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Geo-Environmental Investigation

**Project: Fleet Wood Lane Primary
School, Fleet, Holbeach**

Project No: EGE-24-05-08-01

Client: Lindum BMS



Report Details

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1.0 Authorisation, Context and Purpose

1.1 Authorisation

Evolve Geo-Environmental Limited (EGE) was instructed by Lindum BMS (the 'Client') to undertake a Geo-Environmental Investigation for the proposed development at Fleet Wood Lane Primary School, Fleet, Holbeach (the 'Site').

A Site Location Map is included as Figure I.

1.2 Context and Purpose

This Report is designed in general accordance with:

- ▼ Guidance on Land Contamination: Risk Management pages of the [GOV.UK](https://www.gov.uk) web pages;
- ▼ The relevant requirements of the National Planning Policy Framework 2023 (NPPF) (paragraphs 180 & 189 - 194) [National Planning Policy Framework - 15. Conserving and enhancing the natural environment - Guidance - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/national-planning-policy-framework-15-conserving-and-enhancing-the-natural-environment); and
- ▼ The Planning Practice Guidance (Land Affected by Contamination) <https://www.gov.uk/guidance/land-affected-by-contamination>.

The aim of the study was to complete a geo-environmental assessment of the Site to obtain information regarding ground conditions, from which risks to end-users, the environment and structures have been assessed specific to the proposed development scheme, with remediation and/or mitigation measures recommended, where necessary.

The investigation has also gathered geotechnical information to support preliminary design of foundations and infrastructure. The Report provides recommendations for further work (where appropriate) based on the findings of the investigation.

1.3 Existing Information

EGE has been provided with the following drawings;

- ▼ PDG Architects Ltd, Classroom Extension at Fleet Wood Lane Primary School, Fleet, Sketch Scheme Plan, Drawing 23055/SK01A, Dated 18/12/2023 (Drawing I); and
- ▼ Associated Surveying Consultants, Topographical Survey, Fleet Wood Lane School, Spalding, PE12 8NN, Drawing ACS.23.777 Dated 07/12/2023 (Drawing II).

In addition, EGE has undertaken the following previous report relating to the Site:

- ▼ Evolve Geo-Environmental Limited, Preliminary (Geo-Environmental) Risk Assessment, Fleet Wood Lane Primary School, Fleet, Project No. EGE-24-05-08-01, dated 5th September 2024.

1.4 Proposed Development

The Site is currently under assessment for the development of a new classroom (58 m²), secure lobby (17 m²) and possible car parking in the west of the existing Fleet Wood Lane Primary School.

The proposed development is included within the Sketch Scheme Plan included as Drawing I (Reference. 23035/SK01A).



1.5 Limitations

Geotechnical investigations were where practical carried out in general accordance with BS EN 1997:2 2007 '*Eurocode 7 - Geotechnical Design - Part 2: Ground Investigation and Testing*'. This Report is deemed to be a Ground Investigation Report (GIR) as set out in BS EN 1997:2. The Geotechnical section of this Report provides geotechnical design values and interpretation, however this Report does not constitute a Geotechnical Design Report as defined in section 2.8 of BS EN 1997-1:2004 '*Eurocode 7 - Geotechnical Design - Part 1: General Rules*'.

The EGE standard limitations are included as Appendix I. In addition, the following limitations also apply to this Assessment:

- ▽ This Assessment does not constitute a Flood Risk Assessment (FRA); and
- ▽ Whilst waste acceptance Criteria (WAC) testing has been undertaken, this investigation was not specifically undertaken to advise on the classification of waste materials. Any reference to materials management and disposal of Site generated waste soils is for information purposes.

Site specific limitations encountered during the investigation included the following:

- ▽ The BRE365 infiltration test undertaken within SA101 failed to soak, with the water levels remaining static over the monitoring period, as such, an infiltration rate could not be produced from the test.



2.0 Site Details

A summary of the current Site status, environmental setting and key historical features is presented below. This has been summarised from the existing EGE report listed in Section 1.3, a Site walkover and widely available online information.

2.1 Site Setting

Co-ordinates, Area and Elevation	▽ National Grid Reference (NGR) 538770, 323900; ▽ Approximately 0.03 Hectares (ha); and ▽ Circa 2.8 m to 3.5 m above ordnance datum (AOD) across the Site surface based on the Client provided topographical survey included as Drawing II.
General Location	Site The Site is approximately 0.03 hectares (ha) and is located within Fleet Wood Lane Primary School, to the east of Hazelwood Lane, Fleet. Located approximately 3 km, south-east of Holbeach, Lincolnshire. A Site Location plan is included as Figure I.
Current Site Use	A Site walkover was undertaken by an EGE representative on 24th June 2024. Pertinent information observed during the walkover is included below. A Relevant Features Plan with supporting photographs is included as Figure II. The development Site comprises a hardstanding (macadam and block paving) and gravel area and grassed area to the front of the school. It is noted that the gravel area is used for car parking, no signs of small leaks / spills were noted. The school building to the south of the development Site was noted to be of an older construction than that to the east. The building to the south showed signs of settlement, including a stepped crack covered with cement on the western face. Significant potential sources of contamination were not identified during the Site walkover.
Adjacent Land use	The Site was bound by the following land uses: ▽ North - Flower beds and school playground with road (Hockles Gate) beyond; ▽ East - school buildings; ▽ South - soft landscaping, tree and hardstanding parking area; and ▽ West - Hazelwood Lane with residential properties beyond.
Site Setting	<u>Geology</u> British Geological Survey (BGS) mapping indicates the Site is underlain by superficial deposits comprising Tidal Flat Deposits (clay and silt) overlying Amphill Clay Formation (mudstone) bedrock. Made Ground may be present in areas of existing or historic buildings. There are no BGS boreholes within 1 km of the Site.



		<u>Hydrogeology</u> The superficial soils and bedrock beneath the Site are both classified as Unproductive Strata. The Site is not within a Source Protection Zone (SPZ). There are no potable groundwater abstractions within 500 m of the Site. <u>Hydrology</u> The nearest watercourse is an unnamed brook located 17 m south-west of the Site. There are no surface water abstractions within 500 m of the Site. <u>Site History - on-Site</u> From the earliest map edition of 1887 Site comprises part of the school with buildings to the south of the Site, with the site appearing to remain as access to the school throughout the mapping. <u>Site History - off-Site</u> The school buildings are present adjacent to the east of the Site from 1887 along with Hazelwood Lane to the west. The school appears to have been expanded with further buildings to the east of the Site constructed between 2000 and 2024. Fleet village, including St Mary Magdalene's Church is located approximately 200 m south of the Site. Bourn and Lynn Joint Railway is present between 1887 and 1959 approximately 400 m north of the Site, it is no longer present by 1970. The surrounding areas has remained in general agricultural use with residential properties, with numerous drains present.
Preliminary Conceptual Model	Site	Based on the Preliminary (Geo-Environmental) Risk Assessment undertaken, the following Conceptual Site Model (CSM) was identified; <u>Sources</u> ▼ Potential Made Ground, although likely limited in thickness, associated with the buildings and hardstanding areas on the wider school; ▼ Limited spillages from parked vehicles; ▼ Compressible ground such as peat within Tidal Flat Deposits may represent a source of ground gas; and ▼ Potential unrecorded/ un-mapped sources. <u>Pathways</u> ▼ Direct contact, ingestion or inhalation of soil bound contaminants / dust during or following redevelopment; ▼ Inhalation of organic vapours associated with contamination; ▼ Migration of ground gas / vapours into on-site buildings causing asphyxiation or risk of explosion; ▼ Leaching of contamination into surface water; and



	▼ Direct contact between aggressive ground conditions and new infrastructure. <u>Receptors</u> Relevant potential receptors are considered to include: ▼ Construction workers; ▼ Third parties during construction (adjacent Site users and adjacent residents); ▼ Future Site users and maintenance workers; ▼ Drainage ditch 17 m south-west; and ▼ The Built Environment (new buildings and infrastructure / utilities). On the basis of the above, limited environmental sampling was recommended at the time of any geotechnical investigation works to confirm the presence of any shallow soil contamination and the associated risk to Human Health and Controlled Waters. Given the unproductive nature of the underlying stratum, the risk to groundwaters from any on-Site sourced contamination was considered to be very low.
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3.0 Ground Investigation

EGE undertook intrusive investigation between the 24th and 25th July 2024 to assess the Possible Pollutant Linkages (PPL's) identified in the initial CSM and provide preliminary geotechnical information.

3.1 Ground Investigation Scope of Works

The following Scope of Works was completed:

- ▼ Supervision by EGE representatives on a full-time basis;
- ▼ Drilling of one (1 no.) borehole (BH101), using sonic drilling techniques to a maximum depth of 20.00 m bgl;
- ▼ Installation of BH101 as a monitoring well to facilitate return ground gas & groundwater monitoring;
- ▼ Excavation and construction of one (1 no.) infiltration test (SA101), in accordance with BRE365 methodology to a maximum depth of 1.63 m bgl;
- ▼ Excavation of two (2 no.) Foundation Inspection Pits (FIP101 and FIP102) to allow for inspection of the existing foundations at the Site, to a maximum depth of 1.40 m bgl; and
- ▼ Collection of soil samples for chemical and geotechnical laboratory testing from across the Site.

An Approximate Intrusive Location Plan is included as Figure III.

Exploratory hole logs are included as Appendix II.

3.2 Environmental Sample Rationale and Sampling Methodology

Chemical testing was undertaken on selected samples based from on-Site observations during soil sampling.

Soils collected for laboratory analysis were placed in a variety of containers appropriate to the anticipated testing suite. Records of the samples taken as part of the Site investigation works, including their depths and location, are included within the exploratory hole records. All samples were submitted to a UKAS accredited laboratory (I2) with testing methodologies for each specific compound contained within the laboratory results included as Appendix III.

3.2.1 Environmental Sampling Rationale - Soils

The environmental soil sampling rationale is provided within the table overleaf.



Sample Location	Depth (m bgl)	Justification	Strata	Determinands							
				Total Organic Carbon	10 heavy metals	Asbestos identification	pH in soil	Speciated PAHs	BTEX and MTBE	TPHCWG A/A Split	Inert WAC
BH101	0.10	General Site Coverage	Made Ground	✓	✓	✓	✓	✓	✓	✓	
BH101	0.60		Tidal Flat Deposits	✓	✓	✓	✓	✓	✓	✓	
FIP101	1.30			✓	✓	✓	✓	✓	✓	✓	
FIP102	0.20		Made Ground	✓	✓	✓	✓	✓	✓	✓	
SA101	0.20		Topsoil	✓	✓	✓	✓	✓	✓	✓	
FIP101	0.20		Made Ground		✓	✓					✓
SA101	0.60		Tidal Flat Deposits		✓	✓					✓
Total				5	7	7	5	5	5	5	2

3.2.2 Monitoring Well Installations

One (1 no.) borehole (BH101) was installed within the Tidal Flat Deposits as a 50 mm internal diameter groundwater level and ground gas monitoring wells.

The well construction details are included within the exploratory hole logs within Appendix II.

3.2.3 Geotechnical Sampling Methodology

Sampling comprised disturbed jar/tub and bulk samples as detailed on the exploratory logs. All samples were submitted to a UKAS accredited laboratory (i2 and TTL) with the specific testing standards contained within the laboratory results included as Appendix III and Appendix IV.

3.2.4 Geotechnical Sampling Rationale

Geotechnical soil sampling rationale is provided within the table overleaf.



Sample Location	Depth (m bgl)	Justification	Strata	Determinands					
				Water Content	Particle Size Distribution	Atterberg Test	Laboratory CBR	Water soluble Sulphate	pH in soil
SA101	0.8	Classification of cohesive soils	Tidal Flat Deposits	✓		✓			
BH101	1.8			✓		✓			
BH101	10.70			✓		✓			
BH101	16.50			✓		✓			
SA101	1.10v - 1.50	Classification of granular soils		✓	✓				
BH101	5.00 - 6.00			✓	✓				
BH101	12.0 - 13.0			✓	✓				
BH101	0.30 - 0.90	California Bearing Ratio Testing					✓		
BH101	0.10	Concrete Classification Suite	Made Ground					✓	✓
BH101	0.60		Tidal Flat Deposits					✓	✓
BH101	2.20							✓	✓
BH101	5.00							✓	✓
FIP101	1.30							✓	✓
FIP102	0.20		Made Ground					✓	✓
SA101	0.20		Topsoil					✓	✓
Total				7	3	4	1	7	7

3.3 In-Situ-Testing

Standard Penetration Tests (SPTs) were undertaken at approximately 1.00 m intervals for the first 5.00 m and 1.50 m thereafter within BH101. The results and depths of these tests is presented on the borehole log included as Appendix II.

Infiltration testing in general accordance BRE365 methodology was undertaken within one location (SA101). The results are discussed in Section 6.8 of this Report.



3.4 Foundation Inspection Pits

Two (2 no.) Foundation Inspection Pits (FIP101 and FIP102) were excavated to identify the dimensions of the existing foundations.

As noted on the Foundation Inspection Pit Logs, FIP101 comprised concrete and was proven to step down at 0.92 m bgl, with the foundation terminating at 1.38 m bgl, likely comprising traditional strip foundations. FIP102 comprised brick and was proven to slope down between 0.45 (top) to 0.50 (bottom) m bgl, with the foundation terminating at 0.65 m bgl, likely comprising traditional brick strip foundations.

Foundation Inspection Pit sketches are included as Figure IVa and IVb .

3.5 Monitoring Programme

Four (4 no.) rounds of groundwater level and ground gas monitoring were undertaken on both newly installed wells (DS101 and DS102) between 7th and 28th August 2024.

Measurements of the depth to groundwater within the monitoring wells were taken using an electronic dip meter.

To characterise the ground gas regime at the Site, an infrared gas meter was used to measure gas flow, concentrations of carbon dioxide (CO₂), methane (CH₄) and oxygen (O₂) in percentage by volume. Initial and steady state concentrations were recorded. The atmospheric pressure before and during monitoring, together with the weather conditions, was recorded.

The monitoring record sheets are included as Appendix V.



4.0 Ground Conditions

The following Sections summarise the soil and groundwater conditions identified during the ground investigation.

4.1 Ground Conditions Summary

A summary of the observed ground conditions during the ground investigation are provided in the table below:

Strata	General Description	Range of depth to base (m bgl)	Comments
Made Ground	Concrete / Macadam; over, Light yellowish brown sandy angular to sub-angular fine to coarse gravel of mixed lithologies including limestone and brick. Sand is fine to coarse.	0.30 - 0.33	Identified in BH101, FIP101 and FIP102.
Topsoil	TOPSOIL: Grass over soft dark brown sandy SILT with frequent fine rootlets and a singular decayed tree stump. Sand is fine to coarse.	0.50	Identified in SA101 only.
Tidal Flat Deposits	Soft dark grey sandy SILT. Sand is fine to coarse; Over, Light grey, light brown and orangish brown mottled silty fine to coarse SAND; Over, Variable soils comprising; slightly gravelly sandy SILT, slightly silty sandy GRAVEL, silty gravelly SAND.	Proven to 20.00	Identified in all locations beneath any Made Ground or Topsoil. All locations terminated within this strata.

Ground conditions encountered at the Site comprised Made Ground (BH101, FIP101 and FIP102) to depths between 0.30 and 0.33 m bgl, most commonly comprising Concrete / Macadam; over, 'Light yellowish brown sandy angular to sub-angular fine to coarse gravel of mixed lithologies including limestone and brick. Sand is fine to coarse.'. Topsoil was encountered at surface within SA101 only, to a depth of 0.50 m bgl, comprising 'TOPSOIL: Grass over soft dark brown sandy SILT with frequent fine rootlets and a singular decayed tree stump. Sand is fine to coarse.'.

Thereafter, below any Made Ground or Topsoil, the Site was underlain by superficial Tidal Flat Deposits to a maximum proven depth of 20.00 m bgl, most commonly comprising; 'Soft dark grey sandy SILT. Sand is fine to coarse' over, 'Light grey, light brown and orangish brown mottled silty fine to coarse SAND', over, Variable soils comprising; slightly gravelly sandy SILT, slightly silty sandy GRAVEL and silty gravelly SAND.

4.2 Visual and Olfactory Evidence of Contamination

No visual and olfactory evidence of contamination was identified during the Site investigation or subsequent return groundwater and ground gas monitoring visits.



4.3 Groundwater Strikes during Site Investigation

No groundwater strikes were encountered during the Site investigation works.

4.4 Groundwater Levels during Monitoring

Groundwater levels were monitored on four (4 no.) occasions; between 7th and 28th August 2024. The monitoring record sheets are included as Appendix V and summarised in the table below.

Exploratory Hole Location	Groundwater Level - m bgl (m AOD)		Depth to Base (m bgl)	Comments	Geology
	Minimum	Maximum			
BH101	2.04 (1.20)	2.30 (0.94)	2.60	-	Tidal Flat Deposits

Groundwater was encountered between 2.04 and 2.30 m bgl (1.20 and 0.94 m AOD) within the Tidal Flat Deposits across the four return monitoring visits.



5.0 Contaminated Land Assessment

5.1 Background Information

5.1.1 Human Health

The presence of hazardous substances identified as part of the risk assessment is only of concern if an actual or potential unacceptable risk is deemed to be present. Legislation and guidance on the assessment of contaminated sites, requires a tiered risk-based approach.

This Section represents a Generic Quantitative Risk Assessment (GQRA) from information obtained through intrusive Site investigation and a comparison of Site contaminant levels against specific Generic Assessment Criteria (GAC). The general GAC utilised as part of this assessment include:

- ▼ Land Quality Management/CIEH S4ULs for Human Health Risk Assessment 2014 (LQM);
- ▼ Category 4 Screening Levels (C4SL) by DEFRA;
- ▼ Guidance Values Produced by the Environmental Industries Commission (EIC), The Association of Geotechnical and Geoenvironmental Specialists (AGS) and Contaminated Land: Application in Real Environments (CL:AIRE) in December 2009; and
- ▼ A 5,000 mg/kg maximum value for Total TPH based on EGE professional opinion given the absence of specific GAC.

5.1.2 Controlled Waters

Given the 'prevent and limit' approach of the Water Framework Directive (2000/60/EC) and the identified receptors, a range of Water Quality Standards (WQS) have been applied as Generic Assessment Criteria (GAC), these include:

- ▼ Water Framework Directive standards and thresholds (WFD);
- ▼ Freshwater Environmental Quality Standards (EQS);
- ▼ UK Drinking Water Quality Standards (DWQS);
- ▼ WHO Guidelines for Drinking Water Quality; and
- ▼ SEPA resource protection values, where required.

The above guidance values have been used as initial conservative GAC to assess whether groundwater contamination requires further assessment or discussion in terms of the risks to controlled waters and surface waters.

5.2 Human Health Generic Quantitative Risk Assessment

Given the proposed end-use of the Site (School), the risk to Human Health has been assessed against the Residential without plant uptake end use GAC, assuming 1% Soil Organic Matter (SOM).

No specific guidance criteria have been derived for a school setting, as such Residential without Plant Uptake is considered to be a conservative approach.



5.2.1 Site Wide Soil Analytical Summary

A total of seven (7 no.) soil samples were collected from the Site for assessment of soil chemistry (1 no. from Topsoil, 3 no. from Made Ground and 3 no. from the Tidal Flat Deposits). In addition, a further two (2 no.) samples were tested for heavy metals and asbestos to assist in the initial classification of waste. The samples were submitted to a UKAS accredited laboratory for a suite of potential contaminants of concern. A summary of concentrations above laboratory detection limits are provided in the following table overleaf.



Contaminant	Max Conc. (mg/kg)	GAC (mg/kg)	GAC Source	No. Exceed GAC / No. of samples	Location of Exceedances (depth) = Concentration (mg/kg)
Asbestos	Not Detected	Detected	N/A	0/7	-
Metals					
Arsenic	16	40	LQM	0/7	-
Cadmium	0.4	85	LQM		
Chromium III	28	910	LQM		
Copper	23	7,100	LQM		
Lead	33	310	C4SL		
Mercury	<0.3	56	LQM		
Nickel	25	180	LQM		
Zinc	77	40,000	LQM		
Polycyclic Aromatic Hydrocarbons					
Naphthalene	<0.05	2.3	LQM	0/5	-
Acenaphthylene	0.07	2,900	LQM		
Acenaphthene	0.07	3,000	LQM		
Fluorene	<0.05	2,800	LQM		
Phenanthrene	0.93	1,300	LQM		
Anthracene	0.13	31,000	LQM		
Fluoranthene	3.0	1,500	LQM		
Pyrene	2.7	3,700	LQM		
Benzo[a]anthracene	1.2	11	LQM		
Chrysene	1.5	30	LQM		
Benzo[b]fluoranthene	1.7	3.9	LQM		
Benzo[k]fluoranthene	0.7	110	LQM		
Benzo[a]pyrene	1.5	3.2	LQM		
Indeno(1,2,3-c,d)pyrene	0.86	45	LQM		
Dibenz(a,h)anthracene	0.24	0.31	LQM		
Benzo[g,h,i]perylene	0.94	360	LQM		
Total PAH16	15.4	GAC			
Petroleum Hydrocarbons					
Aliphatic TPH >C5-C6	< 0.02	42	LQM	0/5	-
Aliphatic TPH >C6-C8	< 0.02	100	LQM		
Aliphatic TPH >C8-C10	< 0.05	27	LQM		
Aliphatic TPH >C10-C12	<1.0	130	LQM		
Aliphatic TPH >C12-C16	<2.0	1,100	LQM		



Contaminant	Max Conc. (mg/kg)	GAC (mg/kg)	GAC Source	No. Exceed GAC / No. of samples	Location of Exceedances (depth) = Concentration (mg/kg)
Aliphatic TPH >C16-C21	<8.0	65,000	LQM		
Aliphatic TPH >C21-C35	12.0	65,000	LQM		
Aromatic TPH >C5-C7	< 0.01	370	LQM		
Aromatic TPH >C7-C8	< 0.01	860	LQM		
Aromatic TPH >C8-C10	< 0.02	47	LQM		
Aromatic TPH >C10-C12	<1.0	250	LQM		
Aromatic TPH >C12-C16	<2.0	1,800	LQM		
Aromatic TPH >C16-C21	12.0	1,900	LQM		
Aromatic TPH >C21-C35	25.0	1,900	LQM		
Total TPH	61.07	5,000	EGE		
BTEX and MTBE					
Benzene	< 0.005	0.89	C4SL	-	-
Toluene	< 0.005	880	LQM		
Ethylbenzene	< 0.005	83			
p & m-xylene	< 0.005	79			
o-xylene	< 0.005	88			
MTBE	< 0.005	73	EIC		
Others					
TOC	1.8	-	-	-	Average of 0.86%
Notes:					
= Concentration(s) above GAC GAG = No GAC available for individual compounds C4SL = Category 4 Screening Levels (C4SLs) published by DEFRA. LQM = Land Quality Management/CIEH S4UIs for Human Health Risk Assessment, 2014. EGE = Evolve Geo-Environmental 'in-house' screening value based on professional judgement.					

Significant soil contamination has not been identified at the Site. No concentrations of the tested contaminants of concern were identified above the applied stringent 'Residential without plant uptake' end use GACs, which is considered conservative based on the final proposed end-use.

Asbestos was not encountered in any of the samples scheduled for asbestos identification analysis. Additionally, no concentrations of BTEX were identified above the respective laboratory limits of detection (LOD) within the samples selected for analysis.

Although concentrations of individual metals, PAHs and TPH were identified above their respective laboratory limits of detection, these were not identified above their applied GAC by several orders of magnitude.

No evidence of volatile vapours has been identified.



No evidence of visual or olfactory contamination or Non-Aqueous Phase Liquid (NAPL) was identified during sampling.

The chemical soil analytical results are included as Appendix III.

5.3 Controlled Waters Generic Quantitative Risk Assessment

The approach adopted to assessing risks to Controlled Waters/Water Environment is based principally on considering the concentrations of contaminants identified within groundwater samples obtained in comparison to GACs with respect to relevant receptors.

The Site has been compared against a combination of Controlled Waters and Inland Surface Water GACs, applying the most stringent value where more than one GAC is available for a conservative approach to groundwater protection.

5.3.1 Groundwater Analytical Summary

Given the absence of significant soil contamination from in-situ soil sampling, absence of visual and olfactory evidence of significant contamination (including NAPL), the risk to Controlled Waters is considered very low.

Furthermore, the Site is underlain by Unproductive Strata (Tidal Flat Deposits and Ampthill Clay Formation), is not located within a Source Protection Zone, no potable groundwater abstractions within 500 m of the Site, no surface water abstractions within 500 m of the Site and as such, are not considered plausible receptors for any site-sourced contamination given the distance and low-level contamination identified.

On this basis, the risk to Controlled Waters is considered very low and no further works or risk assessment is considered to be required.

5.4 Waste Management

In recent years a number of mechanisms have aimed to change the way in which waste materials have traditionally been managed (i.e. a move away from less sustainable options such as landfill disposal).

In general, the predominant waste material encountered during the construction phase of development schemes will likely be construction waste, predominantly waste soils within the Made Ground and Tidal Flat Deposits.

WAC testing undertaken at the Site is presented in Appendix III. The results should be passed to a haulier/ receiving facility to confirm disposal routes and budget costs.

This assessment was not undertaken as a waste classification assessment and has not been undertaken in accordance with WM3.

In accordance with best practice, sustainability and cost efficiency, materials should be retained on-Site where possible. Waste Acceptance Criteria may be required to facilitate any off-Site disposal of soils, with the results of this assessment provided for initial waste classification.



6.0 Geotechnical Assessment

6.1 Background Information

The Site is currently under assessment for the development of a new classroom (58 m²), secure lobby (17 m²) and possible car parking in the west of the existing Fleet Wood Lane Primary School.

The proposed development is included within the Sketch Scheme Plan included as Drawing I (Reference. 23035/SK01A).

Should an alternative development be considered the below assessment will require updating.

No development loads have been provided at this stage and as such, the information provided below should be treated as preliminary.

6.2 Factual Geotechnical Laboratory Data

The table below summarises the results of in-situ and laboratory test data. The geotechnical laboratory data is included as Appendix IV.

Parameter	Unit	Value or Range	Justification
Tidal Flat Deposits			
w (Water Content)	%	15 - 33	Laboratory Testing
Liquid Limit	%	22 - 40	
Plastic Limit	%	18 - 29	
Plasticity Index	%	4 - 17	
Modified Plasticity Index	%	2 - 17	
Volume Change Potential		Low	BRE240
California Bearing Ratio	%	0.12 - 0.25	Laboratory Testing
Particle Size Distribution	%	Gravel - 0 - 34 Sand - 20 - 91 Silt/Clay - 8 - 80	
Uncorrected SPT 'N'	Blows	2 - 50	In Situ Testing

6.3 Ground Model Summary

Ground conditions encountered at the Site comprised Made Ground (BH101, FIP101 and FIP102) to depths between 0.30 and 0.33 m bgl, most commonly comprising Concrete / Macadam; over, 'Light yellowish brown sandy angular to sub-angular fine to coarse gravel of mixed lithologies including limestone and brick. Sand is fine to coarse.'. Topsoil was encountered at surface within SA101 only, to a depth of 0.50 m bgl, comprising 'TOPSOIL: Grass over soft dark brown sandy SILT with frequent fine rootlets and a singular decayed tree stump. Sand is fine to coarse.'.

Thereafter, below any Made Ground or Topsoil, the Site was underlain by superficial Tidal Flat Deposits to a maximum proven depth of 20.00 m bgl, most commonly comprising; 'Soft dark grey sandy SILT. Sand is fine to coarse' over, 'Light grey, light brown and orangish brown



mottled silty fine to coarse SAND', over, Variable soils comprising; slightly gravelly sandy SILT, slightly silty sandy GRAVEL and silty gravelly SAND.

Groundwater was encountered between 2.04 m bgl and 2.30 m bgl (1.20 and 0.94 m AOD) within the Tidal Flat Deposits across the four return monitoring visits.

6.4 Foundations

6.4.1 General

The Topsoil and Made Ground at the Site is considered to be too limited in thickness, variable, weak and compressible in their existing condition for conventional shallow foundations at the Site. As such, the Topsoil and Made Ground have been discounted as a founding medium. Therefore, all foundations should be extended into the Tidal Flat Deposits.

It is understood that the proposed development will comprise a single storey new classroom (58 m²) and secure lobby (17 m²) at the Site. An assessment has been made of the likely foundation requirements of the proposed development. A number of considerations will need to be taken in to account to assess suitable foundation types and depth for the proposed development. These include:

- ▼ Depth of Made Ground;
- ▼ Low allowable bearing capacity of the underlying Tidal Flats Deposits;
- ▼ High consolidation settlements of the soft Tidal Flat Deposits;
- ▼ Differential settlement between proposed and existing structures;
- ▼ Loading of the proposed foundations on the existing structures;
- ▼ CDM and health and safety considerations of excavations; and
- ▼ Causing damage through excavations or vibrations to existing structures.

Given the above consideration a bottom driven low vibration pile or bored pile are likely to be the preferred option. Foundation options are presented below and the risks presented by the ground model should be considered by the foundation design engineer.

6.4.2 Spread Foundations

Based on these proposed development, allowable bearing capacities have been calculated at 1.20, 2.00 and 3.00 m bgl.

Should natural undisturbed Tidal Flat Deposits be encountered within economic reach for traditional strip foundations (up to 0.60 m wide), then for preliminary foundation design purposes the very soft cohesive soils at 1.00 m bgl (SPT of 2 or greater) are likely to achieve an allowable bearing capacity of 25 kPa, while the very loose granular soils at 2.00 m bgl (SPT of 4 or greater) are likely to achieve an allowable bearing capacity of 100 kPa. The loose granular soils at 3.00 m bgl (SPT of 8 or greater) are likely to achieve an allowable bearing capacity of 150 kPa **in dry conditions** (with settlement limited to 25 mm), however, consideration should be given to shallow groundwater conditions, which is circa 2.00 m bgl. The above allowable bearing pressures have not been adjusted for groundwater.

Excavations below the groundwater table are likely to be unstable in the long term. It should be ensured that foundations are cast in dry conditions and groundwater exclusion methods may be required to maintain dry conditions. If foundation excavations cannot be kept dry alternative foundations solutions may be required.



Consideration should be given to founding in uniform strata in order limit the potential for differential settlement.

All foundation excavations should be inspected by a suitably qualified engineer prior to casting to ensure the appropriate depth, founding medium and strength characteristics have been achieved.

6.4.3 Volume Change Potential

The underlying Tidal Flat Deposits comprised a Low volume change potential in accordance with NHBC guidance.

The volume change potential should be considered in any foundation schedule for structures and services located within the influence zone of trees or bushes (proposed, existing or to be removed) and appropriate precautions and/or founding depths should be designed accordingly.

In cohesive soils, it is recommended that foundations should be designed in accordance with NHBC Standard Chapter 4.2 "*Building Near Trees*".

For piled foundations this may include slip liner on piles and compressible materials or void former on ground beams.

6.4.4 Ground Improvement Techniques

Given the small nature of the Site, some ground improvement techniques are likely to be unsuitable, however ground improvement techniques such as vibro could be utilised to improve the shallow soils at the Site. Consideration would need to be given to the very low strength and silty consistency of the Tidal Flat Deposits and the high water table. These may preclude the use of some ground improvement techniques.

Any ground improvement installation and applicability of proprietary systems, diameters and depths required would need to be informed based on the results of this investigation, by discussions with a ground improvement contractor with suitable experience, whose design should be warranted.

6.4.5 Piling

A piled foundation solution using driven or bored piles transferring loads to competent geology may be suitable for the proposed or anticipated design loads, utilising both skin friction and end bearing capacity. Skin friction is likely to be limited in the soft Tidal Flat Deposits and it is recommended that the piles are extended at least to the medium dense sands encountered at 10.80 m depth.

The precise method of pile installation and applicability of proprietary systems, diameters and depths required would need to be informed based on the results of this investigation, by discussions with a piling contractor with suitable experience, whose design should be warranted.

Normal static and dynamic load testing (including uplift tests) should be considered to achieve satisfactory quality control/assurance in accordance with good practice.

There will be a requirement for the placement of a suitably engineered piling mat, which should be designed and validated by a suitably qualified and experienced engineer.

This Report should be provided to a Piling Contractor to confirm their design requirements and confirm the likely depth of piles.



6.4.6 Raft Foundation

A raft foundation may be suitable for the Site, assuming a maximum floor area of 7.02 m by 8.28 m (as per Drawing I), a raft should be suitable for floor loads of up to 15 kPa with less than 25 mm settlement, reducing to one quarter of that at in the corners; so long as all Made Ground and Topsoil is removed, the Tidal Flat Deposits are heavily proof rolled with any soft spots excavated and replaced with well compacted granular material.

There is a risk of differential settlement between the new and existing buildings with a raft foundation and any raft needs to be suitably designed and reinforced.

6.5 Floor Slabs

All topsoil and organic matter should be removed from beneath the floor. It is likely that a piled foundation is required and as such, floor slabs would be suspended from the pile caps.

If a spread foundation is chosen then ground bearing slabs should not be used in ground conditions where heave can occur or where the foundation depth is greater than 1.5 m and a suspended slab is required. Additionally if the foundation depth is greater than 1.5 m, allowance should be made in the design for heave. This must incorporate either a clear void or a proprietary compressible material/void former below the underside of the floor construction.

6.6 Excavations and Obstructions

It is expected that conventional mechanical excavators will readily remove the shallow soils.

Excavations are likely to remain stable in the short term however may collapse where shallow water has been encountered. Temporary trench support, or battering of excavation sides, should be considered for all excavations that are to be left open for any length of time and will be required where man entry is required. It is recommended that any temporary support is design in accordance with CIRIA R97 Trenching Practice.

Particular attention should be paid to excavation at, or close to, site boundaries and existing structures, where collapse of excavation faces could have a disproportionate effect.

A risk assessment of the stability of any open excavation should be undertaken by a competent person and appropriate measures adopted to ensure safe working practise in and around open excavations.

Due to the current developed status of the Sites services are likely to be present. During development care will be required to ensure that these services, if retained, are accurately located and either diverted or that the final foundation design accommodates their locations. The preferred drainage solution for the site is not known at this stage.

6.7 Chemical Attack on Buried Concrete

In accordance with the recommendations of BRE Special Digest 1, 'Concrete in Aggressive Ground' 2005, the conditions of the soils at the Site would be classified as Design Sulphate Class DS-1 and ACEC Class AC-1 for soils, when considering the most appropriate type of concrete to be used at the Site in order to resist chemical attack from elevated sulphate present in the soils (assuming mobile groundwater in non-pyritic soils).

6.8 BRE365 Soakaways

One (1 no.) soakaway tests (SA101) was undertaken at a depth of 1.63 m bgl within the Tidal Flat Deposits in general accordance with BRE365. The water level within the first fill within



SA101 failed to sufficiently soakaway to ground within a sufficient time, as such the test was terminated and classified as a 'Failed Test'.

Infiltration to land is unlikely to be suitable at the Site and alternative SUDs options may need to be explored.

The table below presents a summary of the results with the full results included as Appendix VI.

Soakaway	Geology	Depth (m)	Recommended Soil Infiltration Rate (m/s)
SA101	Tidal Flat Deposits	1.63	'Failed Test'

6.9 Pavements

One (1 no.) laboratory CBR test was undertaken on a sample recovered from between 0.30 - 0.90 m depth within the Tidal Flat Deposits at the Site to provide equivalent CBR values.

CBR's between 0.12 - 0.25% were recorded, however, it is recommended that, a conservative preliminary design CBR of less than 1.5 % should be adopted at this stage.

The operational strength of the subgrade will depend to a large extent on its condition at the time of construction and therefore we recommend these CBR values be utilised for design purposes and reassessed immediately prior to construction.

It should be noted that the CBR value is dependent on the condition of the strata and could be different upon excavation to the formation subject to seasonal conditions. Careful control of the moisture content during the development will be required to ensure the proposed preliminary CBR values are achieved.

Additionally, the CBR value can be impacted by tracking and plant movements and so the finished formation should be suitably protected as soon as possible to avoid degradation. This can be achieved with either granular sub-base material or a capping layer.

Once formation levels have been established it is recommended that the formation be trimmed and rolled following current requirements of the Specification for Highways Works Series 600 (clause 616). Such a process will identify any soft areas, which we recommend be either excavated out and backfilled with a suitable well compacted material similar to those exposed in the sides of the resulting excavation, or granular material rolled into the formation to stabilise the 'soft' area.



7.0 Ground Gas Risk Assessment

7.1 Background Information

Based on the proposed School end use, the following documents have been consulted when assessing the gas regime at the Site:

- ▽ CIRIA C665 (2007), Assessing risks posed by hazardous ground gases to buildings;
- ▽ British Standards Institute (BSI, 2019): Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings, BS:8485:2015+A1:2019; and
- ▽ CL:AIRE Research Bulletin 17 (RB17), 2012, 'A Pragmatic Approach to Ground Gas risk Assessment'.

The presence of a source of hazardous gas within the ground does not necessarily indicate a risk will be present. Consideration of recorded gas flows together with source concentrations can allow an initial assessment to be made of the potential both for generation and subsequent migration of gas. A Characteristic Situation (CS) is derived from an assessment of the ground gas data and forms the basis of determining mitigation measures.

7.2 Hazardous Ground Gas Monitoring Programme

The PRA previously undertaken by EGE identified the Site to be a 'Low Risk' from hazardous ground gas relating to a likely limited thickness of Made Ground, and potential organic deposits within the Tidal Flat Deposits, in combination with the proposed school end use. Preliminary hazardous ground gas monitoring was undertaken in order to investigate the presence of a significant hazardous ground gas risk to the identified receptors.

Four (4 no.) rounds of hazardous ground gas monitoring were undertaken on BH101 between 7th and 28th August 2024 using an infra-red gas analyser.

The hazardous ground gas monitoring sheets are included as Appendix V.

7.3 Hazardous Ground Gas Conceptual Site Model

7.3.1 Sources

Following the EGE desktop assessment and Site investigation works, the following potential and actual sources of hazardous ground gas were identified:

- ▽ Potential Made Ground associated with the buildings and hardstanding areas on the wider school (recorded to a maximum depth of 0.33 m bgl, within FIP101);
- ▽ Compressible ground such as peat within Tidal Flat Deposits; and
- ▽ Potential unrecorded/ un-mapped sources.

Significant organic deposits within the superficial Tidal Flat Deposits were not identified during the Site investigation.

No visual and olfactory evidence of contamination was identified during the Site investigation.

No potentially gas generating deleterious or putrescible material were visually observed within the Made Ground during the soil sampling or subsequent laboratory testing.

7.3.2 Pathways

The following plausible pathways are considered applicable to this Assessment:



- ▼ Vertical and lateral migration of ground gas through permeable strata;
- ▼ Potential for gases to enter current and future buildings through voids in the floor including service entry points and cracks and accumulate in confined spaces; and
- ▼ Future maintenance/construction workers may come into contact with hazardous ground gases via entry into below ground confined spaces such as excavations or service entries/inspection points.

7.3.3 Receptors

The principal receptors are considered to be:

- ▼ Future Site users; and
- ▼ Buildings/ property.

7.4 Ground Gas Screening Value

The Gas Screening Value (GSV - maximum gas concentration as a fraction x maximum recorded flow) is used to provide an initial assessment of risks to future Site users. The GSVs calculated for the monitoring wells are presented in the following table.

Location	Maximum Steady Methane (%v/v)	Maximum Steady Carbon Dioxide (%v/v)	Maximum Steady Flow Rate (l/hr)	GSV/Classification		Flooded?
				GSV	Classification	
BH101	<0.1	4.8	<0.1	0.0048	CS1	No

As can be seen from the table above, the initial hazardous ground gas monitoring data indicates that the Site would be classified as a CS1 (Very Low Risk). Carbon dioxide above 5.0 % was not recorded, furthermore, concentrations of methane were not recorded above the limit of detection (0.1 %v/v). Additionally, no flow has been encountered during the monitoring period.

Based on the following, the risk for the generation and accumulation of ground gas at the Site remains low given:

- ▼ No deleterious or putrescible materials noted during soil sampling;
- ▼ No positive flows identified during four rounds of monitoring;
- ▼ Significant organic deposits within the superficial Tidal Flat Deposits were not identified during the Site investigation;
- ▼ No visual or olfactory evidence of contamination was identified during the Site investigation;
- ▼ No elevated hazardous ground gas over four rounds of monitoring, including no detectable concentrations in monitoring well head space through the degradation of organic generated gas dissolved in groundwater;
- ▼ No sources of volatile contamination or ground gas identified through desktop assessment or from laboratory testing; and
- ▼ Absence of landfills on-Site or in the surrounding Site area.

As such, ground gas protection measures are not required as part of the proposed development.



7.5 Radon

The property is in a Lower probability radon area (less than 1 % of homes are estimated to be at or above the Action Level). **No radon protective measures are necessary** in the construction of new dwellings or extensions.



8.0 Revised Conceptual Site Model

A revised CSM is presented in the table below and has been formulated taking into account all of the available data from the EGE assessment, suitable for a site with a proposed school end use.

Source	Pathway(s)	Receptor(s)	Risk Ratings	Justification & Mitigation (if required)
Low concentrations of individual metals, PAHs, and TPHs in soil above respective LODs but below the applied conservative GAC. Potentially unidentified contamination in areas not directly investigated.	Direct contact/ ingestion and inhalation of dust, vapours and asbestos fibres.	Future Site users.	Low Risk	Significant soil contamination has not been identified at the Site. No concentrations of the tested contaminants of concern were identified above the applied stringent 'Residential without plant uptake' end use GACs. Asbestos was not encountered in any of the samples scheduled for asbestos identification analysis. Additionally, no concentrations of BTEX were identified above the respective laboratory limits of detection (LOD) within the samples selected for analysis. Although concentrations of individual metals, PAHs and TPH were identified above their respective laboratory limits of detection, these were not identified above their applied GAC by several orders of magnitude. No evidence of volatile vapours has been identified. No evidence of visual or olfactory contamination or Non-Aqueous Phase Liquid (NAPL) was identified during sampling. The identified sources will be largely encapsulated through the implementation of the proposed development, comprising hardstanding and building cover, limiting the direct exposure risk to Future Site users from the low-level contamination. If new soft landscaped areas are to be incorporated into the development a clean certified layer of topsoil of 150 mm is recommended, with geotextile membrane, undertaken in accordance with the requirements of YALPAG for cover systems document.



				A 'hotspot' protocol should be in place during any below surface works for groundworkers to act upon should potential unexpected contamination be identified. It would be prudent for any mitigation measures to be set out within a Remediation Method Statement.
		Groundworkers during the redevelopment or during any sub-surface maintenance works.	Low Risk	Groundworkers should use appropriate personal protective equipment (PPE) and respiratory protective measures (RPE) to maintain good standards of hygiene to be protected from any soil contamination which may be present. A 'hotspot' protocol should be in place during any below surface works for groundworkers to act upon should potential unexpected contamination be identified.
	Leaching of contamination into groundwater. Vertical and lateral migration of contamination through permeable deposits below the Site.	Drainage Ditch (17 m south-west).	Very Low Risk	Given the absence of significant soil contamination from in-situ soil sampling, absence of visual and olfactory evidence of significant contamination (including NAPL), the risk to Controlled Waters is considered very low. Furthermore, the Site is underlain by Unproductive Strata (Tidal Flat Deposits and Ampthill Clay Formation), is not located within a Source Protection Zone, no potable groundwater abstractions within 500 m of the Site, no surface water abstractions within 500 m of the Site and as such, are not considered plausible receptors for any site-sourced contamination given the distance and low-level contamination identified. On this basis, the risk to Controlled Waters is considered very low and no further works or risk assessment is considered to be required.
	Direct infiltration in water supply pipes.	Service conduits.	Low Risk	Whilst elevated concentrations of contaminants within soils have not been above the conservative residential without plant uptake GACs, the identified low-level contamination within Made Ground may require potable water pipes to be upgraded to protectaline, or similar. This will be the decision of the local Water provider and the previous Desktop Assessment should be provided for confirmation.

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Fleet Wood Lane Primary School, Fleet, Holbeach
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Hazardous ground gas (Made Ground and potential unrecorded/ un-mapped sources).	Accumulation of gas in enclosed spaces and sub- floor voids.	Buildings and future Site users.	Very Low Risk	On-Site sources of ground gas identified from the Site Investigation are limited to limited Made Ground deposits (maximum of 0.33 m bgl, FIP101) and potential unrecorded/ un-mapped sources. Based on the results of the preliminary hazardous ground gas monitoring undertaken, the Site has been classified as CS1 - Very Low Risk. As such, ground gas protection measures are not considered to be required as part of the proposed development at this stage. No ground gas protection measures are required. Vigilance is required during groundworks for any suspect ground conditions, such as deep Made Ground, organic or deleterious materials and organic contamination which may present a potential source of hazardous ground gas.
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Risk Ratings included as Appendix VII.



9.0 Conclusions and Recommendations

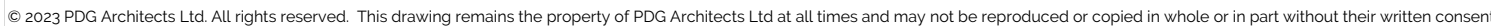
Soils	Widespread significant soil contamination has not been identified at the following intrusive investigation by EGE and the risk is considered low given the Site is largely to be encapsulated by hardstanding/ buildings or a specific clean cover layer in landscaped areas. No volatile contamination has been identified was identified during the soil sampling. It is recommended that the following standard construction phase remediation measures are undertaken during the development to mitigate residual risk: ▽ A 'hotspot protocol' to be in place for groundworkers to report suspected previously unidentified contamination over and above that detailed in this Report; ▽ All groundworkers to be provided with task specific PPE/RPE suitable for the contamination and asbestos identified as part of this assessment; and ▽ A clean certified layer of 150 mm subsoil/topsoil in any new landscaped areas, in accordance with the Yorkshire and Lincolnshire Pollution Advisory Guidance (YALPAG) for clean cover systems, Version 4.1.
Groundwater	The risk to Controlled Waters is considered Very Low and no further works or risk assessment is required.
Ground Gas	Significant on-Site source of ground gas identified from the Site investigation are limited to Made Ground. Based on the results of the preliminary hazardous ground gas monitoring undertaken, the Site has been classified as CS1 - Very Low Risk. No ground gas protection measures are required. Vigilance is required during groundworks for any suspect ground conditions, such as deep Made Ground, organic or deleterious materials and organic contamination which may present a potential source of hazardous ground gas.
Potable Water Pipes	Whilst elevated concentrations of contaminants within soils have not been above the relevant GACs, the identified low-level contamination within Made Ground may require potable water pipes to be upgraded to protectaline, or similar. This will be the decision of the local Water provider and the previous Desktop Assessment should be provided for confirmation.
Geotechnical Recommendations	Topsoil/Made Ground is considered to be too variable, weak and compressible in its existing condition for conventional shallow foundations at the Site. A piled foundation is recommended. It is expected that conventional mechanical excavators will readily remove the Topsoil, Made Ground and Tidal Flat Deposits.



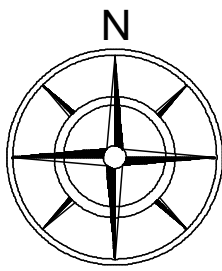
	In addition, the following information is considered pertinent: ▼ The underlying Tidal Flat Deposits have been classified as low plasticity; ▼ Groundwater was encountered between 2.04 and 2.30 m bgl (1.20 and 0.94 m AOD) within the Tidal Flat Deposits across the four return monitoring visits. ▼ Infiltration to land is unlikely to be suitable at the Site and alternative SUDs options may need to be explored. ▼ In accordance with the recommendations of BRE Special Digest 1, 'Concrete in Aggressive Ground' 2005, the conditions of the soils for the Tidal Flat Deposits at the Site would be classified as Design Sulphate Class DS-1 and ACEC Class AC-1 for shallow soils; and ▼ A conservative CBR design value of less than 1.5 % is recommended for pavement and hardstanding.
Recommendations	On the basis of the above, the following recommendations are made: ▼ A 'Hotspot' Protocol to be in place during the groundworkers for workers to act upon should potential contamination, other than that identified as part of this investigation, is identified; ▼ All groundworkers to be provided with task specific PPE/RPE suitable for the contamination and asbestos identified as part of this assessment; ▼ A clean certified layer of 150 mm subsoil/topsoil in any new landscaped areas in accordance with the Yorkshire and Lincolnshire Pollution Advisory Guidance (YALPAG) for clean cover systems, Version 4.1; ▼ Consultation with the Local Water Authority to confirm the requirements of any upgraded potable water pipes, however, upgraded water pipes should be anticipated at this stage; ▼ Additional testing maybe required to support the off-Site disposal of waste soils, including further WAC testing; and ▼ Production of a Remediation Method Statement to support likely planning requirements.

Drawings

Drawing I - Sketch Scheme Plan (Reference. 23035/SK01A)



Drawing II - Topographical Survey (Reference. ASC.23.777)



KEY:		
FH	-	Fire Hydrant
FR	-	Flat Roof Level
G	-	Gully
IC	-	Inspection Cover
MH	-	Manhole Cover
MP	-	Marker Post
RP	-	Rodding Point
SNP	-	Street Name Plate
SV	-	Stop Valve
TIC	-	Telecom Inspection Cover
TP	-	Telegraph Post
WM	-	Water Meter
0.00	-	Top Of Fence/Wall/Building Level
0.00	-	Overhead Electricity Cable Level
0.00	-	Overhead Telephone Cable Level
GRID:		
All Survey Data Shown Has Been Orientated To National Grid With All Levels Related To OS Datum Unless Otherwise Stated.		
DISCLAIMERS:		
The Survey Symbol Used To Represent Tree Spreads Gives An Average Crown Dimension Only.		
Detail Shown On This Drawing Relating To Services Above And Below Ground Are For Indication Only.		
Verification Of This Detail Must Be Sought From The Relevant Authority.		
Chartered Surveyors The Loft Kym Road Bicton Industrial Estate Kimbolton Cambridgeshire PE28 0LW Tel: 01480 212790 Fax: 01480 406456 Internet: www.asc-geomatics.co.uk Email: asc@asc-geomatics.co.uk Registered in England and Wales No. 4500757		
SITE: Fleet Wood Lane School, Spalding, PE12 8NN.		
TITLE: Topographical Survey. As Surveyed 16.11.2023.		
CLIENT: PDG Architects Limited		
© Crown copyright and database rights (2023) OS (100017983)		
	DATE:	07.12.2023
	SCALE:	1:200 @ A1
	DRAWN BY:	Adam Newman
	SURVEYED BY:	Adam Newman
		ASC.23.777

Figures

Figure I - Site Location Map

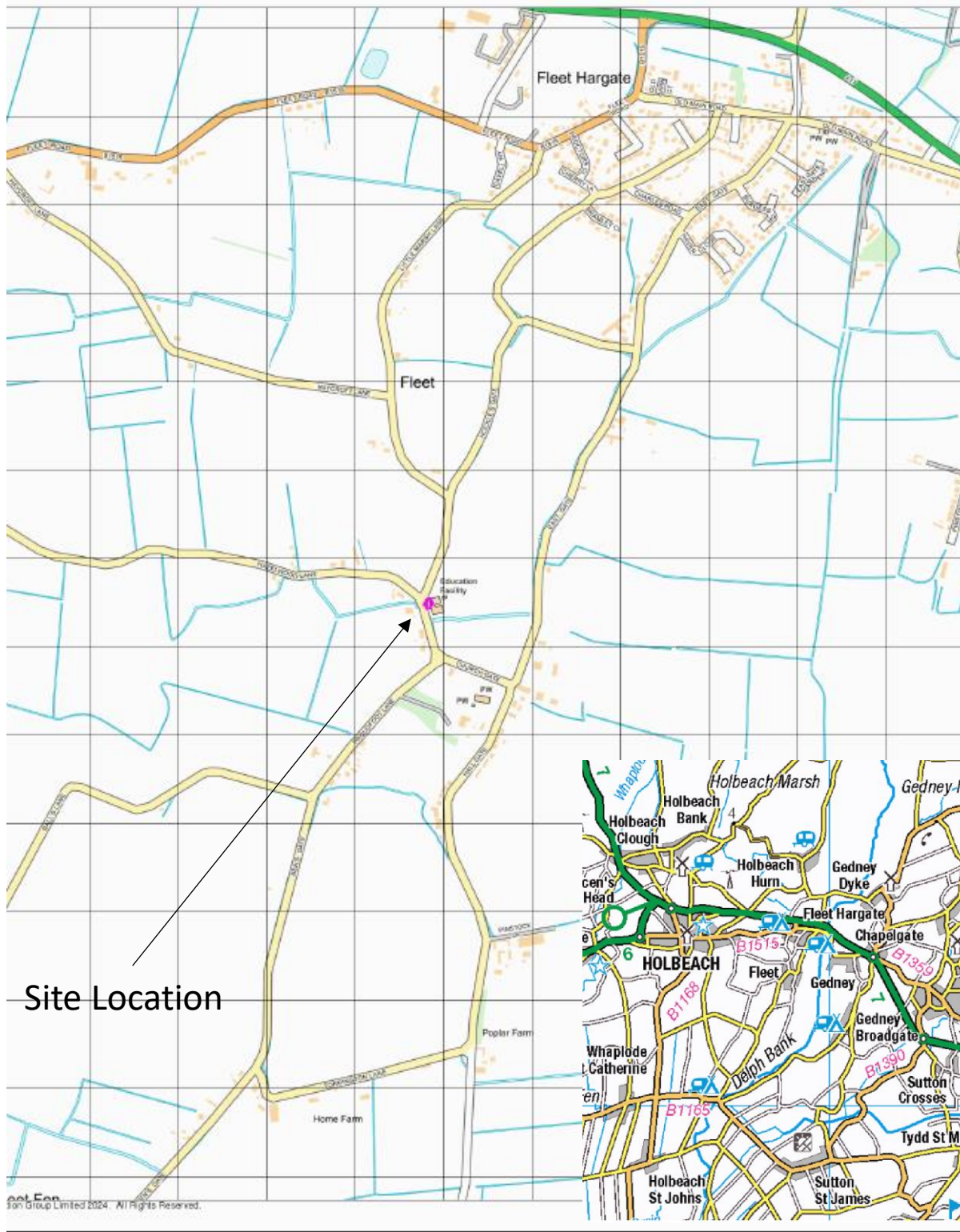


Figure No.

Figure I – Site Location Map

Project Name

Fleet Wood Primary School, Fleet

Client

Lindum BMS

Service

Geo-Environmental Investigation

Date of Issue

September 2024

Project number

EGE-24-05-08-01

evolve
GEO - ENVIRONMENTAL

Figure II - Relevant Feature Plan

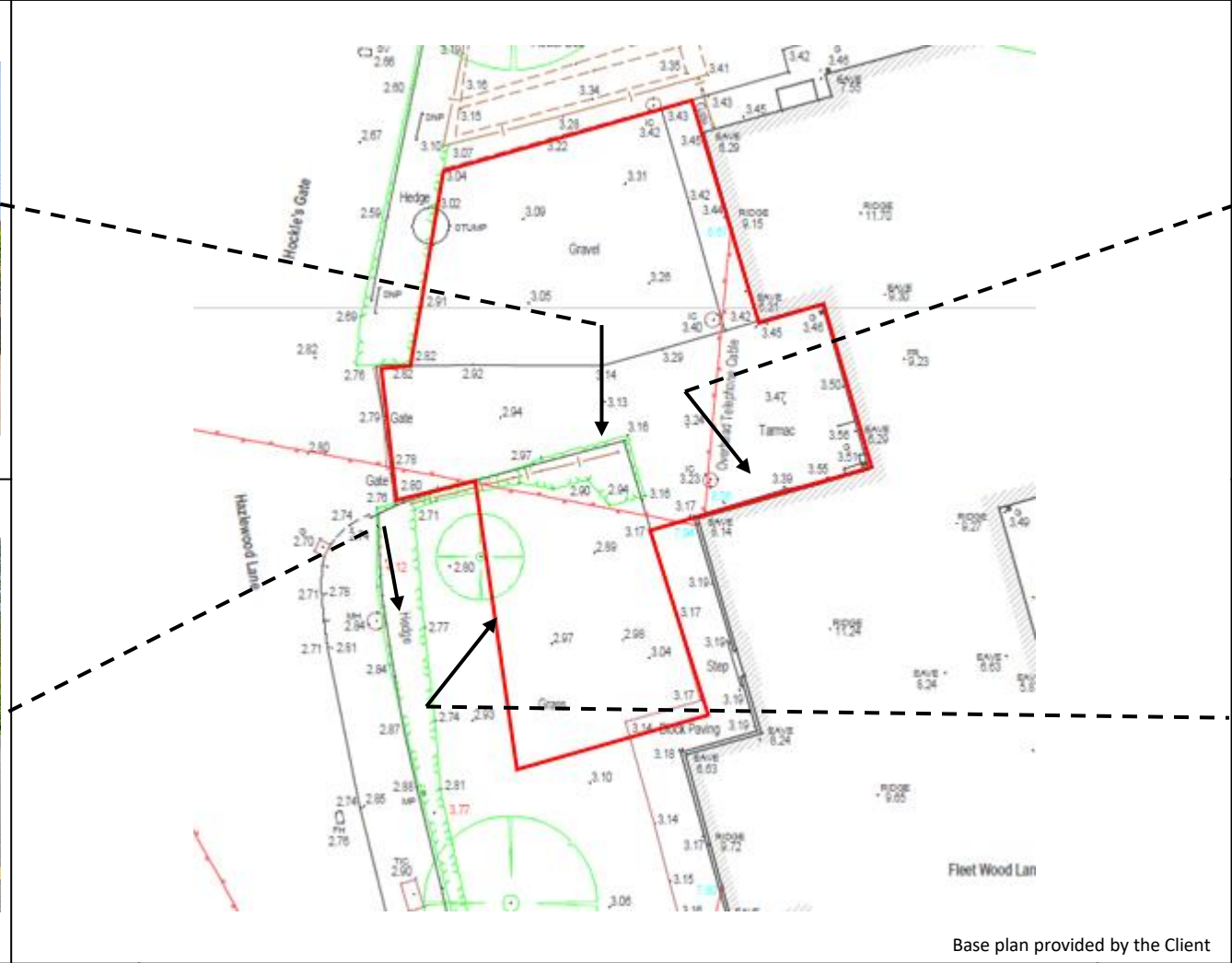
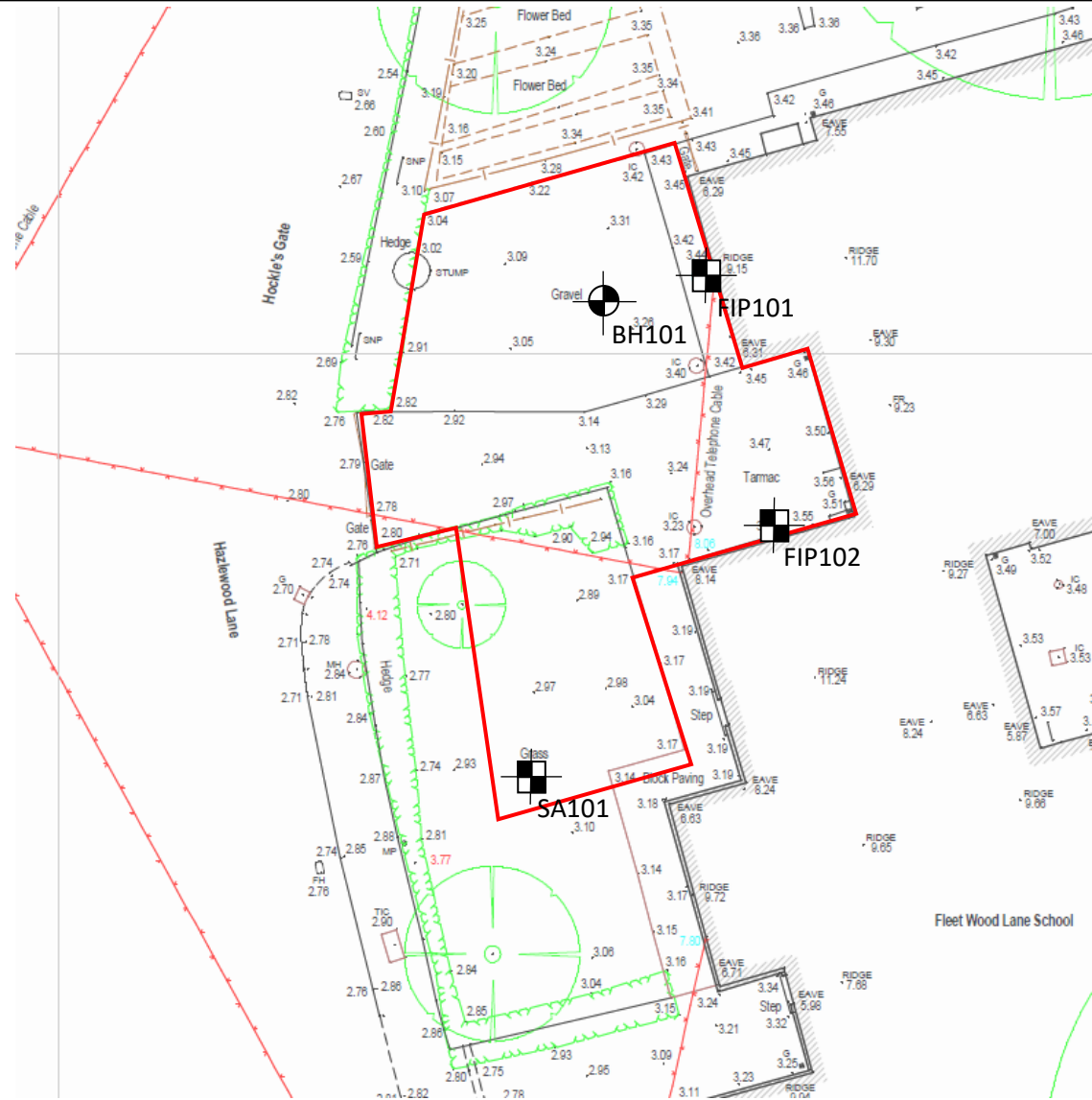


Figure No. and Title	Figure II - Relevant Feature Plan
Project Name	Fleet Wood Primary School, Fleet
Client	Lindum BMS
Service	Geo-Environmental Investigation
Date of Issue	September 2024
Project number	EGE-24-05-08-01

Figure III - Approximate Intrusive Location Plan

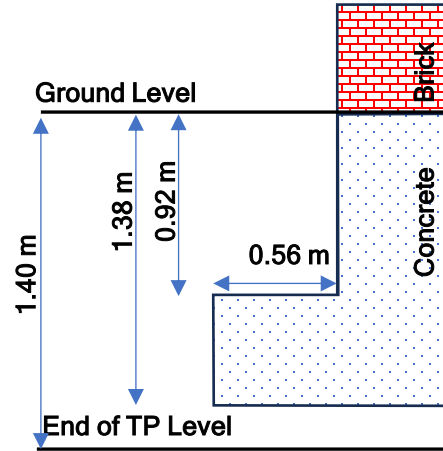


Legend

	Site Boundary
	BRE365 Infiltration Test - SA10X
	Hand Dug Foundation Inspection Pit - FIP10X
	Sonic Borehole - BH10X

Figure No. and Title	Figure III - Approximate Intrusive Location Plan
Project Name	Fleet Wood Primary School, Fleet, Holbeach
Client	Lindum Group
Service	Geo-Environmental Investigation
Date of Issue	September 2024
Project number	EGE-24-05-08-01

Figure IV - Foundation Inspection Pit Logs



Ground Conditions		
Strata	Depth Range (m bgl)	Description
Made Ground	0.00 - 0.13	MADE GROUND: Paving slab over, Concrete.
	0.13 - 0.33	MADE GROUND: Light yellowish brown sandy angular to sub-angular fine to coarse gravel of mixed lithologies including limestone and brick. Sand is fine to coarse.
Tidal Flat Deposits	0.33 - 0.90	Soft dark grey sandy SILT. Sand is fine to coarse.
	0.90 - 1.40	Firm brown sandy SILT. Sand is fine to coarse.
Trial pit complete at 1.40 m bgl, below the foundation level.		

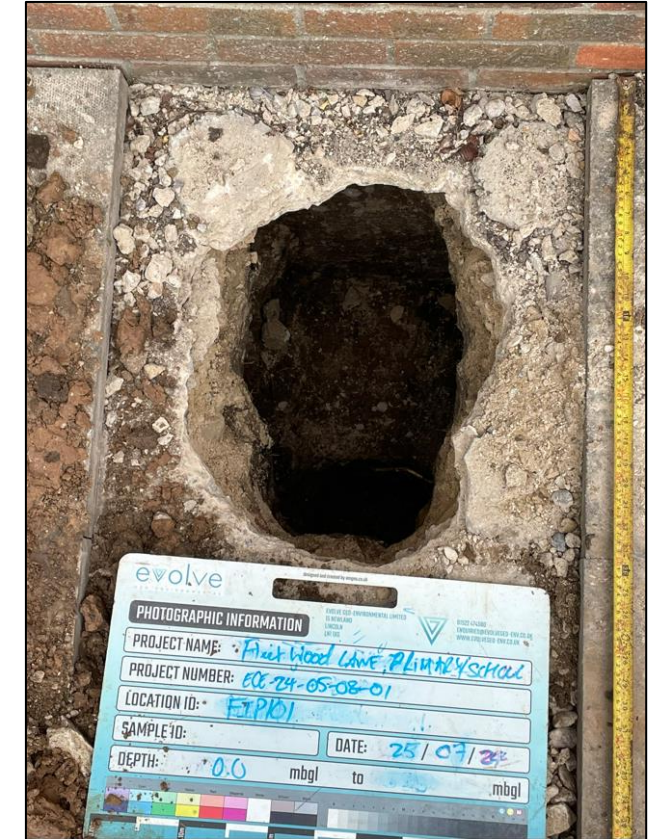
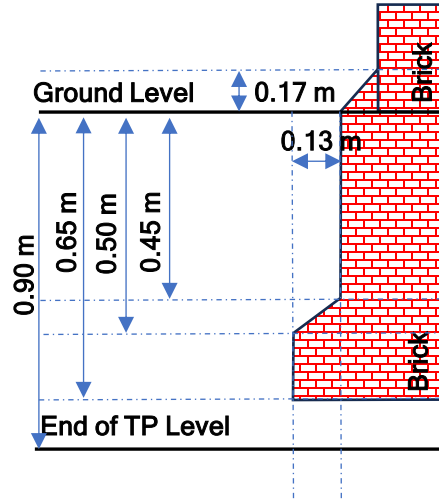


Figure No. and Title	IVa - Foundation Inspection Pit Log - FIP101	
Project Name	Fleet Wood Lane Primary School	
Client	Lindum BMS	
Service	Geo-Environmental Investigation	
Date of Issue	September 2024	
Project number	EGE-24-05-08-01	



Ground Conditions		
Strata	Depth Range (m bgl)	Description
Made Ground	0.00 - 0.07	MADE GROUND: Macadam.
	0.07 - 0.30	MADE GROUND: Light yellowish brown sandy angular to sub-angular fine to coarse gravel of mixed lithologies including limestone and brick. Sand is fine to coarse.
Tidal Flat Deposits	0.30 - 0.90	Soft dark grey sandy SILT. Sand is fine to coarse.
Trial pit complete at 0.90 m bgl, below the foundation level.		

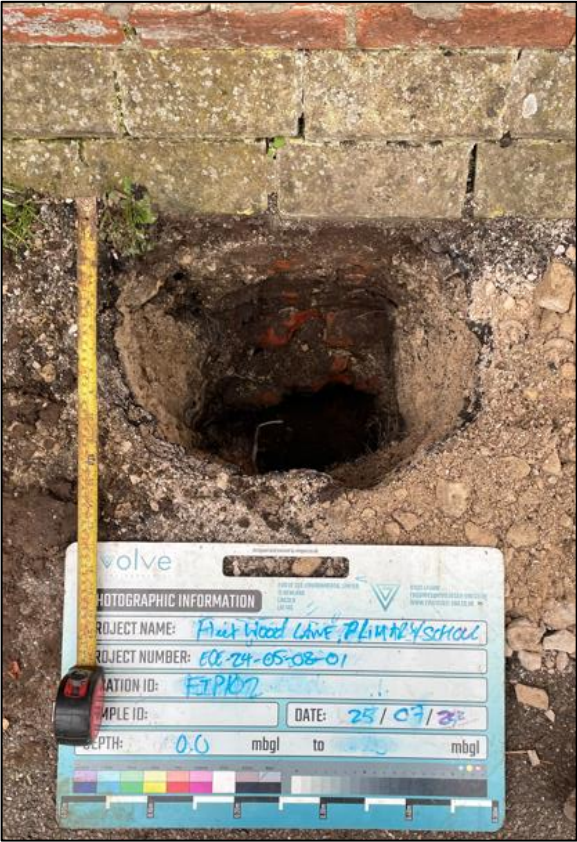


Figure No. and Title	IVb - Foundation Inspection Pit Log - FIP102
Project Name	Fleet Wood Lane Primary School
Client	Lindum BMS
Service	Ground Investigation
Date of Issue	September 2024
Project number	EGE-24-05-08-01

Appendices

Appendix I - Standard Limitations

Limitations

The conclusions and recommendations made in this Report are limited to those that can be made based on the findings of the investigation and in the context of the proposed development.

Where comments are made based on information obtained from third parties, EGE assumes that all third party information is true and correct. No independent action has been undertaken to validate the findings of third parties, unless specifically stated.

This Report has been prepared in accordance with our understanding of current best practice. However changes to best practice, guidance or legislation may necessitate revision of this Report after the date of issue.

EGE has prepared this Report for the sole use and reliance of the Client, in accordance with our Standard Conditions and Limitations issued with the proposal. This Report may not be used or relied upon by any unauthorised third party without the explicit written agreement of EGE. Third parties use the information at their own risk.

Appendix II - Exploratory Hole Logs

Evolve Geo-Environmental Limited
C/O 15 Newland, LN1 1XG,
Tel: 07538173418
Email: josh@evolvegeo-env.co.uk



Project:	Fleet Wood Lane Primary School	Project No:	EGE-24-05-08-01	Hole ID:	BH101
		Date:	25/07/2024	Client:	Lindum BMS

DESCRIPTION OF STRATA	LEGEND	WATER	CASING DEPTH / (Diam. mm)	DEPTH (Thickness)	Sample Details			Test Results	Installation/ Backfill Details
					TYPE	REF	Depth		
MADE GROUND: Multicoloured slightly sandy angular to sub-rounded fine to coarse flint gravel. sand is fine to coarse.				0.05 0.30 0.90		ES1 CBR1	0.10 0.30 - 0.90		
MADE GROUND: Yellowish brown very sandy angular to sub-angular fine to coarse limestone gravel. Sand is fine to coarse.				(1.10) 2.00		ES2 D1 BRE1	1.20 - 1.65 1.80 2.00 - 2.45	CPT N=2 1,0/0,0,1,1 CPT N=4 1,0/1,1,1,1	
Soft dark grey sandy SILT. Sand is fine to coarse. (TIDAL FLAT DEPOSITS)				2.70 3.00			2.20 3.00 - 3.45	CPT N=8 1,2/2,2,2,2	
Very soft grey and brown mottled sandy SILT. Sand is fine to coarse. (TIDAL FLAT DEPOSITS)							4.00 - 4.45	CPT N=9 2,2/2,2,2,3	
Very loose brown silty fine to coarse SAND. (TIDAL FLAT DEPOSITS)						B1 BRE2	5.00 - 6.00 5.00	CPT N=11 2,3/3,2,3,3	
Grey silty fine to coarse SAND. (TIDAL FLAT DEPOSITS)							5.00 - 5.45 6.00 - 6.45	CPT N=10 2,2/2,2,3,3	
Loose becoming medium dense brown silty fine to coarse SAND. (TIDAL FLAT DEPOSITS)				(7.50)			7.50 - 7.95	CPT N=15 3,4/3,4,4,4	
							9.00 - 9.45	CPT N=19 4,4/4,5,5,5	
Stiff brown gravelly slightly sandy SILT. Gravel is angular to sub-angular fine to medium flint. (TIDAL FLAT DEPOSITS)				10.50 10.80		D2	10.50 - 10.95 10.70	CPT N=23 3,5/5,5,6,7	
Medium dense brown slightly silty sandy angular to sub-angular fine to medium flint GRAVEL. Sand is fine to coarse. (TIDAL FLAT DEPOSITS)				(2.20) 13.00		B2	12.00 - 13.00 12.00 - 12.45	CPT N=25 4,5/5,6,6,8	
Medium dense becoming dense brown silty fine to coarse SAND. (TIDAL FLAT DEPOSITS)				(3.00)			13.50 - 13.95	CPT N=28 5,6/6,7,7,8	
				16.00			15.00 - 15.45	CPT N=43 6,7/9,9,10,15	
Very stiff brown gravelly slightly sandy SILT. Gravel is angular to sub-angular fine to medium flint. (TIDAL FLAT DEPOSITS)				16.70		D3	16.50 16.50 - 16.95	CPT N=35 6,8/7,8,9,11	
Dense brown silty gravelly fine to coarse SAND. Gravel is angular to sub-angular fine to medium flint. (TIDAL FLAT DEPOSITS)				17.70			18.00 - 18.45	CPT N=43 7,8/8,10,10,15	
Dense yellowish brown silty sandy angular to sub-angular fine to medium flint GRAVEL. Sand is fine to coarse. (TIDAL FLAT DEPOSITS)				(1.30) 19.00			19.50 - 19.95	CPT N=50/275mm (7,9/10,12,15,13/50mm)	
Very dense yellowish brown slightly silty gravelly fine to coarse SAND. Gravel is angular to sub-angular fine to medium flint. (TIDAL FLAT DEPOSITS)				20.00					
Borehole complete at 20.00 m bgl.									

REMARKS :

1. Logged in general accordance with BS5930:2015+A1:2020;
2. Location cleared for underground utilities by Safe Dig Surveys Limited;
3. Hand dug inspection pit to 1.20 m bgl;
4. Groundwater not recorded due to addition of water during drilling;
5. Borehole complete at 20.00 m bgl; and
6. Borehole installed as 50 mm internal diameter monitoring well.

CHISELLING

Depth From	Depth To	Time Taken

NO CHISELLING UNDERTAKEN:

WATER LEVEL OBSERVATIONS

Date	Time	Water Strike	Standing Level	Casing Depth

NO WATER ENCOUNTERED:

BOREHOLE DIAMETER**CASING DIAMETER****DEPTH SEALED**

All measurements in metres
 unless otherwise stated

20m/page

Scale: 1:137.50

Coordinates to Local Grid
 Ground Level to Local Datum

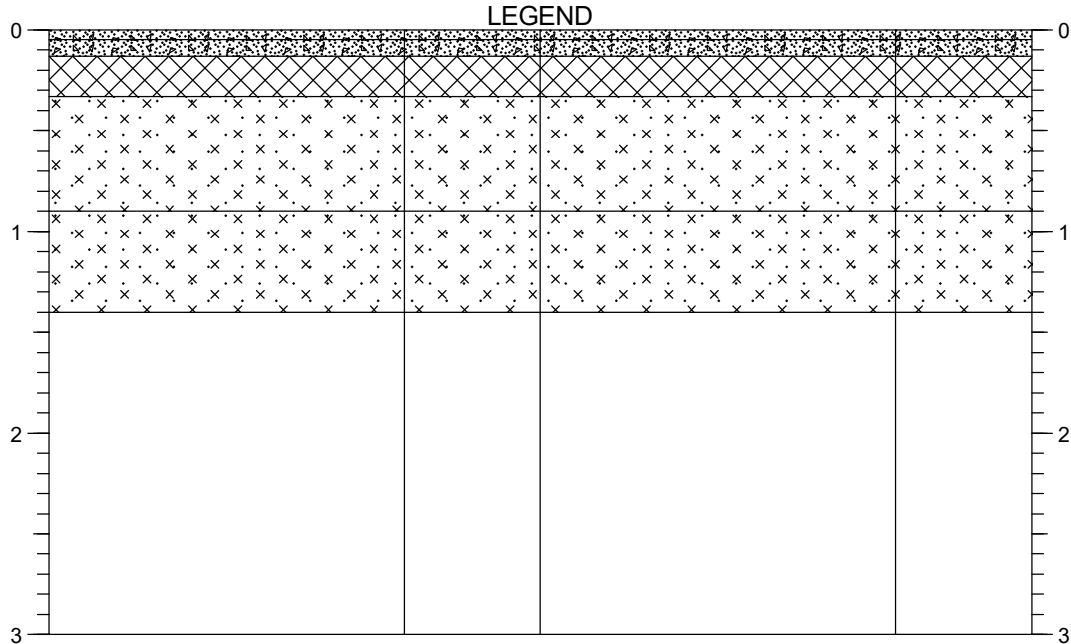
Page 1 of 1

Plant Used: Eijkelamp XL140	Coordinates / Level (mAOD): E: 538767.64 N: 323901.888 Level: 3.239	Logged By: JJR	Checked By: PB	Approved By: PW
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Evolve Geo-Environmental Limited
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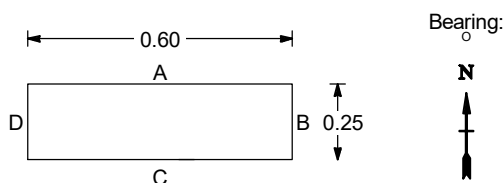


Project:	Fleet Wood Lane Primary School	Project No:	EGE-24-05-08-01	Hole ID:	FIP101
	TRIAL PIT LOG	Date:	25/07/2024	Client:	Lindum BMS



STRATA			SAMPLES		TESTS	
Depth	No	DESCRIPTION	Depth	No	Depth	Results
0.05		MADE GROUND: Concrete paving slab.	0.20	WAC1		
0.13		MADE GROUND: Concrete.				
0.33		MADE GROUND: Light yellowish brown sandy angular to sub-angular fine to coarse gravel of mixed lithologies including limestone and brick. Sand is fine to coarse.				
(0.57)		Soft dark grey sandy SILT. Sand is fine to coarse. (TIDAL FLAT DEPOSITS)				
0.90			1.30	ES1		
(0.50)		Firm brown sandy SILT. Sand is fine to coarse. (TIDAL FLAT DEPOSITS)				
1.40						
		Hand Dug Foundation Inspection Pit complete at 1.40 m bgl, below the foundation.				

Shoring/Support:
Stability:



REMARKS :

1. Logged in general accordance with BS5930:2015+A1:2020;
2. Location cleared for underground utilities by Safe Dig Surveys Limited;
3. Trial pit remained stable throughout;
4. Groundwater not encountered; and
5. Trial pit complete at 1.40 m bgl beneath the foundation.

All measurements in metres
unless otherwise stated

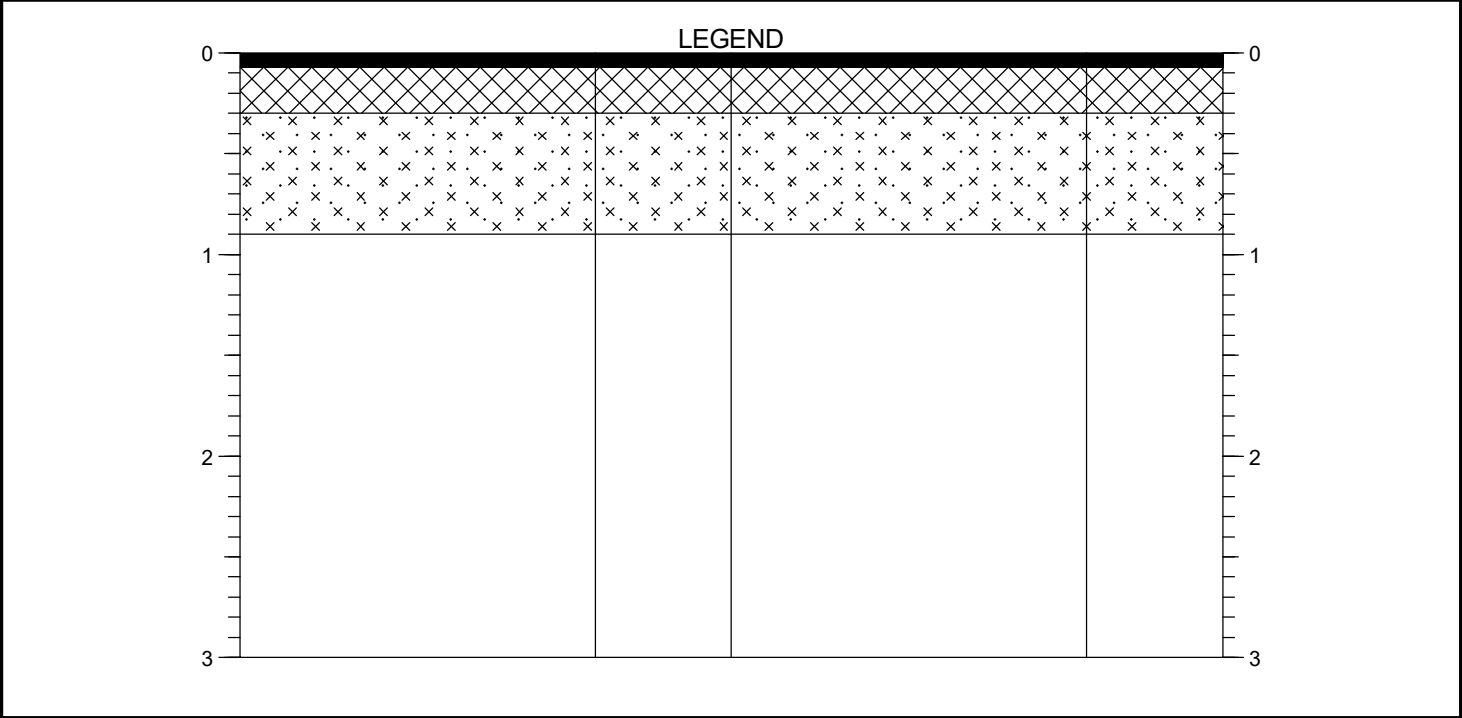
3m/page

Scale: 1:37.5

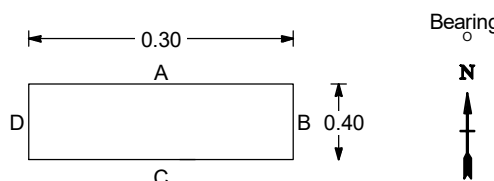
Coordinates to Local Grid
Ground Level to Local Datum

Plant Used:	Hand Tools	Coordinates / Level (mAOD):	E: 538771.299 N: 323902.809 Level: 4.147	Logged By:	JJR	Checked By:	PB	Approved By:	PW
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Evolve Geo-Environmental Limited C/O 15 Newland, LN1 1XG, Tel: 07538173418 Email: josh@evolvegeo-env.co.uk			
Project:	Fleet Wood Lane Primary School	Project No:	EGE-24-05-08-01
		Hole ID:	FIP102
TRIAL PIT LOG		Date:	25/07/2024
		Client:	Lindum BMS



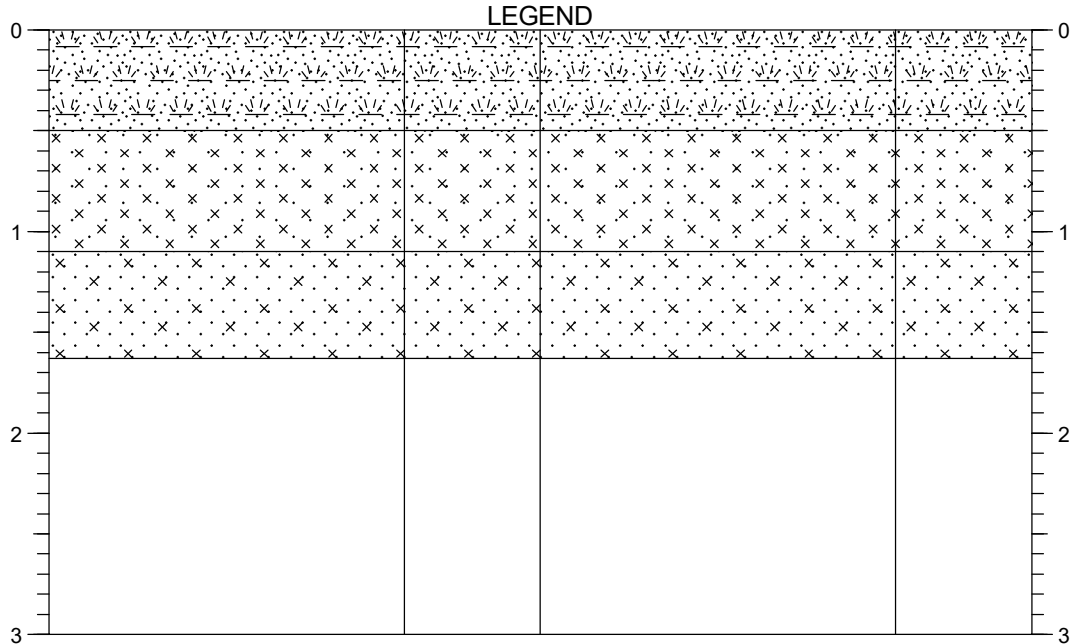
STRATA			SAMPLES		TESTS	
Depth	No	DESCRIPTION	Depth	No	Depth	Results
0.07		MADE GROUND: Macadam.	0.20	ES1		
0.30		MADE GROUND: Light yellowish brown sandy angular to sub-angular fine to coarse gravel of mixed lithologies including limestone and brick. Sand is fine to coarse.				
(0.60)		Soft dark grey sandy SILT. Sand is fine to coarse. (TIDAL FLAT DEPOSITS)				
0.90						
		Hand Dug Foundation Inspection Pit complete at 0.90 m bgl, below the foundation.				

Shoring/Support: Stability:				REMARKS : 1. Logged in general accordance with BS5930:2015+A1:2020; 2. Location cleared for underground utilities by Safe Dig Surveys Limited; 3. Trial pit remained stable throughout; 4. Groundwater not encountered; and 5. Trial pit complete at 0.90 m bgl beneath the foundation.	
All measurements in metres unless otherwise stated		3m/page	Scale: 1:37.5	Coordinates to Local Grid Ground Level to Local Datum	
Plant Used:	Hand Tools	Coordinates / Level (mAOD): E: 538773.653 N: 323893.973 Level: 3.407	Logged By: JJR	Checked By: PB	Approved By: PW

Evolve Geo-Environmental Limited
C/O 15 Newland, LN1 1XG,
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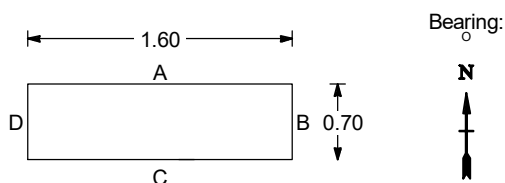


Project:	Fleet Wood Lane Primary School	Project No:	EGE-24-05-08-01	Hole ID:	SA101
	TRIAL PIT LOG	Date:	24/07/2024	Client:	Lindum BMS



STRATA			SAMPLES		TESTS	
Depth	No	DESCRIPTION	Depth	No	Depth	Results
(0.50)		TOPSOIL: Grass over soft dark brown sandy SILT with frequent fine rootlets and a singular decayed tree stump. Sand is fine to coarse.	0.20	ES1		
0.50						
(0.60)		Soft grey slightly sandy SILT. Sand is fine to coarse. (TIDAL FLAT DEPOSITS)	0.60	WAC1		
1.10			0.80	D1		
(0.53)		Light grey, light brown and orangish brown mottled silty fine to coarse SAND. (TIDAL FLAT DEPOSITS)	1.10-1.50	B1		
1.63						
		Trial Pit complete at 1.63 m bgl.				

Shoring/Support:
 Stability:



REMARKS :

1. Logged in general accordance with BS5930:2015+A1:2020;
2. Location cleared for underground utilities by Safe Dig Surveys Limited;
3. Trial pit remained stable throughout;
4. Groundwater not encountered;
5. BRE365 infiltration test undertaken within the Trial Pit; and
6. Trial pit backfilled with arising and nominally compacted.

All measurements in metres
 unless otherwise stated

3m/page

Scale: 1:37.5

Coordinates to Local Grid
 Ground Level to Local Datum

Plant Used:	Coordinates / Level (mAOD):	Logged By:	Checked By:	Approved By:
JCB 3CX	E: 538765.071 N: 323885.289 Level: 3.057	JJR	PB	PW

Appendix III - Chemical Analytical Results



Evolve Geo-Environmental Limited
15 Newland
Lincoln
Lincolnshire

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

e: josh@evolvegeo-env.co.uk

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 24-033287

Project / Site name:	Fleet Wood Lane Primary School	Samples received on:	29/07/2024
Your job number:	EGE-24-05-08-01	Samples instructed on/ Analysis started on:	29/07/2024
Your order number:	EGE0464	Analysis completed by:	02/08/2024
Report Issue Number:	1	Report issued on:	02/08/2024
Samples Analysed:	9 soil samples		

Signed: _____

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.



4041



Environmental Science

Analytical Report Number: 24-033287

Project / Site name: Fleet Wood Lane Primary School

Your Order No: EGE0464

Lab Sample Number				271291	271292	271293	271294	271295
Sample Reference				BH101	BH101	BH101	BH101	FIP101
Sample Number				ES1	ES2	BRE1	BRE2	WAC1
Depth (m)				0.10	0.60	2.20	5.00	0.20
Date Sampled				25/07/2024	25/07/2024	25/07/2024	25/07/2024	25/07/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Test Limit of detection	Test Accreditation Status		

Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	22.8
Moisture Content	%	0.01	NONE	4.6	20	21	22	5.4
Total mass of sample received	kg	0.1	NONE	0.8	0.8	0.4	0.5	0.8

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	-	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	KJK	KJK	-	-	KJK

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	9.8	7.7	9	9.2	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	130	81	63	37	-
Water Soluble SO ₄ 16hr extraction (2:1)	mg/l	1.25	MCERTS	65.4	40.3	31.4	18.5	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.2	1.8	-	-	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.07	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.07	-	-	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	0.57	0.93	-	-	-
Anthracene	mg/kg	0.05	MCERTS	0.16	0.14	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	2.6	3	-	-	-
Pyrene	mg/kg	0.05	MCERTS	2.3	2.7	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.2	1.2	-	-	-
Chrysene	mg/kg	0.05	MCERTS	1.4	1.5	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	1.2	1.7	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.6	0.7	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.2	1.5	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.7	0.86	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.24	0.2	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.76	0.94	-	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	13	15.4	-	-	-
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	2.7	13	-	-	7.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	< 0.2	-	-	0.4
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	-	-	< 1.8
Chromium (III)	mg/kg	1	NONE	5.5	18	-	-	16
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	5.7	18	-	-	16
Copper (aqua regia extractable)	mg/kg	1	MCERTS	5.5	23	-	-	6.1
Lead (aqua regia extractable)	mg/kg	1	MCERTS	11	33	-	-	11
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	-	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	2.9	16	-	-	8.4
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	44	77	-	-	50

Analytical Report Number: 24-033287

Project / Site name: Fleet Wood Lane Primary School

Your Order No: EGE0464

Lab Sample Number				271291	271292	271293	271294	271295
Sample Reference				BH101	BH101	BH101	BH101	FIP101
Sample Number				ES1	ES2	BRE1	BRE2	WAC1
Depth (m)				0.10	0.60	2.20	5.00	0.20
Date Sampled				25/07/2024	25/07/2024	25/07/2024	25/07/2024	25/07/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					

Petroleum Hydrocarbons

TPHCWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	-	-
TPHCWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	-	-
TPHCWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	-	-
TPHCWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
TPHCWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	< 2.0	< 2.0	-	-	-
TPHCWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	-	-	-
TPHCWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	-	-	-
TPHCWG - Aliphatic >EC5 - EC35 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	< 10	< 10	-	-	-

TPHCWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	-	-
TPHCWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	-	-
TPHCWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.02	MCERTS	< 0.020	< 0.020	-	-	-
TPHCWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
TPHCWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0	-	-	-
TPHCWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	12	-	-	-
TPHCWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	20	22	-	-	-
TPHCWG - Aromatic >EC5 - EC35 _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	20	34	-	-	-

VOCs

MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	-	-	-
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	-	-
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	-	-
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	-	-
p & m-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	-	-
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



4041



Environmental Science

Analytical Report Number: 24-033287

Project / Site name: Fleet Wood Lane Primary School

Your Order No: EGE0464

Lab Sample Number				271296	271297	271298	271299
Sample Reference				FIP101	FIP102	SA101	SA101
Sample Number				ES1	ES1	ES1	WAC
Depth (m)				1.30	0.20	0.20	0.60
Date Sampled				25/07/2024	25/07/2024	24/07/2024	24/07/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Test Limit of detection	Test Accreditation Status	

Stone Content	%	0.1	NONE	< 0.1	34.7	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	19	7	23	16
Total mass of sample received	kg	0.1	NONE	0.8	0.8	0.8	0.8

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	KJK	KJK	KJK	KJK

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	8.4	9.8	7.9	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	50	34	15	-
Water Soluble SO ₄ 16hr extraction (2:1)	mg/l	1.25	MCERTS	24.8	17.1	7.65	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.5	0.5	1.3	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.17	< 0.05	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-
Fluoranthene	mg/kg	0.05	MCERTS	0.06	0.63	0.12	-
Pyrene	mg/kg	0.05	MCERTS	0.06	0.66	0.1	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.31	< 0.05	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.36	0.06	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.34	< 0.05	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.2	< 0.05	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.32	0.05	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.19	< 0.05	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.22	< 0.05	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	3.4	< 0.80	-
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	3.6	7.2	14
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.4	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	28	5.7	13	20
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	5.9	14	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	12	11	10	20
Lead (aqua regia extractable)	mg/kg	1	MCERTS	14	21	22	31
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	25	3.6	12	18
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	61	53	51	55



4041



Environmental Science

Analytical Report Number: 24-033287

Project / Site name: Fleet Wood Lane Primary School

Your Order No: EGE0464

Lab Sample Number				271296	271297	271298	271299
Sample Reference				FIP101	FIP102	SA101	SA101
Sample Number				ES1	ES1	ES1	WAC
Depth (m)				1.30	0.20	0.20	0.60
Date Sampled				25/07/2024	25/07/2024	24/07/2024	24/07/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status				

Petroleum Hydrocarbons

TPHCWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	-
TPHCWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	-
TPHCWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	-
TPHCWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-
TPHCWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	-
TPHCWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	-
TPHCWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	12	< 8.0	-
TPHCWG - Aliphatic >EC5 - EC35 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	< 10	12	< 10	-

TPHCWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	-
TPHCWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	-
TPHCWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.02	MCERTS	< 0.020	< 0.020	< 0.020	-
TPHCWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-
TPHCWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	-
TPHCWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10	< 10	-
TPHCWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	25	< 10	-
TPHCWG - Aromatic >EC5 - EC35 _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	< 10	25	< 10	-

VOCs

MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	-
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	-
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	-
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	-
p & m-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	-
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



Analytical Report Number : 24-033287

Project / Site name: Fleet Wood Lane Primary School

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
271291	BH101	ES1	0.1	Brown sand with gravel
271292	BH101	ES2	0.6	Brown clay and sand with gravel and vegetation
271293	BH101	BRE1	2.2	Brown sand
271294	BH101	BRE2	5	Brown sand
271295	FIP101	WAC1	0.2	Light brown sand with concrete and stones
271296	FIP101	ES1	1.3	Brown sandy clay
271297	FIP102	ES1	0.2	Brown sandy loam with tar and stones
271298	SA101	ES1	0.2	Brown sandy clay
271299	SA101	WAC	0.6	Brown loam and clay

Analytical Report Number : 24-033287

Project / Site name: Fleet Wood Lane Primary School

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088	D/W	MCERTS
Chromium III in soil	In-house method by calculation from total Cr and Cr VI	In-house method by calculation	L080	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazine followed by colorimetry	In-house method	L080	W	MCERTS

Analytical Report Number : 24-033287

Project / Site name: Fleet Wood Lane Primary School

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

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Analytical Report Number : 24-033289

Project / Site name:	Fleet Wood Lane Primary School	Samples received on:	29/07/2024
Your job number:	EGE-24-05-08-01	Samples instructed on/ Analysis started on:	29/07/2024
Your order number:	EGE0464	Analysis completed by:	07/08/2024
Report Issue Number:	1	Report issued on:	07/08/2024
Samples Analysed:	2 10:1 WAC samples		

Signed:

Dominika Liana
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.



Analytical Report Number: 24-033289
Project / Site name: Fleet Wood Lane Primary School
Your Order No: EGE0464

Lab Sample Number				271302	271303
Sample Reference				FIP101	SA101
Sample Number				WAC1	WAC
Depth (m)				0.20	0.60
Date Sampled				25/07/2024	24/07/2024
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Test Limit of detection
				Test Accreditation Status	

Stone Content	%	0.1	NONE	22.8	< 0.1
Moisture Content	%	0.01	NONE	5.4	16
Total mass of sample received	kg	0.1	NONE	0.8	0.8

General Inorganics

pH (L005B)	pH Units	N/A	MCERTS	10.5	8.2
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.2	1.4
Loss on Ignition @ 450°C	%	0.2	MCERTS	1.2	3.1
Acid Neutralisation Capacity	+/- mmol/kg	-9999	NONE	34	3.5

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.33	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.31	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	2.7	0.13
Anthracene	mg/kg	0.05	MCERTS	0.51	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	3	0.31
Pyrene	mg/kg	0.05	MCERTS	2.6	0.26
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.9	0.15
Chrysene	mg/kg	0.05	MCERTS	1.1	0.17
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.9	0.17
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.39	0.08
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.79	0.13
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.43	0.08
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.49	0.09
Coronene	mg/kg	0.05	NONE	0.21	< 0.05

Total PAH

Total WAC-17 PAHs	mg/kg	0.85	NONE	14.7	1.56
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Petroleum Hydrocarbons

Mineral Oil (EC10 - EC40) EH_CU_1D_AL	mg/kg	10	NONE	< 10	< 10
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VOCs

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0
p & m-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0
Total BTEX	µg/kg	5	MCERTS	< 5.0	< 5.0



Analytical Report Number: 24-033289
Project / Site name: Fleet Wood Lane Primary School
Your Order No: EGE0464

Lab Sample Number				271302	271303
Sample Reference				FIP101	SA101
Sample Number				WAC1	WAC
Depth (m)				0.20	0.60
Date Sampled				25/07/2024	24/07/2024
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Test Limit of detection
				Test Accreditation Status	

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001	< 0.001
Total PCBs	mg/kg	0.007	MCERTS	< 0.007	< 0.007

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



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Waste Acceptance Criteria Analytical Results							
Report No:	24-033289						
					Client: EGEL		
Location	Fleet Wood Lane Primary School						
Lab Reference (Sample Number)	271302				Landfill Waste Acceptance Criteria		
Sampling Date	25/07/2024				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	FIP101 WAC1						
Depth (m)	0.20						
Solid Waste Analysis							
TOC (%)**	0.2				3%	5%	6%
Loss on Ignition (%) **	1.2				--	--	10%
BTEX (µg/kg) **	< 5.0				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	14.7				100	--	--
pH (units)**	10.5				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	34				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.00100			< 0.0100	0.5	2	25
Barium *	0.0316			0.316	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.022			0.22	0.5	10	70
Copper *	0.015			0.15	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	0.000897			0.00897	0.5	10	30
Nickel *	0.0022			0.022	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	0.0019			0.019	0.06	0.7	5
Selenium *	0.0062			0.062	0.1	0.5	7
Zinc *	0.0072			0.072	4	50	200
Chloride *	3.7			37	800	15000	25000
Fluoride*	0.11			1.1	10	150	500
Sulphate *	15			150	1000	20000	50000
TTDS*	380			3800	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	4.98			49.8	500	800	1000
Leach Test Information							
Stone Content (%)	22.8						
Sample Mass (kg)	0.8						
Dry Matter (%)	95						
Moisture (%)	5.4						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.				*= UKAS accredited (liquid eluate analysis only)			
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation				** = MCERTS accredited			

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.



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Waste Acceptance Criteria Analytical Results							
Report No:	24-033289						
					Client: EGEL		
Location	Fleet Wood Lane Primary School						
Lab Reference (Sample Number)	271303				Landfill Waste Acceptance Criteria		
Sampling Date	24/07/2024				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	SA101 WAC						
Depth (m)	0.60						
Solid Waste Analysis							
TOC (%)**	1.4				3%	5%	6%
Loss on Ignition (%) **	3.1				--	--	10%
BTEX (µg/kg) **	< 5.0				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	1.56				100	--	--
pH (units)**	8.2				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	3.5				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1			10:1	Limit values for compliance leaching test		
	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.00100			< 0.0100	0.5	2	25
Barium *	0.0112			0.112	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	< 0.00040			< 0.0040	0.5	10	70
Copper *	0.021			0.21	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	< 0.000400			< 0.00400	0.5	10	30
Nickel *	0.0027			0.027	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0050			0.050	4	50	200
Chloride *	1.0			10	800	15000	25000
Fluoride*	0.92			9.2	10	150	500
Sulphate *	1.6			16	1000	20000	50000
TDS*	52			520	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	20.4			204	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.8						
Dry Matter (%)	84						
Moisture (%)	16						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.					*= UKAS accredited (liquid eluate analysis only)		
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation					** = MCERTS accredited		

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.



Analytical Report Number : 24-033289
Project / Site name: Fleet Wood Lane Primary School

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
271302	FIP101	WAC1	0.2	Light brown sand with concrete and stones
271303	SA101	WAC	0.6	Brown loam and clay

Analytical Report Number : 24-033289
Project / Site name: Fleet Wood Lane Primary School

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
pH at 20°C in soil	Determination of pH in soil by addition of water followed by electrometric measurement	In-house method	L005B	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031B	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination	L033B	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Sample Preparation		In-house method	L043B	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046B	W	NONE
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088	D/W	NONE
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser	In-house based on MEWAM Method ISBN 0117516260	L082B	W	ISO 17025



Analytical Report Number : 24-033289
Project / Site name: Fleet Wood Lane Primary School

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

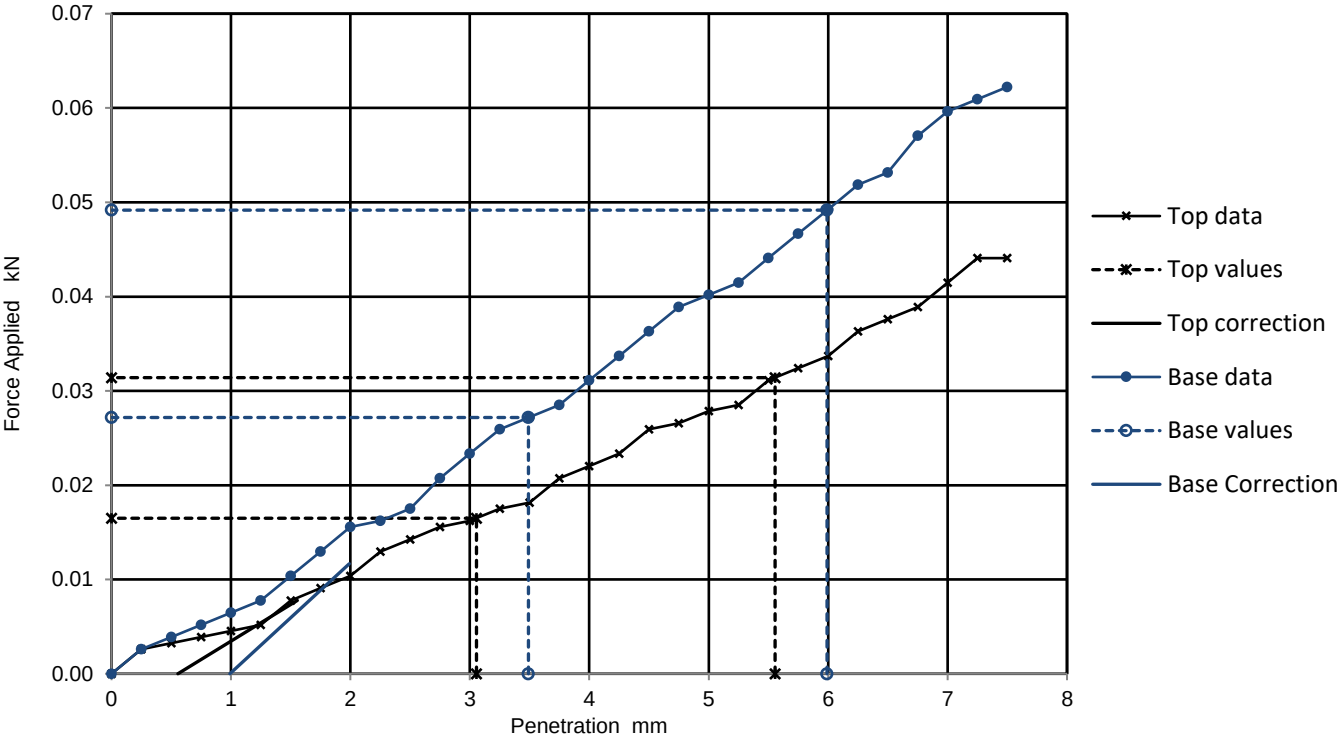
Appendix IV - Geotechnical Laboratory Results

GQF-008-36 Issue 01 - Oct 22	California Bearing Ratio (CBR)			Job Ref	J280320
				Borehole/Pit No.	BH101
Project Name	Fleetwood Lane Primary School			Sample No.	1
Soil Description	Dark brown slightly gravelly sandy CLAY			Depth m	0.30
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description				KeyLAB ID	TTLP202407318
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED		Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer		Period of soaking	days	
			Time to surface	days	
			Amount of swell recorded	mm	
Material retained on 20mm sieve removed	2	%	Dry density after soaking	Mg/m ³	
Initial Specimen details	Bulk density	1.90	Mg/m ³	Surcharge applied	0 kg
	Dry density	1.48	Mg/m ³		0 kPa
	Moisture content	28.2	%		

Force v Penetration Plots



Results

TOP
BASE

Curve correction applied	CBR Values, %			
	2.5mm	5mm	Highest	Average
Yes	0.12	0.16	0.16	N/A
Yes	0.21	0.25	0.25	

Moisture Content	%
	27.9
	28.2

Remarks



CBR

Project Name

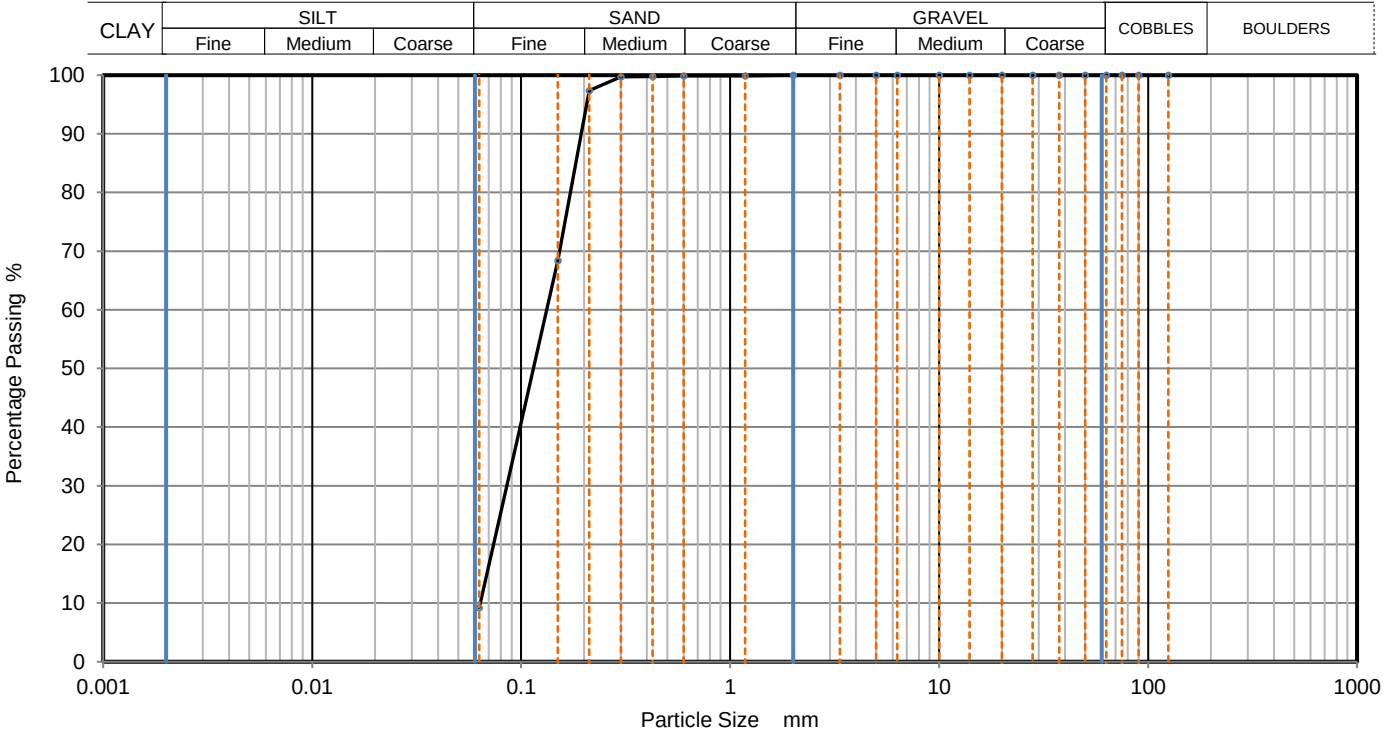
Fleetwood Lane Primary School

All tests performed in accordance with BS1377:1990 unless specified otherwise

Date Printed	12/08/2024
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INDEX

GQF-008-55 Issue 01 - Oct 22	PARTICLE SIZE DISTRIBUTION			Job Ref	J280320
				Borehole/Pit No.	BH101
Project Name	Fleetwood Lane Primary School			Sample No.	1
Soil Description	Brown slightly silty SAND			Depth, m	5.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	TTLP2024073112



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	100		
0.3	100		
0.212	97		
0.15	68		
0.063	9		

Dry Mass of sample, g	2451
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Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	91
Fines <0.063mm	9

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

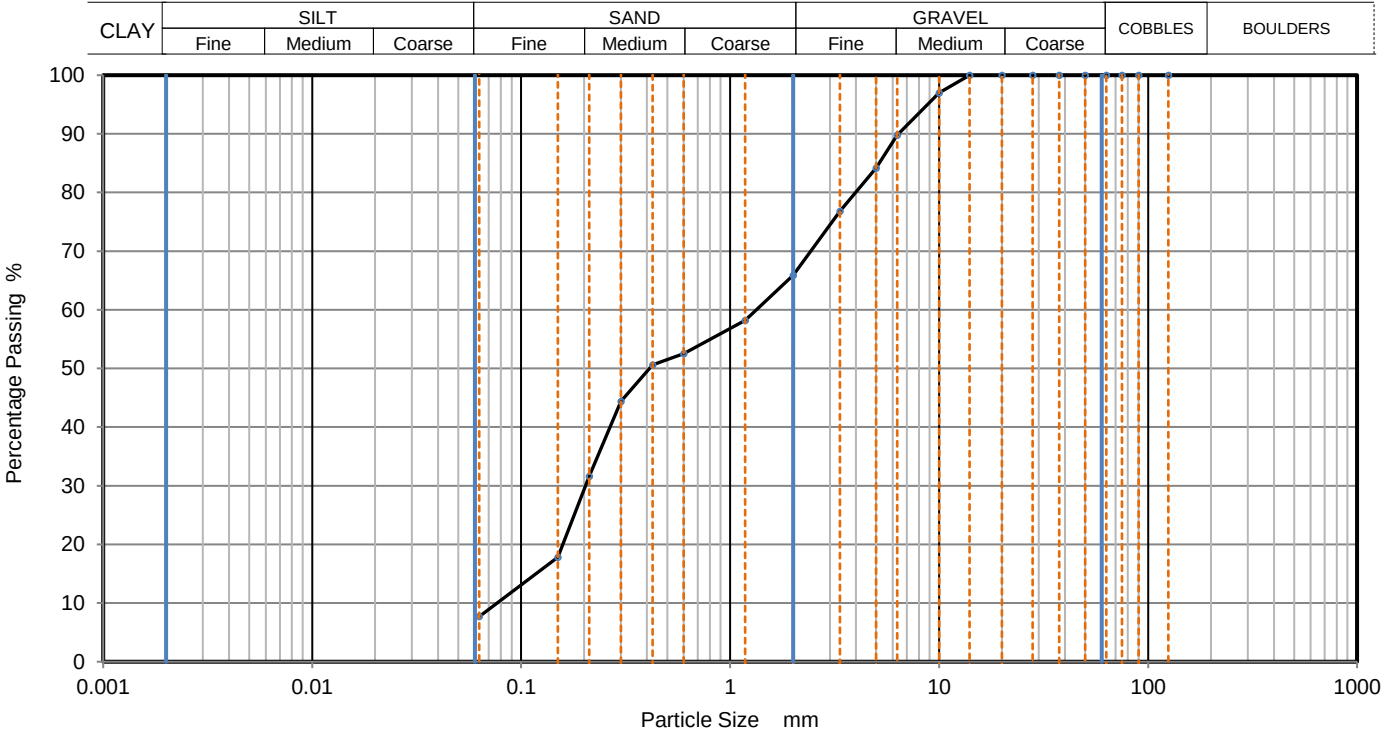
Remarks
Preparation and testing in accordance with BS1377 unless noted below

Date Printed	12/08/2024
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PSD

GQF-008-55 Issue 01 - Oct 22	PARTICLE SIZE DISTRIBUTION			Job Ref	J280320
				Borehole/Pit No.	BH101
Project Name	Fleetwood Lane Primary School			Sample No.	2
Soil Description	Brown slightly clayey gravelly SAND			Depth, m	12.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	TTLP2024073113



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	97		
6.3	90		
5	84		
3.35	77		
2	66		
1.18	58		
0.6	53		
0.425	51		
0.3	44		
0.212	32		
0.15	18		
0.063	8		

Dry Mass of sample, g	3037
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Sample Proportions	% dry mass
Very coarse	0
Gravel	34
Sand	58
Fines <0.063mm	8

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks
Preparation and testing in accordance with BS1377 unless noted below

Date Printed	12/08/2024
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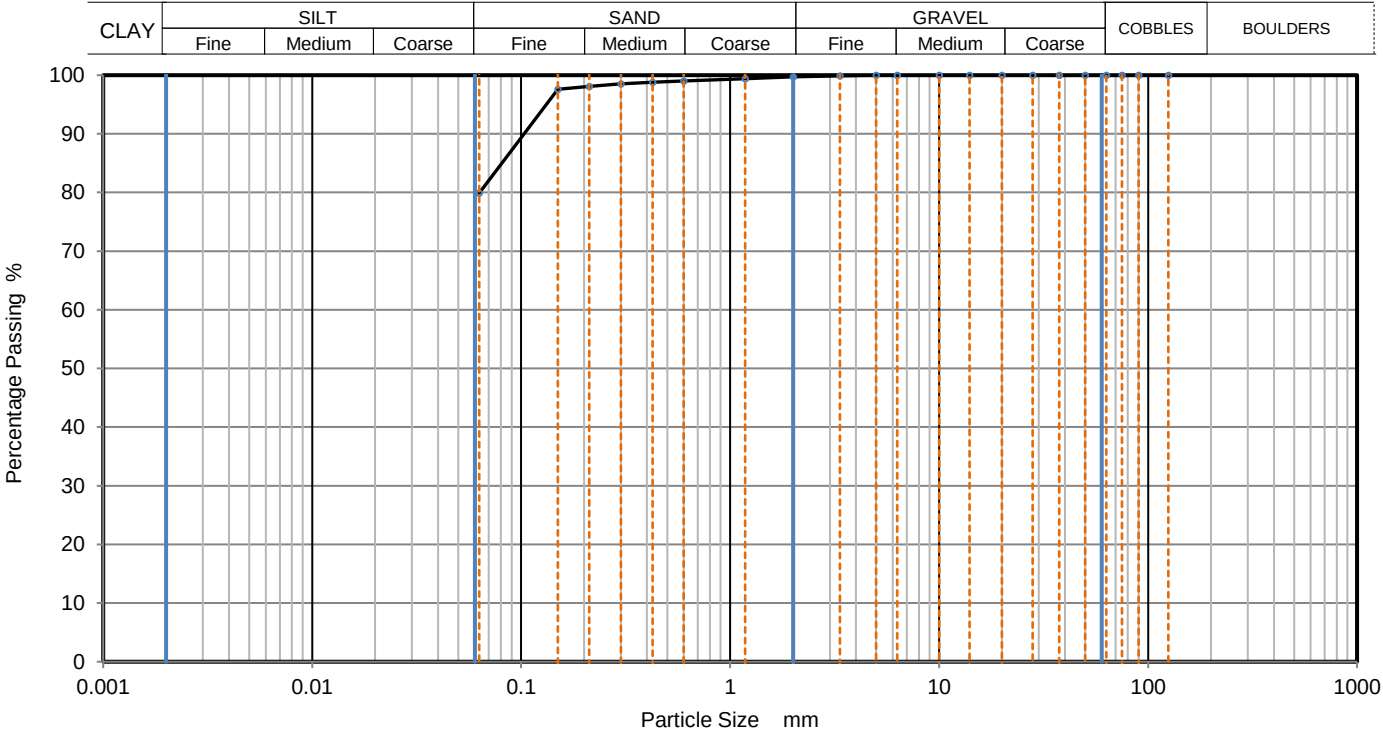


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PSD

GQF-008-55 Issue 01 - Oct 22	PARTICLE SIZE DISTRIBUTION			Job Ref	J280320
				Borehole/Pit No.	SA101
Project Name	Fleetwood Lane Primary School			Sample No.	1
Soil Description	Brown slightly sandy CLAY			Depth, m	1.10
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	TTLP202407317



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	99		
0.425	99		
0.3	99		
0.212	98		
0.15	98		
0.063	80		

Dry Mass of sample, g		1408
Sample Proportions		% dry mass
Very coarse		0
Gravel		0
Sand		20
Fines <0.063mm		80
Grading Analysis		
D100	mm	
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks
Preparation and testing in accordance with BS1377 unless noted below

Date Printed	12/08/2024
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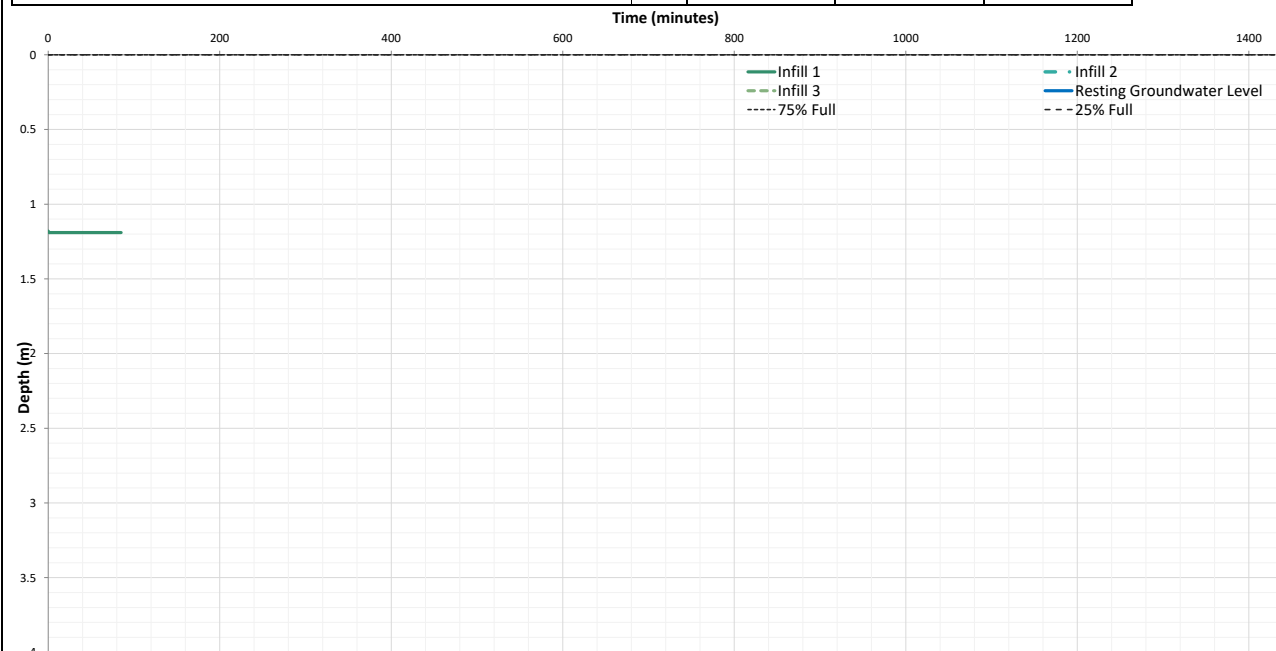
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Appendix V - Ground Gas and Groundwater Level Monitoring Sheets

BOREHOLE LOCATION/DATA		CH ₄	CO ₂	O ₂	Mb	Peak Flow	Flow l/Hr	Pa	LEL	DTW	DTB
R1	BH101	<0.1	1.5	14.7	1011	<0.1	<0.1	0	0	2.04	2.60
R2	BH101	<0.1	3.5	11.0	1014	<0.1	<0.1	0	0	2.16	2.60
R3	BH101	<0.1	4.4	10.2	1008	<0.1	<0.1	0	0	2.22	2.60
R4	BH101	<0.1	4.8	10.5	1014	<0.1	<0.1	0	0	2.30	2.60
		Site: Fleet Wood Primary School, Holbeach					Weather	R1 - Cloudy, 15 mph SWS wind, 15 deg C			
		Date: 7 th August (R1), 14 th August (R2), 21 st August (R3) and (R4) 28 th August 2024						R2 - Overcast, 3 mph NEN wind, 16 deg C			
								R3 - Overcast, 10 mph NE wind, 17 deg C			
		Client: Lindum BMS						R4 - Sunny Intervals, 6 mph wind, 16 deg C			

Appendix VI - Soakaway Results

	units	Infill 1	Infill 2	Infill 3
Length	m		1.60	
Width	m		0.70	
Depth	m		1.63	
Gravel type			No gravel	
Voids ratio			1.00	
Resting groundwater level at time of testing	m		6.00	
Depth of first reading	m	1.18	0.00	0.00
Depth of final reading	m	1.19	0.00	0.00
Did soakage test reach 25% of maximum fill depth?		No	No	No
Did soakage test reach near empty?		No	No	No
Depth at 75% full/effective depth	m	1.18	0.00	0.00
Depth at 25% full/effective depth	m	1.19	0.00	0.00
Time at 75% full/effective depth	mins	0.25	#N/A	#N/A
Time at 25% full/effective depth	mins	0.75	#N/A	#N/A
Vp75 - 25 (volume outflowing between 75% and 25% full/effective depth)	m ³	0.01	0.00	0.00
Mean surface area for outflow (50% full/effective depth)	m ²	1.14	1.12	1.12
tp75 (time for the water level to fall from 75% to 25% full/effective depth)	mins	0.50	#N/A	#N/A
Soil infiltration rate, f =	m/s	Failed Test	Failed Test	Failed Test
or	m/s	Failed Test	Failed Test	Failed Test



Recommended soil infiltration rate

Failed Test

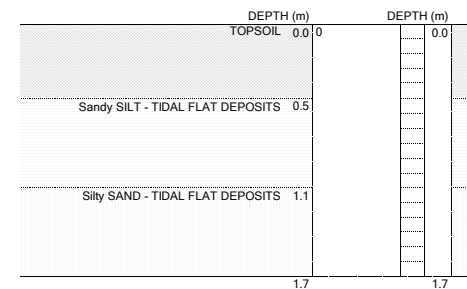
m/s

Note:

Where water level reaches nearly empty (5% full), soil infiltration based on 'Full' depth. Where water level did not reach nearly empty (5% full), soil infiltration rate is based on 'Effective' drainage achieved only. Where water level did not fall below 25% of the maximum fill level, this is considered to be a 'Failed' test.

LOG

BACKFILL



TITLE: Soakaway Test Results
Fleet Wood Lane Primary School
Lindum BMS

In general accordance with BRE Digest 365 (2016)

DRAWN BY: JJR	SCALE: Not to Scale	PROJECT NUMBER: EGE-24-05-08-01
CHECKED BY: PB	REVISION: 1	SOAKAWAY NUMBER: SA101
DATE: 24/07/2024		

Appendix VII - Risk Ratings

Risk Definitions	
Significance Level	Definition/Comments
Very High Risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High Risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term. Likely contaminated land situation, risk assessment and action recommended.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term. Plausible contaminated land situation, risk assessment and possible action recommended.
Low Risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild. Unlikely contaminated land situation, possible risk assessment and possible action.
Very Low Risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe. Negligible risk, no action recommended except vigilance for changes in conditions.