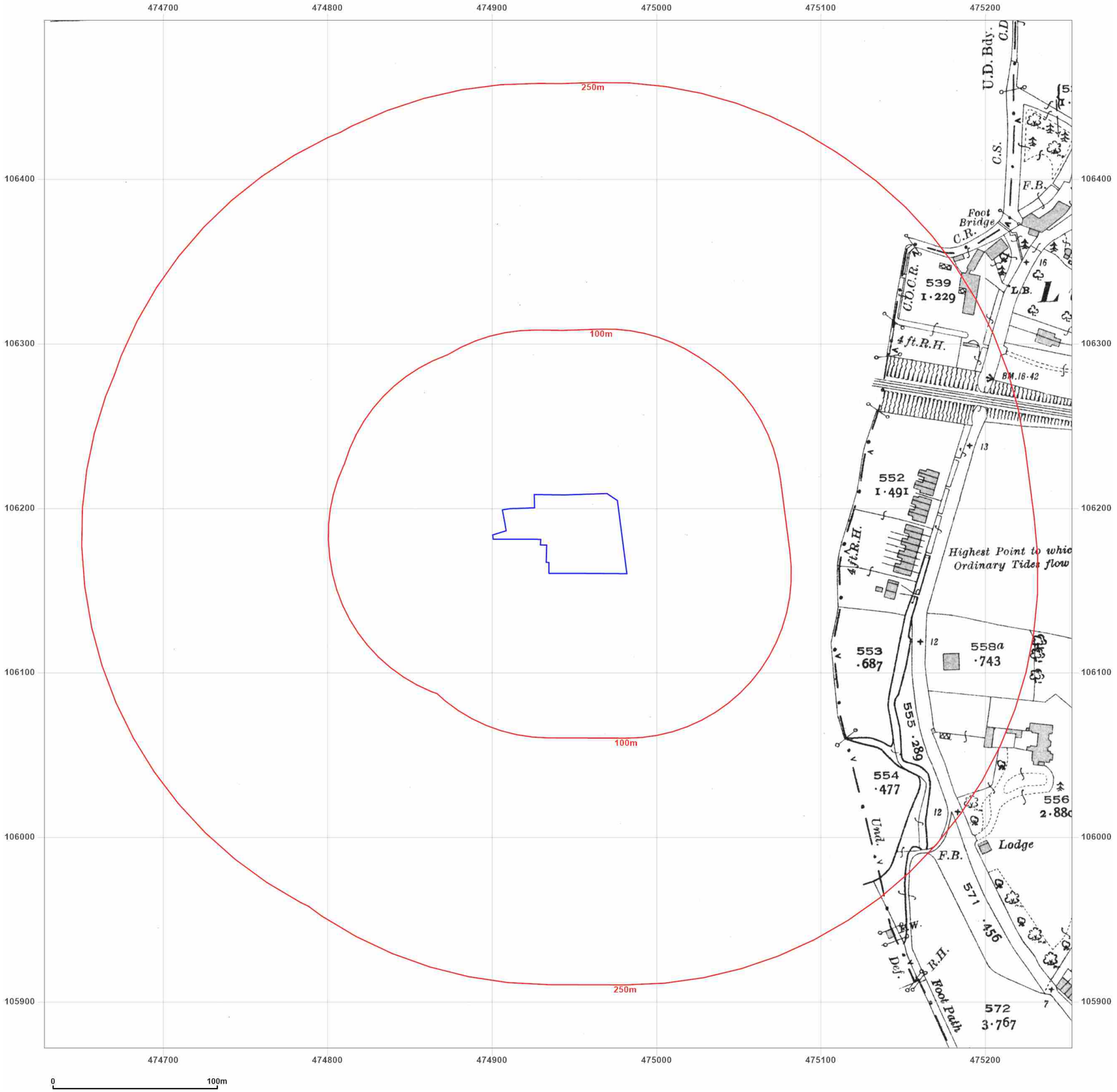
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PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

Map date: **1932**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1932
Revised 1932
Edition N/A
Copyright N/A
Levelled N/A

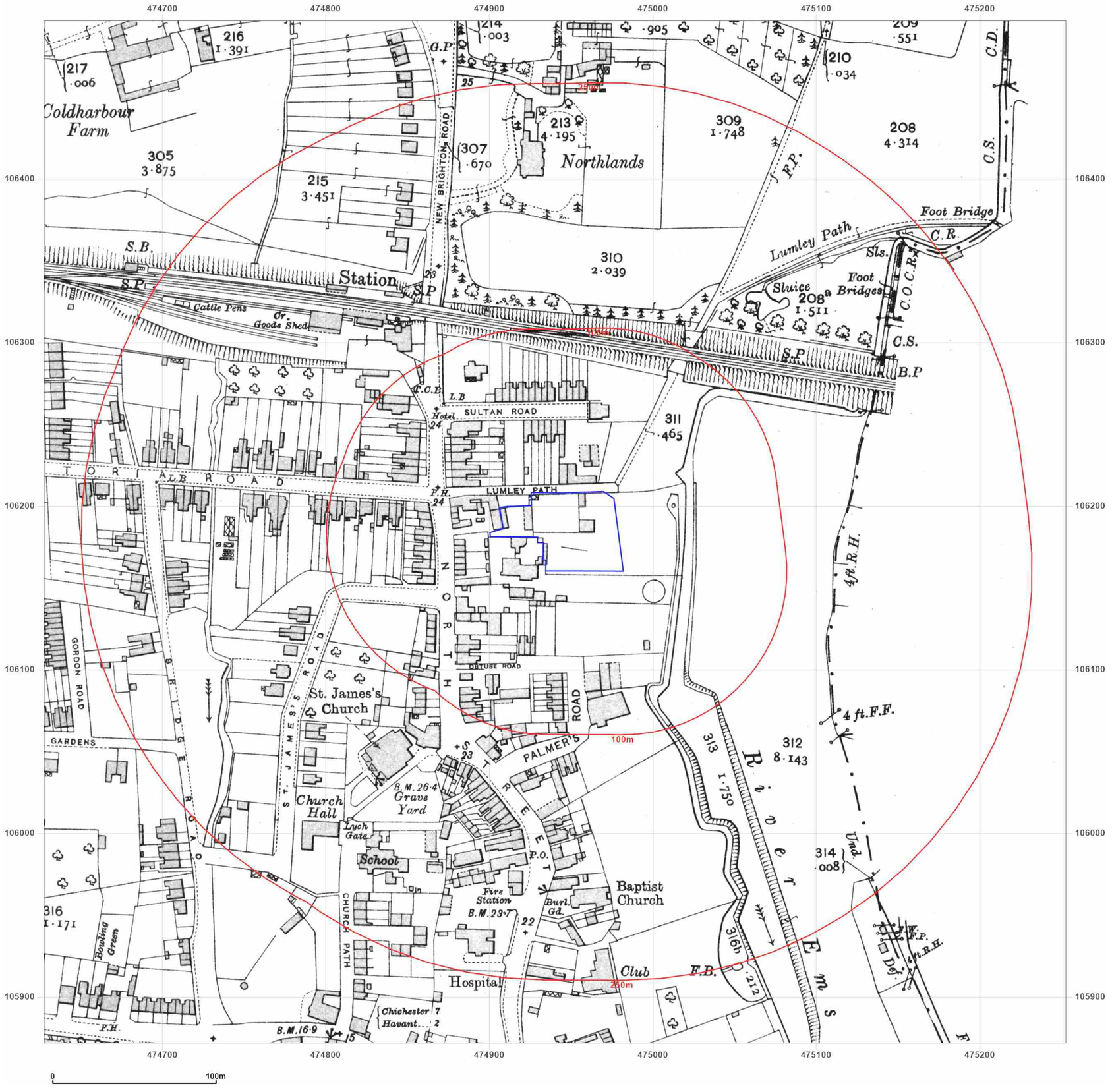
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Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

Map date: **1932**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1865
Revised 1931
Edition 1932
Copyright N/A
Levelled 1907

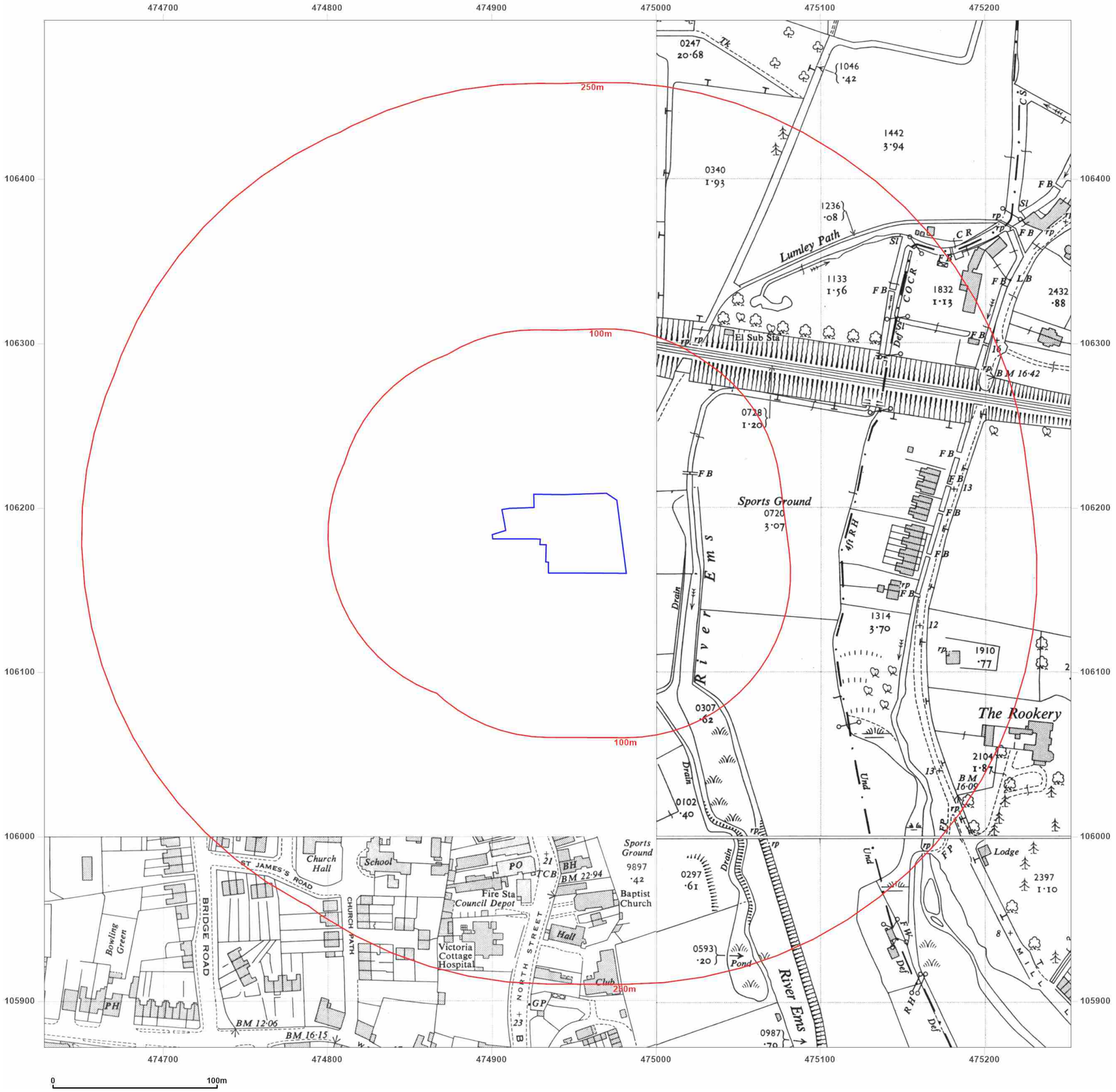
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PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: National Grid

Map date: **1952**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1952
Revised 1952
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1952
Revised 1952
Edition N/A
Copyright N/A
Levelled 1941

Surveyed 1952
Revised 1952
Edition N/A
Copyright N/A
Levelled 1941

Surveyed 1952
Revised 1952
Edition N/A
Copyright N/A
Levelled 1941

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Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: National Grid

Map date: **1965-1969**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1961
Revised 1961
Edition N/A
Copyright 1965
Levelled 1958

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Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: National Grid

Map date: **1974-1978**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1978
Revised 1978
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1952
Revised 1973
Edition N/A
Copyright 1974
Levelled 1958

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Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: National Grid

Map date: **1979-1980**

Scale: 1:1,250

Printed at: 1:2,000

N
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Surveyed 1978
Revised 1978
Edition N/A
Copyright 1980
Levelled 1958

Surveyed 1978
Revised 1978
Edition N/A
Copyright 1979
Levelled 1958

Surveyed 1978
Revised 1978
Edition N/A
Copyright 1979
Levelled 1958

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Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: National Grid

Map date: **1986-1989**

Scale: 1:1,250

Printed at: 1:2,000

N
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Surveyed 1958
Revised 1989
Edition N/A
Copyright 1989
Levelled 1958

Surveyed 1958
Revised 1986
Edition N/A
Copyright 1986
Levelled 1958

Surveyed 1958
Revised 1989
Edition N/A
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Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: National Grid

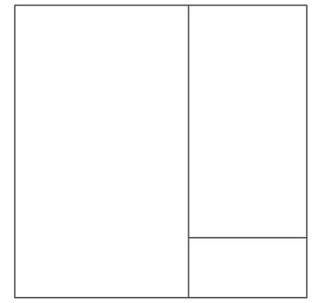
Map date: **1987-1989**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1958
Revised 1989
Edition N/A
Copyright 1989
Levelled 1958



Surveyed 1958
Revised 1987
Edition N/A
Copyright 1987
Levelled 1958

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Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: National Grid

Map date: **1991-1993**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1993 Revised N/A Edition N/A Copyright 1993 Levelled N/A		Surveyed 1993 Revised 1993 Edition N/A Copyright N/A Levelled N/A
Surveyed 1993 Revised 1993 Edition N/A Copyright N/A Levelled N/A		Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A

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Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

N
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2003

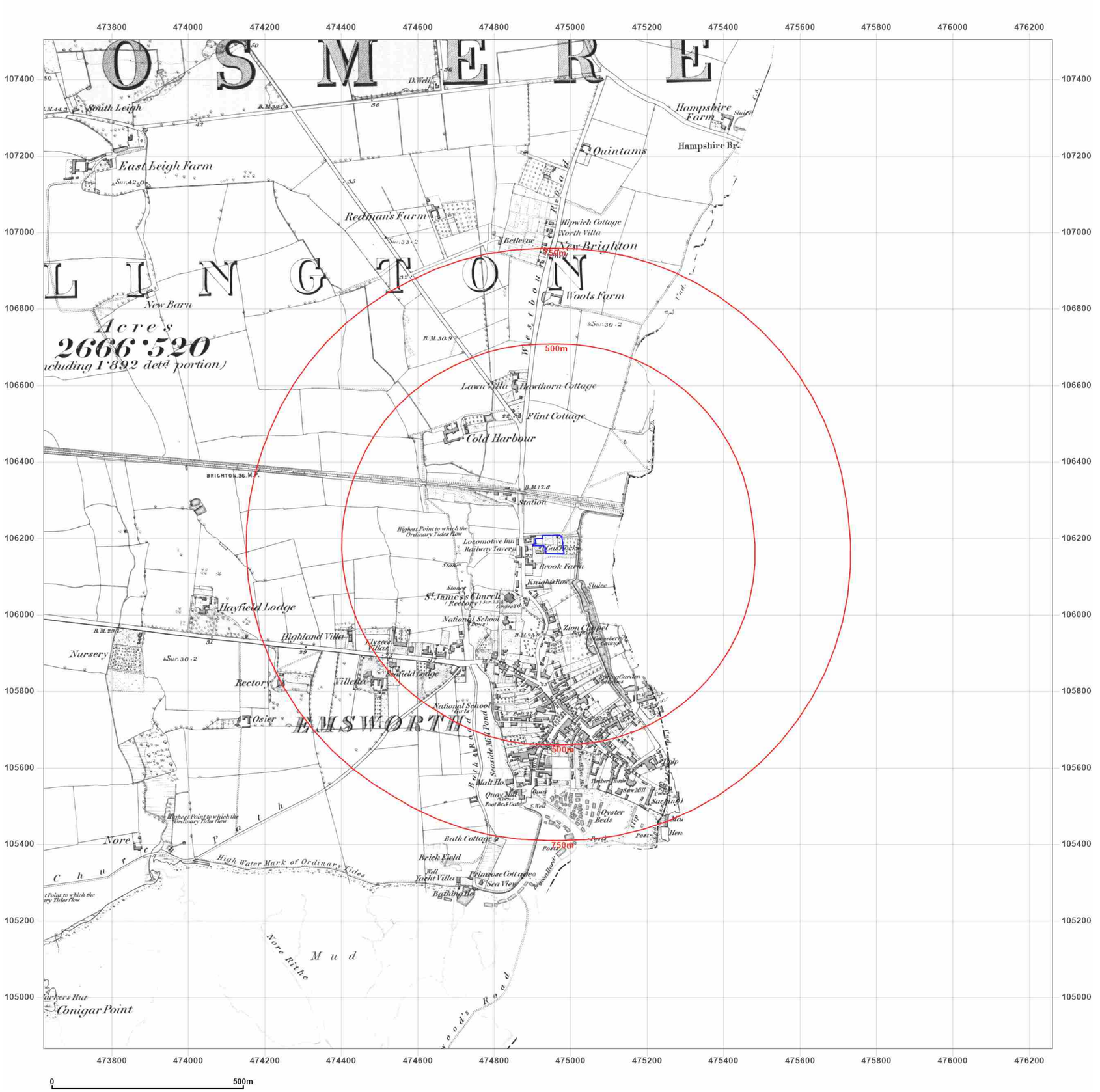
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Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

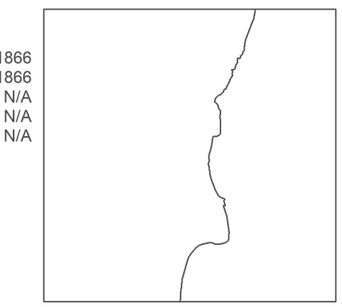
Map Name: County Series

Map date: **1866**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1866
Revised 1866
Edition N/A
Copyright N/A
Levelled N/A

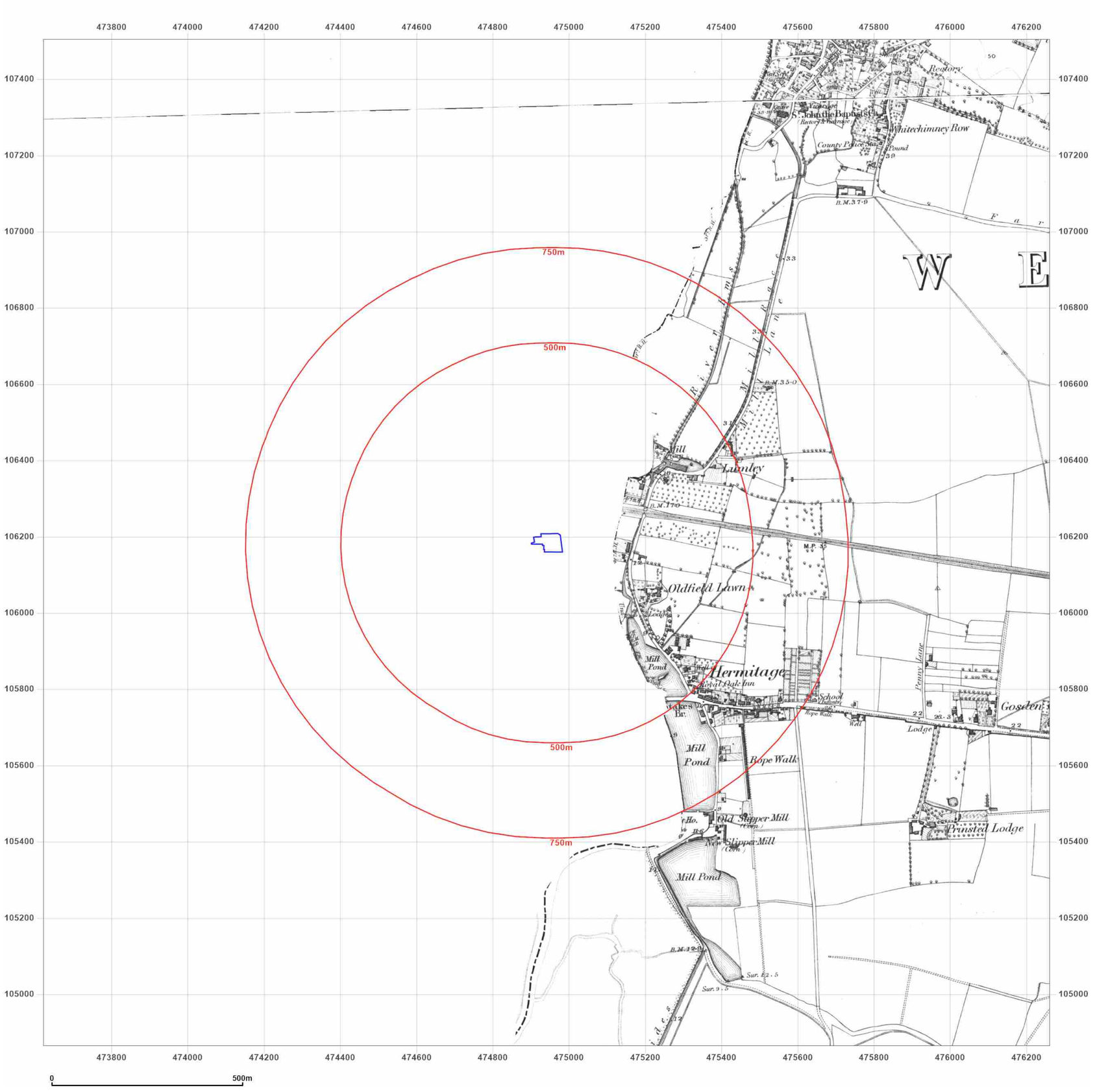
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Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

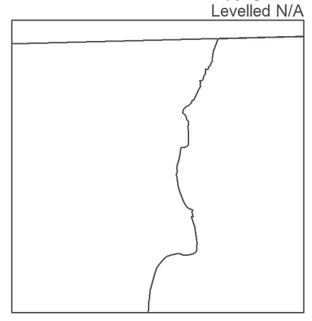
Map date: **1875-1877**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1875
Revised 1875
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1877
Revised 1877
Edition N/A
Copyright N/A
Levelled N/A

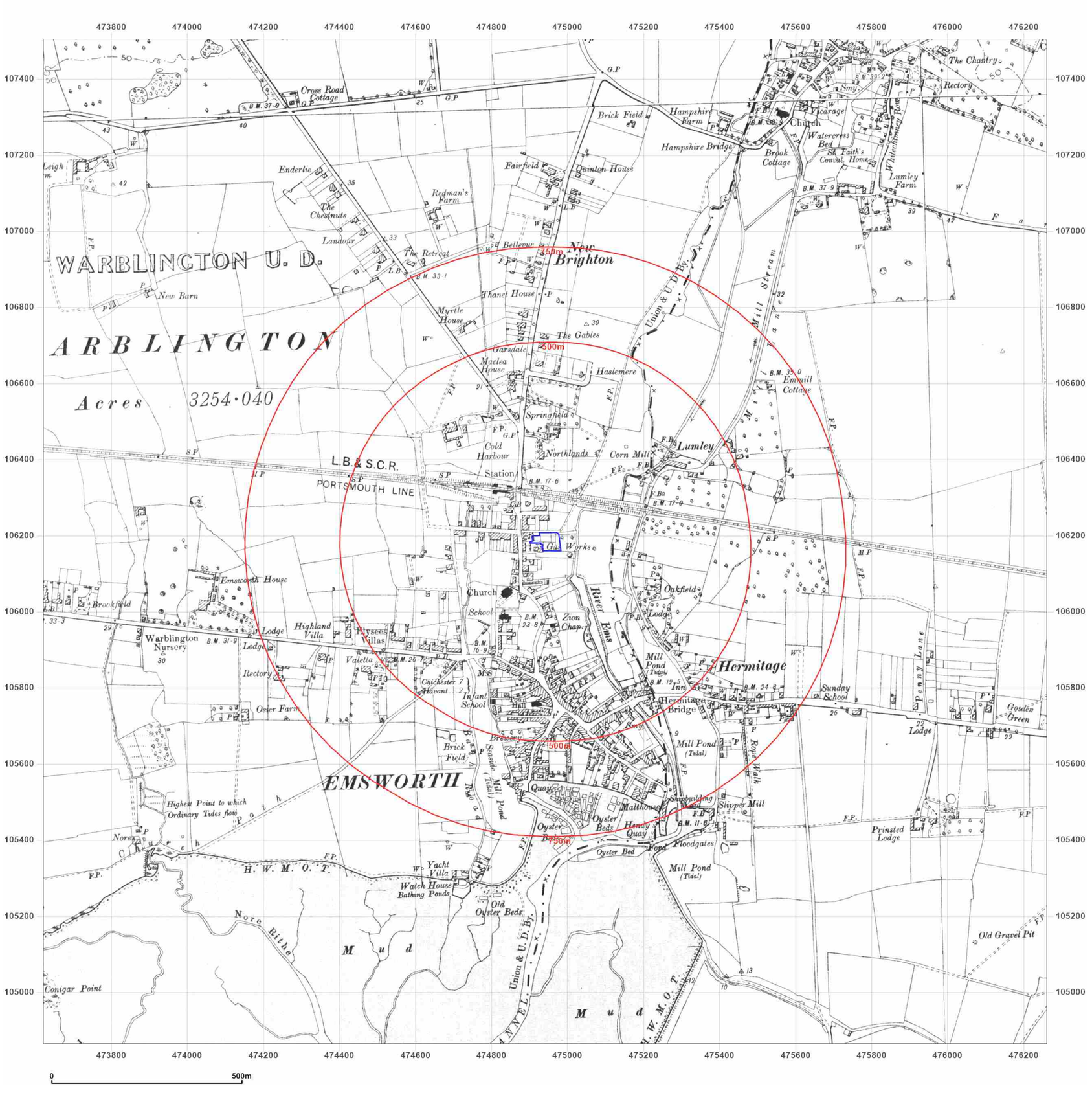
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Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

Map date: **1895-1896**

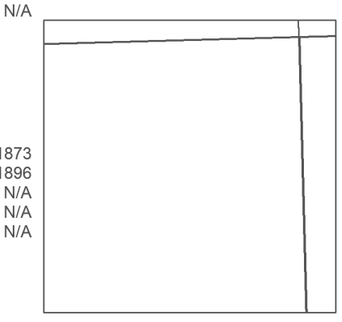
Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1873
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1875
Revised 1896
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1873
Revised 1896
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1875
Revised 1896
Edition N/A
Copyright N/A
Levelled N/A

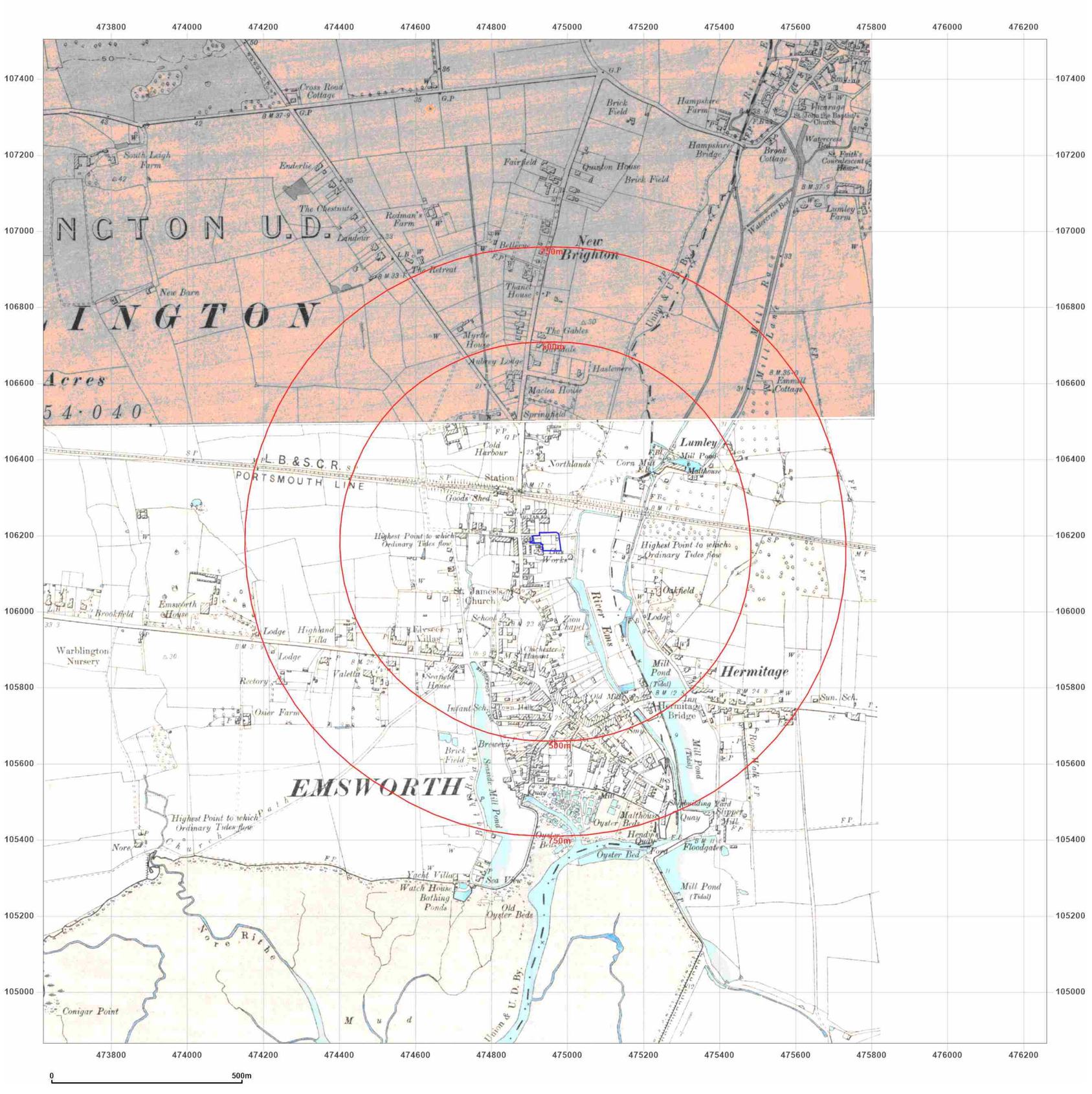
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Site Details:

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PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

Map date: **1896-1898**

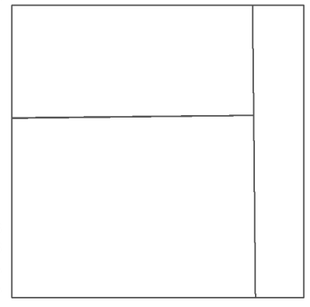
Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1873
Revised 1895
Edition 1898
Copyright N/A
Levelled N/A

Surveyed 1866
Revised 1896
Edition N/A
Copyright N/A
Levelled N/A



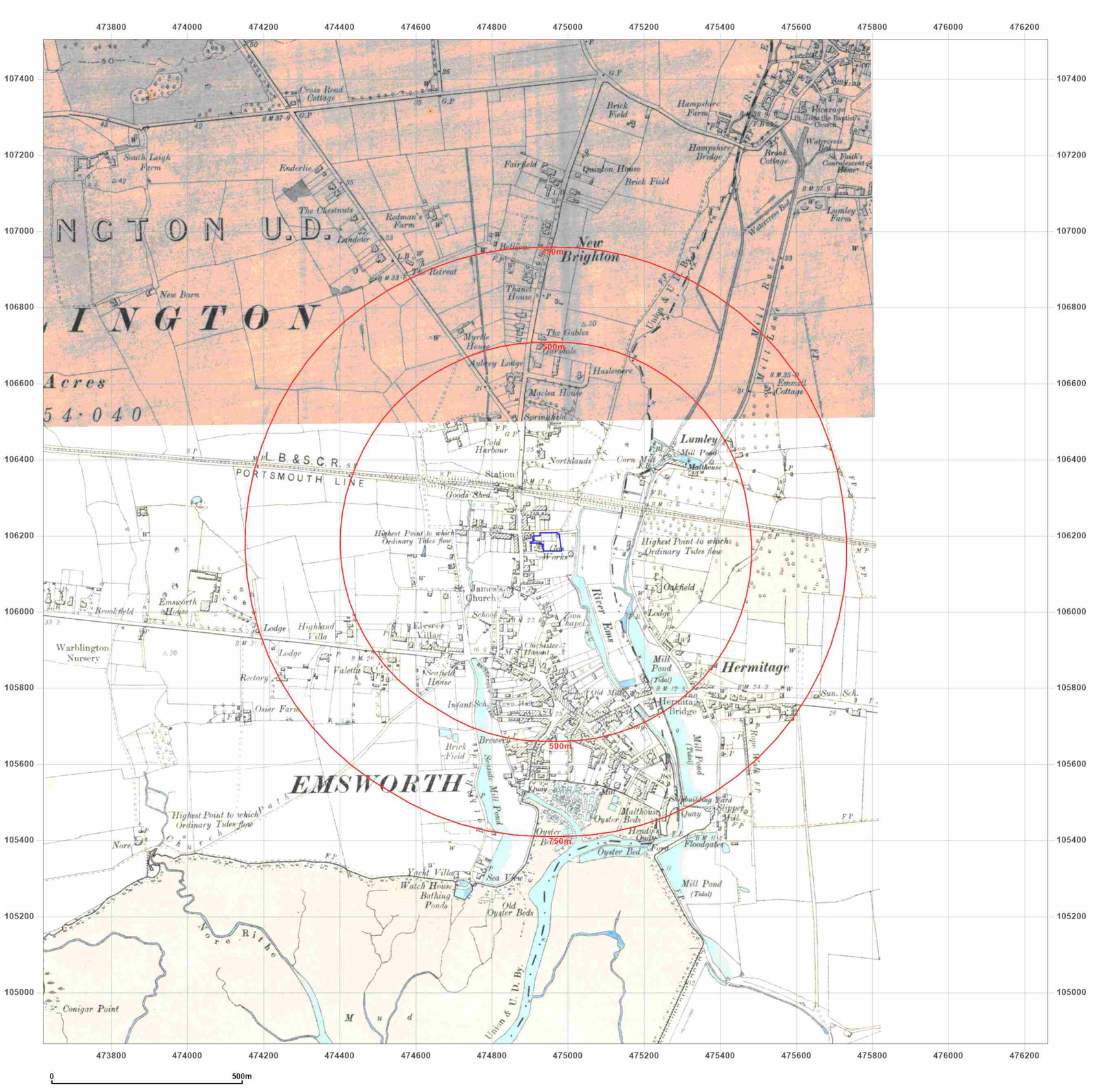
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PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

Map date: **1895-1898**

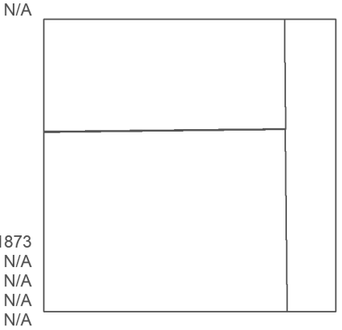
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Printed at: 1:10,560

N
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Surveyed 1872
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1873
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A



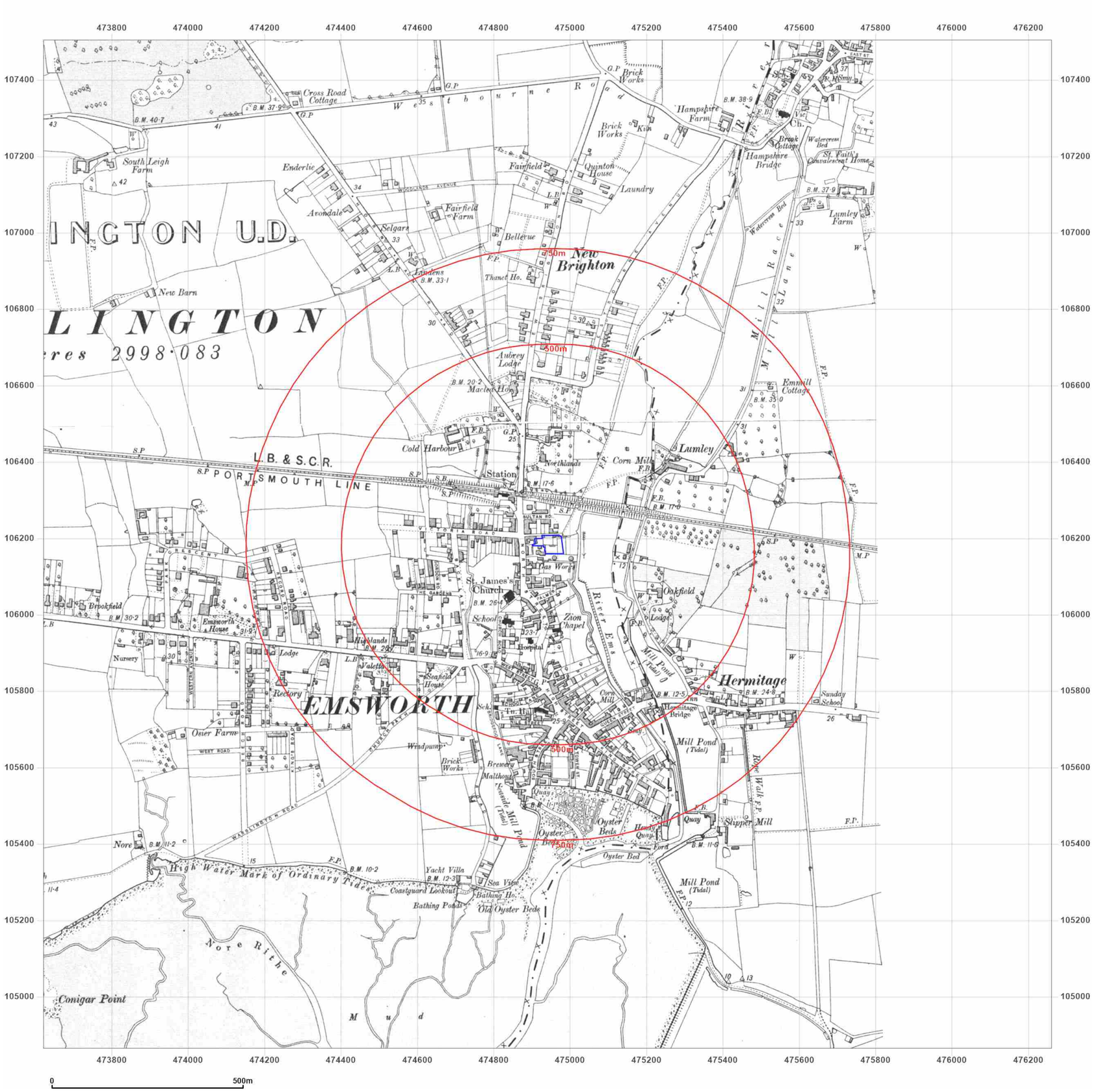
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PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

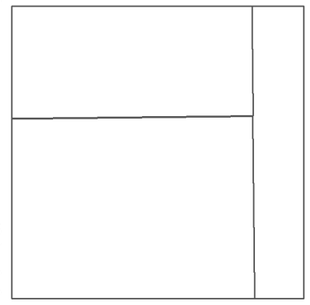
Map date: **1907**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1865
Revised 1907
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1865
Revised 1907
Edition N/A
Copyright N/A
Levelled N/A

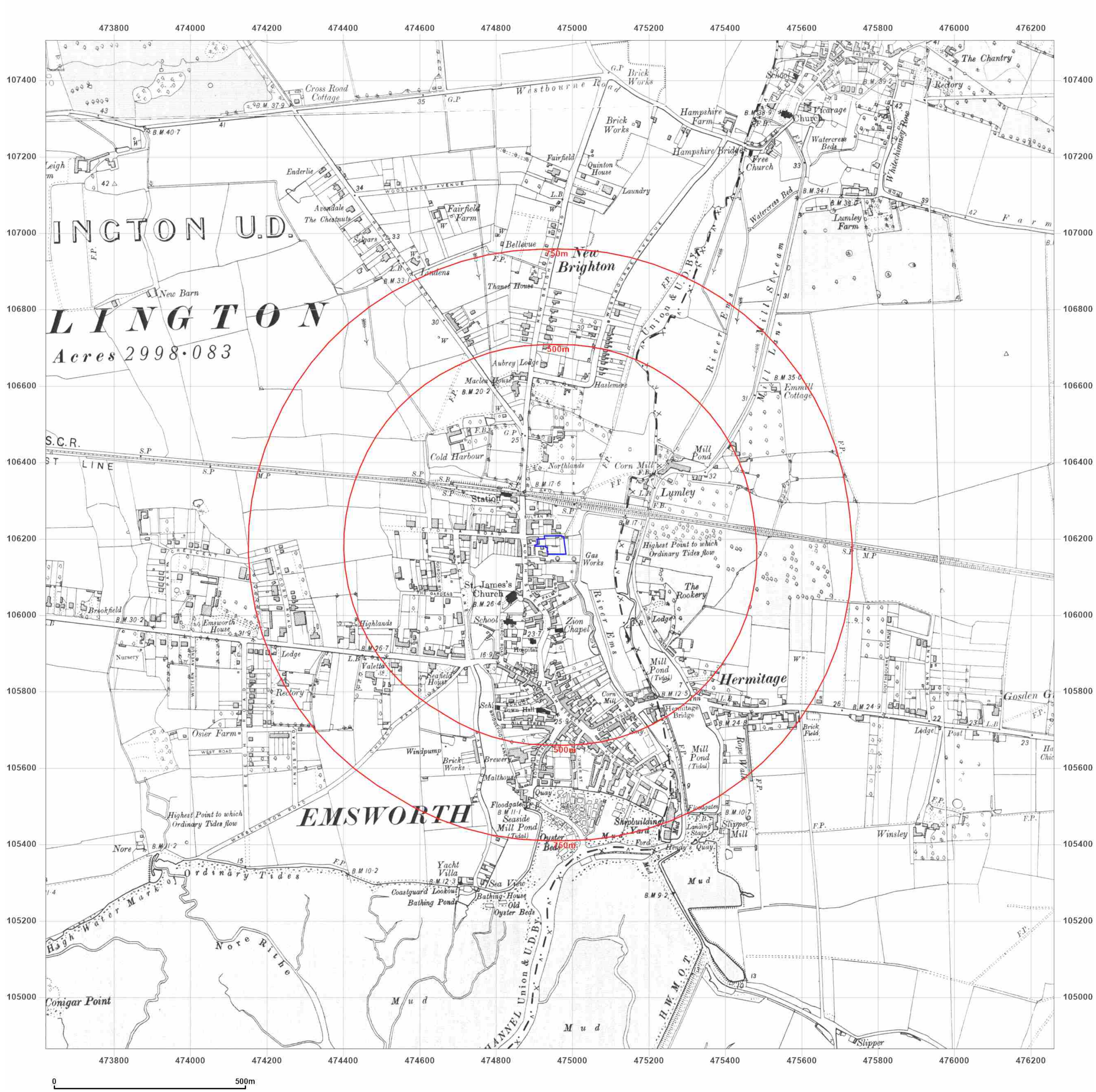
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Site Details:

2, SEAGULL LANE, EMSWORTH,
PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

Map date: **1910-1914**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1873
Revised 1910
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1873
Revised 1914
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1873
Revised 1914
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1873
Revised 1914
Edition N/A
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Site Details:

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PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

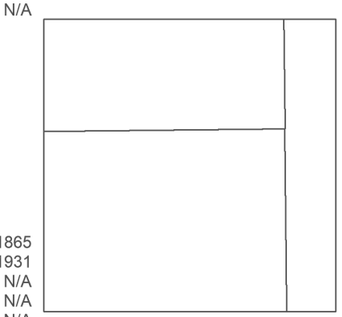
Map date: **1931**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1865
Revised 1931
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1865
Revised 1931
Edition N/A
Copyright N/A
Levelled N/A

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Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

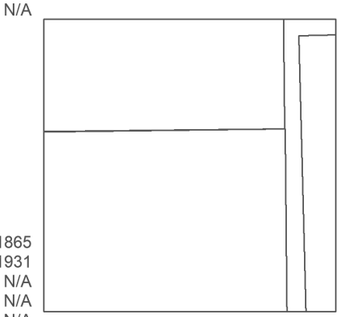
Map date: **1931-1932**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1865
Revised 1931
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1873
Revised 1932
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1865
Revised 1931
Edition N/A
Copyright N/A
Levelled N/A

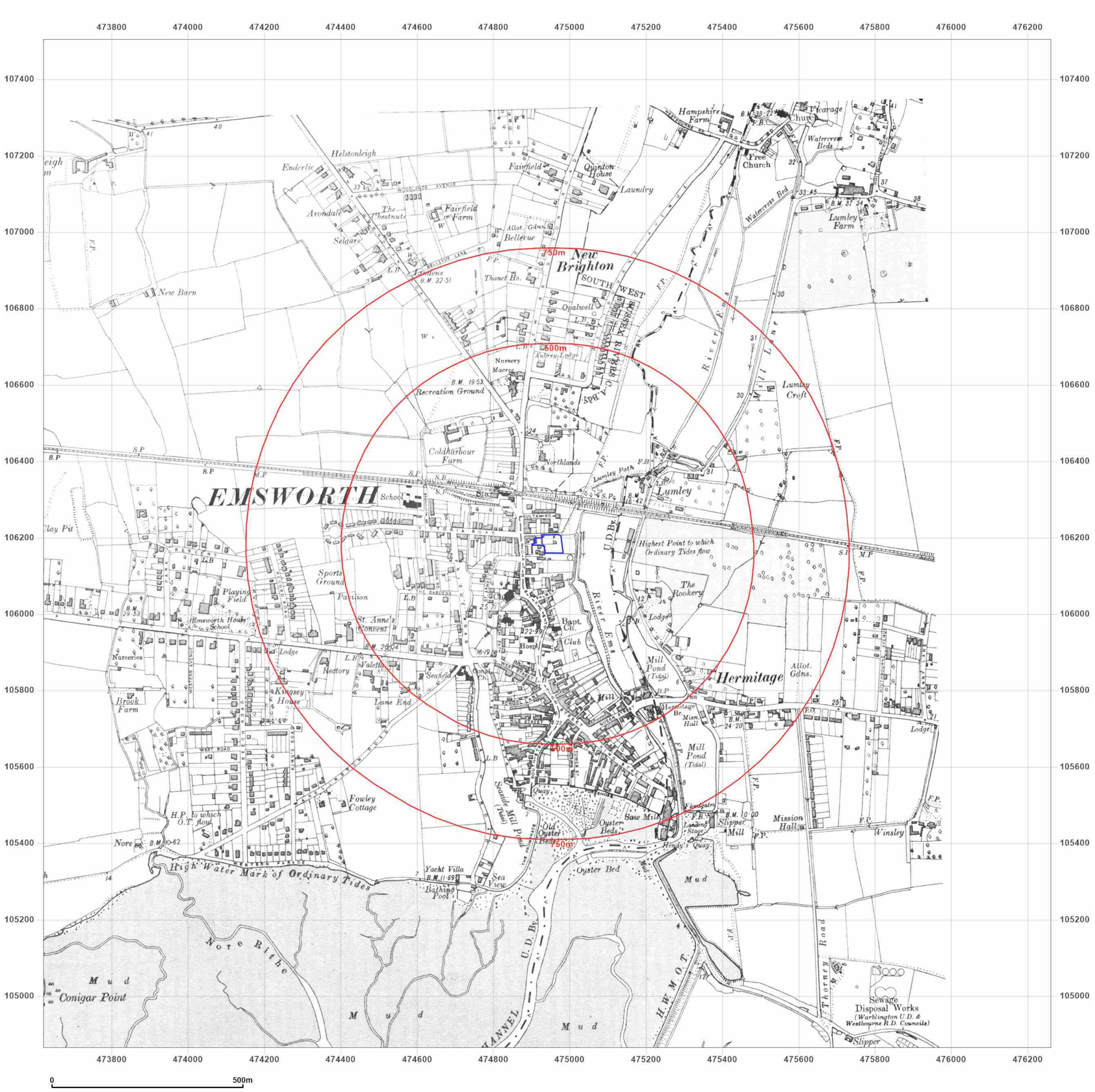
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PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

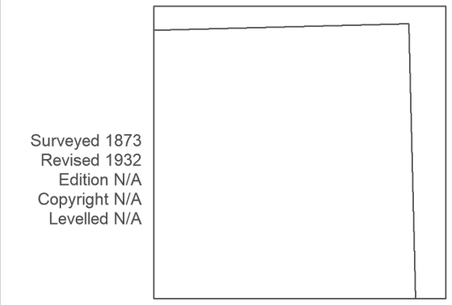
Map Name: County Series

Map date: **1932**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1873
Revised 1932
Edition N/A
Copyright N/A
Levelled N/A

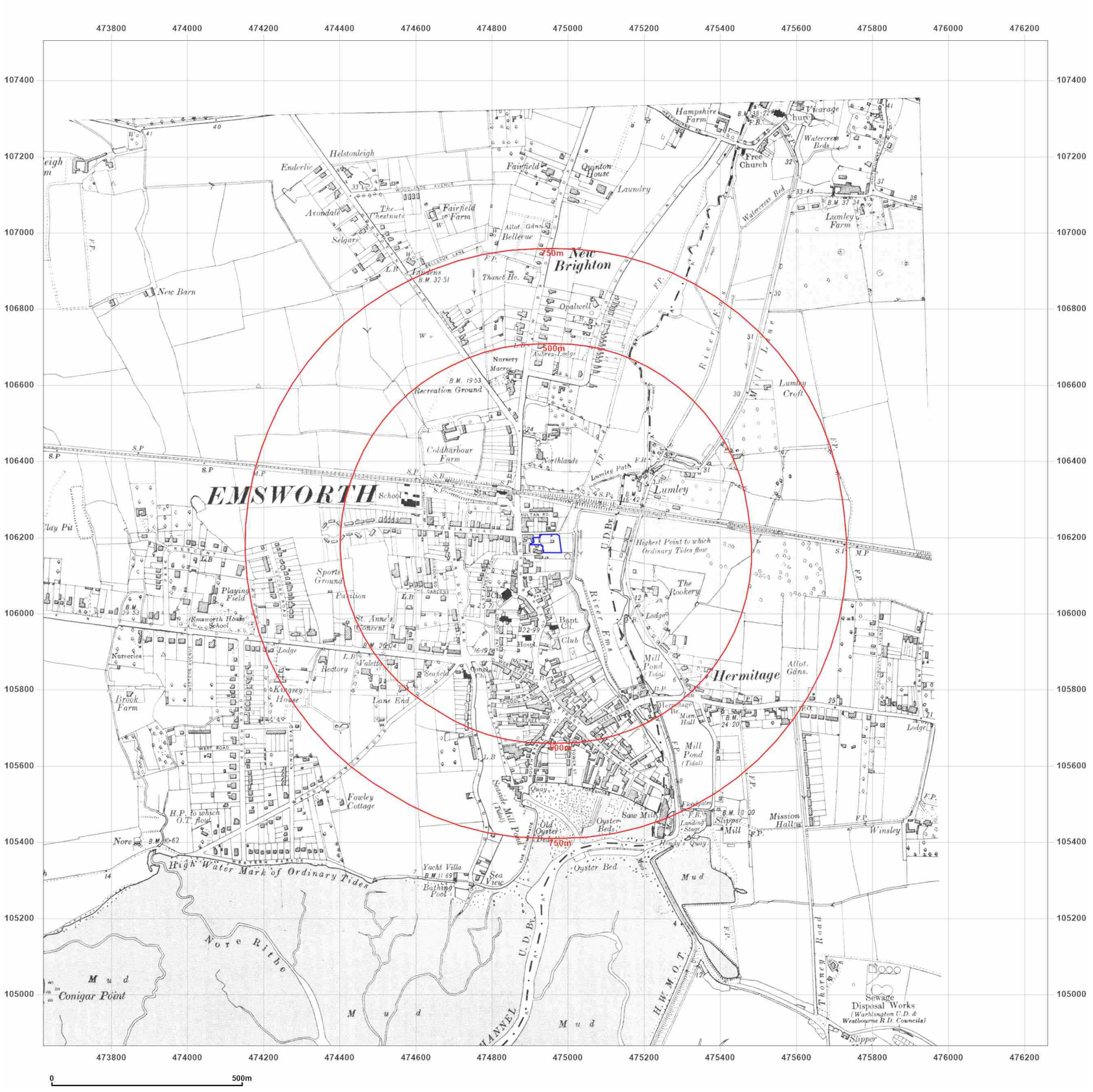
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Site Details:

2, SEAGULL LANE, EMSWORTH,
PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

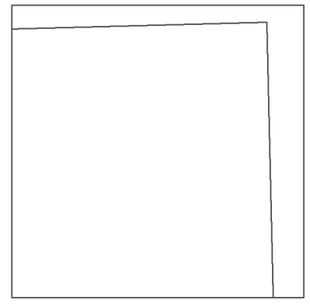
Map date: **1932**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1873
Revised 1932
Edition N/A
Copyright N/A
Levelled N/A



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Groundsure INSIGHTS

Site Details:

2, SEAGULL LANE, EMSWORTH,
PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

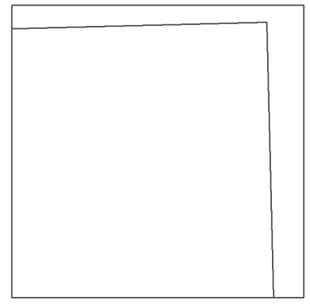
Map date: **1932**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1873
Revised 1932
Edition N/A
Copyright N/A
Levelled N/A



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Site Details:

2, SEAGULL LANE, EMSWORTH,
PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: County Series

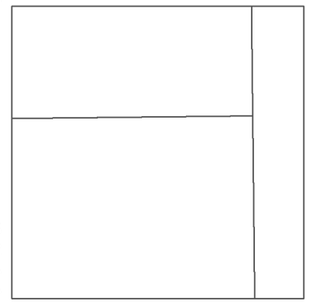
Map date: **1938-1942**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1865
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1865
Revised 1942
Edition N/A
Copyright N/A
Levelled N/A

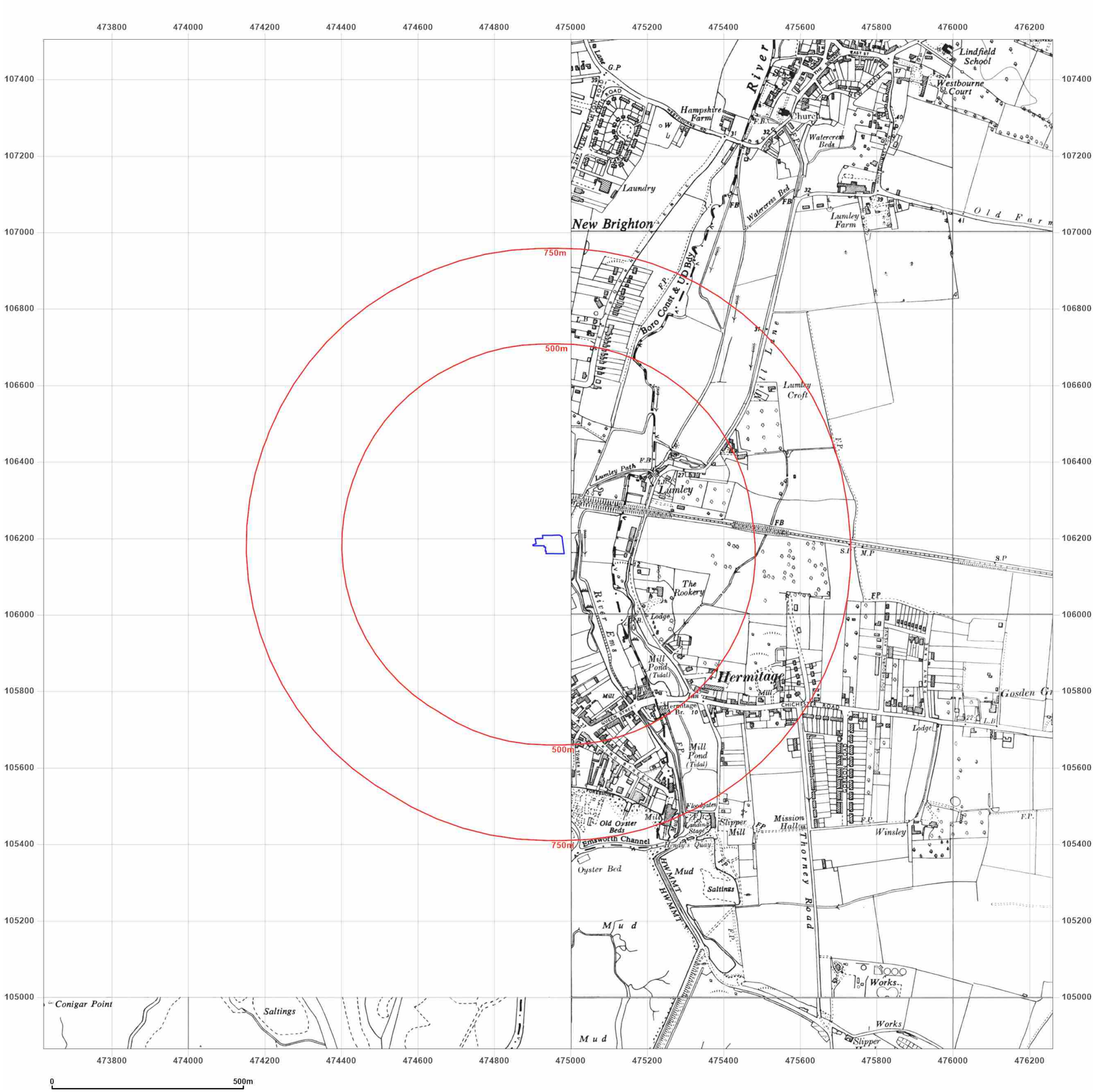
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Site Details:

2, SEAGULL LANE, EMSWORTH,
PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: Provisional
Map date: **1957-1962**
Scale: 1:10,560
Printed at: 1:10,560

N
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Surveyed N/A
Revised 1961
Edition N/A
Copyright 1962
Levelled N/A

Surveyed 1957
Revised 1957
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1957
Revised 1957
Edition N/A
Copyright N/A
Levelled N/A

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Groundsure INSIGHTS

Site Details:

2, SEAGULL LANE, EMSWORTH,
PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: Provisional

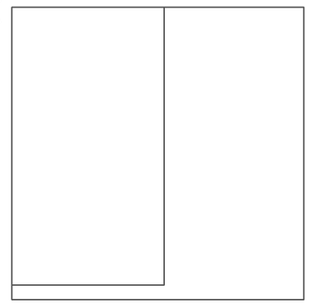
Map date: **1963**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1873
Revised 1957
Edition N/A
Copyright 1963
Levelled N/A



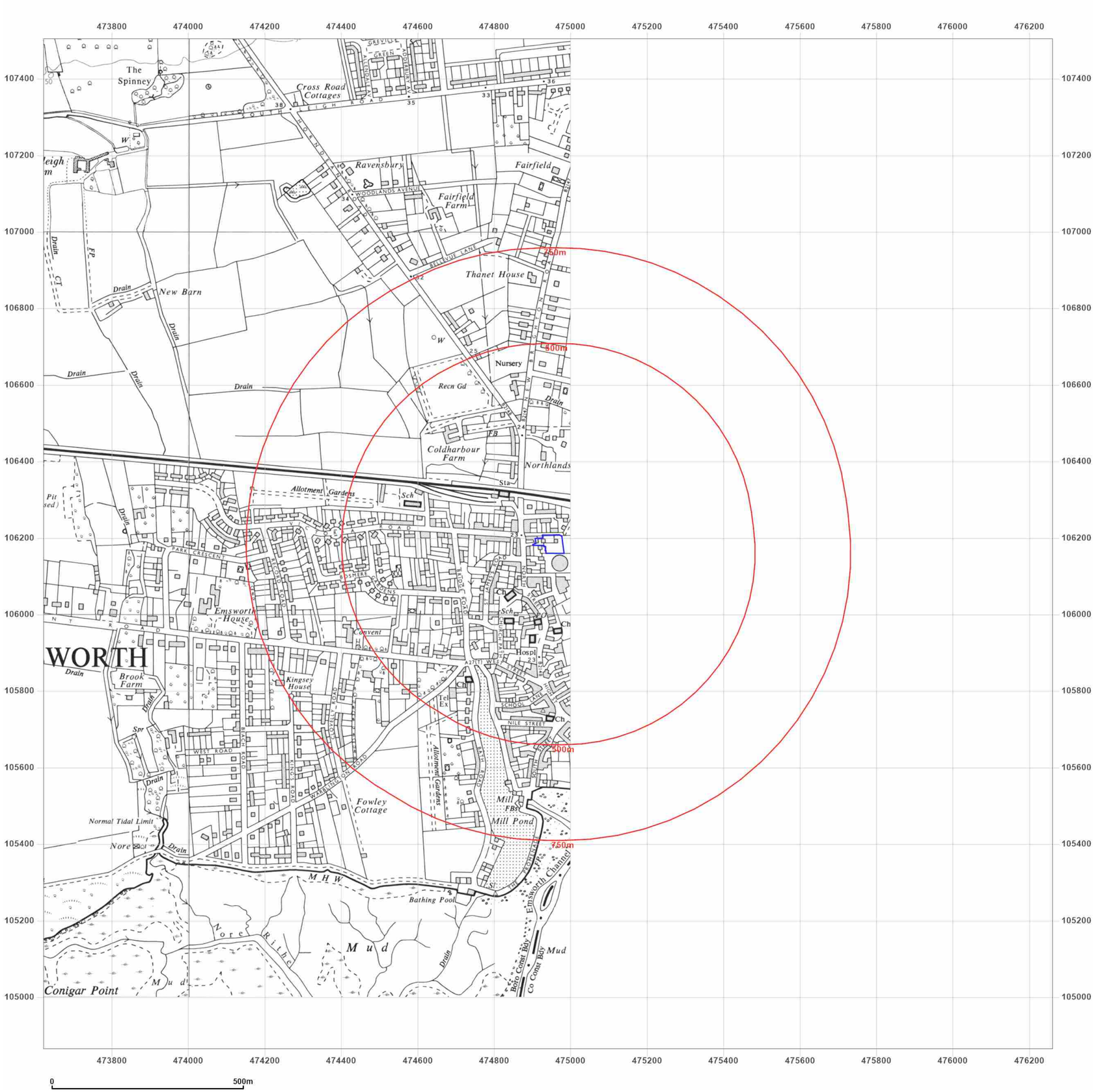
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PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: Provisional

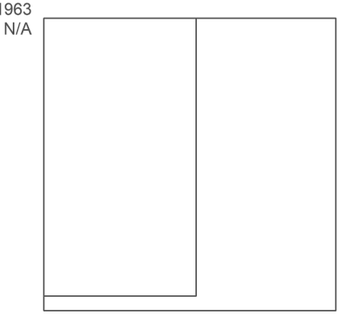
Map date: **1966**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1873
Revised 1966
Edition N/A
Copyright 1963
Levelled N/A



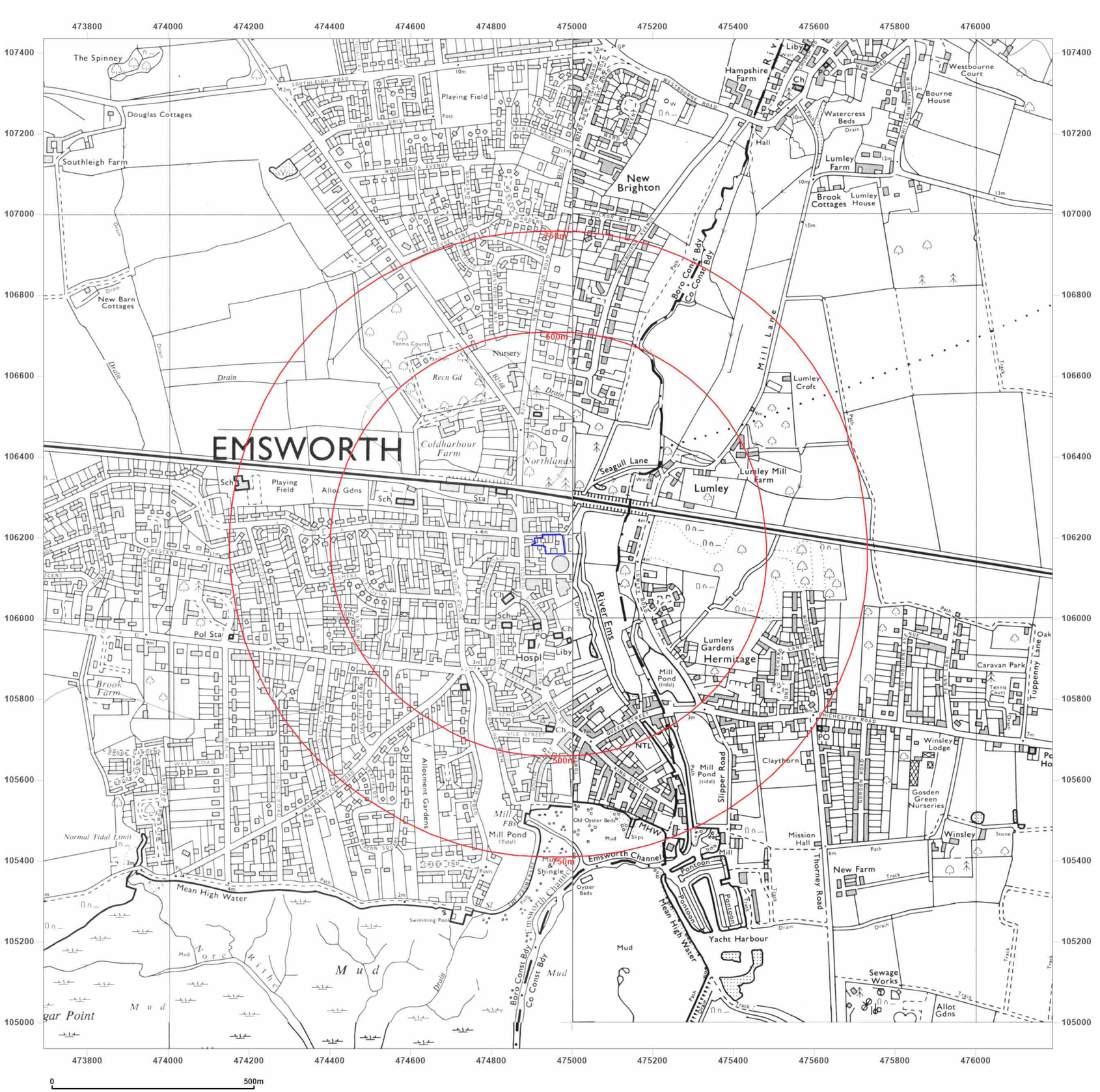
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Site Details:

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PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: National Grid

Map date: **1972-1975**

Scale: 1:10,000

Printed at: 1:10,000

N
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Surveyed 1973
Revised 1975
Edition N/A
Copyright 1975
Levelled 1962

Surveyed 1969
Revised 1973
Edition N/A
Copyright 1973
Levelled N/A

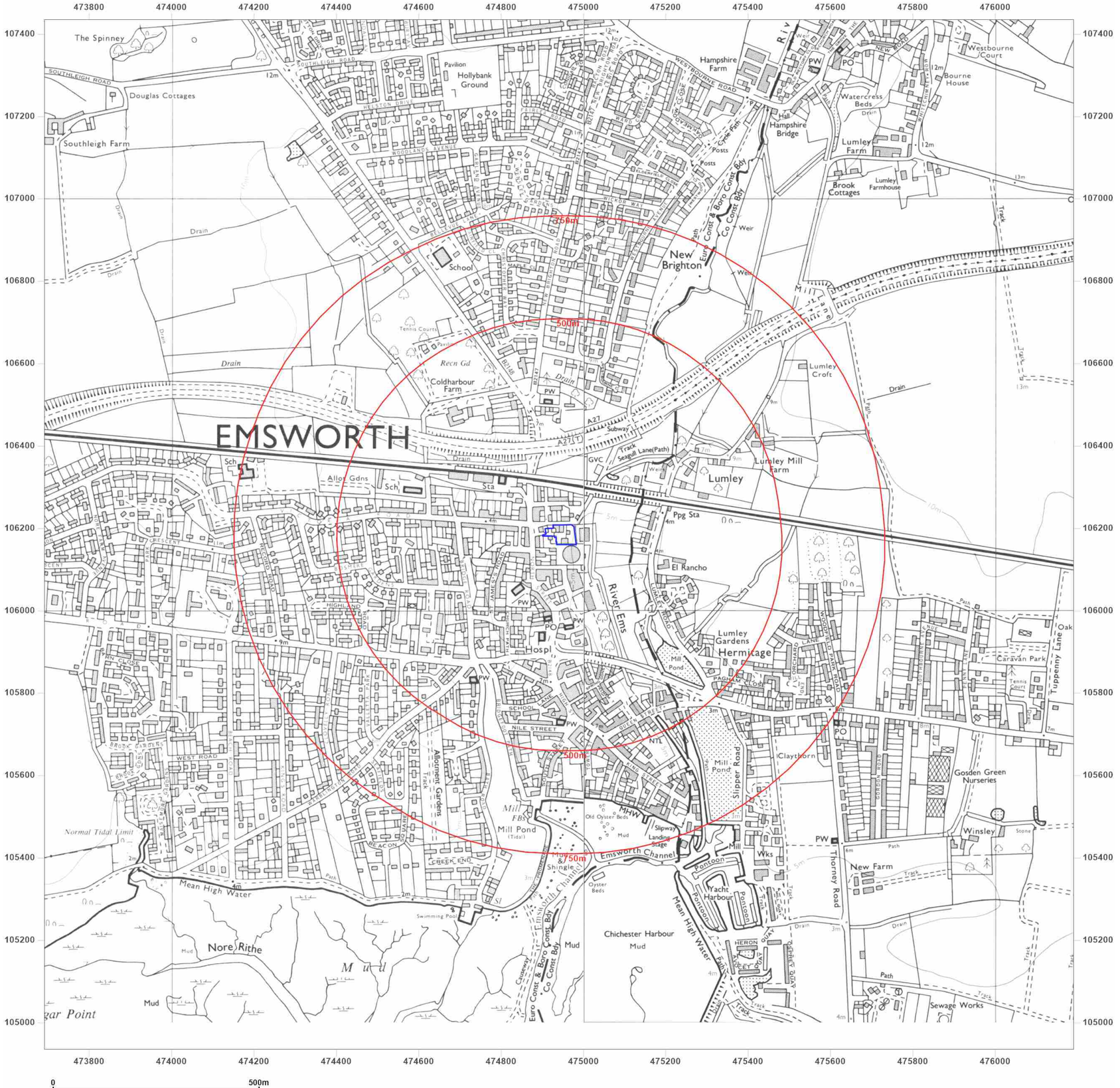
Surveyed 1968
Revised 1972
Edition N/A
Copyright 1972
Levelled 1971

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Site Details:

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PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: National Grid

Map date: **1990-1991**

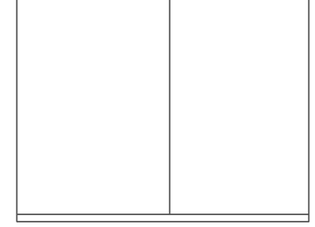
Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1989
Revised 1991
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1969
Revised 1990
Edition N/A
Copyright N/A
Levelled N/A



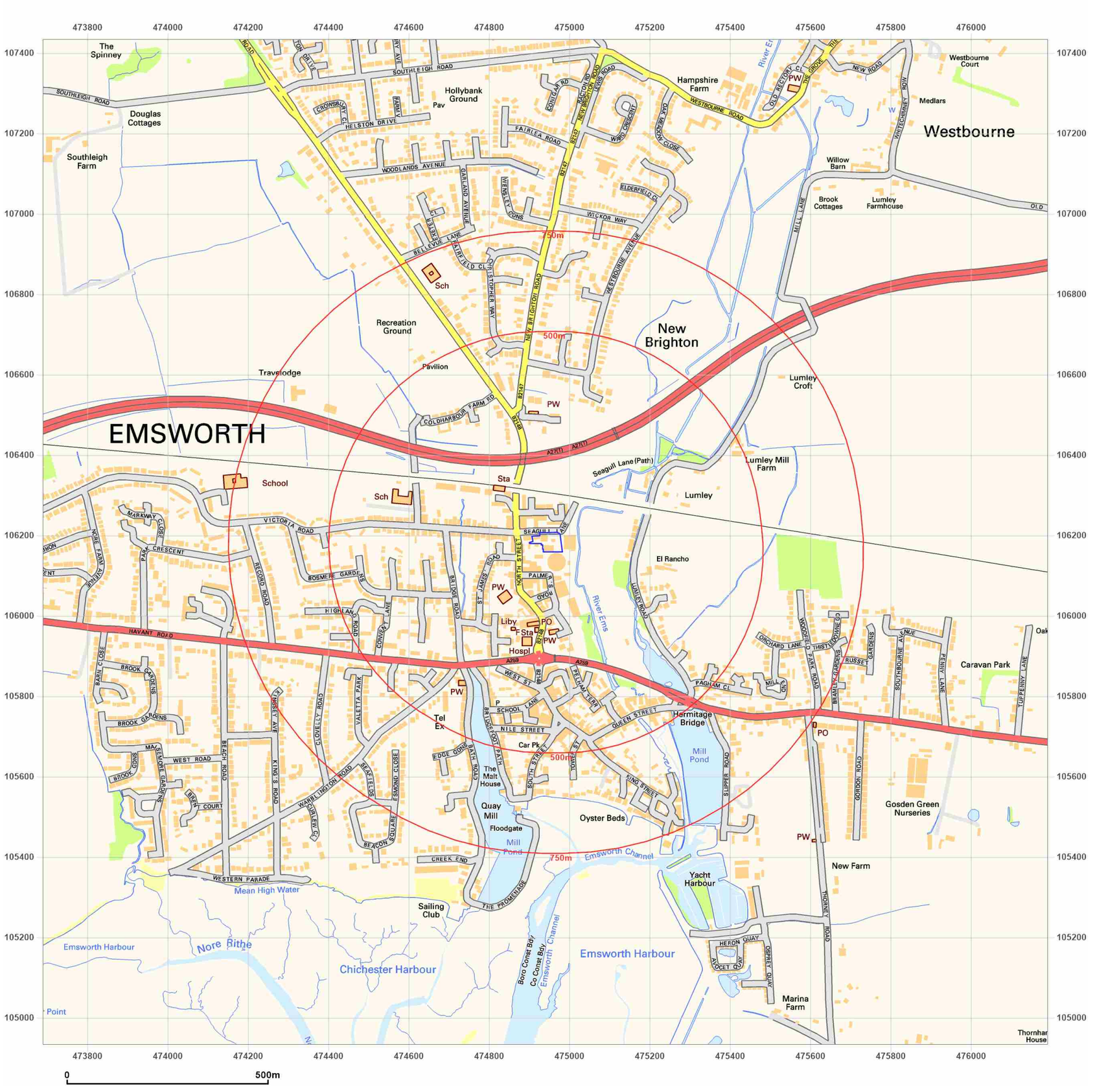
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Groundsure INSIGHTS

Site Details:

2, SEAGULL LANE, EMSWORTH,
PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: National Grid

Map date: **2001**

Scale: 1:10,000

Printed at: 1:10,000

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2001

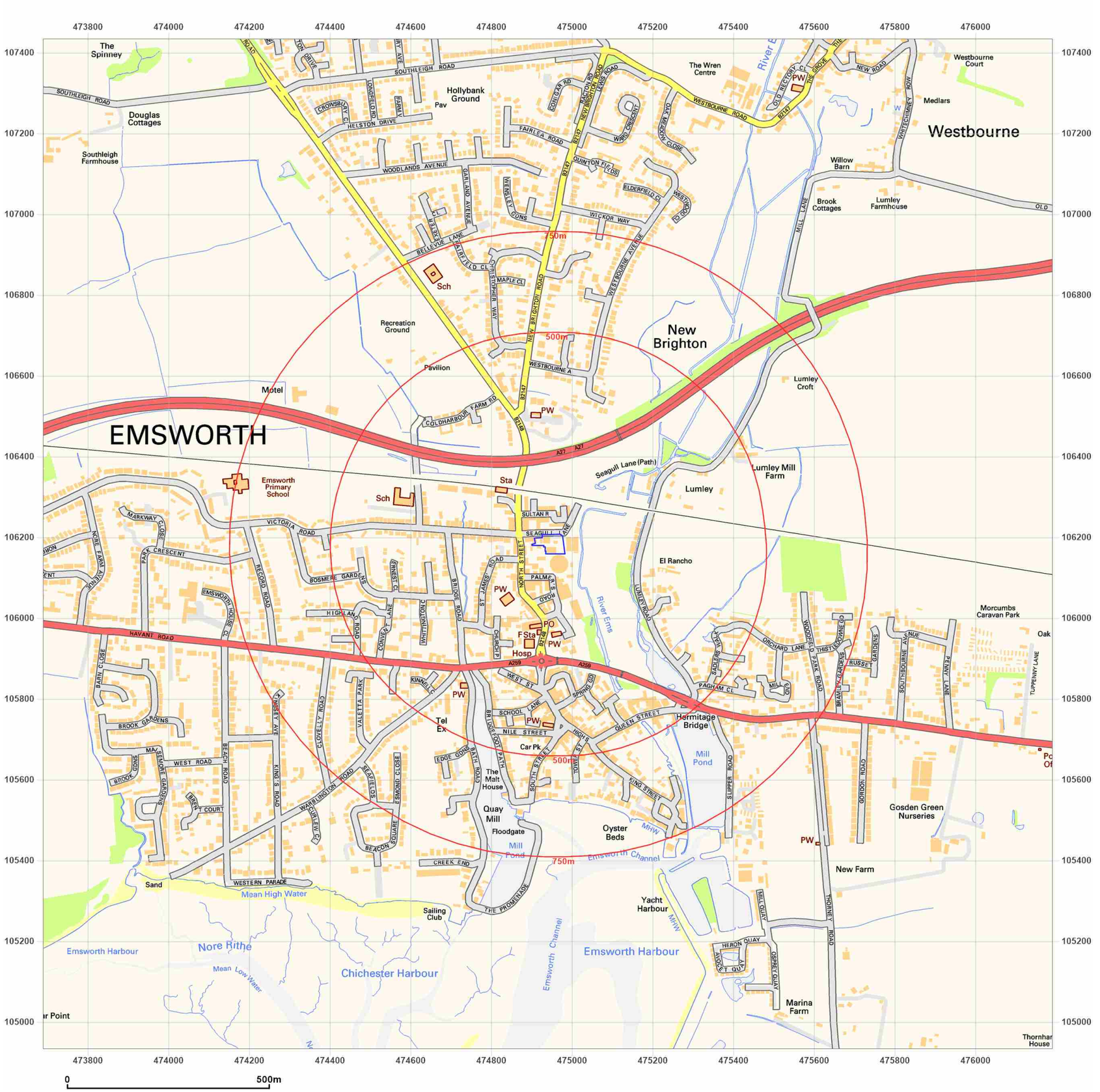
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Groundsure INSIGHTS

Site Details:

2, SEAGULL LANE, EMSWORTH,
PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

N
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2010

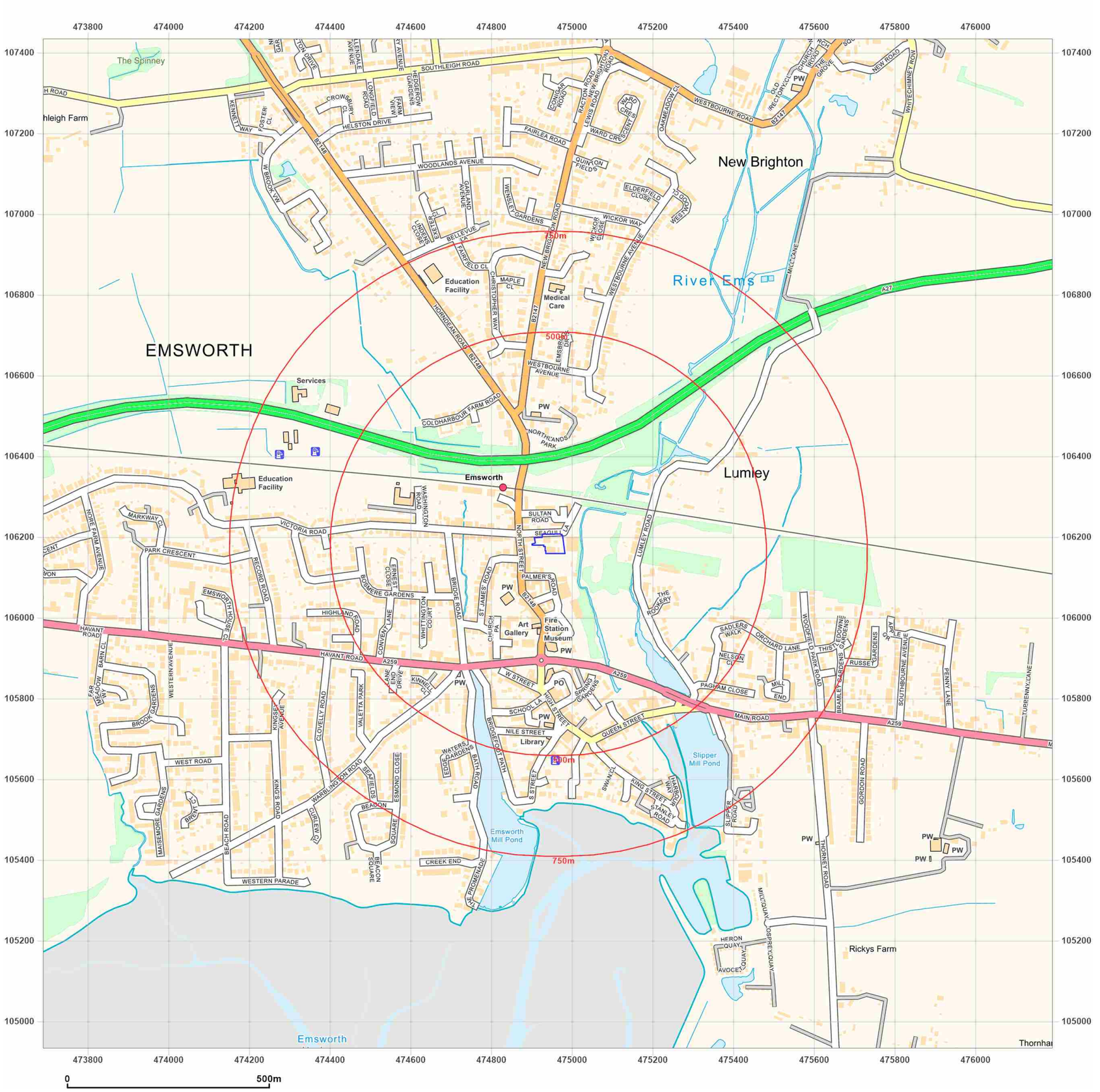
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Groundsure INSIGHTS

Site Details:

2, SEAGULL LANE, EMSWORTH,
PO10 7QH

Client Ref: GWPR5385_2-6_Seagull_lane_Emsworth
Report Ref: GS-TXX-XOX-4UK-H41
Grid Ref: 474940, 106184

Map Name: National Grid
Map date: **2023**
Scale: 1:10,000
Printed at: 1:10,000

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APPENDIX D:
Trial Hole Logs

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001

Percussion Drilling Log

Project Name: 2 - 6 Seagull Lane	Client: Nyetimber Management Ltd	Date: 15/05/2023
Location: Emsworth PO10 7QH	Contractor: AB SI Limited	
Project No. : GWPR5385	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS1	WS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.20	D		0.15			MADE GROUND: Concrete
		0.50	D					MADE GROUND: Dark brown black slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to sub-rounded flint (50%), brick (30%) and concrete (20%). Strong hydrocarbon odour.
		0.80	D					
		1.00	D					
		1.00	SPT	N=11 (3,3/2,3,3,3)				
		1.50	D		1.60			
		2.00	D					Light brown very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse sub-angular to sub-rounded flint. (HEAD DEPOSITS).
		2.00	SPT	N=12 (2,1/2,3,3,4)	2.30			
		2.50	D					Mottled brown, grey gravelly CLAY. Gravel is fine sub-rounded to sub-angular flint. (HEAD DEPOSITS).
		3.00	D		3.00			
		3.00	SPT	N=9 (2,3/2,2,3,2)				Light brown very sandy GRAVEL. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse flint. (HEAD DEPOSITS).
		3.50	D		3.40			Mottled brown, grey slightly gravelly CLAY with rare fine selenite crystals. Gravel is fine sub-angular to sub-rounded flint. (LONDON CLAY FORMATION).
		4.00	D					
		4.00	SPT	N=12 (2,1/2,3,3,4)				
		4.50	D					
		5.00	D		5.00			End of Borehole at 5.000m
		5.00	SPT	N=11 (3,3/2,3,3,3)				

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Groundwater recorded at 0.90m bgl.
No roots recorded.

Percussion Drilling Log

Project Name: 2 - 6 Seagull Lane	Client: Nyetimber Management Ltd	Date: 15/05/2023
Location: Emsworth PO10 7QH	Contractor: AB SI Limited	
Project No. : GWPR5385	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS2	WS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Concrete.
		0.20	D					MADE GROUND: Brown, orange, gravelly fine to coarse SAND. Gravel is fine to coarse sub-angular to sub-rounded flint (20%), brick (50%) and concrete (30%).
					0.40			
		0.50	D					
		0.80	D					MADE GROUND: Dark brown, black, gravelly CLAY. Gravel is fine to coarse sub-angular to sub-rounded flint (60%), brick (10%) and concrete (30%).
		1.00	D		1.00			
		1.00	SPT	N=15 (2,5/6,4,3,2)				
		1.50	D					Brown grey slightly gravelly CLAY. Gravel is fine sub-angular to sub-rounded flint. (HEAD DEPOSISTS).
		2.00	D					
		2.00	SPT	N=11 (1,1/2,3,3,3)				
		2.50	D					
		3.00	D					
		3.00	SPT	N=8 (1,2/2,2,2,2)				
		3.50	D					
		4.00	D					
		4.00	SPT	N=9 (1,3/2,2,3,2)				
		5.00	SPT	N=10 (2,3/2,2,3,3)	5.00			End of Borehole at 5.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No Groundwater recorded.
No roots recorded.

Percussion Drilling Log

Project Name: 2 - 6 Seagull Lane	Client: Nyetimber Management Ltd	Date: 15/05/2023
Location: Emsworth PO10 7QH	Contractor: AB SI Limited	
Project No. : GWPR5385	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS3	WS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D		0.30			MADE GROUND: Concrete
		0.50	D					MADE GROUND: Dark brown, black slightly sandy gravelly CLAY Sand is fine to medium. Gravel is fine to coarse sub-angular to sub-rounded flint (55%), concrete (10%), brick (10%), glass (5%), and Ash (20%).
		0.80	D					
		1.00	D		1.10			
		1.00	SPT	N=29 (2,5/6,8,8,7)				Brown, grey, orange, slightly gravelly CLAY. Gravel is fine to coarse sub-angular to sub-rounded flint. (RIVER TERRACE DEPOSITS).
		1.50	D					
		2.00	D					
		2.00	SPT	N=19 (2,3/4,6,5,4)				
		2.50	D		2.50			Mottled grey, brown, CLAY with selenite crystals. (LONDON CLAY FORMATION).
		3.00	D					
		3.00	SPT	N=11 (2,1/2,2,3,4)				
		3.50	D					
		4.00	D					
		4.00	SPT	N=18 (4,5/5,5,4,4)				
		4.50	D					
		5.00	D		5.00			End of Borehole at 5.000m
		5.00	SPT	N=17 (3,4/4,4,4,5)				

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Groundwater recorded at 1.23m bgl.
Roots recorded to 3.00m bgl.

Percussion Drilling Log

Project Name: 2 - 6 Seagull Lane	Client: Nyetimber Management Ltd	Date: 15/05/2023
Location: Emsworth PO10 7QH	Contractor: AB SI Limited	
Project No. : GWPR5385	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS4	WS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D		0.15			MADE GROUND: Concrete
		0.50	D					MADE GROUND: Dark brown, grey, black, slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-angular to sub-rounded flint (40%), brick (30%), concrete (30%).
	▼	0.80	D					
		1.00	D		1.00			
		1.00	SPT	N=4 (0,0/0,0,2,2)				Brown, grey slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to medium sub-angular to sub-rounded flint. (HEAD DEPOSITS).
		1.50	D					
		2.00	D					
		2.00	SPT	N=11 (1,1/2,2,3,4)	2.20			
		2.50	D					Mottled dark brown, grey, gravelly sandy CLAY. Sand is fine to medium. Gravel is fine to medium sub-angular to sub-rounded flint. (LONDON CLAY FORMATION).
		3.00	D					
		3.00	SPT	N=10 (1,1/2,2,3,3)				
		3.50	D					
		4.00	D					
		4.00	SPT	N=11 (2,1/2,3,2,4)				
		4.50	D					
		5.00	D		5.00			
		5.00	SPT	N=10 (2,2/2,3,3,2)				End of Borehole at 5.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Groundwater recorded to 0.70m bgl.
Decayed roots recorded at 3.00m bgl.

Percussion Drilling Log

Project Name: 2 - 6 Seagull Lane	Client: Nyetimber Management Ltd	Date: 15/05/2023
Location: Emsworth PO10 7QH	Contractor: AB SI Limited	
Project No. : GWPR5385	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS5	WS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D		0.10			MADE GROUND: Concrete
		0.50	D					MADE GROUND: Dark brown, black, slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular flint (70%), brick (10%), concrete (10%) and ash (10%). Strong hydrocarbon odour.
		0.80	D					
	▼	1.00	D					
		1.00	SPT	N=6 (2,2/2,1,1,2)	1.10			Mottled Brown grey slightly gravelly CLAY. Gravel is fine sub-angular to sub-rounded flint. (HEAD DEPOSITS).
		1.50	D					
		2.00	D					
		2.00	SPT	N=10 (1,1/2,2,3,3)				
		2.50	D		2.50			Mottled grey, brown, CLAY with selenite crystals. (LONDON CLAY FORMATION).
		3.00	D					
		3.00	SPT	N=9 (1,2/2,2,3,2)				
		3.50	D					
		4.00	D					
		4.00	SPT	N=7 (1,1/2,1,2,2)				
		4.50	D					
		5.00	D		5.00			End of Borehole at 5.000m
		5.00	SPT	N=9 (2,2/2,2,3,2)				

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Groundwater recorded at 1.12m bgl.
Roots recorded to 1.50m bgl.

APPENDIX E: Geotechnical Laboratory Testing

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001

Laboratory Report

UKAS TESTING 2788

GSTL
GEOTECHNICAL SITE & TESTING LABORATORIES
A PHENNA GROUP COMPANY

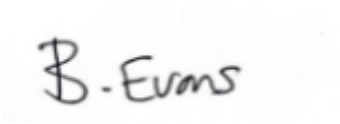
Contract Number: 66588

Client Ref: **GWPR5385**
Client PO: **GWPR5385**

Date Received: **19-05-2023**
Date Completed: **31-05-2023**
Report Date: **31-05-2023**

Client: **Ground and Water Limited**
Unit 2, The Long Barn,
Norton Farm,
Selbourne Road,
Alton,
Hampshire
GU34 3NB

This report has been checked and approved by:



Brendan Evans
Office Administrator

Contract Title: **2-6 Seagull Lane Emsworth PO10 7QH**
For the attention of: **Alex Stratford**

Test Description	Qty
Moisture Content BS 1377:1990 - Part 2 : 3.2 - * UKAS	7
1 Point Liquid & Plastic Limit BS 1377:1990 - Part 2 : 4.4 & 5.3 - * UKAS	7
PSD Wet Sieve method BS 1377:1990 - Part 2 : 9.2 - * UKAS	1
Disposal of samples for job	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
- denotes test carried out by approved contractor
@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This test report/certificate shall not be reproduced except in full, without the approval of GEO Site & Testing Services Ltd. Any opinions or interpretations stated - within this report/certificate are excluded from the laboratories UKAS accreditation.

Approved Signatories:
Brendan Evans (Office Administrator) - Darren Bourne (Quality Senior Technician) - Paul Evans (Director)
Richard John (Quality/Technical Manager) - Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager)
Wayne Honey (Human Resources/ Health and Safety Manager)

GEO Site & Testing Services Ltd
Units 3-4, Heol Aur, Dafen, Llanelli, Carmarthenshire, Wales SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@gstl.co.uk gstl.co.uk

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**NATURAL MOISTURE, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX (BS 1377:1990 - Part 2 : 4.4 & 5.3)**	
Contract Number	66588	
Project Name	2-6 Seagull Lane Emsworth PO10 7QH	
Date Tested	25/05/2023	
	DESCRIPTIONS	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Descriptions
WS1			3.50	-		Brown silty CLAY
WS2			1.50	-		Brown silty CLAY
WS2			2.50	-		Brown silty CLAY
WS3			1.50	-		Brown fine to medium gravelly sandy silty CLAY
WS3			3.00	-		Brown silty CLAY
WS4			1.50	-		Brown fine to medium gravelly sandy silty CLAY
WS5			2.00	-		Brown silty CLAY
				-		
				-		
				-		
				-		
				-		
				-		
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				-		

Operator
Clayton Jenkins

GSTL
GEOTECHNICAL SITE & TESTING LABORATORIES

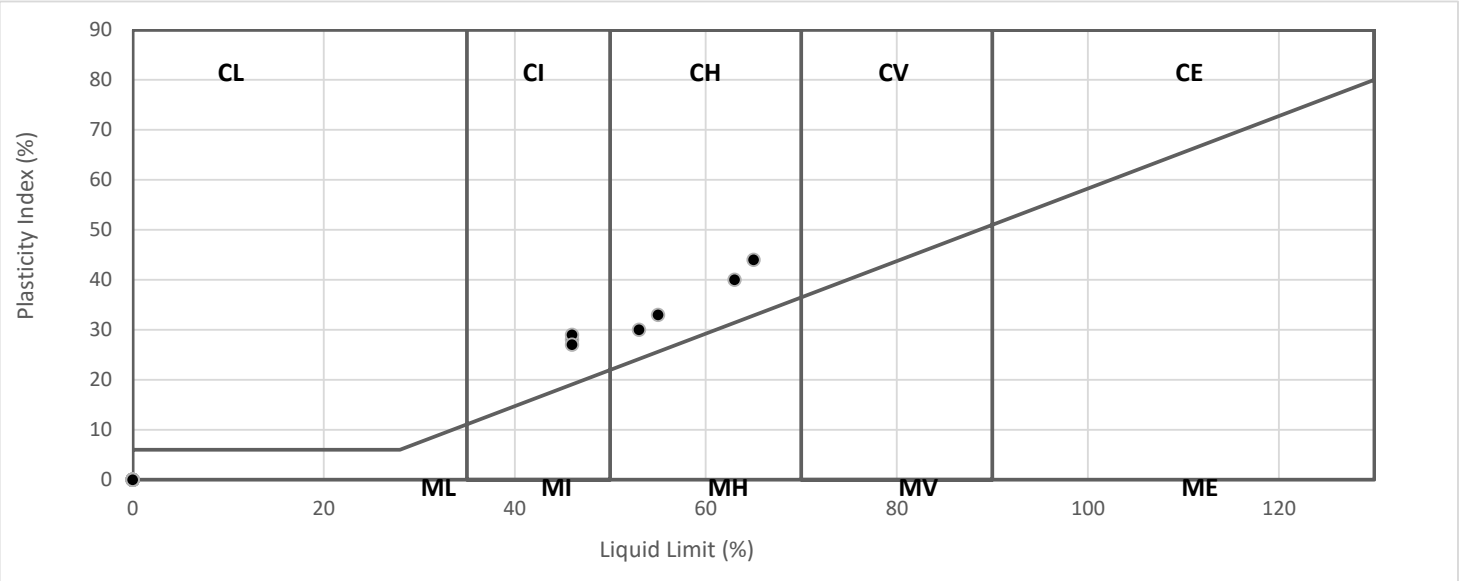
NATURAL MOISTURE, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX
(BS 1377:1990 - Part 2 : 4.4 & 5.3)

Contract Number	66588
Project Name	2-6 Seagull Lane Emsworth PO10 7QH
Date Tested	25/05/2023

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity index %	Passing 0.425mm %	Remarks
WS1			3.50	-		31	55	22	33	100	CH High Plasticity
WS2			1.50	-		23	65	21	44	100	CH High Plasticity
WS2			2.50	-		31	53	23	30	100	CH High Plasticity
WS3			1.50	-		20	46	18	28	80	CI Intermediate Plasticity
WS3			3.00	-		29	63	23	40	100	CH High Plasticity
WS4			1.50	-		14	46	17	29	56	CI Intermediate Plasticity
WS5			2.00	-		23	46	19	27	100	CI Intermediate Plasticity
				-							
				-							
				-							
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Symbols: NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

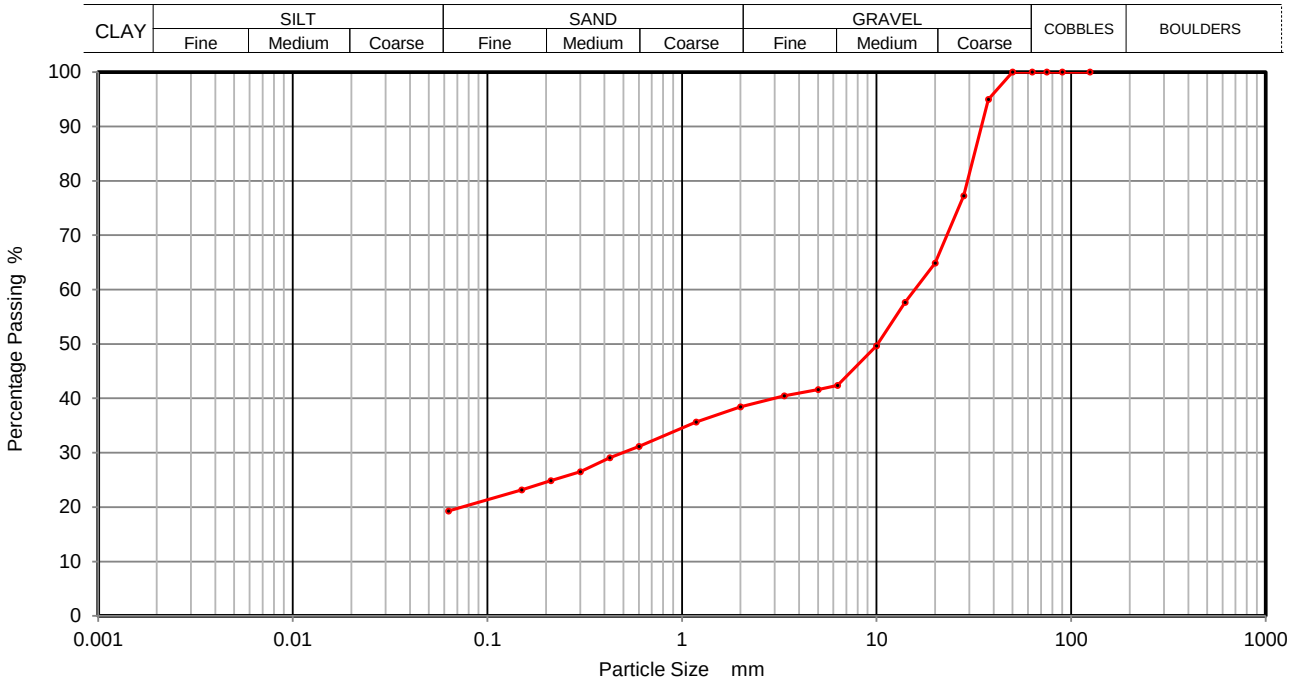
PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION
BS 5930:2015+A1:2020



Operator
Clayton Jenkins

UKAS TESTING
2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION BS 1377 Part 2:1990 Wet Sieve, Clause 9.2**	Contract Number	66588
		Borehole/Pit No.	WS1
Project Name	2-6 Seagull Lane Emsworth PO10 7QH	Sample No.	
Soil Description	Brown/ off white silty/ clayey fine to coarse sandy fine to coarse GRAVEL	Depth Top	2.00
		Depth Base	
Date Tested	26/05/2023	Sample Type	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	95		
28	77		
20	65		
14	58		
10	50		
6.3	42		
5	42		
3.35	40		
2	38		
1.18	36		
0.6	31		
0.425	29		
0.3	27		
0.212	25		
0.15	23		
0.063	19		

Sample Proportions	% dry mass
Cobbles	0
Gravel	62
Sand	19
Silt and Clay	19

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING
2788

APPENDIX F: Chemical Laboratory Testing

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Ground and Water Ltd
Head Office
2 The Long Barn
Norton Farm, Selborne Road
Alton
Hampshire
GU34 3NB

Attention: Alex Stratford

CERTIFICATE OF ANALYSIS

Date of report Generation:	26 May 2023
Customer:	Ground and Water Ltd
Sample Delivery Group (SDG):	230519-69
Your Reference:	GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH
Location:	GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH
Report No:	690450
Order Number:	GWPR5385

We received 8 samples on Friday May 19, 2023 and 8 of these samples were scheduled for analysis which was completed on Friday May 26, 2023. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**
Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
28020244	WS1		0.20 - 0.20	12/05/2023
28020259	WS1		1.00 - 1.00	12/05/2023
28020264	WS2		0.80 - 0.80	12/05/2023
28020279	WS2		2.00 - 2.00	12/05/2023
28020281	WS3		0.20 - 0.20	12/05/2023
28020284	WS3		2.50 - 2.50	12/05/2023
28020290	WS4		0.50 - 0.50	12/05/2023
28020296	WS5		0.20 - 0.20	12/05/2023

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**
Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

			Lab Sample No(s)	28020244	28020259	28020264	28020279	28020281	28020284	28020290	28020296							
			Customer Sample Reference	WS1	WS1	WS2	WS2	WS3	WS3	WS4	WS5							
			AGS Reference															
			Depth (m)	0.20 - 0.20	1.00 - 1.00	0.80 - 0.80	2.00 - 2.00	0.20 - 0.20	2.50 - 2.50	0.50 - 0.50	0.20 - 0.20							
			Container	1kg Cardboard Container	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg Cardboard Container	1kg Cardboard Container	250g Amber Jar (ALE210)	1kg Cardboard Container	1kg Cardboard Container	250g Amber Jar (ALE210)	1kg Cardboard Container	1kg Cardboard Container	250g Amber Jar (ALE210)	1kg Cardboard Container	250g Amber Jar (ALE210)	60g VOC (ALE215)
			Sample Type	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Ammoniacal N as NH4 in 2:1 extract	All	NDPs: 0 Tests: 2					X				X							
ANC at pH4 and ANC at pH 6	All	NDPs: 0 Tests: 1		X														
Anions by Kone (soil)	All	NDPs: 0 Tests: 8		X		X		X	X		X	X		X		X		
Anions by Kone (w)	All	NDPs: 0 Tests: 1	X															
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 5	X				X			X			X		X			
Boron Water Soluble	All	NDPs: 0 Tests: 5		X				X			X			X		X		
CEN Readings	All	NDPs: 0 Tests: 1	X															
Coronene	All	NDPs: 0 Tests: 1		X														
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 5		X				X			X			X		X		
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 1	X															
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 1	X															
EPH by GCxGC-FID	All	NDPs: 0 Tests: 1		X														
EPH CWG GC (S)	All	NDPs: 0 Tests: 2		X												X		
Fluoride	All	NDPs: 0 Tests: 1	X															
GRO by GC-FID (S)	All	NDPs: 0 Tests: 2			X													X

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**
Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

			Lab Sample No(s)	28020244	28020259	28020264	28020279	28020281	28020284	28020290	28020296	
			Customer Sample Reference	WS1	WS1	WS2	WS2	WS3	WS3	WS4	WS5	
			AGS Reference									
			Depth (m)	0.20 - 0.20	1.00 - 1.00	0.80 - 0.80	2.00 - 2.00	0.20 - 0.20	2.50 - 2.50	0.50 - 0.50	0.20 - 0.20	
			Container	1kg Cardboard Container	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg Cardboard Container	1kg Cardboard Container	250g Amber Jar (ALE210)	1kg Cardboard Container	1kg Cardboard Container	250g Amber Jar (ALE210)	1kg Cardboard Container	250g Amber Jar (ALE210)	1kg Cardboard Container	250g Amber Jar (ALE210)	60g VOC (ALE215)
			Sample Type	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 5			X			X			X			X		X	
Loss on Ignition in soils	All	NDPs: 0 Tests: 1			X												
Magnesium (BRE)	All	NDPs: 0 Tests: 2					X					X					
Mercury Dissolved	All	NDPs: 0 Tests: 1	X														
Metals in solid samples by OES	All	NDPs: 0 Tests: 5			X			X			X			X		X	
NO3, NO2 and TON by KONE (s)	All	NDPs: 0 Tests: 2				X						X					
PAH 16 & 17 Calc	All	NDPs: 0 Tests: 1			X												
PAH by GCMS	All	NDPs: 0 Tests: 5			X			X			X			X		X	
PCBs by GCMS	All	NDPs: 0 Tests: 1			X												
pH	All	NDPs: 0 Tests: 8			X		X		X	X		X		X		X	
pH Value of Filtered Water	All	NDPs: 0 Tests: 1	X														
Phenols by HPLC (S)	All	NDPs: 0 Tests: 5			X			X			X			X		X	
Phenols by HPLC (W)	All	NDPs: 0 Tests: 1	X														
Sample description	All	NDPs: 0 Tests: 8			X		X		X	X		X		X		X	
Semi Volatile Organic Compounds	All	NDPs: 0 Tests: 2			X											X	

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**
Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			28020244	28020259		28020264	28020279		28020281	28020284		28020290			28020296			
Customer Sample Reference			WS1	WS1		WS2	WS2		WS3	WS3		WS4			WS5			
AGS Reference																		
Depth (m)			0.20 - 0.20	1.00 - 1.00		0.80 - 0.80	2.00 - 2.00		0.20 - 0.20	2.50 - 2.50		0.50 - 0.50			0.20 - 0.20			
Container			1kg Cardboard Container	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg Cardboard Container	1kg Cardboard Container	250g Amber Jar (ALE210)	1kg Cardboard Container	1kg Cardboard Container	250g Amber Jar (ALE210)	1kg Cardboard Container	1kg Cardboard Container	250g Amber Jar (ALE210)	1kg Cardboard Container	250g Amber Jar (ALE210)	60g VOC (ALE215)	
Sample Type			S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Total Organic Carbon	All	NDPs: 0 Tests: 5		X				X			X			X		X		
Total Sulphate	All	NDPs: 0 Tests: 2				X						X						
Total Sulphur	All	NDPs: 0 Tests: 2				X						X						
TPH CWG GC (S)	All	NDPs: 0 Tests: 2		X												X		
VOC MS (S)	All	NDPs: 0 Tests: 2			X												X	

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
28020244	WS1	0.20 - 0.20	Dark Brown	Sandy Clay	Brick	Stones
28020259	WS1	1.00 - 1.00	Dark Brown	Sandy Clay	Stones	None
28020264	WS2	0.80 - 0.80	Dark Brown	Sandy Clay	Stones	None
28020279	WS2	2.00 - 2.00	Light Brown	Silty Clay	None	None
28020281	WS3	0.20 - 0.20	Dark Brown	Sandy Loam	Stones	Vegetation
28020284	WS3	2.50 - 2.50	Light Brown	Silty Clay	None	None
28020290	WS4	0.50 - 0.50	Dark Brown	Sandy Clay Loam	Brick	Stones
28020296	WS5	0.20 - 0.20	Dark Brown	Sandy Clay Loam	Stones	Glass

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**
Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	WS1	WS1	WS2	WS2	WS3	WS3
			Depth (m)	0.20 - 0.20	1.00 - 1.00	0.80 - 0.80	2.00 - 2.00	0.20 - 0.20	2.50 - 2.50
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	12/05/2023	12/05/2023	12/05/2023	12/05/2023	12/05/2023	12/05/2023
			Sample Time	12:00	12:00	12:00	12:00	12:00	12:00
			Date Received	19/05/2023	19/05/2023	19/05/2023	19/05/2023	19/05/2023	19/05/2023
			SDG Ref	230519-69	230519-69	230519-69	230519-69	230519-69	230519-69
			Lab Sample No.(s)	28020244	28020259	28020264	28020279	28020281	28020284
			AGS Reference						
Moisture Content Ratio (% of as received sample)	%	PM024		20	20	9.7	18	5.6	19
Loss on ignition	<0.7 %	TM018		9.59 M					
Phenol	<0.01 mg/kg	TM062 (S)		<0.01 M		<0.01 M		<0.01 M	
Cresols	<0.01 mg/kg	TM062 (S)		<0.01 M		<0.01 M		<0.01 M	
Xylenols	<0.015 mg/kg	TM062 (S)		<0.015 M		<0.015 M		<0.015 M	
Phenols, Total Detected monohydric	<0.035 mg/kg	TM062 (S)		<0.035 M		<0.035 M		<0.035 M	
Organic Carbon, Total	<0.2 %	TM132		3.69 M		0.402 M		1.12 M	
Sulphur, Total	<0.02 %	TM132			0.0439 #				<0.02 #
Soil Organic Matter (SOM)	<0.35 %	TM132		6.36 #		0.693 #		1.93 #	
pH	1 pH Units	TM133		8.8 M	8.84 M	9.14 M	8.71 M	11.1 M	9 M
Chromium, Hexavalent	<0.6 mg/kg	TM151		<0.6 M		<0.6 M		<0.6 M	
Cyanide, Total	<1 mg/kg	TM153		<1 M		<1 M		<1 M	
PCB congener 28	<0.003 mg/kg	TM168		<0.003 M					
PCB congener 52	<0.003 mg/kg	TM168		<0.003 M					
PCB congener 101	<0.003 mg/kg	TM168		<0.003 M					
PCB congener 118	<0.003 mg/kg	TM168		<0.003 M					
PCB congener 138	<0.003 mg/kg	TM168		<0.003 M					
PCB congener 153	<0.003 mg/kg	TM168		<0.003 M					
PCB congener 180	<0.003 mg/kg	TM168		<0.003 M					
Sum of detected PCB 7 Congeners	<0.021 mg/kg	TM168		<0.021					
Arsenic	<0.6 mg/kg	TM181		10.9 M		7.37 M		6.56 M	
Cadmium	<0.02 mg/kg	TM181		0.59 M		0.562 M		0.198 M	
Chromium	<0.9 mg/kg	TM181		22.6 M		37 M		16.1 M	
Copper	<1.4 mg/kg	TM181		31.6 M		23.4 M		27 M	
Lead	<0.7 mg/kg	TM181		161 M		29.2 M		358 M	
Mercury	<0.1 mg/kg	TM181		<0.1 M		<0.1 M		<0.1 M	
Nickel	<0.2 mg/kg	TM181		24.1 M		40.7 M		12.2 M	
Selenium	<1 mg/kg	TM181		<1 #		<1 #		<1 #	
Vanadium	<0.2 mg/kg	TM181		45.8 #		53.9 #		19.4 #	
Zinc	<1.9 mg/kg	TM181		180 M		93.5 M		132 M	
ANC @ pH 4	<0.03 mol/kg	TM182		0.08					
ANC @ pH 6	<0.03 mol/kg	TM182		<0.03					
Sulphate, acid soluble (total)	<0.0048 %	TM221			0.074 M				0.0194 M

Validated

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**

Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	WS1	WS1	WS2	WS2	WS3	WS3
			Depth (m)	0.20 - 0.20	1.00 - 1.00	0.80 - 0.80	2.00 - 2.00	0.20 - 0.20	2.50 - 2.50
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	12/05/2023	12/05/2023	12/05/2023	12/05/2023	12/05/2023	12/05/2023
			Sample Time	12:00	12:00	12:00	12:00	12:00	12:00
			Date Received	19/05/2023	19/05/2023	19/05/2023	19/05/2023	19/05/2023	19/05/2023
			SDG Ref	230519-69	230519-69	230519-69	230519-69	230519-69	230519-69
			Lab Sample No.(s)	28020244	28020259	28020264	28020279	28020281	28020284
			AGS Reference						
Boron, water soluble	<1 mg/kg	TM222		4.26 M		6.68 M		1.31 M	
Water Soluble Sulphate as SO4 2:1 Extract	<0.004 g/l	TM243		0.0633 M		0.535 M	0.194 M	0.0191 M	
Soluble Sulphate 2:1 extract as SO4 BRE	<0.004 g/l	TM243			0.157 M				0.0889 M
Chloride 2:1 water/soil extract BRE	<0.0025 g/l	TM243			0.0568 M				0.0172 M
Nitrate as NO3, 2:1 water soluble (BRE)	<0.0003 g/l	TM243			0.000338				0.000985
Ammoniacal N as NH4 in 2:1 extract BRE	<0.0003 g/l	TM248			0.00879				0.00173
Magnesium (BRE)	<0.008 g/l	TM282			<0.008				<0.008
PAH Total 17 (inc Coronene) Moisture Corrected	<10 mg/kg	TM410		15.3					
Coronene	<0.2 mg/kg	TM410		<0.2					
EPH Surrogate % recovery**	%	TM415		103					
Mineral Oil >C10-C40 (EH_2D_AL)	<5 mg/kg	TM415		562					

Validated

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**
Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	WS4	WS5				
			Depth (m)	0.50 - 0.50	0.20 - 0.20				
			Sample Type	Soil/Solid (S)	Soil/Solid (S)				
			Date Sampled	12/05/2023	12/05/2023				
			Sample Time	12:00	12:00				
			Date Received	19/05/2023	19/05/2023				
			SDG Ref	230519-69	230519-69				
			Lab Sample No.(s)	28020290	28020296				
			AGS Reference						
Moisture Content Ratio (% of as received sample)	%	PM024		14	20				
Phenol	<0.01 mg/kg	TM062 (S)		<0.01 M	<0.01 M				
Cresols	<0.01 mg/kg	TM062 (S)		<0.01 M	<0.01 M				
Xylenols	<0.015 mg/kg	TM062 (S)		<0.015 M	<0.015 M				
Phenols, Total Detected monohydric	<0.035 mg/kg	TM062 (S)		<0.035 M	<0.035 M				
Organic Carbon, Total	<0.2 %	TM132		2.1 M	2.21 M				
Soil Organic Matter (SOM)	<0.35 %	TM132		3.62 #	3.81 #				
pH	1 pH Units	TM133		8.32 M	8.64 M				
Chromium, Hexavalent	<0.6 mg/kg	TM151		<0.6 M	<0.6 M				
Cyanide, Total	<1 mg/kg	TM153		<1 M	<1 M				
Arsenic	<0.6 mg/kg	TM181		10.4 M	14.6 M				
Cadmium	<0.02 mg/kg	TM181		0.417 M	0.533 M				
Chromium	<0.9 mg/kg	TM181		16 M	18 M				
Copper	<1.4 mg/kg	TM181		26.6 M	41.5 M				
Lead	<0.7 mg/kg	TM181		133 M	338 M				
Mercury	<0.1 mg/kg	TM181		<0.1 M	0.175 M				
Nickel	<0.2 mg/kg	TM181		21.9 M	24.2 M				
Selenium	<1 mg/kg	TM181		<1 #	<1 #				
Vanadium	<0.2 mg/kg	TM181		36.7 #	44.4 #				
Zinc	<1.9 mg/kg	TM181		130 M	319 M				
Boron, water soluble	<1 mg/kg	TM222		1.56 M	4.21 M				
Water Soluble Sulphate as SO4 2:1 Extract	<0.004 g/l	TM243		0.0559 M	0.141 M				

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**
Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

PAH by GCMS

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+$@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	WS1	WS2	WS3	WS4	WS5
			Depth (m)	0.20 - 0.20	0.80 - 0.80	0.20 - 0.20	0.50 - 0.50	0.20 - 0.20
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	12/05/2023	12/05/2023	12/05/2023	12/05/2023	12/05/2023
			Sample Time	12:00	12:00	12:00	12:00	12:00
			Date Received	19/05/2023	19/05/2023	19/05/2023	19/05/2023	19/05/2023
			SDG Ref	230519-69	230519-69	230519-69	230519-69	230519-69
			Lab Sample No.(s)	28020244	28020264	28020281	28020290	28020296
			AGS Reference					
Naphthalene-d8 % recovery**	%	TM218		92.9	93.1	92.6	91.6	91.6
Acenaphthene-d10 % recovery**	%	TM218		98.1	93.8	95.1	97.7	95.8
Phenanthrene-d10 % recovery**	%	TM218		109	94.2	93.4	100	96.9
Chrysene-d12 % recovery**	%	TM218		114	88.8	88.7	93	88.2
Perylene-d12 % recovery**	%	TM218		104	90	91.4	98.6	86.5
Naphthalene	<0.009 mg/kg	TM218		0.112 M	<0.009 M	0.102 M	0.0477 M	<0.009 M
Acenaphthylene	<0.012 mg/kg	TM218		0.151 M	<0.012 M	0.0134 M	0.0803 M	<0.012 M
Acenaphthene	<0.008 mg/kg	TM218		0.102 M	<0.008 M	<0.008 M	0.0117 M	0.0195 M
Fluorene	<0.01 mg/kg	TM218		0.308 M	<0.01 M	<0.01 M	0.067 M	<0.01 M
Phenanthrene	<0.015 mg/kg	TM218		1.55 M	<0.015 M	0.0926 M	0.758 M	0.0776 M
Anthracene	<0.016 mg/kg	TM218		0.249 M	<0.016 M	<0.016 M	0.41 M	0.0353 M
Fluoranthene	<0.017 mg/kg	TM218		2.59 M	<0.017 M	0.0974 M	1.78 M	0.292 M
Pyrene	<0.015 mg/kg	TM218		2.18 M	<0.015 M	0.0829 M	1.43 M	0.254 M
Benz(a)anthracene	<0.014 mg/kg	TM218		1.3 M	<0.014 M	0.0683 M	0.963 M	0.146 M
Chrysene	<0.01 mg/kg	TM218		1.48 M	<0.01 M	0.0755 M	1.02 M	0.145 M
Benzo(b)fluoranthene	<0.015 mg/kg	TM218		1.67 M	<0.015 M	0.111 M	1.08 M	0.172 M
Benzo(k)fluoranthene	<0.014 mg/kg	TM218		0.694 M	<0.014 M	0.039 M	0.438 M	0.0654 M
Benzo(a)pyrene	<0.015 mg/kg	TM218		1.25 M	<0.015 M	0.0797 M	0.915 M	0.13 M
Indeno(1,2,3-cd)pyrene	<0.018 mg/kg	TM218		0.753 M	<0.018 M	0.0663 M	0.5 M	0.0901 M
Dibenzo(a,h)anthracene	<0.023 mg/kg	TM218		0.155 M	<0.023 M	<0.023 M	0.0953 M	<0.023 M
Benzo(g,h,i)perylene	<0.024 mg/kg	TM218		0.752 M	<0.024 M	0.0662 M	0.482 M	0.0804 M
PAH, Total Detected USEPA 16	<0.118 mg/kg	TM218		15.3	<0.118	0.894	10.1	1.51

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**
Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

Semi Volatile Organic Compounds

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	WS1	WS5				
			Depth (m)	0.20 - 0.20	0.20 - 0.20				
			Sample Type	Soil/Solid (S)	Soil/Solid (S)				
			Date Sampled	12/05/2023	12/05/2023				
			Sample Time	12:00	12:00				
			Date Received	19/05/2023	19/05/2023				
			SDG Ref	230519-69	230519-69				
			Lab Sample No.(s)	28020244	28020296				
			AGS Reference						
Phenol	<0.1 mg/kg	TM157		<0.2	<0.1				
Pentachlorophenol	<0.1 mg/kg	TM157		<0.2	<0.1				
n-Nitroso-n-dipropylamine	<0.1 mg/kg	TM157		<0.2	<0.1				
Nitrobenzene	<0.1 mg/kg	TM157		<0.2	<0.1				
Isophorone	<0.1 mg/kg	TM157		<0.2	<0.1				
Hexachloroethane	<0.1 mg/kg	TM157		<0.2	<0.1				
Hexachlorocyclopentadiene	<0.1 mg/kg	TM157		<0.2	<0.1				
Hexachlorobutadiene	<0.1 mg/kg	TM157		<0.2	<0.1				
Hexachlorobenzene	<0.1 mg/kg	TM157		<0.2	<0.1				
n-Dioctyl phthalate	<0.1 mg/kg	TM157		<0.2	<0.1				
Dimethyl phthalate	<0.1 mg/kg	TM157		<0.2	<0.1				
Diethyl phthalate	<0.1 mg/kg	TM157		<0.2	<0.1				
n-Dibutyl phthalate	<0.1 mg/kg	TM157		<0.2	<0.1				
Dibenzofuran	<0.1 mg/kg	TM157		<0.2	<0.1				
Carbazole	<0.1 mg/kg	TM157		<0.2	<0.1				
Butylbenzyl phthalate	<0.1 mg/kg	TM157		<0.2	<0.1				
bis(2-Ethylhexyl) phthalate	<0.1 mg/kg	TM157		<0.2	<0.1				
bis(2-Chloroethoxy)methane	<0.1 mg/kg	TM157		<0.2	<0.1				
bis(2-Chloroethyl)ether	<0.1 mg/kg	TM157		<0.2	<0.1				
Azobenzene	<0.1 mg/kg	TM157		<0.2	<0.1				
4-Nitrophenol	<0.1 mg/kg	TM157		<0.2	<0.1				
4-Nitroaniline	<0.1 mg/kg	TM157		<0.2	<0.1				
4-Methylphenol	<0.1 mg/kg	TM157		<0.2	<0.1				
4-Chlorophenylphenylether	<0.1 mg/kg	TM157		<0.2	<0.1				
4-Chloroaniline	<0.1 mg/kg	TM157		<0.2	<0.1				
4-Chloro-3-methylphenol	<0.1 mg/kg	TM157		<0.2	<0.1				
4-Bromophenylphenylether	<0.1 mg/kg	TM157		<0.2	<0.1				
3-Nitroaniline	<0.1 mg/kg	TM157		<0.2	<0.1				
2-Nitrophenol	<0.1 mg/kg	TM157		<0.2	<0.1				
2-Nitroaniline	<0.1 mg/kg	TM157		<0.2	<0.1				
2-Methylphenol	<0.1 mg/kg	TM157		<0.2	<0.1				
1,2,4-Trichlorobenzene	<0.1 mg/kg	TM157		<0.2	<0.1				
2-Chlorophenol	<0.1 mg/kg	TM157		<0.2	<0.1				

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**
Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

Semi Volatile Organic Compounds

Results Legend
- # ISO17025 accredited.
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- aq Aqueous / settled sample.
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- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	WS1	WS5				
			Depth (m)	0.20 - 0.20	0.20 - 0.20				
			Sample Type	Soil/Solid (S)	Soil/Solid (S)				
			Date Sampled	12/05/2023	12/05/2023				
			Sample Time	12:00	12:00				
			Date Received	19/05/2023	19/05/2023				
			SDG Ref	230519-69	230519-69				
			Lab Sample No.(s)	28020244	28020296				
			AGS Reference						
2,6-Dinitrotoluene	<0.1 mg/kg	TM157		<0.2	<0.1				
2,4-Dinitrotoluene	<0.1 mg/kg	TM157		<0.2	<0.1				
2,4-Dimethylphenol	<0.1 mg/kg	TM157		<0.2	<0.1				
2,4-Dichlorophenol	<0.1 mg/kg	TM157		<0.2	<0.1				
2,4,6-Trichlorophenol	<0.1 mg/kg	TM157		<0.2	<0.1				
2,4,5-Trichlorophenol	<0.1 mg/kg	TM157		<0.2	<0.1				
1,4-Dichlorobenzene	<0.1 mg/kg	TM157		<0.2	<0.1				
1,3-Dichlorobenzene	<0.1 mg/kg	TM157		<0.2	<0.1				
1,2-Dichlorobenzene	<0.1 mg/kg	TM157		<0.2	<0.1				
2-Chloronaphthalene	<0.1 mg/kg	TM157		<0.2	<0.1				
2-Methylnaphthalene	<0.1 mg/kg	TM157		0.35	<0.1				
Acenaphthylene	<0.1 mg/kg	TM157		<0.2	<0.1				
Acenaphthene	<0.1 mg/kg	TM157		<0.2	<0.1				
Anthracene	<0.1 mg/kg	TM157		<0.2	<0.1				
Benzo(a)anthracene	<0.1 mg/kg	TM157		1	<0.1				
Benzo(b)fluoranthene	<0.1 mg/kg	TM157		0.813	<0.1				
Benzo(k)fluoranthene	<0.1 mg/kg	TM157		0.798	<0.1				
Benzo(a)pyrene	<0.1 mg/kg	TM157		0.712	<0.1				
Benzo(g,h,i)perylene	<0.1 mg/kg	TM157		0.294	<0.1				
Chrysene	<0.1 mg/kg	TM157		1.26	0.168				
Fluoranthene	<0.1 mg/kg	TM157		1.95	0.345				
Fluorene	<0.1 mg/kg	TM157		<0.2	<0.1				
Indeno(1,2,3-cd)pyrene	<0.1 mg/kg	TM157		0.754	<0.1				
Phenanthrene	<0.1 mg/kg	TM157		1.26	0.199				
Pyrene	<0.1 mg/kg	TM157		1.95	0.309				
Naphthalene	<0.1 mg/kg	TM157		<0.2	<0.1				
Dibenzo(a,h)anthracene	<0.1 mg/kg	TM157		<0.2	<0.1				
Bis(2-chloroisopropyl) ether	<0.1 mg/kg	TM157		<0.2	<0.1				

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**
Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

TPH CWG (S)

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	WS1	WS5				
			Depth (m)	0.20 - 0.20	0.20 - 0.20				
			Sample Type	Soil/Solid (S)	Soil/Solid (S)				
			Date Sampled	12/05/2023	12/05/2023				
			Sample Time	12:00	12:00				
			Date Received	19/05/2023	19/05/2023				
			SDG Ref	230519-69	230519-69				
			Lab Sample No.(s)	28020244	28020296				
			AGS Reference						
GRO Surrogate % recovery**	%	TM089		97.1	104				
Aliphatics >C5-C6 (HS_1D_AL)	<0.01 mg/kg	TM089		0.0175	0.01				
Aliphatics >C6-C8 (HS_1D_AL)	<0.01 mg/kg	TM089		0.124	0.214				
Aliphatics >C8-C10 (HS_1D_AL)	<0.01 mg/kg	TM089		0.574	1.72				
Aliphatics >C10-C12 (EH_2D_AL_#1)	<1 mg/kg	TM414		10.7 #	8.98 #				
Aliphatics >C12-C16 (EH_2D_AL_#1)	<1 mg/kg	TM414		61.9 #	27.6 #				
Aliphatics >C16-C21 (EH_2D_AL_#1)	<1 mg/kg	TM414		94.8 #	17.4 #				
Aliphatics >C21-C35 (EH_2D_AL_#1)	<1 mg/kg	TM414		75.2 #	6.84 #				
Aliphatics >C35-C44 (EH_2D_AL_#1)	<1 mg/kg	TM414		8.83	<1				
Total Aliphatics >C10-C44 (EH_2D_AR_#1)	<5 mg/kg	TM414		251	60.7				
Total Aliphatics & Aromatics >C10-C44 (EH_2D_Total_#1)	<10 mg/kg	TM414		431	91				
Aromatics >EC5-EC7 (HS_1D_AR)	<0.01 mg/kg	TM089		<0.01	<0.01				
Aromatics >EC7-EC8 (HS_1D_AR)	<0.01 mg/kg	TM089		<0.01	<0.01				
Aromatics >EC8-EC10 (HS_1D_AR)	<0.01 mg/kg	TM089		0.383	1.14				
Aromatics > EC10-EC12 (EH_2D_AR_#1)	<1 mg/kg	TM414		4.39 #	<1 #				
Aromatics > EC12-EC16 (EH_2D_AR_#1)	<1 mg/kg	TM414		51.2 #	12.4 #				
Aromatics > EC16-EC21 (EH_2D_AR_#1)	<1 mg/kg	TM414		41.8 #	14.4 #				
Aromatics > EC21-EC35 (EH_2D_AR_#1)	<1 mg/kg	TM414		70.6 #	2.04 #				
Aromatics >EC35-EC44 (EH_2D_AR_#1)	<1 mg/kg	TM414		11.4	<1				
Aromatics > EC40-EC44 (EH_2D_AR_#1)	<1 mg/kg	TM414		2.64	<1				
Total Aromatics > EC10-EC44 (EH_2D_AR_#1)	<5 mg/kg	TM414		179	30.3				
Total Aliphatics & Aromatics >C5-C44 (EH_2D_Total_#1+HS_1D_Total)	<10 mg/kg	TM414		432	94.1				
Total Aliphatics >C5-C10 (HS_1D_AL_TOTAL)	<0.05 mg/kg	TM089		0.715	1.94				
Total Aromatics >EC5-EC10 (HS_1D_AR_TOTAL)	<0.05 mg/kg	TM089		0.383	1.14				
GRO >C5-C10 (HS_1D_TOTAL)	<0.02 mg/kg	TM089		1.1	3.08				

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**
Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

VOC MS (S)

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	WS1	WS5				
			Depth (m)	0.20 - 0.20	0.20 - 0.20				
			Sample Type	Soil/Solid (S)	Soil/Solid (S)				
			Date Sampled	12/05/2023	12/05/2023				
			Sample Time	12:00	12:00				
			Date Received	19/05/2023	19/05/2023				
			SDG Ref	230519-69	230519-69				
			Lab Sample No.(s)	28020244	28020296				
			AGS Reference						
Dibromofluoromethane**	%	TM116		102	109				
Toluene-d8**	%	TM116		89.7	94.9				
4-Bromofluorobenzene**	%	TM116		70.1	91.5				
Dichlorodifluoromethane	<0.006 mg/kg	TM116		<0.006 #	<0.006 #				
Chloromethane	<0.007 mg/kg	TM116		<0.007 #	<0.007 #				
Vinyl Chloride	<0.006 mg/kg	TM116		<0.006 @ M	<0.006 @ M				
Bromomethane	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
Chloroethane	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
Trichlorofluorormethane	<0.006 mg/kg	TM116		<0.006 M	<0.006 M				
1,1-Dichloroethene	<0.01 mg/kg	TM116		<0.01 #	<0.01 #				
Carbon Disulphide	<0.007 mg/kg	TM116		<0.007 M	<0.007 M				
Dichloromethane	<0.01 mg/kg	TM116		<0.01 #	<0.01 #				
Methyl Tertiary Butyl Ether	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
trans-1,2-Dichloroethene	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
1,1-Dichloroethane	<0.008 mg/kg	TM116		<0.008 M	<0.008 M				
cis-1,2-Dichloroethene	<0.006 mg/kg	TM116		<0.006 M	<0.006 M				
2,2-Dichloropropane	<0.01 mg/kg	TM116		<0.01	<0.01				
Bromochloromethane	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
Chloroform	<0.008 mg/kg	TM116		<0.008 M	<0.008 M				
1,1,1-Trichloroethane	<0.007 mg/kg	TM116		<0.007 M	<0.007 M				
1,1-Dichloropropene	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
Carbontetrachloride	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
1,2-Dichloroethane	<0.005 mg/kg	TM116		<0.005 M	<0.005 M				
Benzene	<0.009 mg/kg	TM116		<0.009 M	<0.009 M				
Trichloroethene	<0.009 mg/kg	TM116		<0.009 #	<0.009 #				
1,2-Dichloropropane	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
Dibromomethane	<0.009 mg/kg	TM116		<0.009 M	<0.009 M				
Bromodichloromethane	<0.007 mg/kg	TM116		<0.007 M	<0.007 M				
cis-1,3-Dichloropropene	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
Toluene	<0.007 mg/kg	TM116		<0.007 M	<0.007 M				
trans-1,3-Dichloropropene	<0.01 mg/kg	TM116		<0.01	<0.01				
1,1,2-Trichloroethane	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
1,3-Dichloropropane	<0.007 mg/kg	TM116		<0.007 M	<0.007 M				

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**
Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

VOC MS (S)

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	WS1	WS5				
			Depth (m)	0.20 - 0.20	0.20 - 0.20				
			Sample Type	Soil/Solid (S)	Soil/Solid (S)				
			Date Sampled	12/05/2023	12/05/2023				
			Sample Time	12:00	12:00				
			Date Received	19/05/2023	19/05/2023				
			SDG Ref	230519-69	230519-69				
			Lab Sample No.(s)	28020244	28020296				
			AGS Reference						
Tetrachloroethene	<0.005 mg/kg	TM116		<0.005 M	<0.005 M				
Dibromochloromethane	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
1,2-Dibromoethane	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
Chlorobenzene	<0.005 mg/kg	TM116		<0.005 M	<0.005 M				
1,1,1,2-Tetrachloroethane	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
Ethylbenzene	<0.004 mg/kg	TM116		<0.004 M	<0.004 M				
p/m-Xylene	<0.01 mg/kg	TM116		<0.01 #	<0.01 #				
o-Xylene	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
Styrene	<0.01 mg/kg	TM116		<0.01 @#	<0.01 @#				
Bromoform	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
Isopropylbenzene	<0.005 mg/kg	TM116		0.00794 #	<0.005 #				
1,1,2,2-Tetrachloroethane	<0.01 mg/kg	TM116		<0.01 #	<0.01 #				
1,2,3-Trichloropropane	<0.016 mg/kg	TM116		<0.016 M	<0.016 M				
Bromobenzene	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
Propylbenzene	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
2-Chlorotoluene	<0.009 mg/kg	TM116		<0.009 M	<0.009 M				
1,3,5-Trimethylbenzene	<0.008 mg/kg	TM116		<0.008 M	<0.008 M				
4-Chlorotoluene	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
tert-Butylbenzene	<0.014 mg/kg	TM116		<0.014 #	<0.014 #				
1,2,4-Trimethylbenzene	<0.009 mg/kg	TM116		0.0177 #	<0.009 #				
sec-Butylbenzene	<0.01 mg/kg	TM116		0.0159	<0.01				
4-Isopropyltoluene	<0.01 mg/kg	TM116		<0.01	<0.01				
1,3-Dichlorobenzene	<0.008 mg/kg	TM116		<0.008 M	<0.008 M				
1,4-Dichlorobenzene	<0.005 mg/kg	TM116		<0.005 M	<0.005 M				
n-Butylbenzene	<0.011 mg/kg	TM116		<0.011	<0.011				
1,2-Dichlorobenzene	<0.01 mg/kg	TM116		<0.01 M	<0.01 M				
1,2-Dibromo-3-chloropropane	<0.014 mg/kg	TM116		<0.014 M	<0.014 M				
Tert-amyl methyl ether	<0.01 mg/kg	TM116		<0.01 #	<0.01 #				
1,2,4-Trichlorobenzene	<0.02 mg/kg	TM116		<0.02	<0.02				
Hexachlorobutadiene	<0.02 mg/kg	TM116		<0.02	<0.02				
Naphthalene	<0.013 mg/kg	TM116		<0.013 M	<0.013 M				
1,2,3-Trichlorobenzene	<0.02 mg/kg	TM116		<0.02 #	<0.02 #				
1,3,5-Trichlorobenzene	<0.02 mg/kg	TM116		<0.02	<0.02				

Validated

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**
Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

VOC MS (S)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	WS1	WS5
			Depth (m)	0.20 - 0.20	0.20 - 0.20
			Sample Type	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	12/05/2023	12/05/2023
			Sample Time	12:00	12:00
			Date Received	19/05/2023	19/05/2023
			SDG Ref	230519-69	230519-69
			Lab Sample No.(s)	28020244	28020296
			AGS Reference		
Sum of Detected Xylenes	<0.02 mg/kg	TM116		<0.02	<0.02
Sum of BTEX	<0.04 mg/kg	TM116		<0.04	<0.04

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**
Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

Asbestos Identification - Solid Samples

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
*	Subcontracted test.
(F)	Trigger breach confirmed
1-5&♦$@	Sample deviation (see appendix)

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Asbestos Actinolite	Asbestos Anthophyllite	Asbestos Tremolite	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	WS1 0.20 - 0.20 SOLID 12/05/2023 00:00:00 19/05/2023 05:00:00 230519-69 28020244 TM048	26/05/2023	Odhran McLernon	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	WS2 0.80 - 0.80 SOLID 12/05/2023 00:00:00 19/05/2023 05:00:00 230519-69 28020264 TM048	25/05/2023	Odhran McLernon	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	WS3 0.20 - 0.20 SOLID 12/05/2023 00:00:00 19/05/2023 05:00:00 230519-69 28020281 TM048	25/05/2023	Odhran McLernon	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	WS4 0.50 - 0.50 SOLID 12/05/2023 00:00:00 19/05/2023 05:00:00 230519-69 28020290 TM048	26/05/2023	Odhran McLernon	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	WS5 0.20 - 0.20 SOLID 12/05/2023 00:00:00 19/05/2023 05:00:00 230519-69 28020296 TM048	26/05/2023	Renata Bozhkov	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected

Validated

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**
Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	GWPR5385 2-6 Seagull Lane Emsv
Mass Sample taken (kg)	0.106	**Natural Moisture Content (%)**	17.8
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	84.9
Particle Size <4mm	>95%		

Case	
SDG	230519-69
Lab Sample Number(s)	28020244
Sampled Date	12-May-2023
Customer Sample Ref.	WS1
Depth (m)	0.20 - 0.20

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	3.69	3	5	6
Loss on Ignition (%)	9.59	-	-	10
Sum of BTEX (mg/kg)	<0.04	6	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	562	500	-	-
PAH Sum of 17 (mg/kg)	15.3	100	-	-
pH (pH Units)	8.8	-	>6	-
ANC to pH 6 (mol/kg)	<0.03	-	-	-
ANC to pH 4 (mol/kg)	0.08	-	-	-

Eluate Analysis	**C_2 Concⁿ in 10:1 eluate (mg/l)**		**A_2 10:1 concⁿ leached (mg/kg)**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	0.0182	<0.0005	0.182	<0.005	0.5	2	25
Barium	0.0153	<0.0002	0.153	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.0109	<0.0003	0.109	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.0142	<0.003	0.142	<0.03	0.5	10	30
Nickel	0.006	<0.0004	0.06	<0.004	0.4	10	40
Lead	0.00423	<0.0002	0.0423	<0.002	0.5	10	50
Antimony	0.0125	<0.001	0.125	<0.01	0.06	0.7	5
Selenium	0.00173	<0.001	0.0173	<0.01	0.1	0.5	7
Zinc	0.00815	<0.001	0.0815	<0.01	4	50	200
Chloride	18.9	<2	189	<20	800	15000	25000
Fluoride	0.687	<0.5	6.87	<5	10	150	500
Sulphate (soluble)	3.4	<2	34	<20	1000	20000	50000
Total Dissolved Solids	141	<10	1410	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	26.9	<3	269	<30	500	800	1000

Leach Test Information

Date Prepared	20-May-2023
pH (pH Units)	8.16
Conductivity (µS/cm)	184
Volume Leachant (Litres)	0.884

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable

Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)

Stated limits are for guidance only and ALS Laboratories (UK) Limited cannot be held responsible for any discrepancies with current legislation

26/05/2023 15:56:41

Table of Results - Appendix

Method No	Description
PM024	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
PM115	Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step
TM018	Determination of Loss on Ignition
TM048	Identification of Asbestos in Bulk Material
TM062 (S)	Determination of Phenols in Soils by HPLC
TM089	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM090	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM104	Determination of Fluoride using the Kone Analyser
TM116	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM132	ELTRA CS800 Operators Guide
TM133	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Determination of Hexavalent Chromium using Kone analyser
TM152	Analysis of Aqueous Samples by ICP-MS
TM153	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser
TM157	Determination of SVOC in Soils by GC-MS extracted by sonication in DCM/Acetone
TM168	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils
TM181	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM182	Determination of Acid Neutralisation Capacity (ANC) Using Autotitration in Soils
TM183	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM218	The determination of PAH in soil samples by GC-MS
TM221	Determination of Acid Extractable Sulphate in Soils by ICP OES
TM222	Determination of Hot Water Soluble Boron in Soils (10:1 Water:Soil) by ICP OES.
TM243	Mixed Anions In Soils By Kone
TM248	Determination of Ammonium BRE (2:1 Extract) on solids
TM256	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
TM259	Determination of Phenols in Waters and Leachates by HPLC
TM282	Extraction of Magnesium by BRE Method
TM410	Determination of Coronene in soils by GCMS
TM414	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID
TM415	Determination of Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).

CERTIFICATE OF ANALYSIS

SDG: 230519-69 **Report Number:** 690450 **Superseded Report:**
Client Ref.: GWPR5385 2-6 Seagull Lane Ems **Location:** GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH

Test Completion Dates

Lab Sample No(s)	28020244	28020259	28020264	28020279	28020281	28020284	28020290	28020296
Customer Sample Ref.	WS1	WS1	WS2	WS2	WS3	WS3	WS4	WS5
AGS Ref.								
Depth	0.20 - 0.20	1.00 - 1.00	0.80 - 0.80	2.00 - 2.00	0.20 - 0.20	2.50 - 2.50	0.50 - 0.50	0.20 - 0.20
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Ammoniacal N as NH4 in 2:1 extract		23-May-2023				23-May-2023		
ANC at pH4 and ANC at pH 6	23-May-2023							
Anions by Kone (soil)	24-May-2023	25-May-2023	24-May-2023	24-May-2023	25-May-2023	25-May-2023	24-May-2023	24-May-2023
Anions by Kone (w)	24-May-2023							
Asbestos ID in Solid Samples	26-May-2023		25-May-2023		25-May-2023		26-May-2023	26-May-2023
Boron Water Soluble	23-May-2023		25-May-2023		25-May-2023		23-May-2023	23-May-2023
CEN 10:1 Leachate (1 Stage)	21-May-2023							
CEN Readings	25-May-2023							
Coronene	26-May-2023							
Cyanide Comp/Free/Total/Thiocyanate	25-May-2023		26-May-2023		24-May-2023		24-May-2023	24-May-2023
Dissolved Metals by ICP-MS	25-May-2023							
Dissolved Organic/Inorganic Carbon	24-May-2023							
EPH by GCxGC-FID	23-May-2023							
EPH CWG GC (S)	23-May-2023							24-May-2023
Fluoride	25-May-2023							
GRO by GC-FID (S)	22-May-2023							22-May-2023
Hexavalent Chromium (s)	25-May-2023		25-May-2023		25-May-2023		25-May-2023	25-May-2023
Loss on Ignition in soils	25-May-2023							
Magnesium (BRE)		24-May-2023				24-May-2023		
Mercury Dissolved	25-May-2023							
Metals in solid samples by OES	24-May-2023		24-May-2023		25-May-2023		24-May-2023	24-May-2023
Moisture at 105C	20-May-2023							
NO3, NO2 and TON by KONE (s)		26-May-2023				26-May-2023		
PAH 16 & 17 Calc	26-May-2023							
PAH by GCMS	25-May-2023		25-May-2023		26-May-2023		26-May-2023	25-May-2023
PCBs by GCMS	26-May-2023							
pH	23-May-2023	23-May-2023	23-May-2023	23-May-2023	23-May-2023	23-May-2023	23-May-2023	23-May-2023
pH Value of Filtered Water	25-May-2023							
Phenols by HPLC (S)	25-May-2023		25-May-2023		26-May-2023		25-May-2023	25-May-2023
Phenols by HPLC (W)	25-May-2023							
Sample description	19-May-2023	20-May-2023	19-May-2023	20-May-2023	19-May-2023	20-May-2023	19-May-2023	19-May-2023
Semi Volatile Organic Compounds	24-May-2023							24-May-2023
Total Organic Carbon	25-May-2023		26-May-2023		25-May-2023		26-May-2023	26-May-2023
Total Sulphate		24-May-2023				24-May-2023		
Total Sulphur		25-May-2023				25-May-2023		
TPH CWG GC (S)	23-May-2023							24-May-2023
VOC MS (S)	22-May-2023							22-May-2023

SDG:	230519-69	**Report Number:**	690450	**Superseded Report:**	
Client Ref:	GWPR5385 2-6 Seagull Lane	**Location:**	GWPR5385 2-6 Seagull Lane Emsworth PO10 7QH		

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

APPENDIX G:
Soil Assessment Criteria

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001

Ground and Water Limited

Soil Guideline Values and Generic Assessment Criteria

The Contaminated Land Regime reflects the UK Government's stated objectives of achieving sustainable development through the 'suitable for use approach'. At preliminary risk assessment stage, risks are evaluated qualitatively. As the site investigation progresses to a generic or detailed quantitative risk assessment, data is collected and assessment criteria are utilised to evaluate whether the contaminants represent an unacceptable risk to the identified receptors.

1. Contaminated Land Exposure Assessment Model (CLEA)

Current United Kingdom risk assessment practice is based on the Contaminated Land Exposure Assessment Model (CLEA).

The CLEA Guidance comprises the following documents:

1) EA Science Report SC050021/SR2: Human health toxicological assessment of contaminants in soil.
2) EA Science Report SC050021/SR3: Updated technical background to the CLEA model.
3) EA CLEA Bulletin (2009).
4) CLEA software version 1.07 (2015)
5) Toxicological reports and SGV technical notes.

The CLEA guidance and tools:

- Do not cover other types of risk to humans, such as fire, suffocation or explosion, or short-term and acute exposures;
- Do not cover risks to the environment, such as groundwater, ecosystems or buildings;
- Do not provide a definitive test for telling when human health risks are significant; and
- Are not a legal requirement in assessing land contamination risks. They are not part of the legal regime for Part 2A of the Environmental Protection Act 1990.

The CLEA guidance derives soil concentrations of contaminants above which (in the opinion of the EA) there may be a concern that warrants further investigation. It does not provide a definitive test for establishing that the risk is significant.

1.1. Land-use Scenarios

The CLEA model uses a range of standard land-use scenarios to develop conceptual exposure models outlined in the following sections.

1.1.1. Residential (with home grown produce) (RwHP)

Generic scenario assumes a typical two-storey house built on a ground bearing slab with a private garden having a lawn, flowerbeds and a small fruit and vegetable patch.

- Critical receptor is a young female child (zero to six years old)
- Exposure duration is six years.
- Exposure pathways include direct soil and indoor dust ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and indoor dust and inhalation of indoor and outdoor dust and vapours.
- Building type is a two-storey small-terraced house.

A sub-set of this land-use is residential apartments with communal landscaped gardens where the consumption of home grown vegetables will not occur. (Residential without homegrown produce (RwoHP)).

1.1.2. Allotments

Provision of open space (about 250sq.m) commonly made available to tenants by the local authority to grow fruit and vegetable for their own consumption. Typically, there are a number of plots to a site which may have a total area of up to 1 hectare. The tenants are assumed to be adults and that young children make occasional accompanied visits.

Although some allotment holders may choose to keep animals including rabbits, hens, and ducks, potential exposure to contaminated meat and eggs is not considered.

- Critical receptor is a young female child (zero to six years old)
- Exposure duration is six years.
- Exposure pathways include direct soil ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and inhalation of outdoor dust and vapours.
- There is no building.

1.1.3. Commercial/Industrial

The generic scenario assumes a typical commercial or light industrial property comprising a three-storey building at which employees spend most time indoors and are involved in office-based or relatively light physical work.

- Critical receptor is a working female adult (aged 16 to 65 years old).
- Exposure duration is a working lifetime of 49 years.
- Exposure pathways include direct soil and indoor dust ingestion, skin contact with soils and dusts and inhalation of dust and vapours.
- Building type is a three-storey office (pre 1970).

2. LQM/CIEH Suitable 4 Use Levels (S4UL)

For derivation of these S4UL reference must be made to:

Nathanial, P., McCaffrey, C., Gillet, A., Ogden, R., Nathanial, J., *The LQM/CIEH S4UL's for Human Health Risk Assessment*. **Land Quality Press**. 2015

2.1. S4UL Background

The Land Quality Management/Chartered Institute of Environmental Health (LQM/CIEH) S4UL for a given land use is the concentration of the contaminant in soil at which the predicted daily exposure,

as calculated by the CLEA software, equals the Health Criteria Value. The S4ULs have been derived for substances based on various generic land use and soil organic matter contents.

The final output for each contaminant represents a synthesis of new toxicological (and fate and transport) reviews published since the preparation of the 2nd edition LQM/CIEH GAC's (Nathanial et al., 2009).

In the derivation of LQM/CIEH S4UL's the principles of 'minimal' or 'tolerable' risk enshrined in SR2, which has not been withdrawn, has been maintained.

2.2. S4UL Land-use

S4UL's have been derived for the basic CLEA land-uses, as described in section 1.2, and for two new land uses:

- Public Open Spaces near Residential Housing (POSresi).
- Public Park (POSpark).

2.2.1. Public Open Spaces near Residential Housing (POSresi)

Includes the predominantly grassed areas adjacent to high density housing, the central green area on many 1930's – 1970's housing estates, and smaller areas commonly incorporated in newer developments as informal grassed areas or more formal landscaped areas with a mixture of open space and covered soils with planting. It is assumed that the close proximity to the place of residence will allow tracking back of soil to occur.

2.2.2. Public Park (POSpark)

An area of open space, usually owned and maintained by the local authority, provided for recreational uses including family visists and picnics, children's play area, informal sporting activities (not a dedicated sports pitch), and dog walking. It is assumed that tracking back of soils into places of residence will be negligible.

The following LQM/CIEH S4Uls (Copyright Land Quality Management Limited) have been reproduced with permission, to the publication number S4UL3072.

3. Category 4 Screening Levels (C4SLs)

In the case of Lead, no SGV or GAC has been published to date. This is likely to be due to the toxicity review that is currently being undertaken by the Environment Agency. In the absence of updated toxicity information the SGV derived using CLEA 1.07 methodology and related toxicity will be used.

The overall objective of the C4SLs research project was to assist the provision of technical guidance in support of Defra's revised Statutory Guidance (SG) for Part 2A of the Environmental Protection Act 1990 (Part 2A) (Defra, 2012a). Specifically, the project aimed to deliver:

- A methodology for deriving C4SLs for four generic land-uses comprising residential, commercial, allotments and public open space; and
- A demonstration of the methodology, via the derivation of C4SLs for six substances – arsenic, benzene, benzo(a)pyrene, cadmium, chromium (VI) and lead.

To help achieve a more targeted approach to identifying and managing contaminated land in relation to the risk (or possibility) of harm to human health, the revised SG presented a new four category

system for considering land under Part 2A, ranging from Category 4, where there is no risk that land poses a significant possibility of significant harm (SPOSH), or the level of risk is low, to Category 1, where the risk that land poses a significant possibility of significant harm (SPOSH) is unacceptably high. More specific guidance on what type of land should be considered as Category 4 (Human Health) is provided in Paragraphs 4.21 and 4.22 of the revised SG, as follows:

> *"4.21 The local authority should consider that the following types of land should be placed into Category 4: Human Health:*
> *(a) Land where no relevant contaminant linkage has been established.*
> *(b) Land where there are only normal levels of contaminants in soil, as explained in Section 3 of this Guidance.*
> *(c) Land that has been excluded from the need for further inspection and assessment because contaminant levels do not exceed relevant generic assessment criteria in accordance with Section 3 of this Guidance, or relevant technical tools or advice that may be developed in accordance with paragraph 3.30 of this Guidance.*
> *(d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed in the normal course of their lives).*
>
> *4.22 The local authority may consider that land other than the types described in paragraph 4.21 should be placed into Category 4: Human Health if following a detailed quantitative risk assessment it is satisfied that the level of risk posed is sufficiently low."*

The C4SLs are intended as "relevant technical tools" (in relation to Paragraph 4.21(c)) to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

The Impact Assessment (IA), which accompanied the revised SG (Defra, 2012b) provides further information on the nature and potential role of the C4SLs. Paragraph 47(h) of the IA states that:

> *"The new statutory guidance will bring about a situation where the current SGVs/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land."*

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

> *"SGVs are guidelines on the level of long-term human exposure to individual chemicals in soil that, unless stated otherwise, are tolerable or pose a minimal risk to human health."*

The implication of Paragraph 47(h) of the IA is that minimal risk is well within Category 4 and that the C4SLs should describe a higher level of risk which, whilst not minimal, can still be considered low enough to allow a judgement to be made that land containing substances at, or below, the C4SLs would typically fall within Category 4. This reflects Paragraph 4.20 of the revised SG, which states:

> *"4.20 The local authority should not assume that land poses a significant possibility of significant harm if it considers that there is no risk or that the level of risk posed is low. For the purposes of this Guidance, such land is referred to as a "Category 4: Human Health" case. The authority may decide that the land is a Category 4: Human Health case as soon as it considers it has evidence to this effect, and this may happen at any stage during risk assessment including the early stages."*

C4SLs, therefore, should not be viewed as "SPOSH levels" and they should not be used as a legal trigger for the determination of land under Part 2A.

The generic screening values referred to before usually take the form of risk-based Soil Guideline Values (SGVs) or other Generic Assessment Criteria (GACs) that are most typically derived using the Environment Agency's Contaminated Land Exposure Assessment (CLEA) model, as described in the Environment Agency's SR2, SR3 and SR7 reports (EA, 2009b & c; EA, 2008). It is anticipated that C4SLs will be used in a similar manner; as generic screening criteria that can be used within a GQRA, albeit describing a higher level of risk than the SGVs.

The suggested approach to the development of C4SLs consists of the retention and use of the CLEA framework, modified according to considerations of the underlying science within the context of Defra's policy objectives relating to the revised SG. Within this context, it is suggested that the development of C4SLs may be achieved in one of three ways, namely:

- By modifying the toxicological parameters used within CLEA (while maintaining current exposure parameters);
- By modifying the exposure parameters embedded within CLEA (while maintaining current toxicological "minimal risk" interpretations); and
- By modifying both toxicological and exposure parameters.

There is also a suggested check on "other considerations" (e.g., background levels, epidemiological data, sources of uncertainty) within the approach, applicable to all three options.

It is suggested that a new term is defined for the toxicological guidance values associated with the derivation of C4SLs – a Low Level of Toxicological Concern (LLTC). A LLTC should represent an intake of low concern that remains suitably protective of health, and definitely does not approach an intake level that could be defined as SPOSH.

4. CL:AIRE Generic Assessment Criteria (GAC)

For derivation of the CL:AIRE Generic Assessment Criteria (GAC) reference should be made to the following report:

> CL:AIRE, *The Soil Generic Assessment Criteria for Human Health Risk Assessment.* **Contaminated Land: Applications in the Real Environment**. 2009.

Within this report, Contaminated Land: Applications in Real Environments (CL:AIRE) provided Generic Assessment Criteria (GAC) in accordance with the CLEA software and the principles outlined previously for a further 35 contaminants sometimes encountered on land affected by contamination.

5. SoBRA Acute GAC

The Society of Brownfield Risk Assessment (SoBRA) identified that most human health risk assessments focus on the chronic risks arising from long-term exposure to specific substances. As chronic risks often occur at lower doses than acute risks, they are often the key drivers, however, in some instances the acute dose may also be an important consideration within risk assessments.

The methodology for deriving the acute GAC were related to two distinct receptor groups:

- Members of the public, where the 'critical' receptor for this group will typically be a female child, which is consistent with CLEA residential and Public Open Space/allotments land-uses;
- Workers involved with excavations. The critical receptor for this group is assumed to be a female working adult, without the use of PPE.

The acute GACs relate to short term exposure of high concentrations of a substance that lead to acute effects. They are not considered to be average exposures across a specific / defined area. As a result, the GACs should be normally be compared with the maximum likely concentration that the individual may be exposed to, and not the average concentration within a specific area.

The SoBRA acute GAC will primarily be used for contaminants that do not currently have any GAC, most notably Cyanide.

6. Detailed Quantitative Risk Assessments (DQRA)

Where the adoption of a GAC is not appropriate, for instance when the intended land-use is at variance the CLEA standard land-uses, then a DQRA may be undertaken to develop site specific values for relevant soil contaminants.

- Establishing the plausibility that generic exposure pathways exist in practice by measurement and observation.
- Developing more accurate parameters using site data.

7. Phytotoxicity

CLEA guidance only addresses human health toxicity; assessment of plant toxicity (phytotoxicity) is based on threshold trigger values obtained from the following source:

- BS3882:2015 – *Specification for Topsoil*

The trigger values are relevant only to those contaminants, where present in excess, have the potential to inhibit plant growth, or kill plants (Cu, Ni and Zn). The criteria have been based on a wide range of planting that are common within a multi-purpose topsoil.

8. Statistical Tests

DEFRA R&D Publication CLR 7 (DOE 1994) addressed the statistical treatment of test results and their comparison to Soil Guideline Values.

Consideration must be given to the appropriate area of land to be considered termed the critical averaging area.

For a communal open space or commercial land-use, the critical averaging area will depend on the proposed layout. For a residential use with private gardens the averaging area is the individual plot.

It may be appropriate to compare the upper 95th percentile concentration with the Soil Guideline Value, subject to applying a statistical test to establish that the range of concentrations are reasonably consistent and belonging to the same underlying distribution of data.

CL:AIRE published guidance in 2020, *Guidance in comparing soil contamination data with a critical concentration,* superseding the CL:AIRE/CIEH 2008 report of the same name. The guidance provides ways to assist land contamination stakeholders to apply statistical methods to their data to enable decisions under the legislative framework; either planning system or Part 2A of the Environmental Protection Act 1990.

The use of the statistical tests should only be applied if the following statements are valid for the datasets:

- Averaging areas, as well as the smallest area of concern have been identified on the basis of the CSM, including the desk study and/or the site walkover;
- The sample locations were chosen using a simple random, stratified random or stratified systematic (square, herringbone or triangular grid) sampling pattern, rather than being targeted to locations suspected of being contaminated;
- The sample locations are relatively evenly spread across the area and are not clustered, to avoid giving undue weight to some parts of the site over others in the calculated statistics;
- The analyses do not suggest a hotspot or outlier of contamination that should be treated as a separate zone. This has been established by a histogram and/or a names statistical test;
- The sample locations are all taken from one population (i.e. the same material);
- Where an averaging zone encompasses several averaging areas, analyses do not show a spatial trend or other spatial pattern across that zone; and
- The number of samples has been shown to be sufficient for a statistical analysis.

Any included statistical spreadsheet is based on an in-house method of statistical analysis, in line with those outlined within the CL:AIRE guidance (2020).

Treatment of Hot-Spots

- A statistical test is applied to establish whether the data is a part of a single set, or whether data outliers are present.
- Provided that the data is based on random sampling and no distinct contamination source was present at the sampling location, the hot-spot(s) may be excluded and the mean of the remaining data assessed.

9. Ground and Water Limited Soil Assessment Criteria

The Soil Assessment Criteria used in the preparation of the Generic Quantitative Risk Assessment are tabulated in the following pages, where the source of each has been outlined in the previous sections.

9.1. Inorganics

SoBRA – Acute Generic Assessment Criteria						
Determinand	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Cyanide	24	24	24	1400	24	24

9.2. Metals

C4SL Low Level of Toxicological Concern						
Determinand	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Lead	< 200	< 310	< 80	< 2300	< 630	< 1300

LQM/CIEH Suitable 4 Use Levels – Metals and Semi-metals						
Determinand	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Arsenic	37	40	43	640	79	170
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11000	45	240000	21000	46000
Cadmium	11	85	1.9	190	120	532
Chromium (III)	910	910	18000	8600	1500	33000
Chromium (VI)	6	6	1.8	33	7.7	220
Copper	2400	7100	520	68000	12000	44000
Elemental Mercury	1.2	1.2	21	58	16	30
Inorganic Mercury	40	56	19	1100	120	240
Methylmercury	11	15	6	320	40	68
Nickel	130	180	53	980	230	800
Selenium	250	430	88	12000	1100	1800
Vanadium	410	1200	91	9000	2000	5000
Zinc	3700	40000	620	730000	81000	170000

Phytotoxicity (Harmful to Plants) Threshold Trigger Values			
Determinand	**Soil pH < 6.0 (mg/kg)**	**Soil pH 6.0 – 7.0 (mg/kg)**	**Soil pH > 7.0 (mg/kg)**
Copper	100	135	200
Nickel	60	75	110
Zinc	200	200	300
Notes: BS3882:2015 – *Specification for Topsoil*. Based on a wide range of common plants that will be exposed to multi-purpose topsoil. Toxicity of contaminant may also be impacted by pH of soils. Site observation of plant vitality may give additional guidance.			

CL:AIRE Soil Generic Assessment Criteria				
Determinand	**Residential (mg/kg)**	**Residential without plant uptake (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
Antimony	ND	550	ND	7500
Barium	ND	1300	ND	22000
Molybdenum	ND	670	ND	17000
ND – Not derived				

9.3. Total Petroleum Hydrocarbons (TPHs)

9.3.1. BTEX Compounds

LQM/CIEH Suitable 4 Use Levels – BTEX Compounds							
Determinand	**Soil Organic Matter**	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Benzene	1.0% SOM	0.087	0.38	0.017	27	72	90
	2.5% SOM	0.170	0.70	0.034	47	72	100
	6.0% SOM	0.370	1.40	0.075	90	73	110
Toluene	1.0% SOM	130	880	22	56000	56000	87000
	2.5% SOM	290	1900	51	110000	56000	95000
	6.0% SOM	660	3900	120	180000	56000	100000
Ethylbenzene	1.0% SOM	47	83	16	5700	24000	17000
	2.5% SOM	110	190	39	13000	24000	22000
	6.0% SOM	260	440	91	27000	25000	27000
o-Xylene	1.0% SOM	60	88	28	6600	41000	17000
	2.5% SOM	140	210	67	15000	42000	24000
	6.0% SOM	330	480	160	33000	43000	33000
m-Xylene	1.0% SOM	59	82	31	6200	41000	17000
	2.5% SOM	140	190	74	14000	42000	24000
	6.0% SOM	320	450	170	31000	43000	33000
p-Xylene	1.0% SOM	56	79	29	5900	41000	17000
	2.5% SOM	130	180	69	14000	42000	23000
	6.0% SOM	310	430	160	30000	43000	31000
SOM = Soil Organic Matter Content (%)							

9.3.2. Total Petroleum Hydrocarbons – Aliphatic

LQM/CIEH Suitable 4 Use Levels For TPH							
Aliphatic		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
EC 5-6	1.0% SOM	42	42	730	3,200 (304) [sol]	570,000 (304) [sol]	95,000 (304) [sol]
	2.5% SOM	78	78	1,700	5,900 (558) [sol]	590,000	130,000 (558) [sol]
	6.0% SOM	160	160	3,900	12,000 (1150) [sol]	600,000 (1150)[sol]	180,000 (1150) [sol]
EC >6-8	1.0% SOM	100	100	2,300	7,800 (144) [sol]	600,000	150,000 (144) [sol]
	2.5% SOM	230	230	5,600	17,000 (322) [sol]	610,000	220,000 (322) [sol]
	6.0% SOM	530	530	13,000	40,000 (736) [sol]	620,000	320,000 (736) [sol]
EC >8-10	1.0% SOM	27	27	320	2,000 (78) [sol]	13,000	14,000 (78) [sol]
	2.5% SOM	65	65	770	4,800 (118) [vap]	13,000	18,000 (118) [vap]
	6.0% SOM	150	150	1,700	11,000 (451) [vap]	13,000	21,000 (451) [vap]
EC >10-12	1.0% SOM	130 (48) [vap]	130 (48) [vap]	2,200	9,700 (48) [sol]	13,000	21,000 (48) [sol]
	2.5% SOM	330 (118) [vap]	330 (118) [vap]	4,400	23,000 (118) [vap]	13,000	23,000 (118) [vap]
	6.0% SOM	760 (283) [vap]	760 (283) [vap]	7,300	47,000 (283) [vap]	13,000	24,000 (283) [vap]
EC >12-16	1.0% SOM	1,100 (24) [sol]	1,100 (24) [sol]	11,000	59,000 (24) [sol]	13,000	25,000 (24) [sol]
	2.5% SOM	2,400 (59) [sol]	2,400 (59) [sol]	13,000	82,000 (59) [sol]	13,000	25,000 (59) [sol]
	6.0% SOM	4,300 (142) [sol]	4,400 (142) [sol]	13,000	90,000 (142) [sol]	13,000	26,000 (142) [sol]
EC >16-35	1.0% SOM	65,000 (8.48) [sol]	65,000 (8.48) [sol]	260,000	1,600,000	250,000	450,000
	2.5% SOM	92,000 (21) [sol]	92,000 (21) [sol]	270,000	1,700,000	250,000	480,000
	6.0% SOM	110,000	110,000	270,000	1,800,000	250,000	490,000
EC >35-44	1.0% SOM	65,000 (8.48) [sol]	65,000 (8.48) [sol]	260,000	1,600,000	250,000	450,000
	2.5% SOM	92,000 (21) [sol]	92,000 (21) [sol]	270,000	1,700,000	250,000	480,000
	6.0% SOM	110,000	110,000	270,000	1,800,000	250,000	490,000

SOM = Soil Organic Matter Content (%)

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.

[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

9.3.3. Total Petroleum Hydrocarbons – Aromatic

LQM/CIEH Suitable 4 Use Levels For TPH							
Aromatic		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
EC 5-7 (Benzene)	1.0% SOM	70	370	13	26,000 (1220) [sol]	56,000	76,000 (1220 [sol]
	2.5% SOM	140	690	27	46,000 (2260) [sol]	56,000	84,000 (2260) [sol]
	6.0% SOM	300	1,400	57	86,000 (4710) [sol]	56,000	92,000 (4710) [sol]
EC >7-8 (Toluene)	1.0% SOM	130	860	22	56,000 (869) [vap]	56,000	87,000 (869) [sol]
	2.5% SOM	290	1,800	51	110,000 (1920) [sol]	56,000	95,000 (1920) [sol]
	6.0% SOM	660	3,900	120	180,000 (4360) [vap]	56,000	100,000 (4360) [vap]
EC >8-10	1.0% SOM	34	47	8.6	3,500 (613) [vap]	5,000	7,200 (613) [vap]
	2.5% SOM	83	110	21	8,100 (1500) [vap]	5,000	8,500 (1500) [vap]
	6.0% SOM	190	270	51	17,000 (3850) [vap]	5,000	9,300 (3580) [vap]
EC >10-12	1.0% SOM	74	250	13	16,000 (364) [sol]	5,000	9,200 (364) [sol]
	2.5% SOM	180	590	31	28,000 (899) [sol]	5,000	9,700 (889) [sol]
	6.0% SOM	380	1,200	74	34,000 (2150) [sol]	5,000	10,000
EC >12-16	1.0% SOM	140	1,800	23	36,000 (169) [sol]	5,100	10,000
	2.5% SOM	330	2,300 (419) [sol]	57	37,000	5,100	10,000
	6.0% SOM	660	2,500	130	38,000	5,000	10,000
EC >16-21	1.0% SOM	260	1,900	46	28,000	3,800	7,600
	2.5% SOM	540	1,900	110	28,000	3,800	7,700
	6.0% SOM	930	1,900	260	28,000	3,800	7,800
EC >21-35	1.0% SOM	1,100	1,900	370	28,000	3,800	7,800
	2.5% SOM	1,500	1,900	820	28,000	3,800	7,800
	6.0% SOM	1,700	1,900	1,600	28,000	3,800	7,900
EC >35-44	1.0% SOM	1,100	1,900	370	28,000	3,800	7,800
	2.5% SOM	1,500	1,900	820	28,000	3,800	7,800
	6.0% SOM	1,700	1,900	1,600	28,000	3,800	7,900
EC >44-70	1.0% SOM	1,600	1,900	1,200	28,000	3,800	7,800
	2.5% SOM	1,800	1,900	2,100	28,000	3,800	7,800
	6.0% SOM	1,900	1,900	3,000	28,000	3,800	7,900

SOM = Soil Organic Matter Content (%)

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.

[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

9.4. Polycyclic Aromatic Hydrocarbons (PAHs)

LQM/CIEH Suitable 4 Use Levels For Polycyclic Aromatic Hydrocarbons (PAHs)							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Acenapthene	1.0% SOM	210	3,000 (57.0) [sol]	34	84,000(57.0) [sol]	15,000	29,000
	2.5% SOM	510	4,700(141) [sol]	85	97,000(141) [sol]	15,000	30,000
	6.0% SOM	1100	6,000(336) [sol]	200	100,000	15,000	30,000
Acenapthylene	1.0% SOM	170	2,900(86.1) [sol]	28	83,000(86.1) [sol]	15,000	29,000
	2.5% SOM	420	4,600(212) [sol]	69	97,000(212) [sol]	15,000	30,000
	6.0% SOM	920	6,000(506) [sol]	160	100,000	15,000	30,000
Anthracene	1.0% SOM	2,400	31,000(1.17) [vap]	380	520,000	74,000	150,000
	2.5% SOM	5,400	35,000	950	540,000	74,000	150,000
	6.0% SOM	11,000	37,000	2,200	540,000	74,000	150,000
Benzo(a)anthracene	1.0% SOM	7.20	11	2.90	170	29	49
	2.5% SOM	11	14	6.50	170	29	56
	6.0% SOM	13	15	13	180	29	62
Benzo(a)pyrene	1.0% SOM	2.20	3.20	0.97	35	5.70	11
	2.5% SOM	2.70	3.20	2.00	35	5.70	12
	6.0% SOM	3.00	3.20	3.50	36	5.70	13
Benzo(b)flouranthene	1.0% SOM	2.60	3.90	0.99	44	7.10	13
	2.5% SOM	3.30	4.00	2.10	44	7.20	15
	6.0% SOM	3.70	4.00	3.90	45	7.20	16
Benzo(ghi)perylene	1.0% SOM	320	360	290	3,900	640	1,400
	2.5% SOM	340	360	470	4,000	640	1,500
	6.0% SOM	350	360	640	4,000	640	1,600
Benzo(k)flouranthene	1.0% SOM	77	110	37	1,200	190	370
	2.5% SOM	93	110	75	1,200	190	410
	6.0% SOM	100	110	130	1,200	190	440
Chrysene	1.0% SOM	15	30	4.10	350	57	93
	2.5% SOM	22	31	9.40	350	57	110
	6.0% SOM	27	32	19	350	57	120
Dibenzo(ah)anthracene	1.0% SOM	0.24	0.31	0.14	3.50	0.57	1.10
	2.5% SOM	0.28	0.32	0.27	3.50	0.57	1.30
	6.0% SOM	0.30	0.32	0.43	3.60	0.58	1.40
Flouranthene	1.0% SOM	280	1,500	52	23,000	3,100	6,300
	2.5% SOM	560	1,600	130	23,000	3,100	6,300
	6.0% SOM	890	1,600	290	23,000	3,100	6,300
Flourene	1.0% SOM	170	2,800 (30.9) [sol]	27	63,000(30.9) [sol]	9,900	20,000
	2.5% SOM	400	3,800(76.5) [sol]	67	68,000	9,900	20,000
	6.0% SOM	860	4,500(183) [sol]	160	71,000	9,900	20,000
Indeno(123-cd)pyrene	1.0% SOM	27	45	9.50	500	82	150
	2.5% SOM	36	46	21	510	82	170
	6.0% SOM	41	46	39	510	82	180
Napthalene	1.0% SOM	15	36	65	1,600	11,000	800
	2.5% SOM	36	36	130	3,700	15,000	1,200
	6.0% SOM	85	85	200	8,400	17,000	1,900
Phenanthrene	1.0% SOM	95	1,300(183) [sol]	15	22,000	3,100	6,200
	2.5% SOM	220	1,500	38	22,000	3,100	6,200
	6.0% SOM	440	1,500	90	23,000	3,100	6,300
Pyrene	1.0% SOM	620	3,700	110	54,000	7,400	15,000
	2.5% SOM	1200	3,800	270	54,000	7,400	15,000
	6.0% SOM	2000	3,800	620	54,000	7,400	15,000
Coal Tar (Benzo(a)pyrene used as marker compound)	1.0% SOM	0.79	1.2	0.32	15	2.20	4.40
	2.5% SOM	0.98	1.2	0.67	15	2.20	4.70
	6.0% SOM	1.10	1.2	1.20	15	2.20	4.80

SOM = Soil Organic Matter Content (%)

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.

[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

9.5. Volatile and Semi-volatile Organic Compounds

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Chloroalkanes & alkenes							
1,2 Dichloroethane	1.0% SOM	0.0071	0.0092	0.0046	0.67	29	21
	2.5% SOM	0.011	0.013	0.0083	0.97	29	24
	6.0% SOM	0.019	0.023	0.016	1.70	29	28
1,1,2,2 Tetrachloroethane	1.0% SOM	1.60	3.90	0.41	270	1,400	1,800
	2.5% SOM	3.40	8.00	0.89	550	1,400	2,100
	6.0% SOM	7.50	17	2.00	1,100	1,400	2,300
1,1,1,2 Tetrachloroethane	1.0% SOM	1.20	1.50	0.79	110	1,400	1,500
	2.5% SOM	2.80	3.50	1.90	250	1,400	1,800
	6.0% SOM	6.40	8.20	4.40	560	1,400	2,100
Tetrachloroethene	1.0% SOM	0.18	0.18	0.65	19	1,400	810 [sol](424)
	2.5% SOM	0.39	0.40	1.50	42	1,400	1,100 [sol](951)
	6.0% SOM	0.90	0.92	3.60	95	1,400	1,500
1,1,1 Trichloroethane	1.0% SOM	8.80	9.00	48	660	140,000	57,000 [vap](1425)
	2.5% SOM	18	18	110	1,300	140,000	76,000 [vap](2915)
	6.0% SOM	39	40	240	3,000	140,000	100,000 [vap] (6392)
Tetrachloromethene	1.0% SOM	0.026	0.026	0.45	2.90	890	190
	2.5% SOM	0.056	0.056	1.00	6.30	920	270
	6.0% SOM	0.130	0.130	2.40	14	950	400
Trichloroethene	1.0% SOM	0.016	0.017	0.041	1.20	120	70
	2.5% SOM	0.034	0.036	0.091	2.60	120	91
	6.0% SOM	0.075	0.080	0.210	5.70	120	120
Trichloromethane	1.0% SOM	0.91	1.20	0.42	99	2,500	2,600
	2.5% SOM	1.70	2.10	0.83	170	2,500	2,800
	6.0% SOM	3.40	4.20	1.70	350	2,500	3,100
Vinyl Chloride	1.0% SOM	0.00064	0.00077	0.00055	0.059	3.50	4.80
	2.5% SOM	0.00087	0.00100	0.00100	0.077	3.50	5.00
	6.0% SOM	0.00014	0.00150	0.00180	0.120	3.50	5.40
Explosives							
2,4,6 Trinitrotoluene	1.0% SOM	1.60	65	0.24	1,000	130	260
	2.5% SOM	3.70	66	0.58	1,000	130	270
	6.0% SOM	8.10	66	1.40	1,000	130	270
RDX (Hexogen/Cyclonite/1,3,5-trinitro-1,3,5-triazacyclohexane)	1.0% SOM	120	13,000	17	210,000	26,000	49,000(18.7)[sol]
	2.5% SOM	250	13,000	38	210,000	26,000	51,000
	6.0% SOM	540	13,000	85	210,000	27,000	53,000
HMX (Octogen/1,3,5,7-tetrenitro-1,3,5,7-tetrazacyclo-octane)	1.0% SOM	5.70	67,00	0.86	110,000	13,000	23,000(0.35)[vap]
	2.5% SOM	13	67,00	1.90	110,000	13,000	23,000(0.39)[vap]
	6.0% SOM	26	67,00	3.90	110,000	13,000	24,000(0.48)[vap]
Atrazine	1.0% SOM	3.30	610	0.50	9,300	1,200	2,300
	2.5% SOM	7.60	620	1.20	9,400	1,200	2,400
	6.0% SOM	17.40	620	2.70	9,400	1,200	2,400

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.
[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Pesticides							
Aldrin	1.0% SOM	5.70	7.30	3.20	170	18	30
	2.5% SOM	6.60	7.40	6.10	170	18	31
	6.0% SOM	7.10	7.50	9.60	170	18	31
Dieldrin	1.0% SOM	0.97	7.00	0.17	170	18	30
	2.5% SOM	2.00	7.30	0.41	170	18	30
	6.0% SOM	3.50	7.40	0.96	170	18	31
Dichlorvos	1.0% SOM	0.032	6.40	0.0049	140	16	26
	2.5% SOM	0.066	6.50	0.0100	140	16	26
	6.0% SOM	0.140	6.60	0.0220	140	16	27
Alpha - Endosulfan	1.0% SOM	7.40	160(0.003)[vap]	1.20	5,600(0.003)[vap]	1,200	2,400
	2.5% SOM	18	280(0.007)[vap]	2.90	7,400(0.007)[vap]	1,200	2,400
	6.0% SOM	41	410(0.016)[vap]	6.80	8,400(0.016)[vap]	1,200	2,400
Beta - Endosulfan	1.0% SOM	7.00	190(0.00007)[vap]	1.10	6,300(0.00007)[vap]	1,200	2,400
	2.5% SOM	17	320(0.0002)[vap]	2.70	7,800(0.0002)[vap]	1,200	2,400
	6.0% SOM	39	440(0.0004)[vap]	6.40	8700	1,200	2,500
Alpha - Hexachlorocyclohexanes	1.0% SOM	0.23	6.90	0.035	170	24	47
	2.5% SOM	0.55	9.20	0.087	180	24	48
	6.0% SOM	1.20	11	0.210	180	24	48
Beta - Hexachlorocyclohexanes	1.0% SOM	0.085	3.70	0.013	65	8.10	15
	2.5% SOM	0.200	3.80	0.032	65	8.10	15
	6.0% SOM	0.460	3.80	0.077	65	8.10	16
Gamma - Hexachlorocyclohexanes	1.0% SOM	0.06	2.90	0.0092	67	8.2	14
	2.5% SOM	0.14	3.30	0.0230	69	8.2	15
	6.0% SOM	0.33	3.50	0.0540	70	8.2	15
Chlorobenzenes							
Chlorobenzene	1.0% SOM	0.46	0.46	5.90	56	11,000	1,300(675)[sol]
	2.5% SOM	1.00	1.00	14	130	13,000	2,000(1520)[sol]
	6.0% SOM	2.40	2.40	32	290	14,000	2,900
1,2-Dichlorobenzene	1.0% SOM	23	24	94	2,000 (571) [sol]	90,000	24,000(571)[sol]
	2.5% SOM	55	57	230	4,800 (1370) [sol]	95,000	36,000(1370)[sol]
	6.0% SOM	130	130	540	11,000 (3240) [sol]	98,000	51,000(3240)[sol]
1,3-Dichlorobenzene	1.0% SOM	0.40	0.44	0.25	30	300	390
	2.5% SOM	1.00	1.10	0.60	73	300	440
	6.0% SOM	2.30	2.50	1.50	170	300	470
1,4-Dichlorobenzene	1.0% SOM	61	61	15	4,400 (224)[vap]	17,000[g]	36,000 (224)[vap]
	2.5% SOM	150	150	37	10,000 (540)[vap]	17,000[g]	36,000 (540)[vap]
	6.0% SOM	350	350	88[g]	25,000 (1280)[vap]	17,000[g]	36,000 (1280)[vap]
1,2,3,-Trichlorobenzene	1.0% SOM	1.50	1.50	4.70	102	1,800	770(134)[vap]
	2.5% SOM	3.60	3.70	12	250	1,800	1,100(330)[vap]
	6.0% SOM	8.60	8.80	28	590	1,800	1,600(789)[vap]
1,2,4,-Trichlorobenzene	1.0% SOM	2.60	2.60	55	220	15,000	1,700(318)[vap]
	2.5% SOM	6.40	6.40	140	530	17,000	2,600(786)[vap]
	6.0% SOM	15	15	320	1,300	19,000	4,000(1880)[vap]
1,3,5,-Trichlorobenzene	1.0% SOM	0.33	0.33	4.70	23	1,700	380(36.7)[vap]
	2.5% SOM	0.81	0.81	12	55	1,700	590(90.8)[vap]
	6.0% SOM	1.90	1.90	140	130	1,800	860(217)[vap]

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.
[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Chlorobenzenes (cont.)							
1,2,3,4,- Tetrachlorobenzene	1.0% SOM	15	24	4.40	1,700(122)^{vap}	830	1,500(122)^{vap}
	2.5% SOM	36	56	11	3,080(304)^{vap}	830	1,600
	6.0% SOM	78	120	26	4,400(728)^{vap}	830	1,600
1,2,3,5,- Tetrachlobenzene	1.0% SOM	0.66	0.75	0.38	49(39.4)^{vap}	78	110(39)^{vap}
	2.5% SOM	1.60	1.90	0.90	120(98.1)^{vap}	79	120
	6.0% SOM	3.70	4.30	2.20	240(235)^{vap}	79	130
1,2,4, 5,- Tetrachlobenzene	1.0% SOM	0.33	0.73	0.06	42(19.7)^{sol}	13	25
	2.5% SOM	0.77	1.70	0.16	72(49.1)^{sol}	13	26
	6.0% SOM	1.60	3.50	0.37	96	13	26
Pentachlrobenzene	1.0% SOM	5.80	19	1.20	640(43.0)^{sol}	100	190
	2.5% SOM	12	30	3.10	770(107)^{sol}	100	190
	6.0% SOM	22	38	7.00	830	100	190
Hexachlorobenzene	1.0% SOM	1.80(0.20)^{vap}	4.10 (0.20)^{vap}	0.47	110(0.20)^{vap}	16	30
	2.5% SOM	3.30(0.50)^{vap}	5.70 (0.50)^{vap}	1.10	120	16	30
	6.0% SOM	4.90	6.70 (1.2)^{vap}	2.50	120	16	30
Phenols & Chlorophenols							
BTEX	1.0% SOM	280	750	66	760^{dir}(31,000)	760^{dir}(11,000)	760^{dir}(8,600)
	2.5% SOM	550	1,300	140	1,500^{dir}(35,000)	1,500^{dir}(11,000)	1,500^{dir}(9,700)
	6.0% SOM	1100	2,300	280	3,200^{dir}(37,000)	3,200^{dir}(11,000)	3,200^{dir}(11,000)
Chlorophenols (4 Congeners)	1.0% SOM	0.87	94	0.13	3,500	620	1,100
	2.5% SOM	2.00	150	0.30	4,000	620	1,100
	6.0% SOM	4.50	210	0.70	4,300	620	1,100
Pentachlorophenols	1.0% SOM	0.22	27(16.4)^{vap}	0.03	400	60	110
	2.5% SOM	0.52	29	0.08	400	60	120
	6.0% SOM	1.20	31	0.19	400	60	120
Others							
Carbon Disulphide	1.0% SOM	0.14	0.14	4.80	11	11,000	1,300
	2.5% SOM	0.29	0.29	10	22	11,000	1,900
	6.0% SOM	0.62	0.62	23	47	12,000	2,700
Hexachloro-1,3-Butadiene	1.0% SOM	0.29	0.32	0.25	31	25	48
	2.5% SOM	0.70	0.78	0.61	68	25	50
	6.0% SOM	1.60	1.80	1.40	120	25	51

^{vap} – GAC presented exceeds the vapour saturation limit, which is presented in brackets.
^{sol} – GAC presented exceeds the soil saturation limit, which is presented in brackets.

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds					
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
1,1,2 Trichloroethane	1.0% SOM	0.60	0.88	0.28	94
	2.5% SOM	1.20	1.8	0.61	190
	6.0% SOM	2.70	3.9	1.40	400
1,1-Dichloroethane	1.0% SOM	2.40	2.50	9.20	280
	2.5% SOM	3.90	4.10	17	450
	6.0% SOM	7.40	7.70	35	850
1,1-Dichloroethene	1.0% SOM	0.23	0.23	2.80	26
	2.5% SOM	0.40	0.41	5.60	46
	6.0% SOM	0.82	0.82	12	92
1,2,4-Trimethylbenzene	1.0% SOM	0.35	0.41	0.38	42
	2.5% SOM	0.85	0.99	0.93	99
	6.0% SOM	2.00	2.30	2.20	220
1,2-Dichloropropane	1.0% SOM	0.024	0.024	0.62	3.3
	2.5% SOM	0.042	0.042	1.20	5.9
	6.0% SOM	0.084	0.085	2.60	12
2,4-Dimethylphenol	1.0% SOM	19	210	3.10	16000*
	2.5% SOM	43	410	7.20	24000*
	6.0% SOM	97	730	17	30000*
2,4-Dinitrotoluene	1.0% SOM	1.50	170*	0.22	3700*
	2.5% SOM	3.20	170	0.49	3700*
	6.0% SOM	7.20	170	1.10	3800*
2,6-Dinitrotoluene	1.0% SOM	0.78	78	0.12	1900*
	2.5% SOM	1.70	84	0.27	1900*
	6.0% SOM	3.90	87	0.61	1900*
2-Chloronapthalene	1.0% SOM	3.70	3.80	40	390*
	2.5% SOM	9.20	9.30	98	960*
	6.0% SOM	22	22	230	2200*
Biphenyl	1.0% SOM	66*	220*	14	18000*
	2.5% SOM	160	500*	35	33000*
	6.0% SOM	360	980*	83	48000*
Bis (2-ethylhexyl) phthalate	1.0% SOM	280*	2700*	47*	85000*
	2.5% SOM	610*	2800*	120*	86000*
	6.0% SOM	1100*	2800*	280*	86000*
Bromobenzene	1.0% SOM	0.87	0.91	3.2	97
	2.5% SOM	2.0	2.1	7.6	220
	6.0% SOM	4.7	4.9	18	520
Bromodichloromethane	1.0% SOM	0.016	0.019	0.016	2.1
	2.5% SOM	0.030	0.034	0.032	3.7
	6.0% SOM	0.061	0.070	0.068	7.6
Bromoform	1.0% SOM	2.8	5.2	0.95	760
	2.5% SOM	5.9	11	2.1	1500
	6.0% SOM	13	23	4.6	3100
Butyl benzyl phthalate	1.0% SOM	1400*	42000*	220*	940000*
	2.5% SOM	3300*	44000*	550*	940000*
	6.0% SOM	7200*	44000*	1300*	950000*

*soil concentration above saturation limit

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds					
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
Chloroethane	1.0% SOM	8.3	8.4	110	960
	2.5% SOM	11	11	200	1300
	6.0% SOM	18	18	380	2100
Chloromethane	1.0% SOM	0.0083	0.0085	0.066	1.0
	2.5% SOM	0.0098	0.0099	0.13	1.2
	6.0% SOM	0.013	0.013	0.23	1.6
***Cis* 1,2 Dichloroethene**	1.0% SOM	0.11	0.12	0.26	14
	2.5% SOM	0.19	0.20	0.50	24
	6.0% SOM	0.37	0.39	1.0	47
Dichloromethane	1.0% SOM	0.58	2.10	0.10	270
	2.5% SOM	0.98	2.80	0.19	360
	6.0% SOM	1.70	4.50	0.34	560
Diethyl Phthalate	1.0% SOM	120*	1800*	19*	150000*
	2.5% SOM	260*	3500*	41*	220000*
	6.0% SOM	570*	6300*	94*	290000*
Di-*n*-butyl phthalate	1.0% SOM	13*	450*	2.00	15000*
	2.5% SOM	31*	450*	5.00	15000*
	6.0% SOM	67*	450*	12	15000*
Di-*n*-octyl phthalate	1.0% SOM	2300*	3400*	940*	89000*
	2.5% SOM	2800*	3400*	2100*	89000*
	6.0% SOM	3100*	3400*	3900*	89000*
Hexachloroethane	1.0% SOM	0.20	0.22	0.27	22*
	2.5% SOM	0.48	0.54	0.67	53*
	6.0% SOM	1.10	1.30	1.60	120*
Isopropylbenzene	1.0% SOM	11	12	32	1400*
	2.5% SOM	27	28	79	3300*
	6.0% SOM	64	67	190	7700*
Methyl *tert*-butyl ether (MTBE)	1.0% SOM	49	73	23	7900
	2.5% SOM	84	120	44	13000
	6.0% SOM	160	220	90	24000
Propylbenzene	1.0% SOM	34	40	34	4100*
	2.5% SOM	82	97	83	9700*
	6.0% SOM	190	230	200	21000*
Styrene	1.0% SOM	8.10	35	1.60	3300*
	2.5% SOM	19	78	3.70	6500*
	6.0% SOM	43	170	8.70	11000*
Total Cresols (2-, 3-, and 4-methylphenol)	1.0% SOM	80	3700	12	160000
	2.5% SOM	180	5400	27	180000*
	6.0% SOM	400	6900	63	180000*
***Trans* 1,2 Dichloroethene**	1.0% SOM	0.19	0.19	0.93	22
	2.5% SOM	0.34	0.35	1.90	40
	6.0% SOM	0.70	0.71	0.24	81
Tributyl tin oxide	1.0% SOM	0.25	1.40	0.042	130*
	2.5% SOM	0.59	3.10	0.100	180*
	6.0% SOM	1.30	5.70	0.240	200*

*soil concentration above saturation limit

C4SL Low Level of Toxicological Concern							
Determinands		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
1,2-Dichloroethane (Ethylene Dichloride)	1.0% SOM	0.11	0.16	0.054	12	300	300
	2.5% SOM	0.18	0.24	0.10	17	310	330
	6.0% SOM	0.31	0.41	0.19	29	310	380
Cis-1,2-Dichloroethene	1.0% SOM	0.46	0.50	0.89	38	3,800	2,000
	2.5% SOM	0.78	0.84	1.7	64	3,800	2,400
	6.0% SOM	1.5	1.6	3.6	120	3,900	3,100
Tetrachloroethene (PCE)	1.0% SOM	0.31	0.32	2	24	3,200	1,400
	2.5% SOM	0.70	0.71	4.8	55	3,300	1,900
	6.0% SOM	1.60	1.60	11	130	3,400	2,500
Trans-1,2-Dichloroethene	1.0% SOM	0.90	0.93	3.70	69	13,000	5,600
	2.5% SOM	1.60	1.70	7.50	120	13,000	7,000
	6.0% SOM	3.30	3.40	16	260	13,000	9,100
Trichloroethene (TCE)	1.0% SOM	0.0093	0.0097	0.032	0.73	76	41
	2.5% SOM	0.020	0.020	0.072	1.5	78	54
	6.0% SOM	0.043	0.045	0.16	3.4	79	69
Vinyl Chloride (Chloroethene)	1.0% SOM	0.0064	0.015	0.0017	1.1	7.8	18
	2.5% SOM	0.010	0.019	0.0031	1.4	7.8	19
	6.0% SOM	0.017	0.029	0.0058	2.2	7.8	19

9.6. Per- and Polyfluoroalkyl Substances (PFAS)

Interim C4SLs for PFOA, PFNA, PFHxS and PFOS						
Determinand	RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
PFOA	0.076	0.041	0.0014	0.60	0.079	0.17
PFOS	0.013	0.041	0.0027	0.60	0.079	0.17
PFHxS	0.0081	0.041	0.0015	0.60	0.079	0.17
PFNA	0.0073	0.041	0.0013	0.60	0.079	0.17

9.7. Asbestos

No asbestos or asbestos containing materials (ACM's) are considered acceptable on-site from a human health perspective. Therefore the GAC for asbestos & ACM's within any imported material should be none detected (ND).

APPENDIX H: Waste Hazard Assessment

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious 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.

GHCNE-QCEYX-9PVHR

Job name

GWPR5385 2 - 6 Seagull Lane, Emsworth PO10 7QH

Description/Comments

Project

GWPR5385 2 - 6 Seagull Lane, Emsworth PO10 7QH

Site

2 - 6 Seagull Lane, Emsworth PO10 7QH

Classified by

Name:
Adam Young
Date:
09 Jun 2023 08:57 GMT
Telephone:

Company:
Ground and Water
2 The long Barn, Norton Farm, Selbourne Road,
Alton
GU34 3NB

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: -

Course	Date
Hazardous Waste Classification	-

Purpose of classification

2 - Material Characterisation

Address of the waste

2 - 6 Seagull Lane, Emsworth **Post Code** PO10 7QH

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Redevelopment of industrial buildings.

Description of the specific process, sub-process and/or activity that created the waste

Waste created during excavation of soils.

Description of the waste

Made Ground.

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS1-120523-0.20-0.20		Non Hazardous		3
2	WS2-120523-0.80-0.80		Non Hazardous		9
3	WS3-120523-0.20-0.20		Non Hazardous		11
4	WS4-120523-0.50-0.50		Non Hazardous		13
5	WS5-120523-0.20-0.20		Non Hazardous		15

Related documents

#	Name	Description
1	230519-69.hwol	ALS Hawarden .hwol file used to populate the Job

Report

Created by: Adam Young

Created date: 09 Jun 2023 08:57 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	21
Appendix B: Rationale for selection of metal species	25
Appendix C: Version	26

Classification of sample: WS1-120523-0.20-0.20

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

Sample details

Sample name:
WS1-120523-0.20-0.20
Moisture content:
20%
(wet 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: 20% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	161 mg/kg		128.8 mg/kg	0.0129 %	✓	
2	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021 mg/kg		<0.021 mg/kg	<0.0000021 %		<**LOD**
3	1,1,1-trichloroethane; methyl chloroform	602-013-00-2	200-756-3	71-55-6		<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<**LOD**
4	toluene	601-021-00-3	203-625-9	108-88-3		<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<**LOD**
5	1,2-dichloroethane; ethylene dichloride	602-012-00-7	203-458-1	107-06-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
6	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<**LOD**
7	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4		4.26 mg/kg	23.173	78.973 mg/kg	0.0079 %	✓	
8	tetrachloroethylene	602-028-00-4	204-825-9	127-18-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
9	1,2-dichloropropane; propylene dichloride	602-020-00-0	201-152-2	78-87-5		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**
10	2,4-dinitrotoluene; [1] dinitrotoluene [2]	609-007-00-9	204-450-0 [1] 246-836-1 [2]	121-14-2 [1] 25321-14-6 [2]		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<**LOD**
11	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**
12	chloroform; trichloromethane	602-006-00-4	200-663-8	67-66-3		<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<**LOD**
13	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		45.8 mg/kg	1.785	65.409 mg/kg	0.00654 %	✓	
14	4-chlorophenylphenylether		230-281-7	7005-72-3		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<**LOD**
15	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1.3 mg/kg		1.04 mg/kg	0.000104 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
16		1,2,4-trichlorobenzene	602-087-00-6	204-428-0	120-82-1		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
17		3,5,5-trimethylcyclohex-2-enone; isophorone	606-012-00-8	201-126-0	78-59-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
18		4-bromophenylphenylether		202-952-4	101-55-3		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
19		bromoform; tribromomethane	602-007-00-X	200-854-6	75-25-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		nitrosodipropylamine	612-098-00-8	210-698-0	621-64-7		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
21		2-chloronaphthalene		202-079-9	91-58-7		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
22		trans-1,3-dichloropropene		431-460-4	10061-02-6		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
23		dimethyl phthalate		205-011-6	131-11-3		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
24		2,2-dichloropropane		209-832-0	594-20-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
25		pentachlorophenol	604-002-00-8	201-778-6	87-86-5		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
26		hexachloroethane		200-666-4	67-72-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
27		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
28		azobenzene	611-001-00-6	203-102-5	103-33-3		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
29		carbon tetrachloride; tetrachloromethane	602-008-00-5	200-262-8	56-23-5		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
30		bromodichloromethane		200-856-7	75-27-4		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
31		TPH (C6 to C40) petroleum group			TPH		432	mg/kg		345.6	mg/kg	0.0346 %	✓	
32		dibenzofuran		205-071-3	132-64-9		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
33		2,4,6-trichlorophenol	604-018-00-5	201-795-9	88-06-2		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
34		2-methoxy-2-methylbutane; tert-amyl methyl ether	603-213-00-2	213-611-4	994-05-8		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
35		phenanthrene		201-581-5	85-01-8		1.55	mg/kg		1.24	mg/kg	0.000124 %	✓	
36		1,1,2-trichloroethane	602-014-00-8	201-166-9	79-00-5		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
37		chloromethane; methyl chloride	602-001-00-7	200-817-4	74-87-3		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
38		pyrene		204-927-3	129-00-0		2.18	mg/kg		1.744	mg/kg	0.000174 %	✓	
39		zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		180	mg/kg	4.398	633.301	mg/kg	0.0633 %	✓	
40		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.798	mg/kg		0.638	mg/kg	0.0000638 %	✓	
41		1,2,3-trichloropropane	602-062-00-X	202-486-1	96-18-4		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
42		bis(2-chloroethoxy)methane		203-920-2	111-91-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
43		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		10.9	mg/kg	1.32	11.513	mg/kg	0.00115 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
44		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.155	mg/kg		0.124	mg/kg	0.0000124 %	✓	
45		bromobenzene	602-060-00-9	203-623-8	108-86-1		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
46		1,4-dichlorobenzene; p-dichlorobenzene	602-035-00-2	203-400-5	106-46-7		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
47		1,2-dibromo-3-chloropropane	602-021-00-6	202-479-3	96-12-8		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
48		benzo[ghi]perylene		205-883-8	191-24-2		0.752	mg/kg		0.602	mg/kg	0.0000602 %	✓	
49		hexachlorobutadiene		201-765-5	87-68-3		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
50		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
51		hexachlorobenzene	602-065-00-6	204-273-9	118-74-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
52		4-isopropyltoluene		202-796-7	99-87-6		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
53		1,1-dichloroethylene; vinylidene chloride	602-025-00-8	200-864-0	75-35-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
54		trichlorofluoromethane		200-892-3	75-69-4		<0.006	mg/kg		<0.006	mg/kg	<0.0000006 %		<LOD
55		dichloromethane; methylene chloride	602-004-00-3	200-838-9	75-09-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
56		1,2-dibromoethane	602-010-00-6	203-444-5	106-93-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
57		3,4-xylenol; [1] 2,5-xylenol; [2] 2,4-xylenol; [3] 2,3-xylenol; [4] 2,6-xylenol; [5] xylenol; [6] 2,4(or 2,5)-xylenol [7]	604-006-00-X	202-439-5 [1] 202-461-5 [2] 203-321-6 [3] 208-395-3 [4] 209-400-1 [5] 215-089-3 [6] 276-245-4 [7]	95-65-8 [1] 95-87-4 [2] 105-67-9 [3] 526-75-0 [4] 576-26-1 [5] 1300-71-6 [6] 71975-58-1 [7]		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
58		1,2,3-trichlorobenzene		201-757-1	87-61-6		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
59		carbazole		201-696-0	86-74-8		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
60		trichloroethylene; trichloroethene	602-027-00-9	201-167-4	79-01-6		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
61		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
62		bis(2-chloroethyl) ether	603-029-00-2	203-870-1	111-44-4		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
63		anthracene		204-371-1	120-12-7		0.249	mg/kg		0.199	mg/kg	0.0000199 %	✓	
64		chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol	604-014-00-3	200-431-6	59-50-7		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
65		4-chloroaniline	612-137-00-9	203-401-0	106-47-8		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
66		vinyl chloride; chloroethylene	602-023-00-7	200-831-0	75-01-4		<0.006	mg/kg		<0.006	mg/kg	<0.0000006 %		<LOD
67		fluoranthene		205-912-4	206-44-0		2.59	mg/kg		2.072	mg/kg	0.000207 %	✓	
68		fluorene		201-695-5	86-73-7		0.308	mg/kg		0.246	mg/kg	0.0000246 %	✓	
69		chloroethane	602-009-00-0	200-830-5	75-00-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
70		2-methyl naphthalene		202-078-3	91-57-6		0.35 mg/kg		0.28 mg/kg	0.000028 %	✓	
71		2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4]	604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<**LOD**
72		bromomethane; methylbromide	602-002-00-2	200-813-2	74-83-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**
73		BBP; benzyl butyl phthalate	607-430-00-3	201-622-7	85-68-7		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<**LOD**
74		1,2,4-trimethylbenzene	601-043-00-3	202-436-9	95-63-6		0.0177 mg/kg		0.0142 mg/kg	0.00000142 %	✓	
75		chrysene	601-048-00-0	205-923-4	218-01-9		1.48 mg/kg		1.184 mg/kg	0.000118 %	✓	
76		1,3-dichloropropene; [1] (Z)-1,3-dichloropropene [2]	602-030-00-5	208-826-5 [1] 233-195-8 [2]	542-75-6 [1] 10061-01-5 [2]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**
77		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				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<**LOD**
78		benzene	601-020-00-8	200-753-7	71-43-2		<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		<**LOD**
79		4-nitrophenol; p-nitrophenol	609-015-00-2	202-811-7	100-02-7		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<**LOD**
80		1,1,2,2-tetrachloroethane	602-015-00-3	201-197-8	79-34-5		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**
81		bis(2-ethylhexyl) phthalate; di-(2-ethylhexyl) phthalate; DEHP	607-317-00-9	204-211-0	117-81-7		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<**LOD**
82		n-butylbenzene		203-209-7	104-51-8		<0.011 mg/kg		<0.011 mg/kg	<0.0000011 %		<**LOD**
83		di-n-octyl phthalate		204-214-7	117-84-0		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<**LOD**
84		tert-butylbenzene		202-632-4	98-06-6		<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %		<**LOD**
85		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.25 mg/kg		1 mg/kg	0.0001 %	✓	
86		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		24.1 mg/kg	1.579	30.453 mg/kg	0.00305 %	✓	
87		2,6-dinitrotoluene	609-049-00-8	210-106-0	606-20-2		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<**LOD**
88		2,4,5-trichlorophenol	604-017-00-X	202-467-8	95-95-4		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<**LOD**
89		styrene	601-026-00-0	202-851-5	100-42-5		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**
90		dichlorodifluoromethane		200-893-9	75-71-8		<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<**LOD**
91		dibromomethane	602-003-00-8	200-824-2	74-95-3		<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		<**LOD**
92		diethyl phthalate		201-550-6	84-66-2		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<**LOD**
93		1,1-dichloropropene	602-031-00-0	209-253-3	563-58-6		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**
94		pH			PH		8.8 pH		8.8 pH	8.8 pH		

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
95		1,1,1,2-tetrachloroethane		211-135-1	630-20-6		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
96		2,4-dichlorophenol	604-011-00-7	204-429-6	120-83-2		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
97		carbon disulphide	006-003-00-3	200-843-6	75-15-0		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
98		naphthalene	601-052-00-2	202-049-5	91-20-3		0.112	mg/kg		0.0896	mg/kg	0.00000896 %	✓	
99		nitrobenzene	609-003-00-7	202-716-0	98-95-3		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
100		1,1-dichloroethane	602-011-00-1	200-863-5	75-34-3		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
101		bromochloromethane		200-826-3	74-97-5		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
102		1,3-dichloropropane		205-531-3	142-28-9		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
103		acenaphthene		201-469-6	83-32-9		0.102	mg/kg		0.0816	mg/kg	0.00000816 %	✓	
104		hexachlorocyclopentadiene	602-078-00-7	201-029-3	77-47-4		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
105		chlorobenzene	602-033-00-1	203-628-5	108-90-7		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
106		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		31.6	mg/kg	1.126	28.462	mg/kg	0.00285 %	✓	
107		1,3-dichlorbenzene	602-067-00-7	208-792-1	541-73-1		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
108		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.59	mg/kg	1.285	0.607	mg/kg	0.0000472 %	✓	
109		acenaphthylene		205-917-1	208-96-8		0.151	mg/kg		0.121	mg/kg	0.0000121 %	✓	
110		dibromochloromethane		204-704-0	124-48-1		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
111		mesitylene; 1,3,5-trimethylbenzene	601-025-00-5	203-604-4	108-67-8		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
112		indeno[123-cd]pyrene		205-893-2	193-39-5		0.754	mg/kg		0.603	mg/kg	0.0000603 %	✓	
113		sec-butylbenzene		205-227-0	135-98-8		0.0159	mg/kg		0.0127	mg/kg	0.00000127 %	✓	
114		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.67	mg/kg		1.336	mg/kg	0.000134 %	✓	
115		dibutyl phthalate; DBP	607-318-00-4	201-557-4	84-74-2		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
116		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
117		phenol	604-001-00-2	203-632-7	108-95-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
118		1,2-dichlorobenzene; o-dichlorobenzene	602-034-00-7	202-425-9	95-50-1		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
119		2-nitrophenol		201-857-5	88-75-5		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
120		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]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
121		2-chlorotoluene; [1] 3-chlorotoluene; [2] 4-chlorotoluene; [3] chlorotoluene [4]	602-040-00-X	202-424-3 [1] 203-580-5 [2] 203-397-0 [3] 246-698-2 [4]	95-49-8 [1] 108-41-8 [2] 106-43-4 [3] 25168-05-2 [4]		<0.019	mg/kg		<0.019	mg/kg	<0.0000019 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
122		1,2-dichloroethylene; [1] cis-dichloroethylene; [2] trans-dichloroethylene [3]				<0.016 mg/kg		<0.016 mg/kg	<0.0000016 %		<**LOD**
		602-026-00-3	208-750-2 [1] 205-859-7 [2] 205-860-2 [3]	540-59-0 [1] 156-59-2 [2] 156-60-5 [3]							
123		o-nitroaniline; [1] m-nitroaniline; [2] p-nitroaniline [3]				<0.6 mg/kg		<0.6 mg/kg	<0.00006 %		<**LOD**
		612-012-00-9	201-855-4 [1] 202-729-1 [2] 202-810-1 [3]	88-74-4 [1] 99-09-2 [2] 100-01-6 [3]							
124		m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4]				<0.4 mg/kg		<0.4 mg/kg	<0.00004 %		<**LOD**
		604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]							
125		cumene; [1] propylbenzene [2]				0.0079 mg/kg		0.0063 mg/kg	0.000000635 %	✓	
		601-024-00-X	202-704-5 [1] 203-132-9 [2]	98-82-8 [1] 103-65-1 [2]							
126		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				22.6 mg/kg	1.462	26.425 mg/kg	0.00264 %	✓	
			215-160-9	1308-38-9							
								Total:	0.137 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

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 Most likely worst case scenario

Hazard Statements hit:

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

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.0346%)
1,2,4-trimethylbenzene: (conc.: 1.42e-06%)
sec-butylbenzene: (conc.: 1.27e-06%)
cumene; [1] propylbenzene [2]: (conc.: 6.35e-07%)

Classification of sample: WS2-120523-0.80-0.80

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

Sample details

Sample name:
WS2-120523-0.80-0.80
Moisture content:
9.7%
(wet 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: 9.7% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	29.2 mg/kg		26.368 mg/kg	0.00264 %	✓	
2	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
3	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4		6.68 mg/kg	23.173	139.78 mg/kg	0.014 %	✓	
4	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		53.9 mg/kg	1.785	86.888 mg/kg	0.00869 %	✓	
5	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %		<LOD
6	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %		<LOD
7	phenanthrene		201-581-5	85-01-8		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
8	pyrene		204-927-3	129-00-0		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
9	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		93.5 mg/kg	4.398	371.319 mg/kg	0.0371 %	✓	
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %		<LOD
11	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		7.37 mg/kg	1.32	8.787 mg/kg	0.000879 %	✓	
12	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023 mg/kg		<0.023 mg/kg	<0.0000023 %		<LOD
13	benzo[ghi]perylene		205-883-8	191-24-2		<0.024 mg/kg		<0.024 mg/kg	<0.0000024 %		<LOD
14	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

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		anthracene				<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
			204-371-1	120-12-7									
16		fluoranthene				<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
			205-912-4	206-44-0									
17		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7									
18		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
19		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 }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
		006-007-00-5											
20		benzo[a]pyrene; benzo[def]chrysene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
21		nickel { nickel dihydroxide }				40.7	mg/kg	1.579	58.05	mg/kg	0.0058 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
22		pH				9.14	pH		9.14	pH	9.14 pH		
				PH									
23		naphthalene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		acenaphthene				<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9									
25		copper { dicopper oxide; copper (I) oxide }				23.4	mg/kg	1.126	23.79	mg/kg	0.00238 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
26		cadmium { cadmium sulfide }			1	0.562	mg/kg	1.285	0.652	mg/kg	0.0000507 %	✓	
		048-010-00-4	215-147-8	1306-23-6									
27		acenaphthylene				<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
			205-917-1	208-96-8									
28		indeno[123-cd]pyrene				<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
			205-893-2	193-39-5									
29		benzo[b]fluoranthene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
30		phenol				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		604-001-00-2	203-632-7	108-95-2									
31		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				37	mg/kg	1.462	48.832	mg/kg	0.00488 %	✓	
			215-160-9	1308-38-9									
										Total:	0.0769 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS3-120523-0.20-0.20

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

Sample details

Sample name:
WS3-120523-0.20-0.20

Moisture content:
5.6%
(wet 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: 5.6% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	358 mg/kg		337.952 mg/kg	0.0338 %	✓	
2	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<**LOD**
3	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4		1.31 mg/kg	23.173	28.657 mg/kg	0.00287 %	✓	
4	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		19.4 mg/kg	1.785	32.693 mg/kg	0.00327 %	✓	
5	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.0683 mg/kg		0.0645 mg/kg	0.00000645 %	✓	
6	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %		<**LOD**
7	phenanthrene		201-581-5	85-01-8		0.0926 mg/kg		0.0874 mg/kg	0.00000874 %	✓	
8	pyrene		204-927-3	129-00-0		0.0829 mg/kg		0.0783 mg/kg	0.00000783 %	✓	
9	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		132 mg/kg	4.398	548.017 mg/kg	0.0548 %	✓	
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.039 mg/kg		0.0368 mg/kg	0.00000368 %	✓	
11	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		6.56 mg/kg	1.32	8.176 mg/kg	0.000818 %	✓	
12	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023 mg/kg		<0.023 mg/kg	<0.0000023 %		<**LOD**
13	benzo[ghi]perylene		205-883-8	191-24-2		0.0662 mg/kg		0.0625 mg/kg	0.00000625 %	✓	
14	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**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		anthracene				<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
			204-371-1	120-12-7									
16		fluoranthene				0.0974	mg/kg		0.0919	mg/kg	0.00000919 %	✓	
			205-912-4	206-44-0									
17		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7									
18		chrysene				0.0755	mg/kg		0.0713	mg/kg	0.00000713 %	✓	
		601-048-00-0	205-923-4	218-01-9									
19		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 }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
		006-007-00-5											
20		benzo[a]pyrene; benzo[def]chrysene				0.0797	mg/kg		0.0752	mg/kg	0.00000752 %	✓	
		601-032-00-3	200-028-5	50-32-8									
21		nickel { nickel dihydroxide }				12.2	mg/kg	1.579	18.191	mg/kg	0.00182 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
22		pH				11.1	pH		11.1	pH	11.1 pH		
				PH									
23		naphthalene				0.102	mg/kg		0.0963	mg/kg	0.00000963 %	✓	
		601-052-00-2	202-049-5	91-20-3									
24		acenaphthene				<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9									
25		copper { dicopper oxide; copper (I) oxide }				27	mg/kg	1.126	28.697	mg/kg	0.00287 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
26		cadmium { cadmium sulfide }			1	0.198	mg/kg	1.285	0.24	mg/kg	0.0000187 %	✓	
		048-010-00-4	215-147-8	1306-23-6									
27		acenaphthylene				0.0134	mg/kg		0.0126	mg/kg	0.00000126 %	✓	
			205-917-1	208-96-8									
28		indeno[123-cd]pyrene				0.0663	mg/kg		0.0626	mg/kg	0.00000626 %	✓	
			205-893-2	193-39-5									
29		benzo[b]fluoranthene				0.111	mg/kg		0.105	mg/kg	0.0000105 %	✓	
		601-034-00-4	205-911-9	205-99-2									
30		phenol				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		604-001-00-2	203-632-7	108-95-2									
31		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				16.1	mg/kg	1.462	22.213	mg/kg	0.00222 %	✓	
			215-160-9	1308-38-9									
										Total:	0.103 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS4-120523-0.50-0.50

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

Sample details

Sample name:
WS4-120523-0.50-0.50
Moisture content:
14%
(wet 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: 14% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	133 mg/kg		114.38 mg/kg	0.0114 %	✓	
2	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<**LOD**
3	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4		1.56 mg/kg	23.173	31.089 mg/kg	0.00311 %	✓	
4	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		36.7 mg/kg	1.785	56.344 mg/kg	0.00563 %	✓	
5	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.963 mg/kg		0.828 mg/kg	0.0000828 %	✓	
6	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %		<**LOD**
7	phenanthrene		201-581-5	85-01-8		0.758 mg/kg		0.652 mg/kg	0.0000652 %	✓	
8	pyrene		204-927-3	129-00-0		1.43 mg/kg		1.23 mg/kg	0.000123 %	✓	
9	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		130 mg/kg	4.398	491.688 mg/kg	0.0492 %	✓	
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.438 mg/kg		0.377 mg/kg	0.0000377 %	✓	
11	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		10.4 mg/kg	1.32	11.809 mg/kg	0.00118 %	✓	
12	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.0953 mg/kg		0.082 mg/kg	0.0000082 %	✓	
13	benzo[ghi]perylene		205-883-8	191-24-2		0.482 mg/kg		0.415 mg/kg	0.0000415 %	✓	
14	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**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		anthracene		204-371-1	120-12-7		0.41	mg/kg		0.353	mg/kg	0.0000353 %	✓	
16		fluoranthene		205-912-4	206-44-0		1.78	mg/kg		1.531	mg/kg	0.000153 %	✓	
17		fluorene		201-695-5	86-73-7		0.067	mg/kg		0.0576	mg/kg	0.00000576 %	✓	
18		chrysene	601-048-00-0	205-923-4	218-01-9		1.02	mg/kg		0.877	mg/kg	0.0000877 %	✓	
19		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				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<**LOD**
20		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.915	mg/kg		0.787	mg/kg	0.0000787 %	✓	
21		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		21.9	mg/kg	1.579	29.748	mg/kg	0.00297 %	✓	
22		pH			PH		8.32	pH		8.32	pH	8.32 pH		
23		naphthalene	601-052-00-2	202-049-5	91-20-3		0.0477	mg/kg		0.041	mg/kg	0.0000041 %	✓	
24		acenaphthene		201-469-6	83-32-9		0.0117	mg/kg		0.0101	mg/kg	0.00000101 %	✓	
25		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		26.6	mg/kg	1.126	25.756	mg/kg	0.00258 %	✓	
26		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.417	mg/kg	1.285	0.461	mg/kg	0.0000359 %	✓	
27		acenaphthylene		205-917-1	208-96-8		0.0803	mg/kg		0.0691	mg/kg	0.00000691 %	✓	
28		indeno[123-cd]pyrene		205-893-2	193-39-5		0.5	mg/kg		0.43	mg/kg	0.000043 %	✓	
29		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.08	mg/kg		0.929	mg/kg	0.0000929 %	✓	
30		phenol	604-001-00-2	203-632-7	108-95-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
31		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		16	mg/kg	1.462	20.111	mg/kg	0.00201 %	✓	
											Total:	0.0795 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS5-120523-0.20-0.20

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

Sample details

Sample name:
WS5-120523-0.20-0.20
Moisture content:
20%
(wet 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: 20% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	338 mg/kg		270.4 mg/kg	0.027 %	✓	
2	1,1,1-trichloroethane; methyl chloroform	602-013-00-2	200-756-3	71-55-6		<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
3	toluene	601-021-00-3	203-625-9	108-88-3		<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
4	1,2-dichloroethane; ethylene dichloride	602-012-00-7	203-458-1	107-06-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
5	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
6	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4		4.21 mg/kg	23.173	78.047 mg/kg	0.0078 %	✓	
7	tetrachloroethylene	602-028-00-4	204-825-9	127-18-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
8	1,2-dichloropropane; propylene dichloride	602-020-00-0	201-152-2	78-87-5		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
9	2,4-dinitrotoluene; [1] dinitrotoluene [2]	609-007-00-9	204-450-0 [1] 246-836-1 [2]	121-14-2 [1] 25321-14-6 [2]		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
10	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
11	chloroform; trichloromethane	602-006-00-4	200-663-8	67-66-3		<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<LOD
12	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		44.4 mg/kg	1.785	63.41 mg/kg	0.00634 %	✓	
13	4-chlorophenylphenylether		230-281-7	7005-72-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
14	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.146 mg/kg		0.117 mg/kg	0.0000117 %	✓	
15	1,2,4-trichlorobenzene	602-087-00-6	204-428-0	120-82-1		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
16		3,5,5-trimethylcyclohex-2-enone; isophorone	606-012-00-8	201-126-0	78-59-1		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17		4-bromophenylphenylether		202-952-4	101-55-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18		bromoform; tribromomethane	602-007-00-X	200-854-6	75-25-2		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
19		nitrosodipropylamine	612-098-00-8	210-698-0	621-64-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20		2-chloronaphthalene		202-079-9	91-58-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21		trans-1,3-dichloropropene		431-460-4	10061-02-6		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
22		dimethyl phthalate		205-011-6	131-11-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23		2,2-dichloropropane		209-832-0	594-20-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
24		pentachlorophenol	604-002-00-8	201-778-6	87-86-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25		hexachloroethane		200-666-4	67-72-1		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %		<LOD
27		azobenzene	611-001-00-6	203-102-5	103-33-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28		carbon tetrachloride; tetrachloromethane	602-008-00-5	200-262-8	56-23-5		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29		bromodichloromethane		200-856-7	75-27-4		<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
30		TPH (C6 to C40) petroleum group			TPH		94.1 mg/kg		75.28 mg/kg	0.00753 %	✓	
31		dibenzofuran		205-071-3	132-64-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
32		2,4,6-trichlorophenol	604-018-00-5	201-795-9	88-06-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
33		2-methoxy-2-methylbutane; tert-amyl methyl ether	603-213-00-2	213-611-4	994-05-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
34		phenanthrene		201-581-5	85-01-8		0.199 mg/kg		0.159 mg/kg	0.0000159 %	✓	
35		1,1,2-trichloroethane	602-014-00-8	201-166-9	79-00-5		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
36		chloromethane; methyl chloride	602-001-00-7	200-817-4	74-87-3		<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
37		pyrene		204-927-3	129-00-0		0.309 mg/kg		0.247 mg/kg	0.0000247 %	✓	
38		zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		319 mg/kg	4.398	1122.351 mg/kg	0.112 %	✓	
39		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.0654 mg/kg		0.0523 mg/kg	0.00000523 %	✓	
40		1,2,3-trichloropropane	602-062-00-X	202-486-1	96-18-4		<0.016 mg/kg		<0.016 mg/kg	<0.0000016 %		<LOD
41		bis(2-chloroethoxy)methane		203-920-2	111-91-1		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
42		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		14.6 mg/kg	1.32	15.421 mg/kg	0.00154 %	✓	
43		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023 mg/kg		<0.023 mg/kg	<0.0000023 %		<LOD

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
44		bromobenzene	602-060-00-9	203-623-8	108-86-1		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
45		1,4-dichlorobenzene; p-dichlorobenzene	602-035-00-2	203-400-5	106-46-7		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
46		1,2-dibromo-3-chloropropane	602-021-00-6	202-479-3	96-12-8		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
47		benzo[ghi]perylene		205-883-8	191-24-2		0.0804	mg/kg		0.0643	mg/kg	0.00000643 %	✓	
48		hexachlorobutadiene		201-765-5	87-68-3		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
49		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.175	mg/kg	1.353	0.189	mg/kg	0.0000189 %	✓	
50		hexachlorobenzene	602-065-00-6	204-273-9	118-74-1		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
51		4-isopropyltoluene		202-796-7	99-87-6		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
52		1,1-dichloroethylene; vinylidene chloride	602-025-00-8	200-864-0	75-35-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
53		trichlorofluoromethane		200-892-3	75-69-4		<0.006	mg/kg		<0.006	mg/kg	<0.0000006 %		<LOD
54		dichloromethane; methylene chloride	602-004-00-3	200-838-9	75-09-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
55		1,2-dibromoethane	602-010-00-6	203-444-5	106-93-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
56		3,4-xylenol; [1] 2,5-xylenol; [2] 2,4-xylenol; [3] 2,3-xylenol; [4] 2,6-xylenol; [5] xylenol; [6] 2,4(or 2,5)-xylenol [7]	604-006-00-X	202-439-5 [1] 202-461-5 [2] 203-321-6 [3] 208-395-3 [4] 209-400-1 [5] 215-089-3 [6] 276-245-4 [7]	95-65-8 [1] 95-87-4 [2] 105-67-9 [3] 526-75-0 [4] 576-26-1 [5] 1300-71-6 [6] 71975-58-1 [7]		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
57		1,2,3-trichlorobenzene		201-757-1	87-61-6		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
58		carbazole		201-696-0	86-74-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
59		trichloroethylene; trichloroethene	602-027-00-9	201-167-4	79-01-6		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
60		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
61		bis(2-chloroethyl) ether	603-029-00-2	203-870-1	111-44-4		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
62		anthracene		204-371-1	120-12-7		0.0353	mg/kg		0.0282	mg/kg	0.00000282 %	✓	
63		chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol	604-014-00-3	200-431-6	59-50-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
64		4-chloroaniline	612-137-00-9	203-401-0	106-47-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
65		vinyl chloride; chloroethylene	602-023-00-7	200-831-0	75-01-4		<0.006	mg/kg		<0.006	mg/kg	<0.0000006 %		<LOD
66		fluoranthene		205-912-4	206-44-0		0.345	mg/kg		0.276	mg/kg	0.0000276 %	✓	
67		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
68		chloroethane	602-009-00-0	200-830-5	75-00-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
69		2-methyl naphthalene		202-078-3	91-57-6		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
70		2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4]				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]									
71		bromomethane; methylbromide				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		602-002-00-2	200-813-2	74-83-9									
72		BBP; benzyl butyl phthalate				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		607-430-00-3	201-622-7	85-68-7									
73		1,2,4-trimethylbenzene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-043-00-3	202-436-9	95-63-6									
74		chrysene				0.168	mg/kg		0.134	mg/kg	0.0000134 %	✓	
		601-048-00-0	205-923-4	218-01-9									
75		1,3-dichloropropene; [1] (Z)-1,3-dichloropropene [2]				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		602-030-00-5	208-826-5 [1] 233-195-8 [2]	542-75-6 [1] 10061-01-5 [2]									
76		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 }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
		006-007-00-5											
77		benzene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
78		4-nitrophenol; p-nitrophenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		609-015-00-2	202-811-7	100-02-7									
79		1,1,2,2-tetrachloroethane				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		602-015-00-3	201-197-8	79-34-5									
80		bis(2-ethylhexyl) phthalate; di-(2-ethylhexyl) phthalate; DEHP				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		607-317-00-9	204-211-0	117-81-7									
81		n-butylbenzene				<0.011	mg/kg		<0.011	mg/kg	<0.0000011 %		<LOD
			203-209-7	104-51-8									
82		di-n-octyl phthalate				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			204-214-7	117-84-0									
83		tert-butylbenzene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
			202-632-4	98-06-6									
84		benzo[a]pyrene; benzo[def]chrysene				0.13	mg/kg		0.104	mg/kg	0.0000104 %	✓	
		601-032-00-3	200-028-5	50-32-8									
85		nickel { nickel dihydroxide }				24.2	mg/kg	1.579	30.579	mg/kg	0.00306 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
86		2,6-dinitrotoluene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		609-049-00-8	210-106-0	606-20-2									
87		2,4,5-trichlorophenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		604-017-00-X	202-467-8	95-95-4									
88		styrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-026-00-0	202-851-5	100-42-5									
89		dichlorodifluoromethane				<0.006	mg/kg		<0.006	mg/kg	<0.0000006 %		<LOD
			200-893-9	75-71-8									
90		dibromomethane				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		602-003-00-8	200-824-2	74-95-3									
91		diethyl phthalate				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-550-6	84-66-2									
92		1,1-dichloropropene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		602-031-00-0	209-253-3	563-58-6									
93		pH				8.64	pH		8.64	pH	8.64 pH		
				PH									
94		1,1,1,2-tetrachloroethane				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			211-135-1	630-20-6									

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
95		2,4-dichlorophenol	604-011-00-7	204-429-6	120-83-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
96		carbon disulphide	006-003-00-3	200-843-6	75-15-0		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
97		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
98		nitrobenzene	609-003-00-7	202-716-0	98-95-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
99		1,1-dichloroethane	602-011-00-1	200-863-5	75-34-3		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
100		bromochloromethane		200-826-3	74-97-5		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
101		1,3-dichloropropane		205-531-3	142-28-9		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
102		acenaphthene		201-469-6	83-32-9		0.0195	mg/kg		0.0156	mg/kg	0.00000156 %	✓	
103		hexachlorocyclopentadiene	602-078-00-7	201-029-3	77-47-4		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
104		chlorobenzene	602-033-00-1	203-628-5	108-90-7		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
105		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		41.5	mg/kg	1.126	37.379	mg/kg	0.00374 %	✓	
106		1,3-dichlorbenzene	602-067-00-7	208-792-1	541-73-1		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
107		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.533	mg/kg	1.285	0.548	mg/kg	0.0000426 %	✓	
108		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
109		dibromochloromethane		204-704-0	124-48-1		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
110		mesitylene; 1,3,5-trimethylbenzene	601-025-00-5	203-604-4	108-67-8		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
111		indeno[123-cd]pyrene		205-893-2	193-39-5		0.0901	mg/kg		0.0721	mg/kg	0.00000721 %	✓	
112		sec-butylbenzene		205-227-0	135-98-8		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
113		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.172	mg/kg		0.138	mg/kg	0.0000138 %	✓	
114		dibutyl phthalate; DBP	607-318-00-4	201-557-4	84-74-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
115		phenol	604-001-00-2	203-632-7	108-95-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
116		1,2-dichlorobenzene; o-dichlorobenzene	602-034-00-7	202-425-9	95-50-1		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
117		2-nitrophenol		201-857-5	88-75-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
118		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]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
119		2-chlorotoluene; [1] 3-chlorotoluene; [2] 4-chlorotoluene; [3] chlorotoluene [4]	602-040-00-X	202-424-3 [1] 203-580-5 [2] 203-397-0 [3] 246-698-2 [4]	95-49-8 [1] 108-41-8 [2] 106-43-4 [3] 25168-05-2 [4]		<0.019	mg/kg		<0.019	mg/kg	<0.0000019 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
120		1,2-dichloroethylene; [1] cis-dichloroethylene; [2] trans-dichloroethylene [3]				<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<**LOD**
		602-026-00-3	208-750-2 [1] 205-859-7 [2] 205-860-2 [3]	540-59-0 [1] 156-59-2 [2] 156-60-5 [3]									
121		o-nitroaniline; [1] m-nitroaniline; [2] p-nitroaniline [3]				<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<**LOD**
		612-012-00-9	201-855-4 [1] 202-729-1 [2] 202-810-1 [3]	88-74-4 [1] 99-09-2 [2] 100-01-6 [3]									
122		m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4]				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
		604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]									
123		cumene; [1] propylbenzene [2]				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<**LOD**
		601-024-00-X	202-704-5 [1] 203-132-9 [2]	98-82-8 [1] 103-65-1 [2]									
124		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				18	mg/kg	1.462	21.046	mg/kg	0.0021 %	✓	
			215-160-9	1308-38-9									
										Total:	0.172 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

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 Most likely worst case scenario

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00753%)

Appendix A: Classifier defined and non GB MCL determinands

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

GB MCL index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
20 Nov 2021 - 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

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

GB MCL 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.
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

divanadium pentaoxide; vanadium pentoxide (EC Number: 215-239-8, CAS Number: 1314-62-1)

GB MCL index number: 023-001-00-8
Description/Comments: Hazard statements H301, H330, H350 added by HazWasteOnline due to ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be Carc. 1B; H350. The GB MCL Agency has reached the same opinion [but is yet to formerly make this change to the MCL List]. Substance has therefore been self-classified.
Additional Hazard Statement(s): Carc. 1B; H350 , Acute Tox. 3; H301 , Acute Tox. 2; H330
Reason for additional Hazards Statement(s):
20 Sep 2022 - Carc. 1B; H350 hazard statement sourced from: ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be Carc. 1B; H350. The GB MCL Agency has reached the same opinion [but is yet to formerly make this change to the MCL List]. Substance has therefore been self-classified.
28 Sep 2022 - Acute Tox. 3; H301 hazard statement sourced from: ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be "Acute tox 3; H301". The GB MCL Agency has reached the same opinion [but is yet to formerly make this change to the MCL List]. Substance has therefore been self-classified.
28 Sep 2022 - Acute Tox. 2; H330 hazard statement sourced from: ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be "Acute tox 2; H330". The GB MCL Agency has reached the same opinion [but is yet to formerly make this change to the MCL List]. Substance has therefore been self-classified.

4-chlorophenylphenylether (EC Number: 230-281-7, CAS Number: 7005-72-3)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Eye Dam. 1; H318 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

4-bromophenylphenylether (EC Number: 202-952-4, CAS Number: 101-55-3)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Eye Dam. 1; H318 , Eye Irrit. 2; H319 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

2-chloronaphthalene (EC Number: 202-079-9, CAS Number: 91-58-7)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

trans-1,3-dichloropropene (EC Number: 431-460-4, CAS Number: 10061-02-6)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Flam. Liq. 3; H226 , Acute Tox. 3; H301 , Asp. Tox. 1; H304 , Acute Tox. 3; H311 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Eye Irrit. 2; H319 , Acute Tox. 4; H332 , STOT SE 3; H335 , Aquatic Chronic 1; H410

- **dimethyl phthalate** (EC Number: 205-011-6, CAS Number: 131-11-3)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Acute Tox. 3; H331 , STOT SE 3; H335 , STOT SE 3; H336 , Repr. 2; H361 , Aquatic Chronic 3; H412

- **2,2-dichloropropane** (EC Number: 209-832-0, CAS Number: 594-20-7)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H332 , Flam. Liq. 2; H225 , Acute Tox. 4; H302 , Acute Tox. 4; H312 , Eye Irrit. 2; H319

- **hexachloroethane** (EC Number: 200-666-4, CAS Number: 67-72-1)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 2B;
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , STOT RE 2; H373

- **bromodichloromethane** (EC Number: 200-856-7, CAS Number: 75-27-4)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 2B;
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Eye Dam. 1; H318 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 1A; H360

- **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

- **dibenzofuran** (EC Number: 205-071-3, CAS Number: 132-64-9)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 4; H312 , Acute Tox. 4; H332 , Aquatic Chronic 2; H411

- **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

- **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 , Aquatic Chronic 1; H410

- **bis(2-chloroethoxy)methane** (EC Number: 203-920-2, CAS Number: 111-91-1)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 3; H301 , Acute Tox. 4; H312 , Acute Tox. 1; H330 , Acute Tox. 2; H330 , STOT SE 1; H370 , STOT RE 2; H373

- **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

hexachlorobutadiene (EC Number: 201-765-5, CAS Number: 87-68-3)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 3;
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 3; H301 , Acute Tox. 2; H310 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Eye Irrit. 2; H319 , Acute Tox. 2; H330 , Carc. 2; H351 , Repr. 2; H361 , STOT SE 2; H371 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

4-isopropyltoluene (EC Number: 202-796-7, CAS Number: 99-87-6)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Chronic 2; H411

trichlorofluoromethane (EC Number: 200-892-3, CAS Number: 75-69-4)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H312 , Ozone 1; H420

1,2,3-trichlorobenzene (EC Number: 201-757-1, CAS Number: 87-61-6)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , STOT SE 3; H336 , Aquatic Acute 1; H400 , Aquatic Chronic 3; H410

carbazole (EC Number: 201-696-0, CAS Number: 86-74-8)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 2B;
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Muta. 2; H341 , Carc. 2; H351 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Acute Tox. 3; H331 , Acute Tox. 3; H311 , Acute Tox. 3; H301

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

GB MCL index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

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 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

2-methyl naphthalene (EC Number: 202-078-3, CAS Number: 91-57-6)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , STOT SE 3; H336 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

GB MCL index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

n-butylbenzene (EC Number: 203-209-7, CAS Number: 104-51-8)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Flam. Liq. 3; H226 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

di-n-octyl phthalate (EC Number: 204-214-7, CAS Number: 117-84-0)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Repr. 2; H361 , Skin Sens. 1; H317 , Resp. Sens. 1; H334 , Eye Irrit. 2; H319 , Aquatic Chronic 4; H413

tert-butylbenzene (EC Number: 202-632-4, CAS Number: 98-06-6)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Flam. Liq. 3; H226 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Acute Tox. 3; H331 , Acute Tox. 4; H332 , STOT SE 3; H335 , Asp. Tox. 1; H304 , Aquatic Chronic 2; H411

dichlorodifluoromethane (EC Number: 200-893-9, CAS Number: 75-71-8)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Aquatic Chronic 3; H412 , Ozone 1; H420 , Press. Gas; H280

diethyl phthalate (EC Number: 201-550-6, CAS Number: 84-66-2)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Skin Irrit. 2; H315 , Acute Tox. 3; H331 , Acute Tox. 3; H311 , STOT SE 3; H335 , STOT RE 2; H373 , Repr. 2; H361 , Acute Tox. 4; H302 , STOT SE 3; H336 , Skin Sens. 1; H317 , Aquatic Chronic 1; H410

pH (CAS Number: PH)

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

1,1,1,2-tetrachloroethane (EC Number: 211-135-1, CAS Number: 630-20-6)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 2B;
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , Acute Tox. 3; H331 , Eye Dam. 1; H318 , Acute Tox. 4; H332 , Carc. 2; H351 , Acute Tox. 4; H312 , Aquatic Chronic 3; H412 , Skin Irrit. 2; H315

bromochloromethane (EC Number: 200-826-3, CAS Number: 74-97-5)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H312 , Skin Corr. 1B; H314 , Eye Dam. 1; H318 , Acute Tox. 4; H332 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Ozone 1; H420

1,3-dichloropropane (EC Number: 205-531-3, CAS Number: 142-28-9)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H332 , Flam. Liq. 2; H225 , Flam. Liq. 3; H226 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335

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

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

dibromochloromethane (EC Number: 204-704-0, CAS Number: 124-48-1)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 3;
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 4; H312 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Acute Tox. 4; H332 , STOT SE 3; H335 , STOT SE 3; H336 , Muta. 2; H341 , Aquatic Chronic 2; H411

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

sec-butylbenzene (EC Number: 205-227-0, CAS Number: 135-98-8)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Aquatic Chronic 2; H411

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

2-nitrophenol (EC Number: 201-857-5, CAS Number: 88-75-5)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 4; H312 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Acute Tox. 4; H332 , STOT SE 3; H335 , STOT RE 2; H373 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

Appendix B: Rationale for selection of metal species

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

Most likely worst case

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Most likely worst-case

boron {boron tribromide}

worst-case

vanadium {divanadium pentaoxide; vanadium pentoxide}

Most likely worst-case

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

Most likely worst-case

zinc {zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2]}

Most likely worst case

arsenic {arsenic trioxide}

Most likely worst-case

mercury {mercury dichloride}

Most likely worst-case

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}

Most likely worst-case

nickel {nickel dihydroxide}

Most likely worst-case

copper {dicopper oxide; copper (I) oxide}

Most likely worst-case

cadmium {cadmium sulfide}

Most likely worst-case

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

worst case

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2023.111.5569.10274 (22 Apr 2023)
HazWasteOnline Database: 2023.111.5569.10274 (22 Apr 2023)

This classification utilises the following guidance and legislation:
WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021
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 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
GB MCL List - version 1.1 of 09 June 2021

APPENDIX I:
BGS Radon Report

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001

GeoReports

British Geological Survey

Alex Stratford
234
IVYDALE ROAD
LONDON
SE15 3BU
United Kingdom

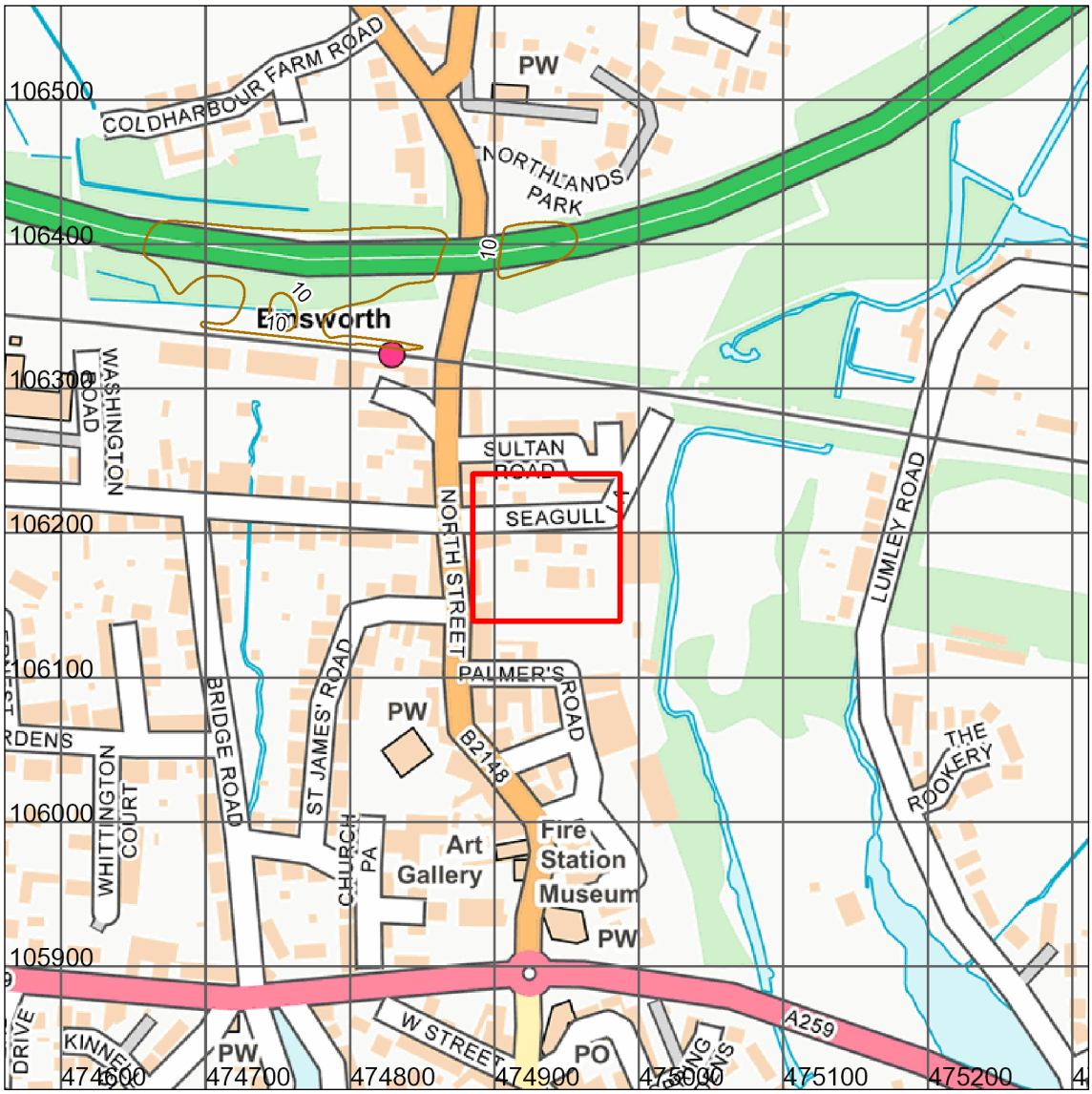
RADON REPORT

ADVISORY REPORT ON THE REQUIREMENT FOR RADON PROTECTIVE MEASURES IN NEW BUILDINGS, CONVERSIONS AND EXTENSIONS TO EXISTING BUILDINGS. THE REPORT ALSO INDICATES WHETHER A SITE IS LOCATED WITHIN A RADON AFFECTED AREA

REPORT ID: ***BGS_333017/45235***

CLIENT REFERENCE: GWPR5385 2-6 SEAGULL LANE EMSWORTH

Search location



Contains OS data © Crown Copyright and database right 2023. OS OpenMap Local: Scale: 1:5 000 (1cm = 50 m)
Search location indicated in red

Site Address:
2
SEAGULL LANE
EMSWORTH
PO10 7QH

This report describes a site located at the National Grid Reference obtained from Ordnance Survey OS Places API.
Note that for sites of irregular shape, this point may lie outside the site boundary. Where the client has submitted a site plan the assessment will be based on the area

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given.

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Radon Report: UK

When extensions are made to existing buildings in high radon areas, or new buildings are constructed in these areas, the Building Regulations for England, Wales, Scotland and Northern Ireland require that protective measures are taken against radon entering the building.

This report provides information on whether radon protective measures are required. Depending on the probability of buildings having high radon levels, the Regulations may require either:

1. No protective measures
2. Basic protective measures
3. Full protective measures

This is an advisory report on the requirement for radon protective measures in new buildings, conversions and extensions. The report also indicates whether a site is located within a radon Affected Area

Requirement for radon protective measures

The determination below follows advice in *BR211 Radon: Guidance on protective measures for new buildings (2015 edition), which also provides guidance on what to do if the* result *indicates that protective measures are required.*

Is the property in an area where radon protective measures are required for new buildings or extensions to existing ones as described in publication BR211 (2015 edition) Radon: Guidance on protective measures for new buildings?

BASIC RADON PROTECTIVE MEASURES ARE REQUIRED FOR THE REPORT AREA.

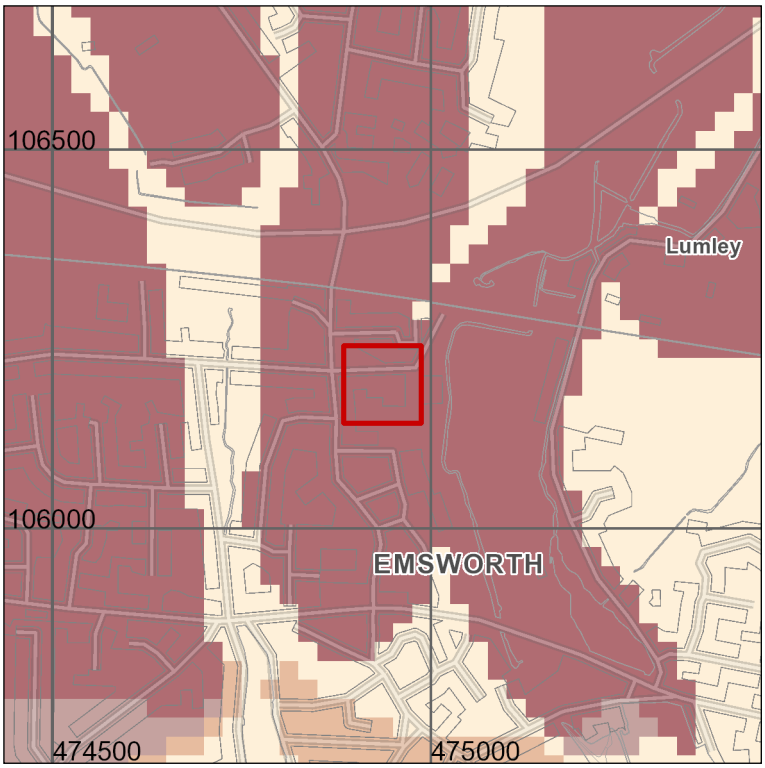
More details of the protective measures required are available in *BR211 Radon: Guidance on protective measures for new buildings (2015 Edition)*. Additional information and guidance is available from the Building Research Establishment website (http://www.bre.co.uk/radon/).

Whether or not the radon level in a building is above or below the radon Action Level can only be established by having the building tested. The UKHSA provides a radon testing service which can be accessed at www.ukradon.org or by telephone (01235 822622).

If you require further information or guidance, you should contact your local authority building control officer or approved inspector.

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Radon Affected Area



% Homes estimated to be at or above the action level
0-1%
1-3%
3-5%
5-10%
10-30%
30-100%

Contains OS data © Crown Copyright and database right 2023
Scale: 1:10 000 (1cm = 100 m)
Search area indicated in red

Is the property in a radon Affected Area as defined by the UK Health Security Agency (UKHSA) and if so what percentage of homes are estimated to be at or above the Action Level? YES

Additional Information

THE PROPERTY IS IN A RADON AFFECTED AREA WHERE 5 TO 10% OF HOMES ARE ESTIMATED TO BE AT OR ABOVE THE ACTION LEVEL.

The UKHSA recommends a radon 'Action Level' of 200 Becquerels per cubic metre of air (Bq m^{-3}) for the annual average of the radon gas concentration in a home. Where 1% or more of homes are estimated to be at or above the Action Level the area should be regarded as a radon Affected Area.

This report informs you whether the property is in a radon Affected Area and the percentage of homes that are estimated to be at or above the radon Action Level at this location. Being in an Affected Area does not necessarily mean there is a high radon level within the property; the only way to determine the radon level is to carry out a radon measurement.

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The UKHSA advises that radon gas should be measured in all properties within radon Affected Areas and that homes with radon levels at or above the Action Level (200 Bq m^{-3}) should be remediated. Householders with levels between the Target Level (100 Bq m^{-3}) and Action Level should seriously consider reducing their radon level, especially if they are at greater risk, such as if they are current or ex smokers. Whether or not a home is in fact above or below the Action Level or Target Level can only be established by having the building tested. The UKHSA provides a validated radon testing service which can be accessed at www.ukradon.org.

The information in this report provides an answer to one of the standard legal enquiries on house purchase in England and Wales, known as Law Society CON29 Enquiries of the Local Authority (2016); 3.14 Radon Gas: Do records indicate that the property is in a “Radon Affected Area” as identified by the UKHSA. The data can also be used to advise house buyers and sellers in Scotland and Northern Ireland.

If you are buying a new build property in a Radon Affected Area, you should ask the builder whether radon protective measures were incorporated in the construction of the property.

If you are buying a currently occupied property in a radon Affected Area, you should ask the present owner whether radon levels have been measured in the property. If they have, ask whether the results were at or above the radon Action Level and if so, whether remedial measures were installed, radon levels were re-tested, and if the results of re-testing confirmed the effectiveness of the measures.

Further information on radon is available from the UKHSA at www.ukradon.org.

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What is radon?

Radon is a naturally occurring radioactive gas, which is produced by the radioactive decay of radium which, in turn, is derived from the radioactive decay of uranium. Uranium is found in small quantities in all soils and rocks, although the amount varies from place to place. Radon released from rocks and soils is quickly diluted in the atmosphere. Concentrations in the open air are normally very low and do not present a hazard. Radon that enters enclosed spaces such as some buildings (particularly basements), caves, mines, and tunnels may reach high concentrations in some circumstances. The construction method and degree of ventilation will influence radon levels in individual buildings. A person's exposure to radon will also vary according to how particular buildings and spaces are used.
Inhalation of the radioactive decay products of radon gas increases the chance of developing lung cancer. If individuals are exposed to high concentrations for significant periods of time, there may be cause for concern. In order to limit the risk to individuals, the Government has adopted an Action Level for radon in homes of 200 becquerels per cubic metre (Bq m^{-3}). The Government advises householders that, where the radon level is at or above the Action Level, measures should be taken to reduce the concentration.

Radon in workplaces

The Ionising Radiation Regulations 2017 require employers to take action when radon is present above a defined level in the workplace. Advice may be obtained from your local Health and Safety Executive Area Office or the Environmental Health Department of your local authority. The BRE publishes a guide (BR293)**: Radon in the workplace.** BRE publications may be obtained from the BRE Bookshop, Tel: 01923 664262, email: bookshop@bre.co.ukwebsite: www.brebookshop.com

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Contact Details

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- Raw data may have been transcribed from analogue to digital format, or may have been acquired by means of automated measuring techniques. Although such processes are subjected to quality control to ensure reliability where possible, some raw data may have been processed without human intervention and may in consequence contain undetected errors.
- Detail, which is clearly defined and accurately depicted on large-scale maps, may be lost when small-scale maps are derived from them.
- Although samples and records are maintained with all reasonable care, there may be some deterioration in the long term.
- The most appropriate techniques for copying original records are used, but there may be some loss of detail and dimensional distortion when such records are copied.
- Data may be compiled from the disparate sources of information at BGS's disposal, including material donated to BGS by third parties, and may not originally have been subject to any verification or other quality control process.
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Ordnance Survey

Report issued by
BGS Enquiry Service

APPENDIX J: Ground Gas Monitoring Results

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001

Job No:	GWPR5385
Site name:	Seagull Lane Emsworth
Operator:	AA

Date:		**25/05/2023**	
Time:	**12:20**	**to**	**12:40**
Visit No:	1	**of**	**2**

Ground Gas Analyser:	GFM-436
Last Calibration:	Apr-22

Monitoring Point	GAS CONCENTRATIONS								VOLATILES		FLOW DATA			WELL AND WATER DATA		Additional Remarks
	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon monoxide (ppm)	Hydrogen sulphide (ppm)	Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Water level (m bgl)	Depth of well (m bgl)	
	Peak	Steady	Peak	Steady	Peak	Peak	Min	Steady			Peak	Steady				
Ambient air	0.00	0.00	0.10	0.00	0.00	0.00	20.40	20.40	0.10	0.00	0.00	0.00	0.00			
WS1	21.20	21.20	3.30	3.30	0.00	0.00	5.50	5.60	155.50	0.00	0.00	0.00	0.00	0.60	3.50	
WS3	0.00	0.00	0.30	0.30	0.00	0.00	20.00	20.00	412.60	0.00	0.00	0.00	0.00	0.50	4.40	
WS5	0.00	0.00	0.70	0.70	0.00	0.00	19.80	19.80	389.20	0.00	0.00	0.00	0.00	0.30	4.60	
Max	**21.20**	**21.20**	**3.30**	**3.30**	**0**	**0**	**20.40**	**20.40**	**412.6**	**0**	**0.00**	**0.00**	**0.00**	**0.6**		
Min	**0.00**	**0.00**	**0.10**	**0.00**	**0**	**0**	**5.50**	**5.60**	**0.1**	**0**	**0.00**	**0.00**	**0.00**	**0.3**		

SITE INFORMATION:

State of ground:	x	Dry		Wet		Snow		Frozen		Hardstanding
Wind:	X	Calm		Moderate		Strong				
Cloud cover:		None	X	Cloudy		Overcast				
Preciptation:	X	None		Moderate		Heavy				

METEOROLOGICAL INFORMATION:

Official Barometric Pressure (mbar): 1027.3 3hr Before 1027.1 End of Monitoring (taken from wow.metoffice.gov.uk station Southbourne)

Official Pressure Tendency:

(Change in atmospheric pressure for the preceding 3 hours of monitoring)

	Falling (decreasing change >1.6 mbar)
X	Steady (change of 0.1 - 1.5 mbar)
	Rising (increasing change >1.6 mbar)

Job No:	GWPR5385
Site name:	Seagull lane Emsworth
Operator:	JC

Date:		**08/06/2023**	
Time:	**15:25**	**to**	**15:40**
Visit No:	2	**of**	**2**

Ground Gas Analyser:	GFM-436
Last Calibration:	Apr-22

Monitoring Point	GAS CONCENTRATIONS								VOLATILES		FLOW DATA			WELL AND WATER DATA		Additional Remarks
	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon monoxide (ppm)	Hydrogen sulphide (ppm)	Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Water level (m bgl)	Depth of well (m bgl)	
	Peak	Steady	Peak	Steady	Peak	Peak	Min	Steady			Peak	Steady				
Ambient air	0.00	0.00	0.00	0.00	0.00	0.00	20.60	20.60	-	-	0.00	0.00	0.00	-	-	
WS1	31.00	31.00	3.90	3.90	0.00	0.00	0.10	0.10	0.60		0.00	0.00	0.00	0.70	3.40	
WS3	0.00	0.00	0.40	0.40	0.00	0.00	19.60	19.60	1.00		0.00	0.00	0.00	0.90	4.40	
WS5	0.00	0.00	0.70	0.70	0.00	0.00	20.50	20.50	6.30		0.00	0.00	0.00	0.40	4.60	
Max	**31.00**	**31.00**	**3.90**	**3.90**	**0**	**0**	**20.60**	**20.60**	**6.3**	**0**	**0.00**	**0.00**	**0.00**	**0.9**		
Min	**0.00**	**0.00**	**0.00**	**0.00**	**0**	**0**	**0.10**	**0.10**	**0.6**	**0**	**0.00**	**0.00**	**0.00**	**0.4**		

SITE INFORMATION:

State of ground:	X	Dry		Wet		Snow		Frozen		Hardstanding
Wind:	X	Calm		Moderate		Strong				
Cloud cover:	X	None		Cloudy		Overcast				
Preciptation:	X	None		Moderate		Heavy				

METEOROLOGICAL INFORMATION:

Official Barometric Pressure (mbar): 1014.8 3hr Before 1013.3 End of Monitoring (taken from wow.metoffice.gov.uk station Southbourne)

Official Pressure Tendency:

(Change in atmospheric pressure for the preceding 3 hours of monitoring)

	Falling (decreasing change >1.6 mbar)
X	Steady (change of 0.1 - 1.5 mbar)
	Rising (increasing change >1.6 mbar)

APPENDIX K: Gas Cannister and Dissolved Gasses in Groundwater results

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Ground and Water Ltd
Head Office
2 The Long Barn
Norton Farm, Selborne Road
Alton
Hampshire
GU34 3NB

Attention: Alex Stratford

CERTIFICATE OF ANALYSIS

Date of report Generation:	13 July 2023
Customer:	Ground and Water Ltd
Sample Delivery Group (SDG):	230705-89
Your Reference:	GWPR5475 2 - 6 Seagull Lane, Emsworth, PO10 7QH
Location:	2 - 6 Seagull Lane, Emsworth PO10 7QH
Report No:	696276
Order Number:	GWPR5475

We received 3 samples on Wednesday July 05, 2023 and 3 of these samples were scheduled for analysis which was completed on Thursday July 13, 2023. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:



Sonia McWhan
Operations Manager

1291

CERTIFICATE OF ANALYSIS

SDG: 230705-89 **Report Number:** 696276 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
28276297	WS1		0.00 - 0.00	03/07/2023
28276301	WS3		0.00 - 0.00	03/07/2023
28276304	WS5		0.00 - 0.00	03/07/2023

Only received samples which have had analysis scheduled will be shown on the following pages.

CERTIFICATE OF ANALYSIS

SDG: 230705-89 **Report Number:** 696276 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			28276297	28276301	28276304
Customer Sample Reference			WS1	WS3	WS5
AGS Reference					
Depth (m)			0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Container			Gas Canister	Gas Canister	Gas Canister
Sample Type			G	G	G
Bulk Gas	All	NDPs: 0 Tests: 3	X	X	X
Odourant Gas Analysis (G)	All	NDPs: 0 Tests: 3	X	X	X
TPH in Gas samples	All	NDPs: 0 Tests: 3	X	X	X
VOC's	All	NDPs: 0 Tests: 3	X	X	X

CERTIFICATE OF ANALYSIS

SDG: 230705-89 **Report Number:** 696276 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	WS1	WS3	WS5			
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
			Sample Type	Gas (G)	Gas (G)	Gas (G)			
			Date Sampled	03/07/2023	03/07/2023	03/07/2023			
			Sample Time	14:00	14:00	14:00			
			Date Received	05/07/2023	05/07/2023	05/07/2023			
			SDG Ref	230705-89	230705-89	230705-89			
			Lab Sample No.(s)	28276297	28276301	28276304			
			AGS Reference						
Hydrogen sulphide	<0.1 ppm v/v	TM216		<2	<2	<2			

CERTIFICATE OF ANALYSIS

SDG: 230705-89 **Report Number:** 696276 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Bulk Gas

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+$@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	WS1	WS3	WS5			
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
			Sample Type	Gas (G)	Gas (G)	Gas (G)			
			Date Sampled	03/07/2023	03/07/2023	03/07/2023			
			Sample Time	14:00	14:00	14:00			
			Date Received	05/07/2023	05/07/2023	05/07/2023			
			SDG Ref	230705-89	230705-89	230705-89			
			Lab Sample No.(s)	28276297	28276301	28276304			
			AGS Reference						
Hydrogen	<0.5 %	TM053		<0.5	<0.5	<0.5			
Oxygen	<0.5 %	TM053		1.41	6.25	25.8			
Nitrogen	<1 %	TM053		54.2	93.8	74.2			
Carbon monoxide	<0.05 %	TM053		<0.05	<0.05	<0.05			
Methane	<0.05 %	TM053		40.5	<0.05	<0.05			
Carbon dioxide	<0.05 %	TM053		3.83	<0.05	<0.05			
Bulk gas, Total	%	TM053		100	100	100			

CERTIFICATE OF ANALYSIS

SDG: 230705-89 **Report Number:** 696276 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Sample Number 28276297
Sample ID WS1 **Depth** 0.00 - 0.00 **Sampled Date** 03/07/2023 00:00

- ISO17025 accredited. **M - *m*CERTS accredited.** **1-4♦§@ - Sample deviation (see appendix)**

Method TM335 Determination of TPH in atmospheric, sub-slab and soil gas samples

Canister No. 92 **Sample Volume (ml)** 5 **Initial pressure (psia)** 13.39 **Final pressure (psia)** 19.04 **Dilution** 1.4219566841

CAS Number	Compound	LOD	Result	Units	LOD	Result	Units
1634-04-4	MTBE	<42.7	<42.7	ppbv	<154	<154	ug/m³
71-43-2	Benzene	<37.0	<37.0	ppbv	<118	<118	ug/m³
108-88-3	Toluene	<42.7	53.8	ppbv	<161	203	ug/m³
100-41-4	Ethyl Benzene	<42.7	95.0	ppbv	<185	412	ug/m³
108-38-3 & 106-42-3	m/p-Xylene	<42.7	86.2	ppbv	<185	374	ug/m³
95-47-6	o-Xylene	<42.7	43.2	ppbv	<185	187	ug/m³
91-20-3	Naphthalene	<65.4	<65.4	ppbv	<342	<342	ug/m³
-	TPH (C4-C6)	<284	9810	ppbv	<829	28600	ug/m³
-	TPH (C6-C8)	<284	9180	ppbv	<1050	33900	ug/m³
-	TPH (C8-C10)	<390	17100	ppbv	<1840	80700	ug/m³
-	TPH (C10-C12)	<603	5860	ppbv	<3500	34000	ug/m³
-	TPH (C4-C12)	<1560	41900	ppbv	<7220	177000	ug/m³
-	Aliphatic (C4-C6)	<284	9810	ppbv	<829	28600	ug/m³
-	Aliphatic (C6-C8)	<204	9130	ppbv	<771	33700	ug/m³
-	Aliphatic (C8-C10)	<106	16300	ppbv	<540	77200	ug/m³
-	Aliphatic (C10-C12)	<319	5860	ppbv	<1280	34000	ug/m³
-	Aromatic (EC5-EC7)	<37.0	<37.0	ppbv	<118	<118	ug/m³
-	Aromatic (EC7-EC8)	<42.7	53.8	ppbv	<161	203	ug/m³
-	Aromatic (EC8-EC10)	<284	765	ppbv	<1300	3510	ug/m³
-	Aromatic (EC10-EC12)	<284	<284	ppbv	<2220	<2230	ug/m³

Validated

CERTIFICATE OF ANALYSIS

SDG: 230705-89 **Report Number:** 696276 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Sample Number 28276301
Sample ID WS3 **Depth** 0.00 - 0.00 **Sampled Date** 03/07/2023 00:00

- ISO17025 accredited. **M - *m*CERTS accredited.** **1-4♦§@ - Sample deviation (see appendix)**

Method TM335 Determination of TPH in atmospheric, sub-slab and soil gas samples

Canister No. 331 **Sample Volume (ml)** 160 **Initial pressure (psia)** 12.54 **Final pressure (psia)** 19.04 **Dilution** 1.5183413078

CAS Number	Compound	LOD	Result	Units	LOD	Result	Units
1634-04-4	MTBE	<1.42	<1.42	ppbv	<5.11	<5.12	ug/m³
71-43-2	Benzene	<1.23	1.76	ppbv	<3.92	5.61	ug/m³
108-88-3	Toluene	<1.42	1.60	ppbv	<5.34	6.02	ug/m³
100-41-4	Ethyl Benzene	<1.42	<1.42	ppbv	<6.16	<6.17	ug/m³
108-38-3 & 106-42-3	m/p-Xylene	<1.42	1.62	ppbv	<6.16	7.02	ug/m³
95-47-6	o-Xylene	<1.42	<1.42	ppbv	<6.16	<6.17	ug/m³
91-20-3	Naphthalene	<2.18	<2.18	ppbv	<11.4	<11.4	ug/m³
-	TPH (C4-C6)	<9.49	354	ppbv	<27.7	1030	ug/m³
-	TPH (C6-C8)	<9.49	84.6	ppbv	<35.0	312	ug/m³
-	TPH (C8-C10)	<13.0	47.3	ppbv	<61.5	223	ug/m³
-	TPH (C10-C12)	<20.1	54.3	ppbv	<117	315	ug/m³
-	TPH (C4-C12)	<52.1	540	ppbv	<241	1880	ug/m³
-	Aliphatic (C4-C6)	<9.49	354	ppbv	<27.7	1030	ug/m³
-	Aliphatic (C6-C8)	<6.84	81.2	ppbv	<25.7	300	ug/m³
-	Aliphatic (C8-C10)	<3.51	47.3	ppbv	<18.0	223	ug/m³
-	Aliphatic (C10-C12)	<10.6	54.3	ppbv	<42.7	315	ug/m³
-	Aromatic (EC5-EC7)	<1.23	1.76	ppbv	<3.92	5.61	ug/m³
-	Aromatic (EC7-EC8)	<1.42	1.60	ppbv	<5.34	6.02	ug/m³
-	Aromatic (EC8-EC10)	<9.49	<9.49	ppbv	<43.5	<43.5	ug/m³
-	Aromatic (EC10-EC12)	<9.49	<9.49	ppbv	<74.3	<74.3	ug/m³

Validated

CERTIFICATE OF ANALYSIS

SDG: 230705-89 **Report Number:** 696276 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Sample Number 28276304
Sample ID WS5 **Depth** 0.00 - 0.00 **Sampled Date** 03/07/2023 00:00

- ISO17025 accredited. **M - *m*CERTS accredited.** **1-4♦§@ - Sample deviation (see appendix)**

Method TM335 Determination of TPH in atmospheric, sub-slab and soil gas samples

Canister No. 131 **Sample Volume (ml)** 160 **Initial pressure (psia)** 13.18 **Final pressure (psia)** 19.04 **Dilution** 1.4446130501

CAS Number	Compound	LOD	Result	Units	LOD	Result	Units
1634-04-4	MTBE	<1.35	<1.35	ppbv	<4.86	<4.87	ug/m³
71-43-2	Benzene	<1.17	3.11	ppbv	<3.73	9.91	ug/m³
108-88-3	Toluene	<1.35	4.13	ppbv	<5.08	15.5	ug/m³
100-41-4	Ethyl Benzene	<1.35	<1.35	ppbv	<5.85	<5.87	ug/m³
108-38-3 & 106-42-3	m/p-Xylene	<1.35	2.98	ppbv	<5.85	12.9	ug/m³
95-47-6	o-Xylene	<1.35	1.45	ppbv	<5.85	6.27	ug/m³
91-20-3	Naphthalene	<2.08	<2.08	ppbv	<10.9	<10.9	ug/m³
-	TPH (C4-C6)	<9.03	149	ppbv	<26.3	435	ug/m³
-	TPH (C6-C8)	<9.03	46.7	ppbv	<33.3	172	ug/m³
-	TPH (C8-C10)	<12.4	116	ppbv	<58.6	549	ug/m³
-	TPH (C10-C12)	<19.1	75.5	ppbv	<111	438	ug/m³
-	TPH (C4-C12)	<49.6	387	ppbv	<229	1590	ug/m³
-	Aliphatic (C4-C6)	<9.03	149	ppbv	<26.3	435	ug/m³
-	Aliphatic (C6-C8)	<6.51	39.5	ppbv	<24.5	147	ug/m³
-	Aliphatic (C8-C10)	<3.37	103	ppbv	<17.2	487	ug/m³
-	Aliphatic (C10-C12)	<10.1	75.5	ppbv	<40.3	438	ug/m³
-	Aromatic (EC5-EC7)	<1.17	3.11	ppbv	<3.73	9.91	ug/m³
-	Aromatic (EC7-EC8)	<1.35	4.13	ppbv	<5.08	15.5	ug/m³
-	Aromatic (EC8-EC10)	<9.03	13.5	ppbv	<41.4	61.8	ug/m³
-	Aromatic (EC10-EC12)	<9.03	<9.03	ppbv	<70.7	<70.7	ug/m³

Validated

CERTIFICATE OF ANALYSIS

SDG: 230705-89 **Report Number:** 696276 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Sample Number 28276297
Sample ID WS1 **Depth** 0.00 - 0.00 **Sampled Date** 03/07/2023 00:00:0

- ISO17025 accredited. **M - *m*CERTS accredited.** **1-4♦§@ - Sample deviation (see appendix)**

Method TM330 Determination of VOC's in atmospheric, sub-slab and soil gas samples **Canister No.** 92

Sample Volume (ml) 5 **Dispatch pressure (psia)** -0.06 **Initial pressure (psia)** 13.39 **Final pressure (psia)** 19.26 **Dilution** 1.4383868559

CAS Number	Compound	LOD	Result		Units	LOD	Result		Units
71-55-6	1,1,1-Trichloroethane	<43.2	<43.2	#	ppbv	<235	<235	#	ug/m³
79-34-5	1,1,2,2-Tetrachloroethane	<43.2	<43.2	3 #	ppbv	<297	<297	3 #	ug/m³
79-00-5	1,1,2-Trichloroethane	<43.2	<43.2	#	ppbv	<235	<235	#	ug/m³
75-34-3	1,1-Dichloroethane	<43.2	<43.2	#	ppbv	<175	<175	#	ug/m³
75-35-4	1,1-Dichloroethene	<43.2	<43.2	#	ppbv	<171	<171	#	ug/m³
526-73-8	1,2,3-Trimethylbenzene	<43.2	<43.2	#	ppbv	<212	<212	#	ug/m³
120-82-1	1,2,4-Trichlorobenzene	<43.2	<43.2	3 #	ppbv	<320	<319	3 #	ug/m³
95-63-6	1,2,4-Trimethylbenzene	<43.2	<43.2	#	ppbv	<212	<212	#	ug/m³
106-93-4	1,2-Dibromoethane	<43.2	<43.2	#	ppbv	<332	<332	#	ug/m³
95-50-1	1,2-Dichlorobenzene	<43.2	<43.2	3 #	ppbv	<260	<259	3 #	ug/m³
107-06-2	1,2-Dichloroethane	<43.2	<43.2	#	ppbv	<175	<175	#	ug/m³
78-87-5	1,2-Dichloropropane	<43.2	<43.2	#	ppbv	<200	<199	#	ug/m³
76-14-2	1,2-Dichlorotetrafluoroethane	<43.2	<43.2	#	ppbv	<302	<302	#	ug/m³
108-67-8	1,3,5-Trimethylbenzene	<43.2	<43.2	#	ppbv	<212	<212	#	ug/m³
106-99-0	1,3-Butadiene	<43.2	<43.2	#	ppbv	<95.4	<95.3	#	ug/m³
106-46-7	1,4-Dichlorobenzene	<43.2	<43.2	3 #	ppbv	<260	<259	3 #	ug/m³
123-91-1	1,4-Dioxane	<43.2	<43.2		ppbv	<155	<155		ug/m³
71-23-8	1-Propanol	<43.2	<43.2		ppbv	<106	<106		ug/m³
78-93-3	2-Butanone (MEK)	<43.2	<43.2	#	ppbv	<127	<127	#	ug/m³
591-78-6	2-Hexanone	<43.2	<43.2	#	ppbv	<177	<176	#	ug/m³
107-87-9	2-Pentanone	<43.2	<43.2		ppbv	<152	<152		ug/m³
589-38-8	3-Hexanone	<43.2	281		ppbv	<177	1150		ug/m³
96-22-0	3-Pentanone	<43.2	<43.2		ppbv	<152	<152		ug/m³
108-10-1	4-Methyl-2-pentanone	<43.2	<43.2	#	ppbv	<177	<176	#	ug/m³
67-64-1 & 123-38-6	Acetone + Propanal	<86.3	<86.3	#	ppbv	<205	<205	#	ug/m³
75-05-8	Acetonitrile	<43.2	<43.2		ppbv	<72.4	<72.4		ug/m³
107-02-8	Acrolein	<43.2	<43.2	#	ppbv	<98.9	<98.8	#	ug/m³
71-43-2	Benzene	<37.4	<37.4	#	ppbv	<119	<119	#	ug/m³
100-44-7	Benzyl Chloride	<43.2	<43.2	3 #	ppbv	<224	<224	3 #	ug/m³
75-27-4	Bromodichloromethane	<43.2	<43.2	#	ppbv	<290	<289	#	ug/m³
75-25-2	Bromoform	<43.2	<43.2	#	ppbv	<447	<447	#	ug/m³
74-83-9	Bromomethane	<43.2	<43.2	3 #	ppbv	<168	<168	3 #	ug/m³
123-72-8	Butanal	<43.2	<43.2		ppbv	<127	<127		ug/m³
75-15-0	Carbon Disulfide	<43.2	375	#	ppbv	<134	1170	#	ug/m³
56-23-5	Carbon Tetrachloride	<43.2	<43.2	#	ppbv	<272	<272	#	ug/m³
108-90-7	Chlorobenzene	<43.2	<43.2	#	ppbv	<200	<199	#	ug/m³
75-00-3	Chloroethane	<43.2	<43.2	#	ppbv	<115	<115	#	ug/m³
67-66-3	Chloroform	<43.2	<43.2	#	ppbv	<210	<210	#	ug/m³
74-87-3	Chloromethane	<43.2	<43.2	#	ppbv	<88.3	<88.2	#	ug/m³
156-59-2	cis-1,2-Dichloroethene	<43.2	<43.2	#	ppbv	<171	<171	#	ug/m³
10061-01-5	cis-1,3-Dichloropropene	<43.2	<43.2	#	ppbv	<196	<196	#	ug/m³
110-82-7	Cyclohexane	<43.2	382	#	ppbv	<148	1310	#	ug/m³
75-71-8	Dichlorodifluoromethane	<43.2	<43.2	#	ppbv	<214	<214	#	ug/m³
75-45-6	Difluorochloromethane	<43.2	<43.2		ppbv	<152	<152		ug/m³
100-41-4	Ethylbenzene	<43.2	113	#	ppbv	<187	490	#	ug/m³
87-68-3	Hexachlorobutadiene	<43.2	<43.2		ppbv	<459	<459		ug/m³

CERTIFICATE OF ANALYSIS

SDG: 230705-89 **Report Number:** 696276 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Sample Number 28276297
Sample ID WS1 **Depth** 0.00 - 0.00 **Sampled Date** 03/07/2023 00:00:0

- ISO17025 accredited. **M - *m*CERTS accredited.** **1-4♦§@ - Sample deviation (see appendix)**

Method TM330 Determination of VOC's in atmospheric, sub-slab and soil gas samples **Canister No.** 92

Sample Volume (ml) 5 **Dispatch pressure (psia)** -0.06 **Initial pressure (psia)** 13.39 **Final pressure (psia)** 19.26 **Dilution** 1.4383868559

CAS Number	Compound	LOD	Result		Units	LOD	Result		Units
66-25-1	Hexanal	<43.2	<43.2	#	ppbv	<177	<176	#	ug/m³
110-54-3	Hexane	<43.2	153	#	ppbv	<152	538	#	ug/m³
74-88-4	Iodomethane	<43.2	<43.2		ppbv	<251	<251		ug/m³
115-11-7	Isobutene	<43.2	2340		ppbv	<98.9	5360		ug/m³
78-79-5	Isoprene	<43.2	<43.2		ppbv	<120	<120		ug/m³
108-38-3 & 106-42-3	m/p-Xylene	<86.3	110	#	ppbv	<374	478	#	ug/m³
78-85-3	Methylacrolein	<43.2	<43.2		ppbv	<124	<124		ug/m³
75-09-2	Methylene Chloride	<43.2	<43.2	#	ppbv	<150	<150	#	ug/m³
1634-04-4	MTBE	<43.2	<43.2	#	ppbv	<155	<155	#	ug/m³
91-20-3	Naphthalene	<43.2	<43.2		ppbv	<226	<226		ug/m³
95-47-6	o-Xylene	<43.2	50.5	#	ppbv	<187	219	#	ug/m³
110-62-3	Pentanal	<43.2	<43.2		ppbv	<152	<152		ug/m³
109-66-0	Pentane	<43.2	369		ppbv	<127	1090		ug/m³
100-42-5	Styrene	<43.2	727	#	ppbv	<184	3090	#	ug/m³
127-18-4	Tetrachloroethene	<43.2	<43.2	#	ppbv	<293	<293	#	ug/m³
	TIC's						See Attached		
108-88-3	Toluene	<43.2	64.3	#	ppbv	<163	242	#	ug/m³
156-60-5	trans-1,2-Dichloroethene	<43.2	<43.2	#	ppbv	<171	<171	#	ug/m³
1006-02-6	trans-1,3-Dichloropropene	<43.2	<43.2	#	ppbv	<196	<196	#	ug/m³
79-01-6	Trichloroethene	<43.2	<43.2	#	ppbv	<231	<231	#	ug/m³
75-69-4	Trichlorofluoromethane	<43.2	<43.2	#	ppbv	<242	<242	#	ug/m³
26523-64-8	Trichlorotrifluoroethane	<43.2	<43.2	#	ppbv	<330	<330	#	ug/m³
108-05-4	Vinyl Acetate	<43.2	<43.2	#	ppbv	<152	<152	#	ug/m³
75-01-4	Vinyl Chloride	<43.2	<43.2	#	ppbv	<110	<109	#	ug/m³

Validated

CERTIFICATE OF ANALYSIS

SDG: 230705-89 **Report Number:** 696276 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Sample Number 28276301
Sample ID WS3 **Depth** 0.00 - 0.00 **Sampled Date** 03/07/2023 00:00:0

- ISO17025 accredited. **M - *m*CERTS accredited.** **1-4♦§@ - Sample deviation (see appendix)**

Method TM330 Determination of VOC's in atmospheric, sub-slab and soil gas samples **Canister No.** 331

Sample Volume (ml) 160 **Dispatch pressure (psia)** -0.10 **Initial pressure (psia)** 12.54 **Final pressure (psia)** 18.92 **Dilution** 1.5087719298

CAS Number	Compound	LOD	Result		Units	LOD	Result		Units
71-55-6	1,1,1-Trichloroethane	<1.41	<1.41	#	ppbv	<7.67	<7.69	#	ug/m³
79-34-5	1,1,2,2-Tetrachloroethane	<1.41	<1.41	3 #	ppbv	<9.69	<9.72	3 #	ug/m³
79-00-5	1,1,2-Trichloroethane	<1.41	<1.41	#	ppbv	<7.67	<7.69	#	ug/m³
75-34-3	1,1-Dichloroethane	<1.41	<1.41	#	ppbv	<5.71	<5.73	#	ug/m³
75-35-4	1,1-Dichloroethene	<1.41	<1.41	#	ppbv	<5.59	<5.61	#	ug/m³
526-73-8	1,2,3-Trimethylbenzene	<1.41	<1.41	#	ppbv	<6.92	<6.94	#	ug/m³
120-82-1	1,2,4-Trichlorobenzene	<1.41	<1.41	3 #	ppbv	<10.4	<10.5	3 #	ug/m³
95-63-6	1,2,4-Trimethylbenzene	<1.41	1.50	3 #	ppbv	<6.92	7.38	3 #	ug/m³
106-93-4	1,2-Dibromoethane	<1.41	<1.41	#	ppbv	<10.8	<10.9	#	ug/m³
95-50-1	1,2-Dichlorobenzene	<1.41	<1.41	3 #	ppbv	<8.48	<8.50	3 #	ug/m³
107-06-2	1,2-Dichloroethane	<1.41	<1.41	#	ppbv	<5.71	<5.73	#	ug/m³
78-87-5	1,2-Dichloropropane	<1.41	<1.41	#	ppbv	<6.52	<6.54	#	ug/m³
76-14-2	1,2-Dichlorotetrafluoroethane	<1.41	<1.41	#	ppbv	<9.86	<9.89	#	ug/m³
108-67-8	1,3,5-Trimethylbenzene	<1.41	<1.41	3 #	ppbv	<6.92	<6.94	3 #	ug/m³
106-99-0	1,3-Butadiene	<1.41	<1.41	#	ppbv	<3.11	<3.12	#	ug/m³
106-46-7	1,4-Dichlorobenzene	<1.41	<1.41	3 #	ppbv	<8.48	<8.50	3 #	ug/m³
123-91-1	1,4-Dioxane	<1.41	<1.41		ppbv	<5.07	<5.09		ug/m³
71-23-8	1-Propanol	<1.41	<1.41		ppbv	<3.46	<3.47		ug/m³
78-93-3	2-Butanone (MEK)	<1.41	<1.41	#	ppbv	<4.15	<4.17	#	ug/m³
591-78-6	2-Hexanone	<1.41	<1.41	#	ppbv	<5.77	<5.79	#	ug/m³
107-87-9	2-Pentanone	<1.41	<1.41		ppbv	<4.96	<4.98		ug/m³
589-38-8	3-Hexanone	<1.41	<1.41		ppbv	<5.77	<5.79		ug/m³
96-22-0	3-Pentanone	<1.41	<1.41		ppbv	<4.96	<4.98		ug/m³
108-10-1	4-Methyl-2-pentanone	<1.41	<1.41	#	ppbv	<5.77	<5.79	#	ug/m³
67-64-1 & 123-38-6	Acetone + Propanal	<2.83	23.1	#	ppbv	<6.71	54.8	#	ug/m³
75-05-8	Acetonitrile	<1.41	<1.41		ppbv	<2.36	<2.37		ug/m³
107-02-8	Acrolein	<1.41	<1.41	#	ppbv	<3.23	<3.24	#	ug/m³
71-43-2	Benzene	<1.23	1.56	#	ppbv	<3.92	4.99	#	ug/m³
100-44-7	Benzyl Chloride	<1.41	<1.41	3 #	ppbv	<7.32	<7.35	3 #	ug/m³
75-27-4	Bromodichloromethane	<1.41	<1.41	#	ppbv	<9.46	<9.49	#	ug/m³
75-25-2	Bromoform	<1.41	<1.41	#	ppbv	<14.6	<14.6	#	ug/m³
74-83-9	Bromomethane	<1.41	<1.41	3 #	ppbv	<5.48	<5.50	3 #	ug/m³
123-72-8	Butanal	<1.41	<1.41		ppbv	<4.15	<4.17		ug/m³
75-15-0	Carbon Disulfide	<1.41	82.2	#	ppbv	<4.38	256	#	ug/m³
56-23-5	Carbon Tetrachloride	<1.41	<1.41	#	ppbv	<8.88	<8.91	#	ug/m³
108-90-7	Chlorobenzene	<1.41	<1.41	3 #	ppbv	<6.52	<6.54	3 #	ug/m³
75-00-3	Chloroethane	<1.41	<1.41	#	ppbv	<3.75	<3.76	#	ug/m³
67-66-3	Chloroform	<1.41	<1.41	#	ppbv	<6.86	<6.88	#	ug/m³
74-87-3	Chloromethane	<1.41	<1.41	#	ppbv	<2.88	<2.89	#	ug/m³
156-59-2	cis-1,2-Dichloroethene	<1.41	<1.41	#	ppbv	<5.59	<5.61	#	ug/m³
10061-01-5	cis-1,3-Dichloropropene	<1.41	<1.41	#	ppbv	<6.40	<6.42	#	ug/m³
110-82-7	Cyclohexane	<1.41	<1.41	#	ppbv	<4.84	<4.86	#	ug/m³
75-71-8	Dichlorodifluoromethane	<1.41	<1.41	#	ppbv	<6.98	<7.00	#	ug/m³
75-45-6	Difluorochloromethane	<1.41	<1.41		ppbv	<4.96	<4.98		ug/m³
100-41-4	Ethylbenzene	<1.41	<1.41	3 #	ppbv	<6.11	<6.13	3 #	ug/m³
87-68-3	Hexachlorobutadiene	<1.41	<1.41		ppbv	<15.0	<15.0		ug/m³

Validated

CERTIFICATE OF ANALYSIS

SDG: 230705-89 **Report Number:** 696276 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Sample Number 28276301
Sample ID WS3 **Depth** 0.00 - 0.00 **Sampled Date** 03/07/2023 00:00:0

- ISO17025 accredited. **M - *m*CERTS accredited.** **1-4♦§@ - Sample deviation (see appendix)**

Method TM330 Determination of VOC's in atmospheric, sub-slab and soil gas samples **Canister No.** 331

Sample Volume (ml) 160 **Dispatch pressure (psia)** -0.10 **Initial pressure (psia)** 12.54 **Final pressure (psia)** 18.92 **Dilution** 1.5087719298

CAS Number	Compound	LOD	Result		Units	LOD	Result		Units
66-25-1	Hexanal	<1.41	<1.41	#	ppbv	<5.77	<5.79	#	ug/m³
110-54-3	Hexane	<1.41	<1.41	#	ppbv	<4.96	<4.98	#	ug/m³
74-88-4	Iodomethane	<1.41	<1.41		ppbv	<8.19	<8.21		ug/m³
115-11-7	Isobutene	<1.41	<1.41		ppbv	<3.23	<3.24		ug/m³
78-79-5	Isoprene	<1.41	<1.41		ppbv	<3.92	<3.93		ug/m³
108-38-3 & 106-42-3	m/p-Xylene	<2.83	<2.83	#	ppbv	<12.3	<12.3	#	ug/m³
78-85-3	Methylacrolein	<1.41	<1.41		ppbv	<4.04	<4.05		ug/m³
75-09-2	Methylene Chloride	<1.41	<1.41	#	ppbv	<4.90	<4.92	#	ug/m³
1634-04-4	MTBE	<1.41	<1.41	#	ppbv	<5.07	<5.09	#	ug/m³
91-20-3	Naphthalene	<1.41	2.43		ppbv	<7.38	12.7		ug/m³
95-47-6	o-Xylene	<1.41	<1.41	#	ppbv	<6.11	<6.13	#	ug/m³
110-62-3	Pentanal	<1.41	<1.41		ppbv	<4.96	<4.98		ug/m³
109-66-0	Pentane	<1.41	<1.41		ppbv	<4.15	<4.17		ug/m³
100-42-5	Styrene	<1.41	4.91	3 #	ppbv	<6.00	20.9	3 #	ug/m³
127-18-4	Tetrachloroethene	<1.41	<1.41	3 #	ppbv	<9.57	<9.60	3 #	ug/m³
	TIC's						See Attached		
108-88-3	Toluene	<1.41	1.70	#	ppbv	<5.31	6.40	#	ug/m³
156-60-5	trans-1,2-Dichloroethene	<1.41	<1.41	#	ppbv	<5.59	<5.61	#	ug/m³
1006-02-6	trans-1,3-Dichloropropene	<1.41	<1.41	#	ppbv	<6.40	<6.42	#	ug/m³
79-01-6	Trichloroethene	<1.41	<1.41	#	ppbv	<7.55	<7.58	#	ug/m³
75-69-4	Trichlorofluoromethane	<1.41	<1.41	#	ppbv	<7.90	<7.93	#	ug/m³
26523-64-8	Trichlorotrifluoroethane	<1.41	<1.41	#	ppbv	<10.8	<10.8	#	ug/m³
108-05-4	Vinyl Acetate	<1.41	<1.41	#	ppbv	<4.96	<4.98	#	ug/m³
75-01-4	Vinyl Chloride	<1.41	<1.41	#	ppbv	<3.58	<3.59	#	ug/m³

Validated

CERTIFICATE OF ANALYSIS

SDG: 230705-89 **Report Number:** 696276 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Sample Number 28276304
Sample ID WS5 **Depth** 0.00 - 0.00 **Sampled Date** 03/07/2023 00:00:0

- ISO17025 accredited. **M - *m*CERTS accredited.** **1-4♦§@ - Sample deviation (see appendix)**

Method TM330 Determination of VOC's in atmospheric, sub-slab and soil gas samples **Canister No.** 131

Sample Volume (ml) 160 **Dispatch pressure (psia)** -0.09 **Initial pressure (psia)** 13.18 **Final pressure (psia)** 19.04 **Dilution** 1.4446130501

CAS Number	Compound	LOD	Result		Units	LOD	Result		Units
71-55-6	1,1,1-Trichloroethane	<1.35	<1.35	#	ppbv	<7.34	<7.37	#	ug/m³
79-34-5	1,1,2,2-Tetrachloroethane	<1.35	<1.35	3 #	ppbv	<9.28	<9.31	3 #	ug/m³
79-00-5	1,1,2-Trichloroethane	<1.35	<1.35	#	ppbv	<7.34	<7.37	#	ug/m³
75-34-3	1,1-Dichloroethane	<1.35	1.77	#	ppbv	<5.47	7.17	#	ug/m³
75-35-4	1,1-Dichloroethene	<1.35	<1.35	#	ppbv	<5.36	<5.37	#	ug/m³
526-73-8	1,2,3-Trimethylbenzene	<1.35	<1.35	#	ppbv	<6.63	<6.65	#	ug/m³
120-82-1	1,2,4-Trichlorobenzene	<1.35	<1.35	3 #	ppbv	<9.99	<10.0	3 #	ug/m³
95-63-6	1,2,4-Trimethylbenzene	<1.35	<1.35	3 #	ppbv	<6.63	<6.65	3 #	ug/m³
106-93-4	1,2-Dibromoethane	<1.35	<1.35	#	ppbv	<10.4	<10.4	#	ug/m³
95-50-1	1,2-Dichlorobenzene	<1.35	<1.35	3 #	ppbv	<8.12	<8.14	3 #	ug/m³
107-06-2	1,2-Dichloroethane	<1.35	<1.35	#	ppbv	<5.47	<5.48	#	ug/m³
78-87-5	1,2-Dichloropropane	<1.35	<1.35	#	ppbv	<6.24	<6.26	#	ug/m³
76-14-2	1,2-Dichlorotetrafluoroethane	<1.35	<1.35	#	ppbv	<9.44	<9.47	#	ug/m³
108-67-8	1,3,5-Trimethylbenzene	<1.35	<1.35	3 #	ppbv	<6.63	<6.65	3 #	ug/m³
106-99-0	1,3-Butadiene	<1.35	<1.35	#	ppbv	<2.98	<2.99	#	ug/m³
106-46-7	1,4-Dichlorobenzene	<1.35	<1.35	3 #	ppbv	<8.12	<8.14	3 #	ug/m³
123-91-1	1,4-Dioxane	<1.35	<1.35		ppbv	<4.86	<4.87		ug/m³
71-23-8	1-Propanol	<1.35	<1.35		ppbv	<3.31	<3.32		ug/m³
78-93-3	2-Butanone (MEK)	<1.35	<1.35	#	ppbv	<3.98	<3.99	#	ug/m³
591-78-6	2-Hexanone	<1.35	<1.35	#	ppbv	<5.52	<5.54	#	ug/m³
107-87-9	2-Pentanone	<1.35	<1.35		ppbv	<4.75	<4.76		ug/m³
589-38-8	3-Hexanone	<1.35	<1.35		ppbv	<5.52	<5.54		ug/m³
96-22-0	3-Pentanone	<1.35	<1.35		ppbv	<4.75	<4.76		ug/m³
108-10-1	4-Methyl-2-pentanone	<1.35	<1.35	#	ppbv	<5.52	<5.54	#	ug/m³
67-64-1 & 123-38-6	Acetone + Propanal	<2.71	16.4	#	ppbv	<6.43	38.8	#	ug/m³
75-05-8	Acetonitrile	<1.35	<1.35		ppbv	<2.26	<2.27		ug/m³
107-02-8	Acrolein	<1.35	<1.35	#	ppbv	<3.09	<3.10	#	ug/m³
71-43-2	Benzene	<1.17	2.77	#	ppbv	<3.73	8.82	#	ug/m³
100-44-7	Benzyl Chloride	<1.35	<1.35	3 #	ppbv	<7.01	<7.03	3 #	ug/m³
75-27-4	Bromodichloromethane	<1.35	<1.35	#	ppbv	<9.06	<9.08	#	ug/m³
75-25-2	Bromoform	<1.35	<1.35	#	ppbv	<14.0	<14.0	#	ug/m³
74-83-9	Bromomethane	<1.35	<1.35	3 #	ppbv	<5.25	<5.26	3 #	ug/m³
123-72-8	Butanal	<1.35	<1.35		ppbv	<3.98	<3.99		ug/m³
75-15-0	Carbon Disulfide	<43.3	106	#	ppbv	<135	329	#	ug/m³
56-23-5	Carbon Tetrachloride	<1.35	<1.35	#	ppbv	<8.50	<8.53	#	ug/m³
108-90-7	Chlorobenzene	<1.35	<1.35	3 #	ppbv	<6.24	<6.26	3 #	ug/m³
75-00-3	Chloroethane	<1.35	<1.35	#	ppbv	<3.59	<3.60	#	ug/m³
67-66-3	Chloroform	<1.35	<1.35	#	ppbv	<6.57	<6.59	#	ug/m³
74-87-3	Chloromethane	<1.35	<1.35	#	ppbv	<2.76	<2.77	#	ug/m³
156-59-2	cis-1,2-Dichloroethene	<1.35	<1.35	#	ppbv	<5.36	<5.37	#	ug/m³
10061-01-5	cis-1,3-Dichloropropene	<1.35	<1.35	#	ppbv	<6.13	<6.15	#	ug/m³
110-82-7	Cyclohexane	<1.35	<1.35	#	ppbv	<4.64	<4.65	#	ug/m³
75-71-8	Dichlorodifluoromethane	<1.35	<1.35	#	ppbv	<6.68	<6.70	#	ug/m³
75-45-6	Difluorochloromethane	<1.35	<1.35		ppbv	<4.75	<4.76		ug/m³
100-41-4	Ethylbenzene	<1.35	<1.35	3 #	ppbv	<5.85	<5.87	3 #	ug/m³
87-68-3	Hexachlorobutadiene	<1.35	<1.35		ppbv	<14.4	<14.4		ug/m³

Validated

CERTIFICATE OF ANALYSIS

SDG: 230705-89 **Report Number:** 696276 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Sample Number 28276304
Sample ID WS5 **Depth** 0.00 - 0.00 **Sampled Date** 03/07/2023 00:00:0

- ISO17025 accredited. **M - *m*CERTS accredited.** **1-4♦§@ - Sample deviation (see appendix)**

Method TM330 Determination of VOC's in atmospheric, sub-slab and soil gas samples **Canister No.** 131

Sample Volume (ml) 160 **Dispatch pressure (psia)** -0.09 **Initial pressure (psia)** 13.18 **Final pressure (psia)** 19.04 **Dilution** 1.4446130501

CAS Number	Compound	LOD	Result		Units	LOD	Result		Units
66-25-1	Hexanal	<1.35	<1.35	#	ppbv	<5.52	<5.54	#	ug/m³
110-54-3	Hexane	<1.35	4.95	#	ppbv	<4.75	17.4	#	ug/m³
74-88-4	Iodomethane	<1.35	<1.35		ppbv	<7.84	<7.87		ug/m³
115-11-7	Isobutene	<1.35	18.0		ppbv	<3.09	41.3		ug/m³
78-79-5	Isoprene	<1.35	<1.35		ppbv	<3.75	<3.77		ug/m³
108-38-3 & 106-42-3	m/p-Xylene	<2.71	3.68	#	ppbv	<11.7	16.0	#	ug/m³
78-85-3	Methylacrolein	<1.35	<1.35		ppbv	<3.87	<3.88		ug/m³
75-09-2	Methylene Chloride	<1.35	<1.35	#	ppbv	<4.69	<4.71	#	ug/m³
1634-04-4	MTBE	<1.35	<1.35	#	ppbv	<4.86	<4.87	#	ug/m³
91-20-3	Naphthalene	<1.35	<1.35		ppbv	<7.07	<7.09		ug/m³
95-47-6	o-Xylene	<1.35	1.67	#	ppbv	<5.85	7.25	#	ug/m³
110-62-3	Pentanal	<1.35	<1.35		ppbv	<4.75	<4.76		ug/m³
109-66-0	Pentane	<1.35	1.44		ppbv	<3.98	4.23		ug/m³
100-42-5	Styrene	<1.35	3.70	3 #	ppbv	<5.74	15.7	3 #	ug/m³
127-18-4	Tetrachloroethene	<1.35	<1.35	3 #	ppbv	<9.17	<9.20	3 #	ug/m³
	TIC's						See Attached		
108-88-3	Toluene	<1.35	4.65	#	ppbv	<5.08	17.5	#	ug/m³
156-60-5	trans-1,2-Dichloroethene	<1.35	<1.35	#	ppbv	<5.36	<5.37	#	ug/m³
1006-02-6	trans-1,3-Dichloropropene	<1.35	<1.35	#	ppbv	<6.13	<6.15	#	ug/m³
79-01-6	Trichloroethene	<1.35	1.73	#	ppbv	<7.23	9.26	#	ug/m³
75-69-4	Trichlorofluoromethane	<1.35	<1.35	#	ppbv	<7.56	<7.59	#	ug/m³
26523-64-8	Trichlorotrifluoroethane	<1.35	<1.35	#	ppbv	<10.3	<10.4	#	ug/m³
108-05-4	Vinyl Acetate	<1.35	<1.35	#	ppbv	<4.75	<4.76	#	ug/m³
75-01-4	Vinyl Chloride	<1.35	<1.35	#	ppbv	<3.42	<3.43	#	ug/m³

Table of Results - Appendix

Method No	Description
TM053	Determination of Bulk Gas Composition
TM335	TPH in atmospheric, sub-slab and soil gas samples
TM216	The Determination of Odourant Compounds in Gases by Gas Chromatography with PFPD Detection
TM330	Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS)

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).

CERTIFICATE OF ANALYSIS

SDG: 230705-89 **Report Number:** 696276 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Test Completion Dates

Lab Sample No(s)	28276297	28276301	28276304
Customer Sample Ref.	WS1	WS3	WS5
AGS Ref.			
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Gas (G)	Gas (G)	Gas (G)
Bulk Gas	13-Jul-2023	13-Jul-2023	13-Jul-2023
Odourant Gas Analysis (G)	13-Jul-2023	13-Jul-2023	13-Jul-2023
TPH in Gas samples	11-Jul-2023	11-Jul-2023	11-Jul-2023
VOC's	11-Jul-2023	11-Jul-2023	11-Jul-2023

VOC TENTATIVELY IDENTIFIED COMPOUNDS REPORT

JOB NUMBER:	230705-89
SAMPLE IDENTITY:	WS1
DATE REPORTED:	10/07/2023
ANALYST:	dj

	TENTATIVE COMPOUND IDENTIFICATION	RESULT (ppbv)	RESULT (µg/m3)
1	isobutane	1692	4018
2	ethanol	3345	6302
3	3-methyl-pentane	1262	4446
4	methyl-cyclohexane	2439	9789
5	1,2,4-trimethyl-cyclopentane	1057	4846
6	1,2-dimethyl-cyclohexane	753	3451
7	mixed hydrocarbons	755	
8	2,6-dimethyl-octane	1033	6006
9	4-methyl-decane	437	2793
10	trans-decahydro-naphthalene	314	1773.5

Tentatively Identified Compounds (TICs) are non-target peaks in the VOC air analysis. All non-target peaks detected with a concentration above the LoD of 10ppbv are subjected to a mass spectral library search. Non-target peaks with a **Library Search Confidence of >75%** are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as **"Mixed Hydrocarbons"**. Non-target compounds identified from the scan data are semi-quantified relative to one of the internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as a Tentatively Identified Compound (TIC). TICs are outside the scope of our UKAS accreditation.

VOC TENTATIVELY IDENTIFIED COMPOUNDS REPORT

JOB NUMBER:	230705-89
SAMPLE IDENTITY:	WS3
DATE REPORTED:	10/07/2023
ANALYST:	dj

	TENTATIVE COMPOUND IDENTIFICATION	RESULT (ppbv)	RESULT (µg/m3)
1	propane	960	1730
2	isobutane	361	857
3	butane	48	113
4	mixed hydrocarbons	63	
5	1-butanol	12	36
6	1-methoxy-2-propanol	71	263
7	undecane	21	137
8	mixed hydrocarbons	25	
9	dodecane	20	138
10			

Tentatively Identified Compounds (TICs) are non-target peaks in the VOC air analysis. All non-target peaks detected with a concentration above the LoD of 10ppbv are subjected to a mass spectral library search. Non-target peaks with a **Library Search Confidence of >75%** are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as **"Mixed Hydrocarbons"**. Non-target compounds identified from the scan data are semi-quantified relative to one of the internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as a Tentatively Identified Compound (TIC). TICs are outside the scope of our UKAS accreditation.

VOC TENTATIVELY IDENTIFIED COMPOUNDS REPORT

JOB NUMBER:	230705-89
SAMPLE IDENTITY:	WS5
DATE REPORTED:	10/07/2023
ANALYST:	dj

	TENTATIVE COMPOUND IDENTIFICATION	RESULT (ppbv)	RESULT (µg/m3)
1	2-methyl-furan	17	58
2	1,2-ethanediol	18	45
3	mixed hydrocarbons	57	
4	trans-decahydro-naphthalene	17	97
5	dodecane	13	94
6			
7			
8			
9			
10			

Tentatively Identified Compounds (TICs) are non-target peaks in the VOC air analysis. All non-target peaks detected with a concentration above the LoD of 10ppbv are subjected to a mass spectral library search. Non-target peaks with a **Library Search Confidence of >75%** are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as **"Mixed Hydrocarbons"**. Non-target compounds identified from the scan data are semi-quantified relative to one of the internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as a Tentatively Identified Compound (TIC). TICs are outside the scope of our UKAS accreditation.

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Ground and Water Ltd
Head Office
2 The Long Barn
Norton Farm, Selborne Road
Alton
Hampshire
GU34 3NB

Attention: Alex Stratford

CERTIFICATE OF ANALYSIS

Date of report Generation:	21 July 2023
Customer:	Ground and Water Ltd
Sample Delivery Group (SDG):	230718-37
Your Reference:	GWPR5475 2 - 6 Seagull Lane, Emsworth, PO10 7QH
Location:	2 - 6 Seagull Lane, Emsworth PO10 7QH
Report No:	697246
Order Number:	GWPR5475

We received 3 samples on Friday July 14, 2023 and 3 of these samples were scheduled for analysis which was completed on Friday July 21, 2023. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:



Sonia McWhan
Operations Manager

CERTIFICATE OF ANALYSIS

SDG: 230718-37 **Report Number:** 697246 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
28344040	WS1		0.00 - 0.00	13/07/2023
28344048	WS3		0.00 - 0.00	13/07/2023
28344055	WS5		0.00 - 0.00	13/07/2023

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG: 230718-37 **Report Number:** 697246 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			28344040	28344048	28344055
Customer Sample Reference			WS1	WS3	WS5
AGS Reference					
Depth (m)			0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Container			Vial (ALE297)	Vial (ALE297)	Vial (ALE297)
Sample Type			GW	GW	GW
Determination of Dissolved Gases	All	NDPs: 0 Tests: 3	X	X	X

CERTIFICATE OF ANALYSIS

SDG: 230718-37 **Report Number:** 697246 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+$@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	WS1	WS3	WS5			
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)			
			Date Sampled	13/07/2023	13/07/2023	13/07/2023			
			Sample Time	12:00	12:00	12:00			
			Date Received	14/07/2023	14/07/2023	14/07/2023			
			SDG Ref	230718-37	230718-37	230718-37			
			Lab Sample No.(s)	28344040	28344048	28344055			
			AGS Reference						
Methane, dissolved	<1 µg/l	TM223		4.5	<1	<1			
Ethene, dissolved	<1 µg/l	TM223		<1	<1	<1			
Ethane, dissolved	<1 µg/l	TM223		<1	<1	<1			
Carbon dioxide, dissolved	<1300 µg/l	TM223		64300	44300	16700			
Propane, dissolved	<1 µg/l	TM223		<1	<1	<1			

Table of Results - Appendix

Method No	Description
TM223	Determination of Dissolved C1-7 Hydrocarbon gases in waters

NA = not applicable.
Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).

CERTIFICATE OF ANALYSIS

SDG: 230718-37 **Report Number:** 697246 **Superseded Report:**
Client Ref.: GWPR5475 2 - 6 Seagull Lan **Location:** 2 - 6 Seagull Lane, Emsworth PO10 7QH

Test Completion Dates

Lab Sample No(s)	28344040	28344048	28344055
Customer Sample Ref.	WS1	WS3	WS5
AGS Ref.			
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Ground Water	Ground Water	Ground Water
Determination of Dissolved Gases	21-Jul-2023	21-Jul-2023	21-Jul-2023

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

APPENDIX L: Vapour Assessment Methodology

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Derivation of Vapour Phase Generic Assessment Criteria for Volatile Organic Compounds

Background

This document provides background and methodology for the calculation of Generic Assessment Criteria (GAC) for various Volatile Organic Compounds (VOCs) when directly measured in their vapour phases within the soil gas, from here in referred to as vGAC. This is based upon the framework for assessing the risk posed to a site's receptors outlined within CIRIA C682[1].

The development of these vGAC has been driven by the limitations in using the results of soil or groundwater testing, compared to published Soil Guideline Values (SGV) or calculated GAC, for assessing the risk posed to a development and its end-users by VOCs within the soils underlying the site. The most notable of these limitations arises from the volatile nature of the contaminants of concern, resulting in the loss of VOC to the atmosphere during sampling. To counter this, there is a need for assessment criteria that can be applied to direct measurements of the level of VOCs within the soil gas, for example via sampling of the soil gas from ground-gas monitoring standpipes installed onsite. Further guidance on investigating VOCs in soil gas can be found in CIRIA C682, Section 6.4[1], which should be followed during any sampling of soil gas.

It should be noted that it is not considered necessary to undertake VOC testing of soil gas on every site. Development of the Conceptual Site Model (CSM) should evaluate the potential risk to the site's receptors posed by VOCs and determine on a site-by-site basis whether soil gas VOC testing is an appropriate assessment tool. Factors that should be considered within this assessment include the presence and scale of potential VOC sources, presence or lack of visual/olfactory evidence of VOC contamination during intrusive investigations and the presence of VOCs above laboratory detection limits within other forms of chemical testing undertaken on the site (within soil or groundwater).

Method

Ground and Water Limited have chosen to calculate vGAC using the J&E method[2] as per discussion within CIRIA C682 Section 7.4.3[1] and recommendation by Evans *et al* (2002)[3]. The basis of this methodology can be seen outlined within the *Updated technical background to the CLEA model (SR3), 2009, (section 10.3, equation 10.4)*[4]. The J&E method describes the attenuation factor (α), which is a quantitative representation of the reduction of VOC concentration as it migrates from soil gas, present directly below the site, to the air indoors within a building onsite. The attenuation factor can be calculated as outlined overleaf:

$$\alpha = \frac{\left[\left(\frac{D_{eff} A_B}{Q_b L_T}\right) \exp\left(\frac{Q_s L_{crack}}{D_{crack} A_{crack}}\right)\right]}{\left[\exp\left(\frac{Q_s L_{crack}}{D_{crack} A_{crack}}\right) + \left(\frac{D_{eff} A_B}{Q_b L_T}\right) + \left(\frac{D_{eff} A_B}{Q_s L_T}\right)\left[\exp\left(\frac{Q_s L_{crack}}{D_{crack} A_{crack}}\right) - 1\right]\right]}$$

Where:
α is the steady-state attenuation coefficient between soil and indoor air, dimensionless
D_{eff} is the effective diffusion coefficient for unsaturated soils, $cm^2 s^{-1}$
A_B is the area of enclosed floor and walls below ground, cm^2
Q_b is the building ventilation rate, $cm^3 s^{-1}$
L_T is the source-building separation, cm
Q_s is the volumetric flow rate of soil gas into the enclosed space, $cm^3 s^{-1}$ [25 to 150]
L_{crack} is the foundation slab thickness, cm
A_{crack} is the floor crack area, cm^2
D_{crack} is the effective diffusion coefficient through the cracks, $cm^2 s^{-1}$ [= D_{eff}]
Note: Appendix 1, Equation A10 where the Peclet number approaches infinity

However, it is considered that the full method of calculating the attenuation factor as outlined above is not practical from a site investigation standpoint as there are too many variables that would be impractical or too costly to measure, and if assumed would not necessarily provide an adequate level of conservatism.

A more simple and suitably conservative determination of attenuation factor can be provided by Johnson (2002)[5], in which the output of the model was found to be dependent on only three parameters. The relationship between these three parameters within the output of the model varies depending on the relative dominance of advection vs diffusion as the rate limiting process for VOC migrating from soil gas to indoor air. In the most conservative of the identified scenarios, where advection is both the dominant mechanism across foundations and is the overall rate-limiting factor, the attenuation factor was shown to be roughly equivalent to the parameter *C*. This scenario is considered the most conservative as VOC migration via advection occurs at a quicker rate than via diffusion, parameter *C* can be calculated as below:

$$C = \left[\frac{Q_{soil}}{Q_B}\right]$$

Where:
Q_B is the building ventilation rate ($cm^3 s^{-1}$)
Q_{soil} is the soil gas flow into building ($cm^3 s^{-1}$)

For this calculation, worst-case Q_{soil} values can be obtained from *Updated technical background to the CLEA model (SR3), 2009, (section 10.3)*[4], these are provided as 25 $cm^3 s^{-1}$ and 150$cm^3 s^{-1}$ respectively for residential and commercial land-use scenarios. Further to this, SR3 section 10.3, equation 10.5 *ref* provides a calculation for Q_B which is outlined overleaf:

$$Q_b = \left(H \times A_{foot} \times Ex\right) \times 1000000\, cm^3\, m^{-3} \quad \frac{1}{3600}\, s\, hr^{-1}$$

Where: Q_b is the building ventilation rate, $cm^3\ s^{-1}$
H is height of living space, m
A_{foot} is the building footprint, m^2
Ex is the building air exchange rate, $hour^{-1}$

The height and area used in this calculation can either be directly taken from existing or proposed development plans for the relevant site, or from a number of example scenarios provided within SR3, Tables 3.3, 3.10 and 4.21[4]. The values for the Air Exchange Rate can be taken from SR3, Tables 3.3 and 3.10[4].

Once the attenuation factor (α) is known, the equation below is used to calculate vGAC from any applicable inhalation Health Criteria Value (HCV), the HCV is required to be presented in units of mg/m^{-3}.

$$\boldsymbol{vGAC = HCV/\alpha}$$

The standard set of HCVs used by Ground and Water Limited have been calculated based on the data provided in the following sources: *LQM S4UL (2015)*[5], *CLEA1.071 Software*[6] and *CLAIRE GAC (2010)*[7]. Within these sources the inhalation HCVs are listed in units of µg/kg/day, this represents the amount of contaminant that is inhaled per kg of body weight per day by the critical receptor. To be used in the calculation for vGAC these values need to be converted into mg/m^3, the process for this conversion is outlined below.

$$\boldsymbol{HCV = \frac{HCV_{source} \times Bw}{V_{inh}} \div 1000}$$

Where: HCV is the calculated Health Criteria Value for the critical receptor (mg/m^3)
HCV_{source} is the Health Criteria Value taken from the source material (µg/kg/day)
Bw is the critical receptors body weight (kg)
V_{inh} is the daily inhalation rate for the critical receptor (m^3/day)

For calculation of the HCVs two critical receptor scenarios have been considered; residential and commercial, the inputs used for these two scenarios are outlined below, inhalation rates and weight for the critical receptors have been taken from Table 3.2 of SP1010[9] and Table 4.6 of SR3[4] respectively:

<u>Residential</u>

- The critical receptor for this scenario is a female child, age classes 1 – 6 (0 – 6 years old).
- The average weight of the critical receptor is 13.3kg.
- The average inhalation rate of the critical receptor is 8.1m^3/day.

<u>Commercial</u>

- The critical receptor for this scenario is a female adult of age class 17 (16 – 65 years old).
- The average weight of the critical receptor is 70kg.
- The average inhalation rate of the critical receptor is 15.7m^3/day.

An exception to the above method of calculating the HCV had to be made for two determinands, these were 1,1-dichloroethane and cis-1,2-dichloroethene. This exception was made due to there being no available inhalation pathway HCV for these determinands within the available source material. Instead, the HCVs for the oral pathway from the *CL:AIRE GACs (2010)*[8] was used, this is considered to be suitable conservative, and the most appropriate approach based on the data/resources available at the time of writing.

Limitations and Assumptions

The following assumptions have been made in development of the vGACs:

- The source of the VOCs is directly beneath the building foundations.
- The movement of VOCs from soil gas to indoor air is controlled by advection and diffusion has a negligible effect on the change in VOC concentration.

The following limitations in this methodology were considered worth highlighting:

- The vGAC are only relevant for contaminants where the indoor inhalation pathway is the dominant exposure pathway.
- The vGAC are only to be used for comparison against onsite measurements of VOC concentration within soil gas.
- The vGAC may not be suitably conservative in a situation where there are high rates of flow measured from ground-gas monitoring.
- The methodology for calculating vGAC does not factor in vapour intrusion/migration along drainage pipes.
- Biodegradation of the VOCs is not factored into the methodology.

Despite these limitations/assumptions it is considered by Ground and Water Limited that the methodology presented herein provides an adequately conservative and appropriate approach for assessing the risk of VOCs onsite.

References

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8. CL:AIRE (2010). *Soil Generic Assessment Criteria for Human Health Risk Assessment*. CL:AIRE (London).
9. CL:AIRE (2014). *SP1010 - Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, Revision 2.* DEFRA research project.

APPENDIX M: Vapour Assessment Criteria

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Table 4 - Vapour Generic Assessment Criteria (Commercial)

Determinand	Commercial vGACs (mg/m3)					
	Warehouse (pre-1970)	Warehouse (post-1970)	Office (pre-1970)	Office (post-1970)	Service Station	Site Specific (Commercial)
TPH_Aliph EC5-EC6	70619	140827	53933	98893	2993	7358
TPH_Aliph >EC6-EC8	70619	140827	53933	98893	2993	7358
TPH_Aliph >EC8-EC10	4096	8168	3128	5736	174	427
TPH_Aliph >EC10-EC12	4096	8168	3128	5736	174	427
TPH_Aliph >EC12-EC16	4096	8168	3128	5736	174	427
TPH_Arom >EC5-EC7	21260	42396	16237	29772	901	2215
TPH_Arom >EC7-EC8	22747	45361	17372	31854	964	2370
TPH_Arom >EC8-EC10	847	1690	647	1187	35.9	88.3
TPH_Arom >EC10-EC12	847	1690	647	1187	35.9	88.3
TPH_Arom >EC12-EC16	847	1690	647	1187	35.9	88.3
Acenaphthene	847	1690	647	1187	35.9	88.3
Acenaphthylene	847	1690	647	1187	35.9	88.3
Acetonitrile	755	1506	577	1057	32.0	78.7
Difluorochloromethane	629200	1254733	480533	881111	26667	65556
Chloroethane	40352	80468	30817	56507	1710	4204
Chloromethane	72.6	145	55.4	102	3.08	7.56
1,2-Dichlorotetrafluoroethane	7000*	7000*	7000*	7000*	7000*	7000*
Dichlorodifluoromethane	1258	2509	961	1762	53.3	131
Vinyl Chloride	404	806	308	566	17.1	42.1
Bromomethane	50.3	100	38.4	70.5	2.13	5.24
Isobutene						
Acetone + Propanal	101	201	76.9	141	4.27	10.5
1,3-Butadiene	25.2	50.2	19.2	35.2	1.07	2.62
1,1-Dichloroethene	805	1605	615	1127	34.1	83.9
Iodomethane	10*	10*	10*	10*	10*	10*
Trichlorofluoromethane	5600*	5600*	5600*	5600*	5600*	5600*
Acrolein	0.252	0.502	0.192	0.352	0.0107	0.0262
Methylene Chloride (Dichloromethane)	1897	3783	1449	2656	80.4	198
Isoprene						
Pentane	12584	25095	9611	17622	533	1311
trans-1,2-Dichloroethene	240	479	183	336	10.2	25.0
Trichlorotrifluoroethane	62920	125473	48053	88111	2667	6556
Carbon Disulfide	404	806	308	566	17.1	42.1
Methylacrolein						
Vinyl Acetate	2517	5019	1922	3524	107	262
1-Propanol	500*	500*	500*	500*	500*	500*
Benzene	19.8	39.4	15.1	27.7	0.838	2.06
cis-1,2-Dichloroethene	84.7	169	64.7	119	3.59	8.83
1,1-Dichloroethane	2825	5633	2157	3956	120	294
MTBE	10197	20335	7788	14280	432	1062
Butanal	51085	101872	39015	71538	2165	5322
Trichloromethane (chloroform)	565	1127	431	791	23.9	58.9
2-Butanone (MEK)	62920	125473	48053	88111	2667	6556
Cyclohexane	75504	150568	57664	105733	3200	7867
Hexane	8809	17566	6727	12336	373	918
1,2-Dichloroethane	1.69	3.38	1.29	2.37	0.0718	0.177
Carbon Tetrachloride	46.0	91.8	35.2	64.5	1.95	4.80
1,1,1-Trichloroethane	8474	16899	6472	11867	359	883
4-Methyl-2-pentanone	37752	75284	28832	52867	1600	3933
Trichloroethene	8.05	16.1	6.15	11.3	0.341	0.839
Bromoform	282	563	216	396	12.0	29.4
Pentanal						
cis-1,3-Dichloropropene	252	502	192	352	10.7	26.2
1,2-Dichloropropane	16.1	32.1	12.3	22.5	0.682	1.68
trans-1,3-Dichloropropene	252	502	192	352	10.7	26.2
Bromodichloromethane	4.24	8.45	3.24	5.93	0.180	0.441
Hexanal						
Toluene	19773	39431	15101	27690	838	2060
m/p-Xylene	847	1690	647	1187	35.9	88.3
1,1,2-Trichloroethane	68.5	137	52.3	95.9	2.90	7.14
Ethylbenzene	1049	2093	801	1470	44.5	109
1,2-Dibromoethane	113	226	86.5	159	4.80	11.8
Tetrachloroethene	805	1605	615	1127	34.1	83.9
Chlorobenzene	114	228	87.4	160	4.85	11.9
1,2,4-Trimethylbenzene	28.2	56.3	21.6	39.6	1.20	2.94
1,3,5-Trimethylbenzene	755	1506	577	1057	32.0	78.7
Styrene	3390	6760	2589	4747	144	353
o-Xylene	847	1690	647	1187	35.9	88.3
1,1,2,2-Tetrachloroethane	81.9	163	62.6	115	3.47	8.53
1,2-Dichlorobenzene	607	1211	464	850	25.7	63.3
1,2,3-Trimethylbenzene	755	1506	577	1057	32.0	78.7
Benzyl Chloride	12.6	25.1	9.61	17.6	0.533	1.31
1,2,4-Trichlorobenzene	32.5	64.8	24.8	45.5	1.38	3.38
1,4-Dichlorobenzene	1695	3380	1294	2373	71.8	177
1,4-Dioxane	378	753	288	529	16.0	39.3
Naphthalene	12.1	24.2	9.28	17.0	0.515	1.27
Hexachlorobutadiene	0.24*	0.24*	0.24*	0.24*	0.24*	0.24*
2-Pentanone	530*	530*	530*	530*	530*	530*
3-Pentanone	705*	705*	705*	705*	705*	705*
3-Hexanone						
2-Hexanone	378	753	288	529	16.0	39.3

Notes

* The National Institute for Occupational Safety and Health (NIOSH) limits, given the absence of available toxicological data.