



**Interbridges
New Brighton Road
Emsworth
Hampshire**

**Combined Geotechnical and
Ground Contamination Risk Assessment**

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This report is not intended to be either an ecological, archaeological or flood risk assessment. An appropriate specialist should be consulted about any concerns that may arise in this regard.

EXECUTIVE SUMMARY

The following presents a summary of the main findings of the report. It is emphasised that no reliance should be placed on any individual point until the whole of the report has been read as other sections of the report may put into context the information contained herein.

A planning application is being submitted for the site at New Brighton Road, Emsworth, Hampshire for a proposed employment development, with associated access, parking, yards, landscaping and substation.

The site currently comprises a hummocky vacant parcel of land with several mounds along the northern and southern boundaries.

The site comprised part of an agricultural field from the time of the earliest map, dated 1869, with the southern extent part of a residential garden since circa 1897. The site was later confined between the A27 and a railway line following the construction of the road, and demolition of the associated dwelling in the late 1980s, and has remained vacant since.

Reference to geological datasets indicates that the site is expected to be underlain by the River Terrace Deposits in the west and Head Deposits in the east, overlying the London Clay Formation. The ground investigation confirmed the underlying soils to comprise a variable thickness of made ground, overlying River Terrace Deposits and, in turn, London Clay deposits. Both the River Terrace Deposits and Head are classed as Secondary A Aquifers, whilst the underlying London Clay Formation is an Unproductive Stratum. The site does not lie within a SPZ.

The geoenvironmental data identifies that the site is located within an area where between 5% and 10% of properties are above the action level requiring radon gas protection measures to be installed in new buildings.

Groundwater was recorded within two of the boreholes on completion of drilling, at depths of 1.33m and 1.30m. All other boreholes remained dry during drilling. Monitoring of stand-pipes installed at the site recorded groundwater levels to gradually rise during the three-week monitoring period to depths of between 3.60m and 3.15m. However, the data indicates that groundwater levels within the standpipes had not fully equilibrated over the monitoring period.

It is recommended that the design of precautions against shrinkage and heave for any new foundation system should assume a high volume change potential for the fine-grained River Terrace Deposits and London Clay Formation

A net allowable bearing capacity of 100kN/m² may be assumed for spread (pad or strip) foundations up to 2.00m across bearing within the River Terrace Deposits of at least firm consistency. Where foundations are constructed onto London Clay Formation soils of at least stiff consistency, an increased bearing capacity of 150kN/m² may be adopted for similarly dimensioned foundations.

A DS-2 Design Sulfate Class and an AC-2 ACEC classification should be assumed as a minimum for the design of concrete in contact with the ground where the ground will not be significantly disturbed. Where the ground will be disturbed during construction activities, a higher DS-3 and AC-3 classification should be assumed.

Ground floors should be suspended unless the conditions set out within this report can be met.

Design equilibrium California bearing ratios and moduli of subgrade reaction are presented in the report. The subgrade is not likely to be susceptible to frost heave.

Retaining structures and slopes should be designed using effective shear strength parameters. Recommended values for key parameters are presented in the report.

Infiltration testing within the River Terrace Deposits soils recorded infiltration rates ranging between 2.33×10^{-4} m/sec and 3.79×10^{-6} m/sec, whilst the London Clay Formation possesses negligible infiltration characteristics.

The preliminary contamination risk assessment identified potential pollutant linkages with regard to proposed end users of the site associated with potential for made ground to be present on the site and the radon risk identified by the geoenvironmental data.

The ground investigation did not identify any of the potential contaminants to be present at concentrations considered to pose an unacceptable risk to either end users of the site. However, a radon risk has been identified which may require radon protection measures to be installed at the site. A detailed assessment of the risk posed by radon could be undertaken which may mitigate the requirement for radon protection measures. Consultation with regulators in this regard is recommended.

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FIGURES

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APPENDIX A

Proposed Development Layout

APPENDIX B

Explanatory Notes
Exploratory Hole Records
DPSH-B Dynamic Probe Records
In-situ TRL Cone Penetrometer (CBR) Test Results
Borehole In Situ Infiltration Test Results
Groundwater Monitoring Results

APPENDIX C

Geotechnical Laboratory Test Results
Contamination Laboratory Test Results

APPENDIX D

Summary of In Situ CBR Test Results
Graph of Subgrade Surface Modulus vs Depth
Graph of CBR vs Depth

APPENDIX E

Classification of Probability, Consequence and Risk

APPENDIX F

Preliminary Conceptual Model

APPENDIX G

Quantitative Conceptual Model

APPENDIX H

BGS Borehole Records

APPENDIX I

Groundsure Enviro+Geo Insight Report
Historical Maps

1. INTRODUCTION

A planning application is being submitted for the site at New Brighton Road, Emsworth, Hampshire for a proposed employment development, with associated access, parking, yards, landscaping and substation. A copy of the proposed development layout is included as Appendix A.

Ashdown Site Investigation Ltd was requested to undertake a ground investigation to provide advice to assist with the structural design and to aid the future submission of a planning application.

The specific objectives of the works were to:

- a) Establish the expected geology, hydrogeology and hydrology at the site;
- b) Ascertain the development history and current site use;
- c) Develop a preliminary conceptual model of the site identifying potential pollutant linkages relating to end users of the proposed development works, to controlled waters beneath and in the vicinity of the site, or to other off-site sensitive receptors, if identified;
- d) Investigate the shallow ground and groundwater conditions prevailing at the site;
- e) Provide advice to assist others in undertaking design of spread foundations, ground floors, road pavement and soakaways;
- f) Provide geotechnical parameters to assist others with the design of slopes, basements, retaining walls etc.;
- g) Test for the presence of contaminants identified by the preliminary conceptual model; and
- h) Develop a quantitative conceptual model of the site, refining the preliminary model to identify any pollutant linkages that may be present.

The scope of the works covered by this report, and the terms and conditions under which they were undertaken, were set out within the offer letter Q13996, dated 28th March 2024. The works were undertaken under purchase order ref: 002019 provided by the client, PNH Properties Ltd.

Copies of the historical maps and geo-environmental data referred to in this report are presented within Appendix I.

2. SITE CONTEXT

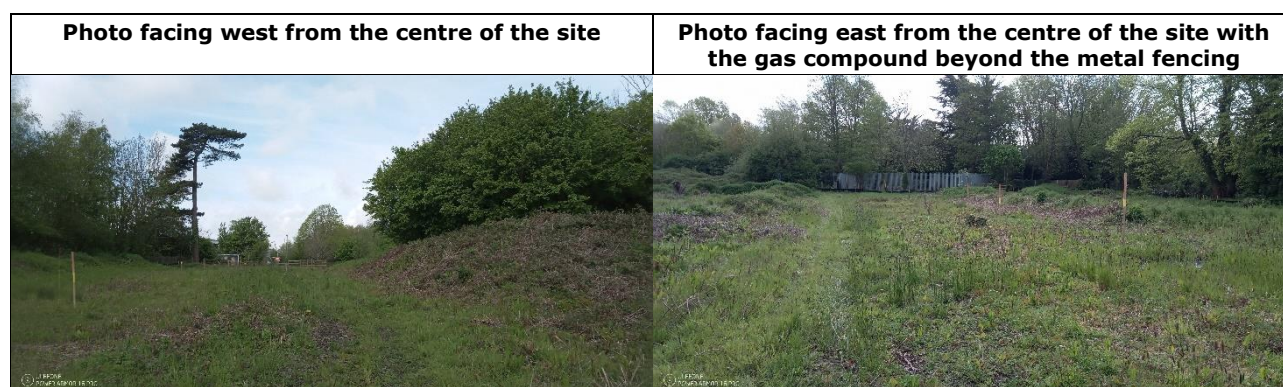
2.1 Walkover Survey

The site is located at the southern end of New Brighton Road, Emsworth, Hampshire, and is centred on the approximate Ordnance Survey national grid reference 474969, 106343. A site location plan and site plan are presented as Figure 1 and Figure 2, respectively.

The site comprises a roughly triangular shaped parcel of undeveloped land. The site was covered by vegetation at the time of the works, particularly along the northern and southern boundaries which are raised as embankments to the A27 to the north and a railway to the south. A high-pressure gas main runs through the centre of the site, aligned east to west, with a series of stakes marking the location of the pipe.

The site was hummocky with small mounds present, principally along the toe of the railway and A27 road embankments.

The site is confined between the A27 to the north and a railway line to the south, both of which are located at a higher elevation than the site. Emsworth Railway station and a parcel of undeveloped land are present to the south-west and west, respectively, with a Gas compound to the immediate east beyond a metal fence.



2.2 Geological Data Review

2.2.1 Expected Geology and Aquifer Designation

The stratigraphic succession that may be expected to underlie the site has been established by reference to British Geological Survey (BGS) mapping and the BGS Lexicon of Named Rock Units. The expected stratigraphy is presented in the following table.

Table 1. Expected Strata and Aquifer Designation

Type	Stratum	Aquifer Designation
Superficial - West	River Terrace Deposits	Secondary A Aquifer
Superficial - East	Head	Secondary A Aquifer
Bedrock	London Clay Formation	Unproductive Stratum

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The River Terrace Deposits are recorded by the BGS to comprise sand, silt and clay. These represent sedimentary superficial deposits formed between 2.588 million years ago and the present during the Quaternary period. The deposits were formerly referred to as 'Brickearth'.

The superficial Head is a polymict deposit generally comprising clay and sandy clay with variable amounts of gravel. The lithology of the Head reflects the nature of the parent solid strata. The material is likely to have been disturbed by intense frost action in a periglacial environment. It is usually poorly sorted but may be stratified where it has been subject to solifluction and/or hillwash and soil creep.

The London Clay Formation forms part of the Thames Group. The formation is of Ypresian age (47.8 to 56 million years old; Early Eocene). The London Clay Formation mainly comprises bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. It commonly contains thin courses of carbonate concretions ('cementstone nodules') and disseminated pyrite. It also includes a few thin beds of shells and fine sand partings or pockets of sand, which commonly increase towards the base and towards the top of the formation. At the base, and at some other levels, thin beds of black rounded flint gravel occur in places. Glauconite is present in some of the sands and in some clay beds, and white mica occurs at some levels. The formation is recorded by the BGS to range in thickness up to 150m.

2.2.2 BGS Borehole

Three BGS boreholes are present on site in the far west and east. The boreholes generally recorded some 1.2 to 2.0m of (unspecified) superficial deposits containing a mix of clayey gravel and sandy gravel, overlying a stiff clay (London Clay Formation). The boreholes extended to a maximum depth of 30m. The relevant records can be found in Appendix H.

2.2.3 Natural Ground Subsidence

Table 2. Natural Ground Subsidence from Groundsure Data

Section	Groundsure Comment (Hazard Rating)
Soil Volume Change Potential (Shrink-Swell)	Low
Running Sands	Low
Compressible Deposits	Negligible (moderate 8m to the east of the site)
Collapsible Deposits	Low
Landslides	Very Low
Ground Dissolution of Soluble Rocks	Negligible

2.2.4 Ground Cavities and Sinkholes

Table 3. Ground Cavities and Sinkholes from Groundsure Data

Section	Groundsure Comment
Natural Cavities	No records are identified within 500m of the site.

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Section	Groundsure Comment
Mining Cavities	No records are identified within 500m of the site.
Reported Recent Incidents	No records are identified within 500m of the site.
Historical Incidents	No records are identified within 500m of the site.
National Karst Database	No records are identified within 500m of the site.

2.2.5 Mining and Ground Workings

Table 4. Mining and Ground Workings from Groundsure Data

Section	Groundsure Comment
BritPits	No BritPits are identified within 500m of the site.
Surface Ground Workings	Ponds are recorded 226m to 236m to the east of the site
Underground Workings	No underground workings are identified within 1km of the site.
Historical Mineral Planning Areas	No records are identified within 500m of the site.
Non-Coal Mining	No records are identified within 500m of the site.
JPB Mining Areas	No records are identified within 500m of the site.
The Coal Authority – Non-Coal Mining	No records are identified within 500m of the site.
Researched Mining	No records are identified within 500m of the site.
Mining Record Office Plans	No records are identified within 500m of the site.
BGS Mine Plans	No records are identified within 500m of the site.
Coal Mining	No records are identified on the site.
Brine Areas	No records are identified on the site.
Gypsum Areas	No records are identified on the site.
Tin Mining	No records are identified on the site.
Clay Mining	No records are identified on the site.

2.2.6 Radon

Table 5. Radon

Section	Groundsure Comment
Radon Affected Areas	The site is reported to be within an area where between 5% and 10% of properties are above the action level requiring radon gas protection measures to be installed in new buildings.
Radon Protection Measures	Basic radon protection measures are reported to be required within new buildings.

2.2.7 Soil Chemistry

Table 6. BGS Estimated Background Soil Chemistry

Contaminant	Estimated Value (mg/kg)
Arsenic	15
Bioaccessible Arsenic	No data
Lead	100
Bioaccessible Lead	60
Cadmium	1.8
Chromium	60 – 90
Nickel	15 – 30

2.3 Hydrogeological and Hydrological Data

2.3.1 Groundwater Abstractions

The closest groundwater abstraction licence is recorded to lie 1715m to the east of the site for [potable] water bottling.

2.3.2 Surface Water Abstractions

The closest surface water abstraction licence is recorded to lie 1729m to the north-east of the site. The abstraction is used for fish farm/cress pond through flow.

2.3.3 Groundwater Vulnerability

The level of groundwater vulnerability, as reported within the Groundsure data, is High, which relates to the superficial strata.

2.3.4 Groundwater Source Protection Zones (SPZ)

The Environment Agency defines SPZs as those areas where groundwater supplies are at risk from potentially polluting activities and accidental releases of pollutants. SPZs are primarily a policy tool used to control activities close to water supplies intended for human consumption.

The site does not lie within a SPZ.

2.3.5 Surface Water Features

The nearest recorded significant surface water feature is an inland river 29m to the east, which flows into the River Ems some 43m to the south east at its closest point to the site.

2.3.6 Flood Risk

The table below summarises the flood risk data provided by the Groundsure report. It is noted that this does not constitute a flood risk assessment.

Table 7. Flood Risk

Section	On Site	Within 50m of the Site
Risk of Flooding from Rivers and Seas (RoFRaS)	Medium	High
Historical Flood Events	None Identified	None Identified
Flood Defences	None Identified	None Identified
Areas Benefitting from Flood Defences	None Identified	None Identified
Flood Storage Areas	None Identified	None Identified
Environment Agency Flood Zone 2	Yes	Yes
Environment Agency Flood Zone 3	None Identified	15m to the east
Surface Water Flooding	Highest Risk: 1 in 250 year event between 0.3m and 1.0m	Highest Risk: 1 in 30 year event between 0.3m and 1.0m
Groundwater Flooding	Highest Risk: High	Highest Risk: High

3. GEO-ENVIRONMENTAL DATA

3.1 Historical Industrial Sites

The following table summarises past land uses of the site and the surrounding area extracted by Groundsure from historical maps.

Table 8. Historical Industrial Sites

Section	Remarks
Historical Industrial Land Uses	A railway station and associated railway features (goods shed, sidings and buildings) are present from 30m west. A Gas Works is identified 99m to the south of the site.
Historical Tank Database	A Gas Compound is present to the immediate east of the site from 1989.
Historical Energy Features	A Gas Compound (as above) is present to the immediate east of the site from 1989. Electricity substations are present within 100m of the site, the closest being 13m to the south-east from 1952. The remaining features are located from 68m away and were present from the 1980s onward. A Gas Governor is present 98m to the north-west in 1996.
Historical Petrol Stations	No historical petrol stations are identified within 100m of the site.
Historical Garages	No historical garages are identified within 100m of the site.
Historical Military Sites	No historical military sites are identified within 100m of the site.

3.2 Landfill and Other Waste Sites

The following table summarises the location of waste sites either on the site or within the surrounding area (within 250m of the site).

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Table 9. Landfill and Other Waste Sites

Section	Groundsure Comments
Active or Recent Landfills	No active or recent landfills are identified within 250m of the site.
Historical Landfill (BGS Records/LA/Mapping Records EA Records)	No historical landfills are identified within 250m of the site.
Historical Waste Sites	No historical waste sites are identified within 250m of the site.
Licensed Waste Sites	No licensed waste sites are identified within 250m of the site.
Waste Exemptions	Waste exemptions are noted 128m and 130m to the south for burning waste in the open. Numerous exemptions are found 135m to the west.

3.3 Current Industrial Land Use

The relevant current industrial land uses are discussed in the table below.

Table 10. Current Industrial Land Uses

Section	Groundsure Comments
Recent Industrial Land Use	A Gas Compound is present to the immediate east of the site, with Emsworth Railway Station 57m to the west. Two electricity substations are present 68m and 75m to the south, with Station Garage 76m to the south-west. A Gas Governor Station is present 100m to the north-west.
Current or Recent Petrol stations	No current or recent petrol stations are identified within 100m of the site.
Electricity Cables / Gas Pipelines	Although no underground high voltage cables or high-pressure pipes are identified within 100m of the site according to the dataset, it is understood that a high pressure SGN gas pipe flows beneath the centre of the site, broadly aligned east to west.
Sites determined as Contaminated Land	No sites determined as contaminated land are identified within 100m of the site.
Control of Major Accident Hazards (COMAH) Sites	No COMAH sites are identified within 100m of the site.
Regulated Explosive Sites	No regulated explosive sites are identified within 100m of the site.
Hazardous Substance Storage/Usage	No consents have been granted for hazardous substance storage/usage within 100m of the site.
Historical Licensed Industrial Activities (IPC)	No records are identified within 100m of the site.
Licensed Industrial Activities (Part A(1))	No records are identified within 100m of the site.
Licensed Pollutant Release (Part A(2)/B)	One record is present 85m to the west of the site at Weldrite Engineering Ltd for oil burner 0.4MW.
Radioactive Substance Authorisations	No records are identified within 100m of the site.
Licensed Discharges to Controlled Waters	No records are identified within 100m of the site.
Pollutant Release to Surface Water / Public Sewer	No records are identified within 100m of the site.
List 1 / List 2 Dangerous Substances	No records are identified within 100m of the site.

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Section	Groundsure Comments
Pollution Incidents (EA/NRW)	No pollution incidents are identified within 100m of the site.
Pollution Inventory Substances / Waste Transfers / Radioactive Waste	No records are identified within 100m of the site.

3.4 Sensitive Land Use

The data identified the site to be located within the greenbelt.

No sensitive land uses at risk from contamination are identified within 1km of the site.

3.5 Railway Infrastructure and Projects

An active railway is present some 10m to the south of the site, with Emsworth Railway Station 57m to the west.

4. HISTORICAL MAP AND IMAGERY REVIEW

Historical Ordnance Survey maps and imagery covering the area of the site have been reviewed and are summarised in the following table.

It is noted that maps and images present information applicable at the time of production of the maps or image captures, that maps are subject to surveying and cartographic errors and images to atmospheric conditions at the time of their capture. It is possible that significant developments may have taken place on or within the vicinity of the site that are not shown on the inspected maps and images.

'In the Vicinity of the Site' generally refers to features of relevance within approximately 250m of the site boundary but may also include more distant features if considered to be pertinent to the assessment of the development history.

Table 11. Summary of Significant Features Identified on Historical Maps and Images

Map/Image Details	On-Site	In the Vicinity of the Site
1869 1:2,500	The site comprised part of an open agricultural field.	A slope/embankment is present along the southern boundary of the site with a railway line beyond and railway station some 50m to the west. A Gas Works is identified approximately 125-150m to the south.
1897 1:2,500	Trees and vegetation are present in the far south west and south eastern extents of the site. A small structure is present towards the centre of the eastern half of the site.	Residential development is present to the north and to the south beyond the railway line.
1932 1:2,500	The small structure is no longer present.	

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Map/Image Details	On-Site	In the Vicinity of the Site
1951-52 1:2,500	A fence runs through the centre (north to south) in the eastern extent of the site. The land to the west of the fence appears to have been incorporated into a garden associated with Northlands to the north.	
1989-93 1:1,250		The A27 has been constructed adjacent to the north of the site. An embankment/slope is present along the northern boundary adjoining the A27 and a small cutting is shown on the western part of the site adjoining New Brighton Road. A <i>Gas Compound</i> is present to the immediate east of the site

5. PRELIMINARY CONTAMINATION RISK ASSESSMENT

5.1 Introduction

The risk assessment considers the potential sources of contamination identified, the receptors that may be present in view of the development proposals and the contaminant pathways by which these may be linked. A complete pollutant linkage is only deemed to exist where all three are present and a site is considered suitable for use where no complete pollutant linkages are identified.

Where a complete pollutant linkage is deemed to be present, an assessment of the level of risk associated with the pollutant linkage has been carried out in line with current guidance¹.

The level of risk is determined using the risk matrix presented in the following table. Classifications of probability, consequence and risk are presented in Appendix E.

Table 12. Risk Assessment Matrix

		Probability			
		Very Low	Low	Moderate	High
Consequence	Very Minor	Negligible	Very Low	Low	Low/Moderate
	Minor	Very Low	Low	Low/Moderate	Moderate
	Moderate	Low	Low/Moderate	Moderate	High
	Severe	Low/Moderate	Moderate	High	Very High

5.2 Contaminant Pathways Identified

The development is to comprise the provision of new, non-residential, units together with areas of soft landscaping.

Pathways associated with gas and vapour intrusion into new buildings are considered to be valid, along with direct contact and dust related pathways, however pathways associated with the consumption of home-grown produce are not considered to be valid.

¹ Contaminated Land Risk Assessment: A guide to good practice, CIRIA C552, 2001.

Should the proposed development plans be altered, a revised risk assessment may be required.

The site is expected to be underlain by the London Clay Formation which is classed as an Unproductive Stratum. The London Clay Formation is likely to yield a very low to negligible infiltration with any leachable contaminants unlikely to come into contact with sensitive groundwater receptors.

Whilst a potable water groundwater abstraction point is present some 1715m to the north-east, the associated borehole has been drilled through the London Clay Formation and underlying Lambeth Group into the White Chalk Subgroup (a Principal Aquifer) at a depth of ~69m below ground level. Given the anticipated thickness of the London Clay Formation >30m, there are not considered to be viable pathways linking potential contamination on the site with sensitive groundwater.

5.3 Potential Contamination Source Identified

It is known that a high pressure gas pipeline has been installed across the site, which may account for the hummocky surface and presence of various mounds. There is therefore the potential for made ground soils to be present across the site.

In addition, the geoenvironmental data has identified that the site is located within an area where between 5% and 10% of properties are above the action level requiring radon gas protection measures to be installed in new buildings.

Overall, the preliminary contamination risk assessment has identified the following potential sources of contamination:

- Potential made ground soils across the site.
- The site is reported to be within an area where between 5% and 10% of properties are above the action level requiring radon gas protection measures to be installed in new buildings.

The potential contaminants associated with these sources are set out in the conceptual model.

5.4 Preliminary Conceptual Model

The preliminary conceptual model for the proposed development is presented in Appendix F.

6. SITE WORKS

6.1 Introduction

The intrusive site works comprised the drilling of a series of dynamic sampler boreholes and excavation of hand dug pits, together with accompanying in-situ geotechnical testing. The intrusive work was carried out on 29th and 30th April 2024. The exploratory hole locations are shown on Figure 2.

It was not possible to drill boreholes in close proximity to the high-pressure gas pipe running through the centre of the site. In order to provide spatial coverage of the site, one of the scheduled boreholes was replaced by five shallow hand dug pits that could be located closer to the central parts of the site.

Descriptions of the strata encountered and comments on groundwater conditions are shown in the exploratory hole records given in Appendix B, together with explanatory notes to assist in their interpretation.

6.2 Exploratory Holes

The following table summarises the intrusive works undertaken at the site.

Table 13. Summary of Intrusive Works Undertaken

Designation	Depth (m bgl)	Method
WS01	5.00	Dynamic Sampler
WS02	3.00	Dynamic Sampler
WS03	3.00	Dynamic Sampler
WS04	5.00	Dynamic Sampler
WS05	3.00	Dynamic Sampler
WS06	3.00	Dynamic Sampler
WS07	5.00	Dynamic Sampler
WS08	3.00	Dynamic Sampler
WS09	3.00	Dynamic Sampler
TP01	1.00	Hand Dug Pit
TP02	1.00	Hand Dug Pit
TP03	1.00	Hand Dug Pit
TP04	1.00	Hand Dug Pit
TP05	1.00	Hand Dug Pit

6.3 Sampling

Samples of soil were taken from the exploratory holes at the depths shown in the exploratory hole records. The types of samples taken are indicated on the exploratory hole records. Details on the sample types are provided in the explanatory notes.

Where appropriate, samples were stored in cool boxes with cooling blocks to maintain temperatures below 4°C until transferred to refrigerators upon return to the office and subsequently forwarded to the external accredited chemical testing laboratory.

6.4 In Situ Strength Testing

The types and depths of in situ testing, together with the test results, are either given on the exploratory hole records or are summarised separately in Appendix B. Further details on the in situ testing methods are provided in the explanatory notes.

6.5 In Situ Infiltration Testing

Falling head soakage tests were undertaken in four of the boreholes in general accordance with Kent County Council guidance².

6.6 Installations

Groundwater data loggers were used to monitor the groundwater levels within standpipes constructed to 5m depth within boreholes WS01, WS04 and WS07. The loggers were installed on the 30th April, 2024 and collected on the 20th May, 2024, and were programmed to collect readings at 15-minute intervals. The results of the groundwater monitoring are included within Appendix B.

6.7 Laboratory Testing

Laboratory testing was scheduled by Ashdown Site Investigation Ltd. Results from the laboratory tests are provided in Appendix C.

Geotechnical testing was undertaken by Ashdown Site Investigation Ltd.

Chemical testing was undertaken by a laboratory with recognised (UKAS and MCERTS) accreditation for quality control.

² The Soakaway Design Guide published by Kent County Council, 2000.
Interbridges, New Brighton Road, Emsworth, Hampshire

7. GROUND CONDITIONS

7.1 Stratigraphy

7.1.1 Surface Covering

Trial pits TP01, TP03 and TP04, and boreholes WS01, WS03, WS04 and WS06 were excavated through a surface cover of topsoil some 100mm to 300mm in thickness.

7.1.2 Made Ground

Made ground or reworked soils, generally comprising slightly gravelly and gravelly clay were recorded within exploratory holes TP02, TP05, and WS02 to WS09. The gravel fraction comprised variable quantities of flint, brick, charcoal-like material, clinker-like material, plastic, metal, sandstone and chalk. The made ground at these positions generally extended to depths of between 0.20m and 0.90m below ground level but was found to extend considerably deeper (to 2.00m below ground level) within borehole WS09. This deeper made ground included a layer of chalk fill between depths of 1.30m and 2.00m.

7.1.3 River Terrace Deposits

Underlying the made ground/surfacing, the exploratory holes, with the single exception of borehole WS09, progressed into undisturbed generally firm (and locally stiff) slightly gravelly/sandy clay deposits. The gravel fraction comprised flint and occasional chalk. Additionally, within the soils encountered within borehole WS05, strata of clayey gravel were recorded between depths of 0.20m and 0.85m, and 2.00m and 2.50m.

These deposits are considered to represent the River Terrace Deposits indicated to underlie the site on BGS geological maps.

The base of the River Terrace Deposits was generally encountered within the boreholes at depths of between 0.70m and 2.30m below ground level, but at the location of borehole WS08 these soils extended to the full depth of the borehole at 3.00m below ground level. All of the shallow trial pit holes were terminated at a depth of 1.0m below ground level within the River Terrace Deposits.

7.1.4 London Clay Formation

Beneath the River Terrace Deposits, where penetrated, the dynamic sampler boreholes encountered generally stiff clay deposits (locally becoming very stiff), within which bands of mudstone and sandstone were occasionally recorded.

These deposits continued to the full depth of investigation and are considered to represent the London Clay Formation indicated to underlie the River Terrace Deposits on BGS geological maps.

7.2 Stability

Boreholes WS05, WS08 and WS09 collapsed to depths of between 2.38m and 2.90m below ground level on completion of drilling. The remaining exploratory holes were recorded to remain stable during excavation/drilling.

7.3 Groundwater Conditions

Groundwater was recorded at depths of 1.33m and 1.30 during the drilling of boreholes WS05 and WS09, respectively. All other exploratory holes remained dry during drilling/excavation.

Monitoring of groundwater levels within the standpipes installed in boreholes WS01, WS04, and WS07 was undertaken over a period of approximately three weeks.

Borehole WS01 was recorded to remain dry during the monitoring period.

Groundwater within boreholes WS04 and WS07 was recorded to gradually rise to respective depths of 3.60m and 3.15m by the end of the monitoring period. However, the data indicates that groundwater levels within the standpipes had not fully equilibrated with the true groundwater levels by the time the dataloggers were collected.

8. GEOTECHNICAL ASSESSMENT

The geotechnical assessment has been prepared in connection with the indicative development proposals shown on the drawing included in Appendix A.

In summary, the proposed development is to comprise the construction of several units with a new access road, parking, yards and limited areas soft landscaping.

At the time of writing, no details were available concerning the specific loads likely to be applied to the foundations.

8.1 Foundations

8.1.1 Soil Shrinkage/Heave Potential

The fine-grained soils of the River Terrace Deposits and London Clay Formation have been classified as clays, and with respective modified plasticity indices of up to 48% and 51%, these soils may be expected to exhibit up to a high volume change potential.

It is recommended that the design of precautions against shrinkage and heave for any new foundation system (spread footings and ground beams etc.) should assume a high volume change potential for both the fine-grained River Terrace Deposits and London Clay Formation and take into account current guidance such as that given by the Building Research Establishment (BRE)³ or the National House Builders Council (NHBC)⁴.

Whilst this report has been prepared to provide advice to assist designers in undertaking detailed design, the report itself does not represent a detailed design statement. Detailed foundation design, including assessment of foundation type, minimum founding depths for spread foundations, and requirements for placement of void formers et cetera, should take into account the findings of this report and the presence of trees (previous, present and proposed). In connection with the latter, it is recommended that an arboricultural survey of the site that identifies the species and maturity of the existing or any recently felled trees in the areas of the proposed new buildings should be provided to engineers responsible for the foundation design. Information on proposed planting schemes that may affect foundation design should also be provided.

8.1.2 Spread Foundations

8.1.2.1 Foundation Depths for Spread Foundations

Foundations should be constructed to bear below soils that are likely to be affected by significant soil volume changes caused by seasonal changes in moisture content to avoid damage to foundations that could otherwise arise. In addition, all made ground and any soils disturbed by the construction or removal of any previously existing services should be regarded as being variable in nature and state of compaction and, as such, unsuitable as a founding medium for shallow footings. New footings should be constructed so as to bear below made ground/disturbed natural soils and soil subject to seasonal soil volume changes, whichever is the deeper, and onto undisturbed, competent, natural deposits.

³ www.bre.co.uk : BRE Digests 240, 241 and 242, Low rise buildings on shrinkable clay soils, parts 1, 2 and 3; and BRE Digest 298 , The influence of trees on house foundations in clay soils and BRE Digest 412, Desiccation in clay soils.

⁴ <http://www.nhbc.co.uk/> : NHBC Standards, Chapter 4.2.

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Summary guidance on suitable minimum foundation depths to protect against the effects of seasonal soil volume changes is presented in the table below but designers undertaking detailed design of foundations should follow the detailed guidance such as that provided within Chapter 4.2 of the NHBC Standards.

Table 14. Indicative Minimum Foundation Depths

Tree Type	Water Demand of Tree	Tree Distance to Tree Height Ratio (D/H)									
		0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.80	1.00	1.25
		Minimum Foundation Depth Required in High Volume Change Potential Soils (m)									
Broad Leaf	High	†					2.50	2.30	1.90	1.50	1.00*
	Moderate	2.40	2.25	2.05	1.85	1.65	1.50	1.30	1.00*	1.00*	1.00*
	Low	1.80	1.65	1.50	1.35	1.20	1.00*	1.00*	1.00*	1.00*	1.00*
Coniferous	High	†			2.20	1.80	1.40	1.00*	1.00*	1.00*	1.00*
	Moderate	2.40	2.00	1.60	1.20	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*

* Minimum foundation depth required to protect against soil volume changes.

† Foundations deeper than 2.50m require specialist design to protect against soil volume changes.

Where specialist foundation design is required (foundation depths exceeding the maximum permitted by the guidance) then piled foundations are likely to be needed, though commercial considerations may also dictate that piled foundations may be more economic even in comparison with conventional spread foundations constructed to depths less than the maximum permitted by guidance. Further works including deep boreholes would be required if structural engineers or quantity surveyors decide that piled foundations should be adopted.

Details on the water demand and mature height of common trees is given within Table 3 of Chapter 4.2 of the NHBC standards which should be referred to when assessing minimum foundation depths required for the proposed development. A summary is provided in the table below.

Table 15. Indicative Summary of Water Demand and Mature Height of Common Trees

Tree Type	High Water Demand		Moderate Water Demand		Low Water Demand	
	Tree	Height (m)	Tree	Height (m)	Tree	Height (m)
Broad Leaf	Elm	18 – 24*	Acacia	18	Birch	14
	Oak	16 – 24*	Alder	18	Elder	10
	Poplar	15 – 28*	Apple	10	Fig	8
	Willow	16 – 24*	Ash	11 – 23*	Hazel	8
	Eucalyptus	18	Laurel	10	Holly	12
	Hawthorn	10	Beech	20	Honey Locust	14
			Blackthorn	8	Hornbeam	17
			Cherry	8 – 17*	Laburnum	12
			Chestnut	20 – 24*	Magnolia	9
			Lime	22	Mulberry	9
			Maple	8 – 18*	Tulip Tree	20
			Pear	12		

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Tree Type	High Water Demand		Moderate Water Demand		Low Water Demand	
	Tree	Height (m)	Tree	Height (m)	Tree	Height (m)
			Plane	26		
			Plum	10		
			Sycamore	22		
			Tree of Heaven	20		
			Walnut	18		
			Whitebeam	12		
Coniferous	Cypress	18 – 20*	Cedar	20		
			Douglas Fir	20		
			Larch	20		
			Monkey Puzzle	18		
			Pine	20		
			Spruce	18		
			Wellingtonia	30		
			Yew	12		

* Dependent on particular species.

8.1.2.2 Bearing Capacity for Spread Foundations

For design purposes, a net allowable bearing capacity of 100kN/m² may be assumed for spread (pad or strip) foundations up to 2.00m across bearing within the River Terrace Deposits of at least firm consistency. Where foundations are constructed onto London Clay Formation soils of at least stiff consistency, an increased bearing capacity of 150kN/m² may be adopted for similarly dimensioned foundations. It is noted that the London Clay Formation was not encountered within the full depth (3.0m) of borehole WS08.

The quoted bearing capacities are expected to limit settlement to less than 25mm.

Attention is drawn to the local presence of interbedded fine-grained soils and coarse-grained River Terrace Deposits soils. Unless foundations are deepened to bear solely onto London Clay Formation soils, there is the potential for mixed soil conditions to be present beneath footings and designers should consider the need for foundations to be reinforced due to the potential for differential cracking to develop as a result of coarse-grained and fine-grained soils settling at different rates under loading.

Care must be taken to ensure that new foundations do not impose additional loading (vertical or lateral) on the existing high-pressure gas main, that runs through the centre of the site.

8.2 Ground Floors

In view of the variable thickness of made ground and the presence of soils of high volume change potential soils underlying the site, it is recommended that ground floors should be suspended.

Ground bearing floor slabs may however be considered provided made ground soils are appropriately compacted and the depth of foundations required to protect against seasonal soil volume changes close to trees is less than 1.5m. In such circumstances further works should be

undertaken to demonstrate, that close to the time of construction, no significant soil desiccation is present. If ground bearing floors are adopted it is recommended that the potential for differential movement, both between the floor slab and walls and across the floor slab itself, should be anticipated. Such floors should be fully debonded from walls. Formations should be adequately proof rolled and any excessively soft materials excavated and replaced with a suitable, well graded granular fill. The depth of any fill should be limited to a maximum of 600mm unless placed to an engineering specification designed to limit internal settlement of the fill materials to a tolerance to be advised by the designer.

Guidance on CBR values and a moduli of subgrade reaction are given in Section 8.6 of this report.

The detailing of services through, or under, ground-bearing floors should incorporate flexible connections and, where appropriate, enhanced falls.

8.3 Groundwater

Groundwater was recorded during the drilling of two of the boreholes at depths of 1.33m and 1.30. Groundwater levels were recorded to gradually rise within two of the standpipes installed at the site during the three-week monitoring period. At the end of the monitoring period groundwater had risen to depths of between 3.60m and 3.15m, however the data indicates that groundwater levels within the standpipes had not fully equilibrated over the monitoring period.

It is also noted that groundwater levels should be expected to fluctuate seasonally, especially during wetter seasons.

Where excavations are proposed to extend below the groundwater table, particularly within coarse-grained River Terrace Deposits, groundwater control will be required to maintain adequately dry working conditions and excavation stability. In such circumstances it is recommended that trial pumping from proposed excavation depths should be undertaken to fully ascertain requirements for groundwater control.

The potential for perched groundwater to be present above the groundwater table, for example within the made ground etc, should not be overlooked. It is also possible that heavy precipitation during construction could lead to the ingress of perched groundwater or surface water run-off into excavations. In such circumstances it would be expected that water entering excavations would be adequately managed by pumping from sumps or natural drainage into coarse grained River Terrace Deposits if present above the groundwater table.

8.4 Stability of Excavations

All made ground or coarse-grained natural soils exposed in excavations should be assumed to be unstable, even in the short term. Whilst fine-grained natural soils may remain stable for a short period of time if not subjected to surcharge loads (such as may be imposed by existing foundations, traffic or storage of materials), the stability of these deposits if left unsupported should be assumed to have the potential to deteriorate. Where stable excavations are required, excavations should either be suitably supported or, where space permits, side slopes could be battered back to a safe angle of repose.

All excavations requiring human entry must be shored or battered as necessary to conform to current best practice, as accepted by the Health and Safety Executive (HSE)⁵. Current legislation

⁵ Relevant guidance is given on the HSE website, www.hse.gov.uk

requires that where personnel access is required into any excavation a competent person must inspect excavation supports or battering of slopes at the start of the working shift and at other specified times. No work should take place until the excavation is safe. Excavations should also be inspected after any event that may have affected their stability, such as a significant weather event, changes in surcharge loadings imposed by temporary storage of materials or changes in site traffic plans or alteration of support systems. Inspections should be formally recorded and any faults that are found should be corrected immediately.

Particular attention must be paid to ensuring the stability of the gas pipeline and neighbouring sites, including the railway and road embankments to the south and north of the site, respectively, and gas infrastructure to the east.

8.5 Aggressivity to Concrete

The aggressivity of the soils to concrete has been assessed in accordance with guidance published by the BRE⁶.

In consideration of the soils encountered beneath the site it is considered that 'natural ground conditions' may be assumed for the purpose of assessing the aggressivity of the chemical environment for concrete classification (ACEC class). Given the noted occurrence of groundwater seepages, 'mobile groundwater' conditions should be assumed.

The soils present beneath the site may be expected to contain sulphides which if exposed to air and water, and potentially bacterial action, may oxidise and convert into sulphates. The sulphides are significantly more likely to oxidise in ground that has been significantly disturbed, for example by cutting and filling as part of earthworks or by excavation and backfilling. Ground that is not disturbed beyond the cut face (e.g. piling operations or excavation without backfill) would not generally be considered by the guidance as being disturbed ground. Where disturbed ground is likely to result from construction activities a Design Sulfate Class based on the total potential sulphate should be adopted.

The following table summarises the characteristic values indicated from the chemical analysis of the soils present beneath the site.

Table 16. Assessment of the Chemical Analysis of the Soil

	Characteristic Value	Design Sulfate Class	ACEC Classification
pH	7.7	-	-
Water Soluble Sulphate (mg/l as SO₄) *	500	DS-2	AC-2
Total Potential Sulphate (TPS % SO₄)	0.7	DS-3	AC-3

Notes: * Characteristic value rounded to nearest 100.

In accordance with the guidance, a DS-2 Design Sulfate Class and an AC-2 ACEC classification should be assumed as a minimum for the design of concrete in contact with the ground where

⁶ BRE Special Digest 1:2005 Concrete in Aggressive Ground.

the ground will not be significantly disturbed. Where the ground will be disturbed during construction activities, a higher DS-3 and AC-3 classification should be assumed.

8.6 Pavement Design

Current guidance⁷ suggests that pavement design should be based on the design subgrade surface modulus, determined as being equal to the lower of the short-term subgrade modulus and the long-term subgrade modulus. The subgrade surface modulus can be related to California bearing ratio using the formula, $E = 17.6(\text{CBR})^{0.64}$, where E is the subgrade modulus expressed in MPa.

Cone penetrometer tests were undertaken to establish the California bearing ratio (CBR) of the in situ soils at the time of the investigation. The range of values determined is presented on the test result records within Appendix B, and the table and graphs contained within Appendix D. A summary of the in situ test data is presented below. It is noted that in situ CBR values are, in part, dependent on the moisture content of the tested soils and are consequently subject to seasonal variation.

Table 17. In Situ CBR Values (At Time of Ground Investigation Works)

	CBR (%)	Modulus of Subgrade Reaction E (MPa)
Minimum	1.9	26.7
Average	22.1	118.2
Maximum	114.7	366.0
10%ile	5.4	51.8
20%ile	7.0	61.4
50%ile (Median)	17.3	108.9

Equilibrium CBR values can be derived from knowledge of soil classification data (plasticity index for soils exhibiting cohesion (clay type) and particle size distribution for granular soils) and pavement thickness. Historical guidance⁸ suggests the following design equilibrium CBR values would be applicable to the River Terrace Deposits and London Clay Formation soils for the construction of pavement. The subgrade moduli calculated from these design equilibrium CBR values can be reasonably considered to be representative of long-term subgrade modulus using the formula given above.

Table 18. Long-term CBR Values

Stratum	Design Equilibrium CBR Value (%)			†Modulus of Subgrade Reaction E (MPa)
		Thin Road* Pavement	Thick Road* Pavement	
Fine grained River Terrace Deposits and London Clay Formation	Minimum	2.0	2.5	27.4
	Average	2.3	3.1	30.0
	Maximum	3.1	5.9	36.3

⁷ Highways England Design Manual for Roads and Bridges CD 225 Rev1; Design for new pavement foundations.

⁸ Highways England Design Manual for Roads and Bridges Interim Advice Note 73/09 Rev1; now withdrawn.

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* Thin pavement being 300mm sub-base, thick pavement being 1200mm sub-base. †Modulus based on average of all calculated moduli based on CBR values for thin sub-base.

The subgrade may be assumed not to be susceptible to frost heave.

If new roads are to be adopted the local highway authority should be consulted with reference to the acceptability of the proposed CBR figures prior to designs being finalised and construction undertaken.

8.7 Stormwater Infiltration Systems

In-situ infiltration testing⁹ was undertaken in boreholes WS02, WS05, WS06, and WS08. From the test results, calculations were made to estimate the infiltration rate that could be expected for soakaways constructed to discharge into the underlying soils within the test zone.

The infiltration rates derived from the tests are summarised in the following table.

Table 19. Calculated Infiltration Rates

Exploratory Hole	Test Response Zone Depth (m)		Stratum	Infiltration Rate (f) (m/sec)	Driving Head of Water (m)
	Top	Bottom			
WS02	2.00	3.00	London Clay Formation	Negligible – no fall in water level in 67 minutes	
WS05 – Test 1	1.00	3.00*	River Terrace Deposits	1.07 x 10 ⁻⁴	0.7
WS05 – Test 2	1.00	3.00*	River Terrace Deposits	1.05 x 10 ⁻⁴	0.7
WS05 – Test 3	1.00	3.00*	River Terrace Deposits	9.89 x 10 ⁻⁵	0.6
WS06	2.00	3.00*	London Clay Formation	1.16x 10 ⁻⁷	2.3
WS08	2.00	3.00*	River Terrace Deposits	9.03x 10 ⁻⁷	2.2

Notes: * Boreholes collapsed/unstable at base.

The value 'f' is equivalent to the soil infiltration coefficient 'q' quoted in the Construction Industry Research and Information Association (CIRIA) Report 156.

The results from the infiltration tests should be provided to engineers responsible for the design of the drainage system.

To comply with building regulations¹⁰, point discharging infiltration systems (conventional ring or trench soakaways) are required to be constructed a minimum of 5.0m away from proposed or existing buildings.

⁹ Conducted in accordance with The Soakaway Design Guide, published by Kent County Council, July 2000.

¹⁰ The Building Regulations 2010; Part H; Drainage and Waste Disposal

8.8 Retaining Structures and Slopes

It is recommended that retaining structures and slopes should be designed using effective shear strength parameters. Suggested unfactored geotechnical parameters (most probable) for use in design are provided in the following table.

Table 20. Most Probable Values of Geotechnical Parameters

Stratum	Internal Angle of Shearing Resistance (°)	Cohesion (kN/m²)	Unit Weight (kN/m³)
Made Ground	25	0	18.0
River Terrace Deposits (Coarse Grained)	30	0	18.0
River Terrace Deposits (Fine Grained)	23	0	18.0
London Clay Formation	21	0	19.0

It is noted that characteristic values should be selected as a cautious estimate of the value affecting the occurrence of the limit state¹¹. In this context characteristic values can be values lower or higher than the most probable value depending on whether unfavourable or favourable actions are being considered. The values presented in the above table should be adjusted in consideration of the specific analysis being undertaken for design purposes.

¹¹ BS EN 1997 Part 1 : Geotechnical Design – General Rules.

9. QUANTITATIVE CONTAMINATION ASSESSMENT

9.1 Assessment Strategy

To enable an assessment of the potential for contaminants to be present within the shallow soils, ten samples from across the site were obtained (mostly of the made ground) and tested for a variety of commonly occurring contaminants which pose an unacceptable risk to human health.

9.2 Analysis of Contamination Test Results

9.2.1 Method of Assessment

For the assessment of risk to end users, comparison of the results of the laboratory testing has been made against published soil screening values (SSV) comprising the 'Suitable For Use Levels' (S4UL)¹² or, in lieu of an S4UL being developed for lead, the Category 4 Screening Level (C4SL)¹³.

In view of the development proposal, the SSV utilised in this assessment are those calculated for the generic "Commercial" land use.

9.2.2 Heavy Metals & Polycyclic Aromatic Hydrocarbon (PAH) Compounds

The following table summarises the SSV along with the maximum and minimum concentrations of the heavy metals and PAH compounds tested for.

Table 21. Summary of Test Results – Heavy Metals and PAH Compounds

Contaminant	SSV (mg/kg)	No. of Samples	Minimum Concentration (mg/kg)	Maximum concentration (mg/kg)	Limit of Detection (mg/kg)	No of exceedances
Arsenic	640	10	2	23	< 2	0
Water Soluble Boron	240000	10	<LOD	2	< 1	0
Cadmium	190	10	<LOD	0.7	< 0.2	0
Chromium	8600	10	6	30	< 2	0
Hexavalent Chromium	33	10	<LOD	<LOD	< 2	0
Copper	68000	10	8	118	< 4	0
Lead	2330	10	13	322	< 3	0
Mercury	1100	10	<LOD	<LOD	< 1	0
Nickel	980	10	4	34	< 3	0
Selenium	12000	10	<LOD	<LOD	< 3	0
Zinc	730000	10	17	306	< 3	0
Naphthalene	190	10	<LOD	<LOD	< 0.1	0
Acenaphthylene	83000	10	<LOD	<LOD	< 0.1	0

¹² Nathanail, C.P, et al., The LQM/CIEH S4ULs for Human Health Risk Assessment, 2015, Land Quality Press, Nottingham. Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3071.

¹³ SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. Final Project Report, published by DEFRA, 2014.

Contaminant	SSV (mg/kg)	No. of Samples	Minimum Concentration (mg/kg)	Maximum concentration (mg/kg)	Limit of Detection (mg/kg)	No of exceedances
Acenaphthene	84000	10	<LOD	<LOD	< 0.1	0
Fluorene	63000	10	<LOD	<LOD	< 0.1	0
Phenanthrene	22000	10	<LOD	0.18	< 0.1	0
Anthracene	520000	10	<LOD	<LOD	< 0.1	0
Fluoranthene	23000	10	<LOD	0.54	< 0.1	0
Pyrene	54000	10	<LOD	0.49	< 0.1	0
Benz(a)anthracene	170	10	<LOD	0.24	< 0.1	0
Chrysene	350	10	<LOD	0.36	< 0.1	0
Benzo(b)fluoranthene	44	10	<LOD	0.39	< 0.1	0
Benzo(k)fluoranthene	1200	10	<LOD	<LOD	< 0.1	0
Benzo(a)pyrene	35	10	<LOD	0.3	< 0.1	0
Indeno(123-cd)pyrene	500	10	<LOD	0.19	< 0.1	0
Dibenz(ah)anthracene	3.5	10	<LOD	<LOD	< 0.1	0
Benzo(ghi)perylene	3900	10	<LOD	0.18	< 0.1	0

None of the samples of made ground tested recorded concentrations of heavy metals or PAH compounds above their respective SSV. The concentrations of heavy metals and PAH compounds present within the soils tested are not considered to pose an unacceptable risk to end users of the site.

9.2.3 Asbestos

No suspected asbestos materials were noted within any of the exploratory holes undertaken at the site.

All ten samples were screened for the presence of asbestos. None of the samples recorded the presence of any asbestos materials.

There is not considered to be an unacceptable risk to end users from asbestos materials within soils. However, due to the heterogeneity of made ground, there will always remain the potential for localised asbestos materials to be encountered during construction works, though the likelihood of this is considered to be very low. All workers at the site should be made aware of what actions to take in the event that suspected asbestos materials are identified at any time during the development works.

9.2.4 Petroleum Hydrocarbons

No detectable concentrations of petroleum hydrocarbons were recorded in the 10 samples tested and as such an unacceptable risk to end users of the site is not considered to be present.

9.3 Quantitative Contamination Risk Assessment

9.3.0 Contamination Source Identified

The following source of contamination has been identified by the quantitative contamination risk assessment:

- The site is reported to be within an area where between 5% and 10% of properties are above the action level requiring radon gas protection measures to be installed in new buildings.

9.3.1 Quantitative Conceptual Model

The quantitative conceptual model for the proposed development is presented in Appendix G.

9.4 Risks to Other Potential Receptors

All construction workers must undertake their own risk assessment, based upon the works to be carried out and the proposed method by which this will be achieved, in accordance with current health and safety legislation. Their assessment should take into account all available information about the site, including that present within this report.

Appropriate working procedures and PPE should be adopted to ensure the health and safety of the site operatives. Instruction should be given in the recognition of potentially hazardous materials. All site personnel should be appropriately briefed on the discovery strategy, presented below, and what actions they must take in the event that further evidence of contamination is identified or suspected.

9.5 Recommendations

Under the Health and Safety at Work Act 1974 and Management of Health and Safety at Work Regulation 1999, employers must undertake sufficient risk assessments to safeguard employees. Radon could be identified as a hazard by such risk assessments where a workplace is identified to be located within a radon affected area.

The Ionising Radiations Regulations 2017 apply where the radon level within a property exceeds 300 Bq m⁻³.

Consideration could be given to undertaking a more detailed assessment of the risk from radon at the site, to determine whether basic radon protection measures are required to be installed within the buildings. It is recommended that discussions are initially held with Building Control as well as Environmental Health to determine the next steps with regard to the requirement for radon protection measures at the site.

Should radon protection measures ultimately be required by regulators, a detailed design, along with a verification plan, in accordance with the guidance presented within BRE211 would generally be a minimum requirement.

9.6 Discovery Strategy

Particular care should be taken to routinely inspect excavations into made ground soils at the site. Whilst based on the results of the ground investigation to date, no asbestos materials have been identified, should any suspected asbestos containing materials be encountered professional advice should be immediately sought. If deemed appropriate further sampling, testing and analysis of suspected materials should be undertaken.

In such circumstances or if, during the course of the site clearance and development works, any other materials not previously identified by the investigation that are suspected of being 'contaminants' are encountered, then the following procedure should apply:

- All works in that area should cease and the site manager should be informed.
- Advice should be sought from suitably qualified and experienced personnel as to whether any further site inspection, sampling, testing and/or assessment is deemed necessary.
- If required, the conclusions of any assessment and any proposed remedial works (if required) should be agreed by the local authority.
- If necessary, full details of any remedial works should be included in a verification report for the site.

Suspected 'contamination' may take the following form, though it is noted that this list is not exhaustive and site operatives should ask if they are at all unsure of any findings:

- Soil or water looks oily and/or has an oily odour
- Soil or water has a solvent type of odour
- Significant quantities of man-made materials within fill such as paint cans, car parts, glass fragments
- Suspected asbestos containing materials (insulating boards, cement, loose fibres etc.)
- Significant volumes of clinker like or ashy material
- Sand bags, and/or subsurface concrete structures
- Animal carcasses or evidence of animal burial pits

Ashdown Site Investigation Ltd.

FIGURES

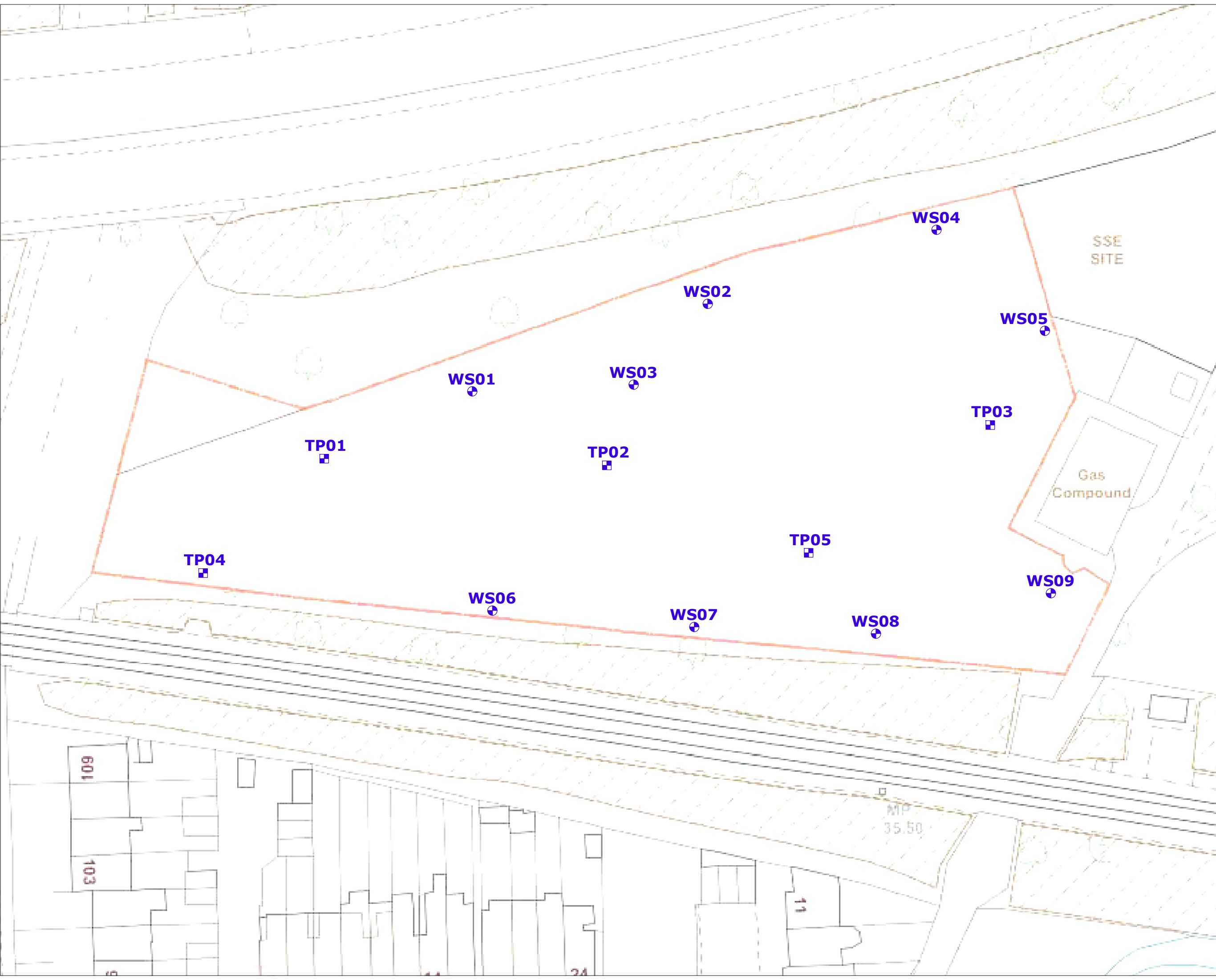
Figure 1 Site Location Plan

Figure 2 Site Plan



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Site Location Plan	Site Name	Figure No.	Project Reference
	Interbridges, New Brighton Road, Emsworth, Hampshire	1	P16578



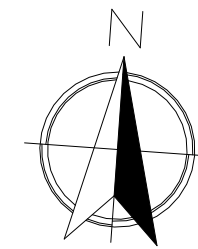
ASHDOWN SITE INVESTIGATION

L · I · M · I · T · E · D

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Site:
Interbridges New Brighton Road Emsworth Hampshire
Project Ref:
P16578
Figure No.
2
Drawing Title
Site Plan
Scale
NTS

APPENDIX A

Proposed Development Layout



- P** PARKING BAY
- A** ACCESS RAMP
- SITE BOUNDARY
- - -** RAIL NETWORK
- ROAD PERIMETER
- GASLINE
- - -** GASLINE EASEMENT
- FOUL DRAINAGE
- - -** FOUL DRAINAGE EASEMENT
- PROTECTED TREES (TBC)
- ROOT PROTECTION AREA (RPA)
- (- -)** RPA TREE TO BE REMOVED

Area (Site Boundary)
Area (Square Meters)
6651 m ²

Parking Bay Schedule	
Family	Count
Car Park Parking1	50

Access Ramp Schedule	
Family	Count
Loading Ramp	14

NOTE
Drawing based on
Topography Information by South Coast Surveys
No. 254BUND/02

Bin Stores	
Name	Count

Cycle Storage Units	
Name	Count
Cycle Shelter	4

P07	For Information	TJ	WB	22/11/20
P08	For Information	TJ	WB	08/11/24
P09	For Information	TJ	WB	06/11/24
P04	For Information	TJ	WB	25/10/24
P03	For Information	TJ	WB	24/10/24
P02	For Information	TJ	WB	09/10/24
P01	For Information	SB	WB	26/07/24
Rev	Description	By	Check	Date

Hyphen

3 Charlotte Mews
Staple Gardens
Winchester, SO23 8SR
+44 1962 835500
info@hyphen.archi

Client
PNH

Project
EMSWORTH BUSINESS PARK

Drawing
SITE PLAN

Scale
As indicated @A0

Date
25/10/24

Author
TJ

Checked
WB

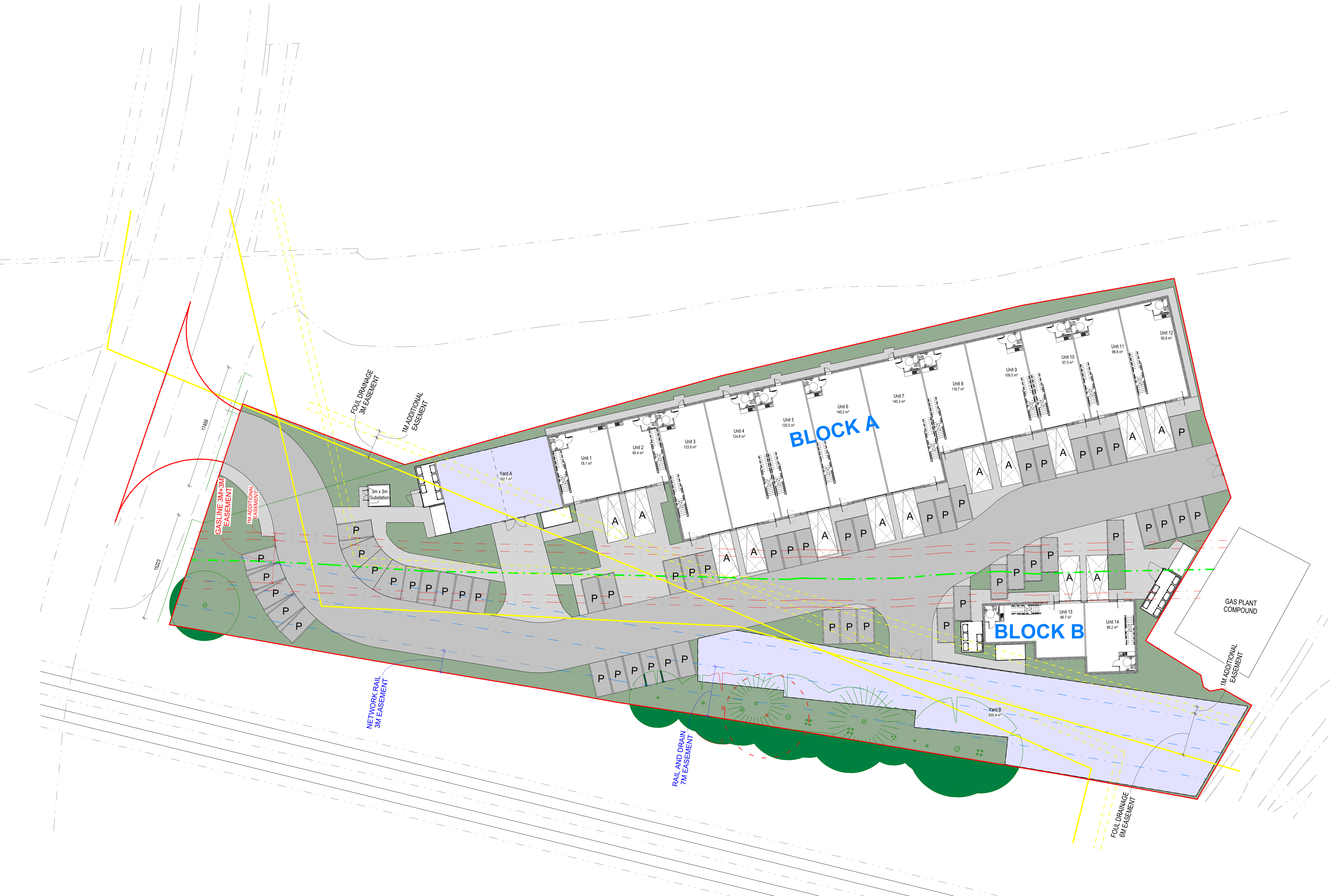
Workstage
2

Status
INFORMATION

Hyphen Project No.
PNH-9173-HYP-00-DR-A-000010

Project / Drawing No.
P07

Do not scale from this drawing.
Report any discrepancies to the author.
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1 Site Plan - Option I
SCALE: 1 : 200

Units Schedule Option I				
Name	Level	Comments	Area	
Unit 1				
Unit 1	Ground Floor		78.1 m ²	
Unit 1	First Floor	50% of GF Area	40.3 m ²	
Unit 2				
Unit 2	Ground Floor		65.4 m ²	
Unit 2	First Floor	50% of GF Area	32.6 m ²	
Unit 3				
Unit 3	Ground Floor		123.9 m ²	
Unit 3	First Floor	50% of GF Area	62.2 m ²	
Unit 4				
Unit 4	Ground Floor		124.8 m ²	

Units Schedule Option I				
Name	Level	Comments	Area	
Unit 4				
Unit 4	First Floor	50% of GF Area	62.2 m ²	
Unit 5				
Unit 5	Ground Floor		125.0 m ²	
Unit 5	First Floor	50% of GF Area	62.5 m ²	
Unit 6				
Unit 6	Ground Floor		146.2 m ²	
Unit 6	First Floor	50% of GF Area	72.7 m ²	
Unit 7				
Unit 7	Ground Floor		145.3 m ²	
Unit 7	First Floor	50% of GF Area	73.2 m ²	

Units Schedule Option I				
Name	Level	Comments	Area	
Unit 8				
Unit 8	Ground Floor		119.7 m ²	
Unit 8	First Floor	50% of GF Area	59.4 m ²	
Unit 9				
Unit 9	Ground Floor		139.5 m ²	
Unit 9	First Floor	50% of GF Area	54.9 m ²	
Unit 10				
Unit 10	Ground Floor		97.0 m ²	
Unit 10	First Floor	50% of GF Area	48.4 m ²	
Unit 11				
Unit 11	Ground Floor		96.8 m ²	

Units Schedule Option I				
Name	Level	Comments	Area	
Unit 11				
Unit 11	First Floor	50% of GF Area	48.4 m ²	
Unit 12				
Unit 12	Ground Floor		95.8 m ²	
Unit 12	First Floor	50% of GF Area	47.9 m ²	
Unit 13				
Unit 13	Ground Floor		86.7 m ²	
Unit 13	First Floor	50% of GF Area	42.0 m ²	
Unit 14				
Unit 14	Ground Floor		66.2 m ²	
Unit 14	First Floor	50% of GF Area	35.2 m ²	
Total Units				2221.4 m ²

APPENDIX B

Explanatory Notes
Exploratory Hole Records
DPSH-B Dynamic Probe Records
In-situ TRL Cone Penetrometer (CBR) Test Results
Borehole In Situ Infiltration Test Results
Groundwater Monitoring Results

Explanatory Notes

Symbols and abbreviations on Exploratory Hole Records

Samples

- U 'Undisturbed' Sample: - 100mm diameter by 450mm long. The number of blows to drive in the sampling tube is shown after the test index letter in the SPT column.
- Pi Piston Sample: 'Undisturbed' sample 100mm diameter by 600mm long.
- D Disturbed Sample
- R Root Sample
- B Bulk Disturbed Sample
- W Water Sample
- ES Environmental Suite (on older records may be referenced J T)

In Situ Testing

- S Standard penetration test (SPT): Using the split spoon sampler.
- C Standard Penetration Test (SPT): Using a solid cone instead of the sampler – conducted usually in coarse grained soils or weak rocks.
- V Shear Vane Test: Undrained shear strength (cohesion) (kN/m²) shown within the Vane/Pen Test and N Value column.
- H Hand penetrometer Test: Undrained shear strength (cohesion) (kN/m²) shown within the Vane/Pen Test and N Value column.
- P Perth Penetrometer Test: Number of blows for 300mm penetration shown under Vane/Pen Test and N Value column.

Excavation Method

- CP Cable Percussion Borehole
- RC Rotary Cored Borehole
- WLS Dynamic Sampler Borehole using windowless sampler tubes
- WS Dynamic Sampler Borehole using window sampler tubes
- TP Trial Pit excavated using mechanic excavator
- HDP Trial Pit excavated using hand tools

Soil Description

Description and classification of soils has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of soil, Part 1 Identification and description (BS EN ISO 14688-1) and Part 2 Principles of classification (BS EN 14688-2) as well as the BS5930 code of Practice for Ground Investigations.

Rock Description

Description and classification of rocks has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of rock, Part 1 Identification and classification (BS EN ISO 14689-1) as well as the BS5930 code of Practice for Ground Investigations. TCR – Total Core Recovery, SCR – Solid Core Recovery, RQD – Rock Quality Designation, NI – Non Intact, If – indicative fracture spacing (min/ave/max), FI – Fracture Index.

Chalk Description

Chalk description is based on BS EN ISO 14688, BS EN ISO 14689 and BS5930. The classification of chalk generally follows the guidance offered by the Construction Industry Research and Information Association (CIRIA) C574, 'Engineering in Chalk'. This is based on assessment of chalk density, discontinuity and aperture spacing, and the proportion of intact chalk to silt of chalk.

In Situ Strength Testing

Standard penetration testing (SPT) carried out in accordance with BS EN ISO 22476-3:2005.

Continuous dynamic probe testing conducted using a super heavy DPSH-B (As defined by BS EN ISO 22476-2:2005) probing geometry. The DPSH-B configuration is similar to that of the standard penetration test (SPT); the main differences being that the tip comprises a 90° cone, the driving rods are lighter than those used for SPT testing and the blow counts are recorded over 100mm increments rather than 300mm, as is the case for the SPT.

Perth penetrometer tests carried out in accordance with Australian Standard AS 1289:6.3.3-1997, Method of Testing Soils for Engineering Purposes; no equivalent European or British Standard having been published to date.

Undrained shear strength determinations made in-situ using a Geonor hand shear vane or a hand penetrometer.

Testing to determine the in-situ California Bearing Ratio (CBR) of soils conducted at shallow depths using a hand-held Transport Research Laboratory (TRL) cone penetrometer.

Samples and In Situ Testing				Dynamic Probe		Stratum Description	
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	051015202530	Legend	Depth
	ES	0.00	0.10				0.00
							0.10
	ES	0.35					
	H	0.50	40				
	D	0.85					
	H	0.90	75				
	H	1.10	110				1.00
	H	1.50	100				
	D	1.60					
	H	1.80	110				
	V	2.00	120				
	D	2.40					
	H	2.50	135				
	H	2.80	160				
	V	3.00	>130				
	H	3.10	135				
D	3.30						
H	3.60	160					
D	3.90						
H	3.90	175					
V	4.00	>130					
H	4.10	185					
D	4.30						
H	4.50	160					
D	4.80						
H	4.90	150					
V	5.00	>130					
							5.00
End of borehole at 5.00m							

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole stable on completion.

Notes: Standpipe installed to 5.00m depth; 5.00m to 2.00m slotted pipe with gravel surround; 2.00m to ground level plain pipe with bentonite seal; completed with end cap and security cover concreted flush with ground surface.

Excavation Method: WLS

Borehole Diameter:	Various
---------------------------	---------

Made By: GRD

ASHDOWN SITE INVESTIGATION L · I · M · I · T · E · D E-mail: contact@ashdownsi.co.uk Web: www.ashdownsi.co.uk Tel: 01273 483119		Site Name: Interbridges, New Brighton Road, Emsworth, Hampshire				
		Job Number: P16578				
		Start Date: 29/04/2024			Borehole Number: WS02	
		End Date: 29/04/2024				
		Sheet 1 of 1				
Samples and In Situ Testing Dynamic Probe Legend Depth Stratum Description						
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result		
	ES	0.05				0.00
	ES	0.30				0.20
	D	0.60				0.55
	ES	0.60				
	H	0.80	40			
	D	0.90				
	V	1.00	90			
	H	1.10	40			
	D	1.20				1.20
	H	1.50	75			
	H	1.80	>225			
	D	1.90				
	V	2.00	>130			
	H	2.10	>225			
	D	2.30				
	H	2.50	>225			
	D	2.90				
	H	2.90	>225			
	V	3.00	>130			3.00
End of borehole at 3.00m						

Made By: GRD

ASHDOWN SITE INVESTIGATION L · I · M · I · T · E · D E-mail: contact@ashdownsi.co.uk Web: www.ashdownsi.co.uk Tel: 01273 483119		Site Name: Interbridges, New Brighton Road, Emsworth, Hampshire												
		Job Number: P16578												
		Start Date: 29/04/2024					Borehole Number: WS04							
		End Date: 29/04/2024												
Sheet 1 of 2														
Samples and In Situ Testing Dynamic Probe Legend Depth Stratum Description														
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	0	5	10	15	20	25	30		Depth	Stratum Description
	ES	0.10											0.00	Topsoil over,
	ES	0.35											0.20	MADE GROUND: Dark brown slightly gravelly clay. Gravel is subangular to subrounded fine to coarse flint and rare chalk.
	H	0.40			60									Firm brown slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse flint. (River Terrace Deposits)
	D	0.60											0.55	Stiff brown and light brown gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse flint. (River Terrace Deposits)
	H	1.10			85								1.05	Stiff brown, orange brown and grey mottled CLAY with gravel of mudstone and sandstone. (London Clay Formation)
	D	1.40												
	H	1.50			135									
	H	1.80			175									
	D	1.90												
	V	2.00			>130									becoming grey brown below 2.00m depth.
	H	2.20			175									
	D	2.50												
	H	2.50			160									
	H	2.80			150									
	V	3.00			>130									3.10
	D	3.20												
H	3.20			110									Stiff dark grey CLAY. (London Clay Formation)	
H	3.50			110										
D	3.80													
H	3.80			110										
V	4.00			120										
D	4.30													
H	4.50			110										
H	4.80			135										
D	4.90													
V	5.00			120									5.00	
Remarks														
Groundwater: Borehole dry on completion.														Excavation Method: WLS
Stability: Borehole stable on completion.														Borehole Diameter: Various
Notes: Standpipe installed to 5.00m depth; 5.00m to 2.00m slotted pipe with gravel surround; 2.00m to ground level plain pipe with bentonite seal; completed with end cap and security cover concreted flush with ground surface.														Made By: GRD

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Web: www.ashdownsi.co.uk
Tel: 01273 483119

Site Name: Interbridges, New Brighton Road, Emsworth, Hampshire

Job Number: P16578

Start Date: 29/04/2024

End Date: 29/04/2024

Borehole Number: WS04

Sheet 2 of 2

Standpipe		Samples and In Situ Testing		Dynamic Probe		Legend		Depth		Stratum Description	
Sample/ Test Type		Depth From (m)	Depth To (m)	Test Result		0 5 10 15 20 25 30					
										End of borehole at 5.00m	

Site Name: Interbridges, New Brighton Road, Emsworth, Hampshire

Job Number: P16578

Start Date: 29/04/2024

End Date: 29/05/2024

Borehole Number:

WS05

Sheet 1 of 1

		Samples and In Situ Testing			Dynamic Probe						Stratum Description	
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	0 5 10 15 20 25 30				Legend	Depth		
	ES	0.10								0.00	MADE GROUND: Dark brown gravelly slightly sandy clay. Gravel is subangular to subrounded fine to coarse flint, rare brick, chalk and charcoal-like material.	
	ES	0.30								0.20		
	D	0.50									Medium dense brown grey sandy very clayey subangular to subrounded fine to coarse GRAVEL of flint with occasional cobbles. (River Terrace Deposits) becoming dense between 0.50m and 0.70m depth.	
	H	0.90		40						0.85	Firm brown and light brown slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to coarse flint. (River Terrace Deposits)	
	D	1.10		40							with only fine gravel between 1.15m and 1.50m depth.	
	H	1.15		40								
	H	1.40		50								
										1.70	Stiff light brown gravelly sandy CLAY. Gravel is subangular to subrounded fine flint. (River Terrace Deposits)	
	D	1.90								2.00	Dense light brown sandy clayey subangular to subrounded fine to coarse GRAVEL of flint. (River Terrace Deposits) becoming medium dense below 2.20m depth.	
	D	2.10								2.30	Stiff dark grey CLAY. (London Clay Formation)	
	H	2.80		75								
	D	2.90										
	V	3.00		110						3.00	End of borehole at 3.00m	

Remarks	
---------	--

Groundwater: Groundwater recorded at 1.33m depth on completion of borehole.

Stability: Borehole cased to 1.00m depth.
Borehole collapsed to 2.38m depth on completion.

Notes: Poor recovery of soil sample below 2.00m depth.

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

Made By: GRD

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		Job Number: P16578												
		Start Date: 30/04/2024					Borehole Number: WS07							
		End Date: 30/04/2024												
Sheet 1 of 1														
Samples and In Situ Testing Dynamic Probe Legend Depth Stratum Description														
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	0	5	10	15	20	25	30		Depth	Stratum Description
	ES	0.15											0.00	MADE GROUND: Dark brown and brown slightly gravelly clay. Gravel is subangular to subrounded fine to coarse brick, metal, flint, charcoal-like material and chalk.
	ES	0.35											0.30	Firm brown gravelly CLAY. Gravel is subangular to subrounded fine to coarse flint and ironstone. (River Terrace Deposits)
	D	0.60											0.70	Firm brown and light grey mottled orange brown CLAY. (London Clay Formation)
	ES	0.75												
	H	0.90		60										
	V	1.00		100										becoming locally stiff below 1.00m depth.
	H	1.10		60										
	D	1.50											1.50	Stiff brown and grey mottled CLAY. (London Clay Formation)
	H	1.50		160										
	H	1.80		135										
	V	2.00		110										
	H	2.10		110										
	D	2.30												
	H	2.50		85										
	H	2.80		100										
	D	2.90												
	V	3.00		100										becoming orange brown mottled grey with occasional lenses/pockets of sand below 3.00m depth.
	H	3.10		135										
	D	3.20												
	H	3.50		75										
	D	3.60												
	H	3.80		85										
	V	4.00		>130									4.00	Stiff dark grey CLAY. (London Clay Formation)
	H	4.10		85										
	D	4.20												
	H	4.60		110										
	D	4.90												
	V	5.00		>130									5.00	End of borehole at 5.00m
Remarks														
Groundwater: Borehole dry on completion.														
Stability: Borehole stable on completion.														
Notes: Standpipe installed to 5.00m depth; 5.00m to 2.00m slotted pipe with gravel surround; 2.00m to ground level plain pipe with bentonite seal; completed with end cap and security cover concreted flush with ground surface.														
Excavation Method: WLS														
Borehole Diameter: Various														
Made By: GRD														

ASHDOWN SITE INVESTIGATION L · I · M · I · T · E · D E-mail: contact@ashdownsi.co.uk Web: www.ashdownsi.co.uk Tel: 01273 483119		Site Name: Interbridges, New Brighton Road, Emsworth, Hampshire				
		Job Number: P16578				
		Start Date: 30/04/2024		Borehole Number: WS08		
		End Date: 30/04/2024		Sheet 1 of 1		
Samples and In Situ Testing Dynamic Probe Legend Depth Stratum Description						
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result		
	ES	0.10				0.00
	ES	0.40				0.25
	ES	0.90				0.90
	H	0.95		85		
	V	1.00		90		
	D	1.20				
	H	1.30		60		
	D	1.80				
	H	1.80		75		
	H	2.20		50		
	D	2.40				
	D	2.90				3.00
						End of borehole at 3.00m
Remarks						
Groundwater: Borehole dry on completion.						Excavation Method: WLS
Stability: Borehole cased to 2.00m depth. Borehole collapsed to 2.40m depth on completion.						Borehole Diameter: Various
Notes: n/a						Made By: GRD

ASHDOWN SITE INVESTIGATION L · I · M · I · T · E · D E-mail: contact@ashdownsi.co.uk Web: www.ashdownsi.co.uk Tel: 01273 483119		Site Name: Interbridges, New Brighton Road, Emsworth, Hampshire											
		Job Number: P16578											
		Start Date: 30/04/2024			Borehole Number: WS09								
End Date: 30/04/2024						Sheet 1 of 2							
Samples and In Situ Testing Dynamic Probe Legend Depth Stratum Description													
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	0	5	10	15	20	25	30		
	ES	0.50											MADE GROUND: Dark brown gravelly slightly sandy clay. Gravel is subangular to subrounded fine to coarse flint, brick, charcoal-like material and chalk.
	ES	1.00											
	ES	1.70											MADE GROUND: Off white and light grey gravelly clayey silt. Gravel is subangular to subrounded fine to coarse chalk with occasional flint. (Possible Chalk Fill)
	D	2.25											Stiff dark grey CLAY with occasional shell fragments. (London Clay Formation)
	D	2.75											
													End of borehole at 3.00m
Remarks													
Groundwater: Groundwater recorded at 1.30m depth on completion of borehole.													Excavation Method: WLS
Stability: Borehole collapsed to 2.50m depth on completion.													Borehole Diameter: Various
Notes: n/a													Made By: GRD

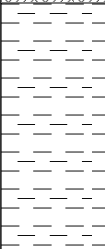
ASHDOWN SITE INVESTIGATION L · I · M · I · T · E · D E-mail: contact@ashdownsi.co.uk Web: www.ashdownsi.co.uk Tel: 01273 483119 Site Name: Interbridges, New Brighton Road, Emsworth, Hampshire Job Number: P16578 Start Date: 30/04/2024 End Date: 30/04/2024		Trial Pit Number: TP01 Sheet 1 of 1				
Samples and In Situ Testing						
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Legend	Depth/ Reduced Level	Stratum Description
ES	0.05				0.00	Topsoil with occasional gravel of subangular to subrounded fine to medium flint and chalk.
ES	0.20				0.10	
						Orange brown slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse flint. (River Terrace Deposits)
D	0.90				1.00	End of trial pit at 1.00m
Remarks						
Groundwater: Trial pit dry on completion.						
Stability: Trial pit stable on completion.						
Notes: n/a						
Excavation Method: HDP						
Pit Length: n/a						
Pit Width: n/a						
Made By: GRD						

End Date: 29/04/2024

Sheet 1 of 1

Remarks Groundwater: Trial pit dry on completion. Stability: Trial pit stable on completion. Notes: n/a	Excavation Method: HDP
	Pit Length: n/a
	Pit Width: n/a
	Made By: GRD

Made By: GRD

ASHDOWN SITE INVESTIGATION L · I · M · I · T · E · D E-mail: contact@ashdownsi.co.uk Web: www.ashdownsi.co.uk Tel: 01273 483119		Site Name: Interbridges, New Brighton Road, Emsworth, Hampshire Job Number: P16578 Start Date: 30/04/2024 End Date: 30/04/2024				Trial Pit Number: TP04		Sheet 1 of 1					
Samples and In Situ Testing													
Sample/ Test Type		Depth From (m)		Depth To (m)		Test Result		Legend		Depth/ Reduced Level		Stratum Description	
ES		0.10		0.15						0.00		Topsoil with occasional gravel of subangular to subrounded fine flint and rare chalk.	
ES		0.30								0.15		Brown mottled orange brown slightly gravelly CLAY. Gravel is subangular to subrounded fine flint and chalk. (River Terrace Deposits)	
D		0.80								1.00		End of trial pit at 1.00m	
Remarks													
Groundwater: Trial pit dry on completion.										Excavation Method: HDP			
Stability: Trial pit stable on completion.										Pit Length: n/a			
Notes: n/a										Pit Width: n/a			
										Made By: GRD			

ASHDOWN SITE INVESTIGATION L · I · M · I · T · E · D E-mail: contact@ashdownsi.co.uk Web: www.ashdownsi.co.uk Tel: 01273 483119		Site Name: Interbridges, New Brighton Road, Emsworth, Hampshire				
		Job Number: P16578				
		Start Date: 30/04/2024		Trial Pit Number: TP05		
		End Date: 30/04/2024				
Sheet 1 of 1						
Samples and In Situ Testing						
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Legend	Depth/ Reduced Level	Stratum Description
ES	0.10				0.00	Topsoil over,
ES	0.30				0.20	MADE GROUND: Dark brown slightly gravelly clay. Gravel is subangular to subrounded fine to coarse flint, rare brick, chalk and charcoal-like material.
						MADE GROUND: Brown slightly gravelly clay. Gravel is subangular to subrounded fine to coarse flint, rare chalk and charcoal-like material.
					0.80	Orange brown and light brown gravelly CLAY. Gravel is subangular to subrounded fine to coarse flint. (River Terrace Deposits)
D	0.90				1.00	End of trial pit at 1.00m
Remarks Groundwater: Trial pit dry on completion. Stability: Trial pit stable on completion. Notes: n/a						Excavation Method: HDP Pit Length: n/a Pit Width: n/a Made By: GRD

ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

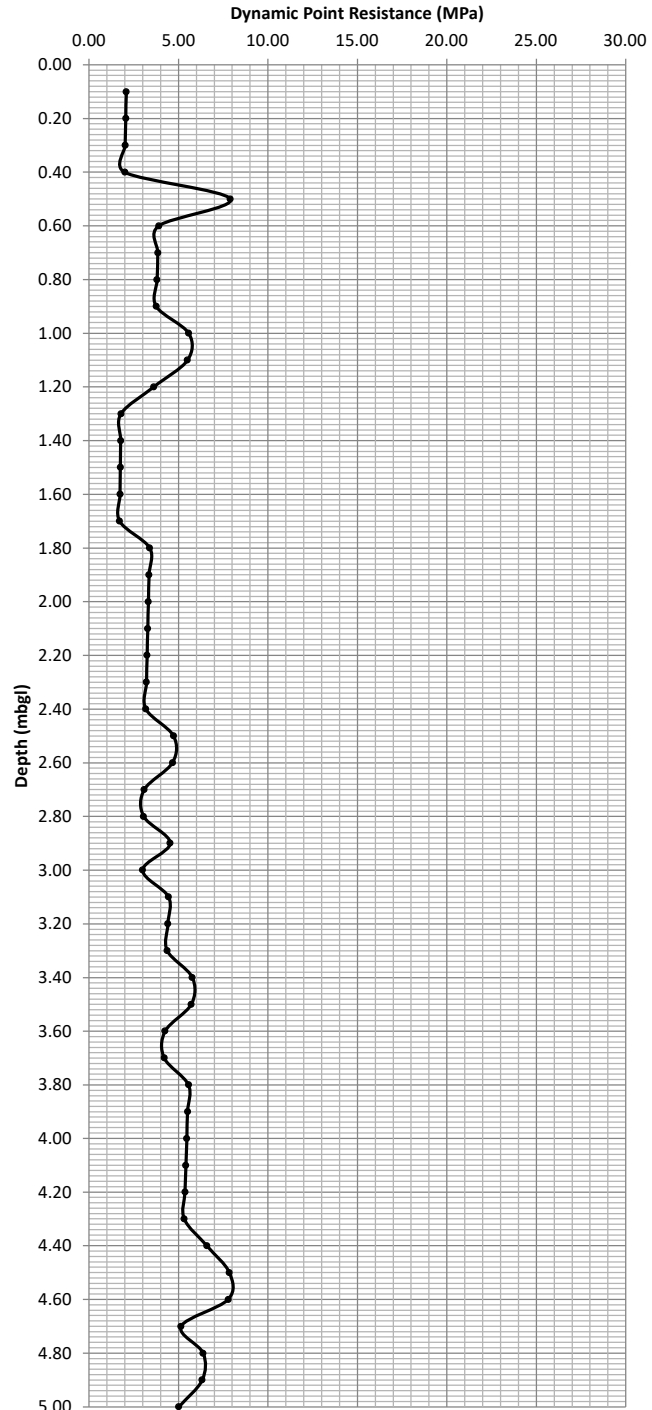
SITE Interbridges, New Brighton Road, Emsworth, Hampshire

Report Ref.

P16578

Test Location Reference **WS01**

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10	1	0.10	2.14	2.08
0.20	1	0.10	2.14	2.05
0.30	1	0.10	2.14	2.03
0.40	1	0.10	2.14	2.00
0.50	4	0.03	8.57	7.90
0.60	2	0.05	4.29	3.90
0.70	2	0.05	4.29	3.85
0.80	2	0.05	4.29	3.80
0.90	2	0.05	4.29	3.76
1.00	3	0.03	6.43	5.57
1.10	3	0.03	6.43	5.50
1.20	2	0.05	4.29	3.63
1.30	1	0.10	2.14	1.79
1.40	1	0.10	2.14	1.77
1.50	1	0.10	2.14	1.75
1.60	1	0.10	2.14	1.73
1.70	1	0.10	2.14	1.71
1.80	2	0.05	4.29	3.39
1.90	2	0.05	4.29	3.35
2.00	2	0.05	4.29	3.32
2.10	2	0.05	4.29	3.28
2.20	2	0.05	4.29	3.25
2.30	2	0.05	4.29	3.21
2.40	2	0.05	4.29	3.18
2.50	3	0.03	6.43	4.72
2.60	3	0.03	6.43	4.67
2.70	2	0.05	4.29	3.08
2.80	2	0.05	4.29	3.05
2.90	3	0.03	6.43	4.54
3.00	2	0.05	4.29	3.00
3.10	3	0.03	6.43	4.45
3.20	3	0.03	6.43	4.41
3.30	3	0.03	6.43	4.37
3.40	4	0.03	8.57	5.77
3.50	4	0.03	8.57	5.71
3.60	3	0.03	6.43	4.25
3.70	3	0.03	6.43	4.21
3.80	4	0.03	8.57	5.56
3.90	4	0.03	8.57	5.51
4.00	4	0.03	8.57	5.46
4.10	4	0.03	8.57	5.41
4.20	4	0.03	8.57	5.37
4.30	4	0.03	8.57	5.32
4.40	5	0.02	10.71	6.60
4.50	6	0.02	12.86	7.85
4.60	6	0.02	12.86	7.78
4.70	4	0.03	8.57	5.15
4.80	5	0.02	10.71	6.38
4.90	5	0.02	10.71	6.33
5.00	4	0.03	8.57	5.02



Notes:

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.86
Anvil Mass	1 kg
Rod Mass	8.79 kg/m

ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

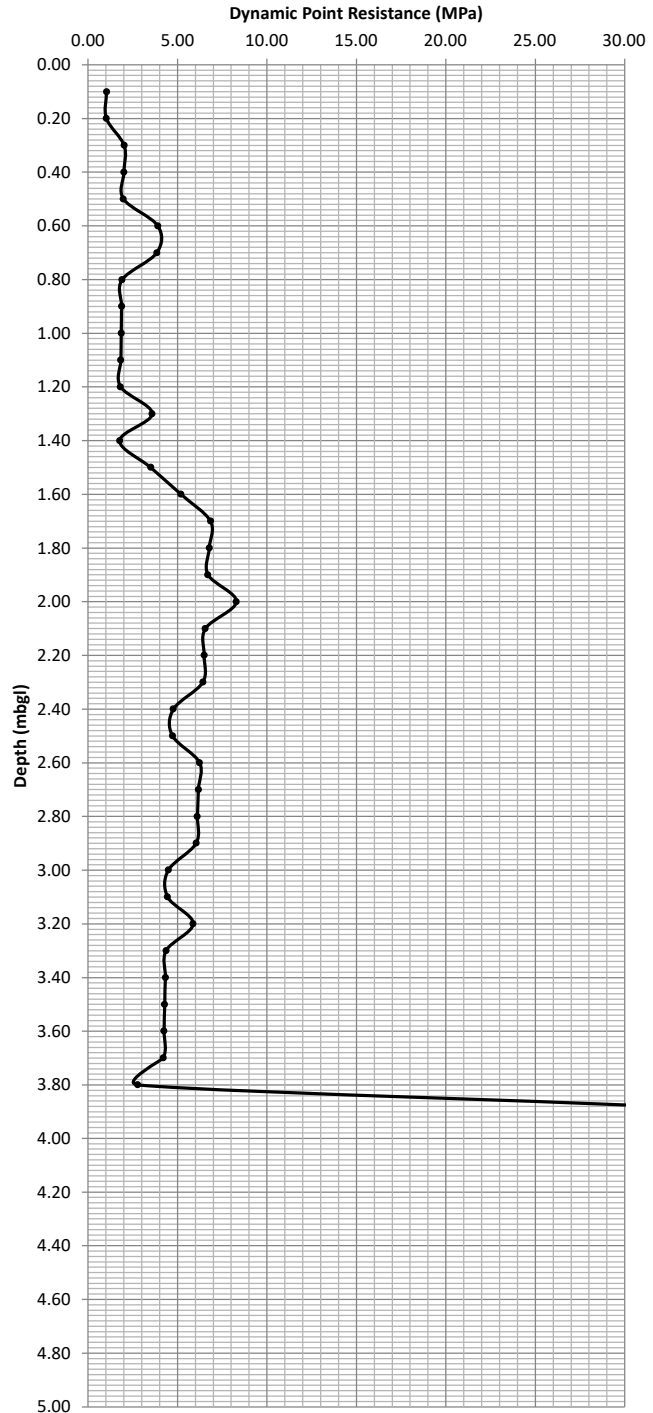
SITE Interbridges, New Brighton Road, Emsworth, Hampshire

Report Ref.

P16578

Test Location Reference **WS02**

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10	0.5	0.20	1.07	1.04
0.20	0.5	0.20	1.07	1.03
0.30	1	0.10	2.14	2.03
0.40	1	0.10	2.14	2.00
0.50	1	0.10	2.14	1.98
0.60	2	0.05	4.29	3.90
0.70	2	0.05	4.29	3.85
0.80	1	0.10	2.14	1.90
0.90	1	0.10	2.14	1.88
1.00	1	0.10	2.14	1.86
1.10	1	0.10	2.14	1.83
1.20	1	0.10	2.14	1.81
1.30	2	0.05	4.29	3.58
1.40	1	0.10	2.14	1.77
1.50	2	0.05	4.29	3.50
1.60	3	0.03	6.43	5.20
1.70	4	0.03	8.57	6.85
1.80	4	0.03	8.57	6.78
1.90	4	0.03	8.57	6.70
2.00	5	0.02	10.71	8.29
2.10	4	0.03	8.57	6.56
2.20	4	0.03	8.57	6.49
2.30	4	0.03	8.57	6.43
2.40	3	0.03	6.43	4.77
2.50	3	0.03	6.43	4.72
2.60	4	0.03	8.57	6.23
2.70	4	0.03	8.57	6.17
2.80	4	0.03	8.57	6.11
2.90	4	0.03	8.57	6.05
3.00	3	0.03	6.43	4.49
3.10	3	0.03	6.43	4.45
3.20	4	0.03	8.57	5.88
3.30	3	0.03	6.43	4.37
3.40	3	0.03	6.43	4.33
3.50	3	0.03	6.43	4.29
3.60	3	0.03	6.43	4.25
3.70	3	0.03	6.43	4.21
3.80	2	0.05	4.29	2.78
3.90	27	0.00	57.86	37.20
4.00	30	0.00	64.29	40.97
4.10				
4.20				
4.30				
4.40				
4.50				
4.60				
4.70				
4.80				
4.90				
5.00				



Notes:

No further progres below 4.00m depth - Hammer bouncing.

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.86
Anvil Mass	1 kg
Rod Mass	8.79 kg/m

ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

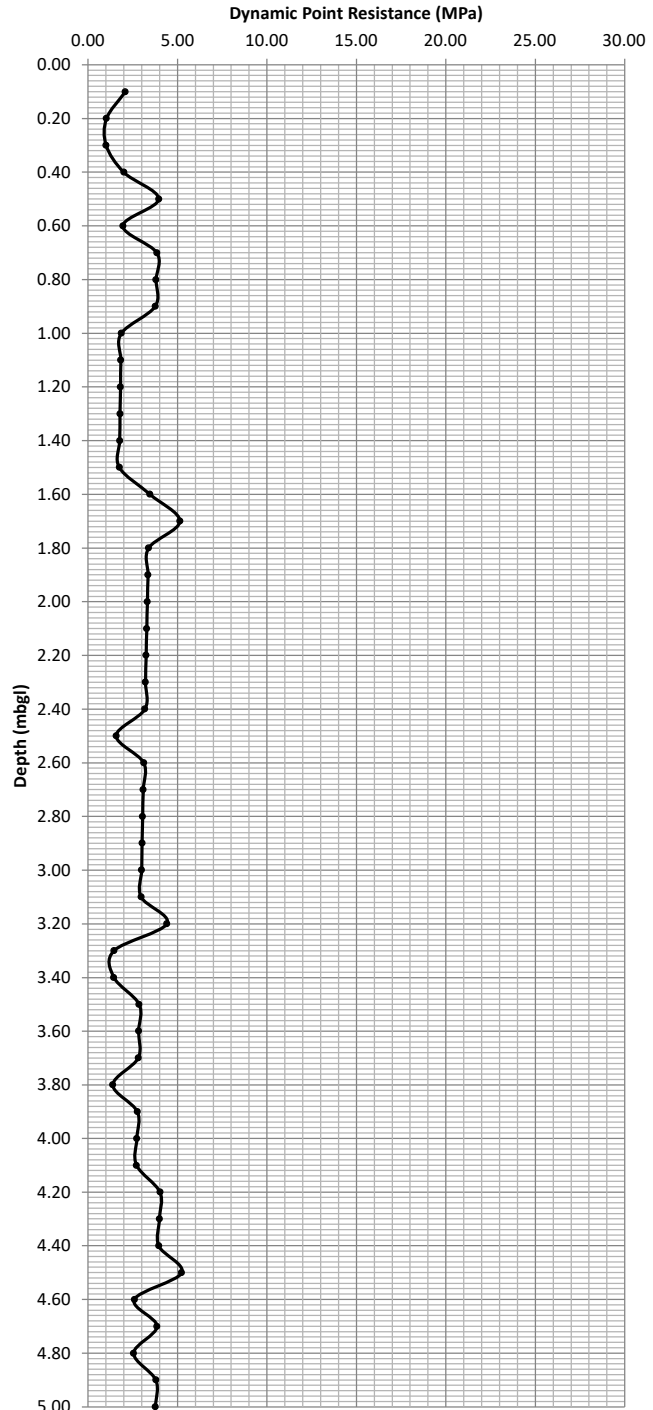
SITE Interbridges, New Brighton Road, Emsworth, Hampshire

Report Ref.

P16578

Test Location Reference **WS03**

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10	1	0.10	2.14	2.08
0.20	0.5	0.20	1.07	1.03
0.30	0.5	0.20	1.07	1.01
0.40	1	0.10	2.14	2.00
0.50	2	0.05	4.29	3.95
0.60	1	0.10	2.14	1.95
0.70	2	0.05	4.29	3.85
0.80	2	0.05	4.29	3.80
0.90	2	0.05	4.29	3.76
1.00	1	0.10	2.14	1.86
1.10	1	0.10	2.14	1.83
1.20	1	0.10	2.14	1.81
1.30	1	0.10	2.14	1.79
1.40	1	0.10	2.14	1.77
1.50	1	0.10	2.14	1.75
1.60	2	0.05	4.29	3.46
1.70	3	0.03	6.43	5.14
1.80	2	0.05	4.29	3.39
1.90	2	0.05	4.29	3.35
2.00	2	0.05	4.29	3.32
2.10	2	0.05	4.29	3.28
2.20	2	0.05	4.29	3.25
2.30	2	0.05	4.29	3.21
2.40	2	0.05	4.29	3.18
2.50	1	0.10	2.14	1.57
2.60	2	0.05	4.29	3.12
2.70	2	0.05	4.29	3.08
2.80	2	0.05	4.29	3.05
2.90	2	0.05	4.29	3.02
3.00	2	0.05	4.29	3.00
3.10	2	0.05	4.29	2.97
3.20	3	0.03	6.43	4.41
3.30	1	0.10	2.14	1.46
3.40	1	0.10	2.14	1.44
3.50	2	0.05	4.29	2.86
3.60	2	0.05	4.29	2.83
3.70	2	0.05	4.29	2.81
3.80	1	0.10	2.14	1.39
3.90	2	0.05	4.29	2.76
4.00	2	0.05	4.29	2.73
4.10	2	0.05	4.29	2.71
4.20	3	0.03	6.43	4.03
4.30	3	0.03	6.43	3.99
4.40	3	0.03	6.43	3.96
4.50	4	0.03	8.57	5.23
4.60	2	0.05	4.29	2.59
4.70	3	0.03	6.43	3.86
4.80	2	0.05	4.29	2.55
4.90	3	0.03	6.43	3.80
5.00	3	0.03	6.43	3.77



Notes:

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.86
Anvil Mass	1 kg
Rod Mass	8.79 kg/m

ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

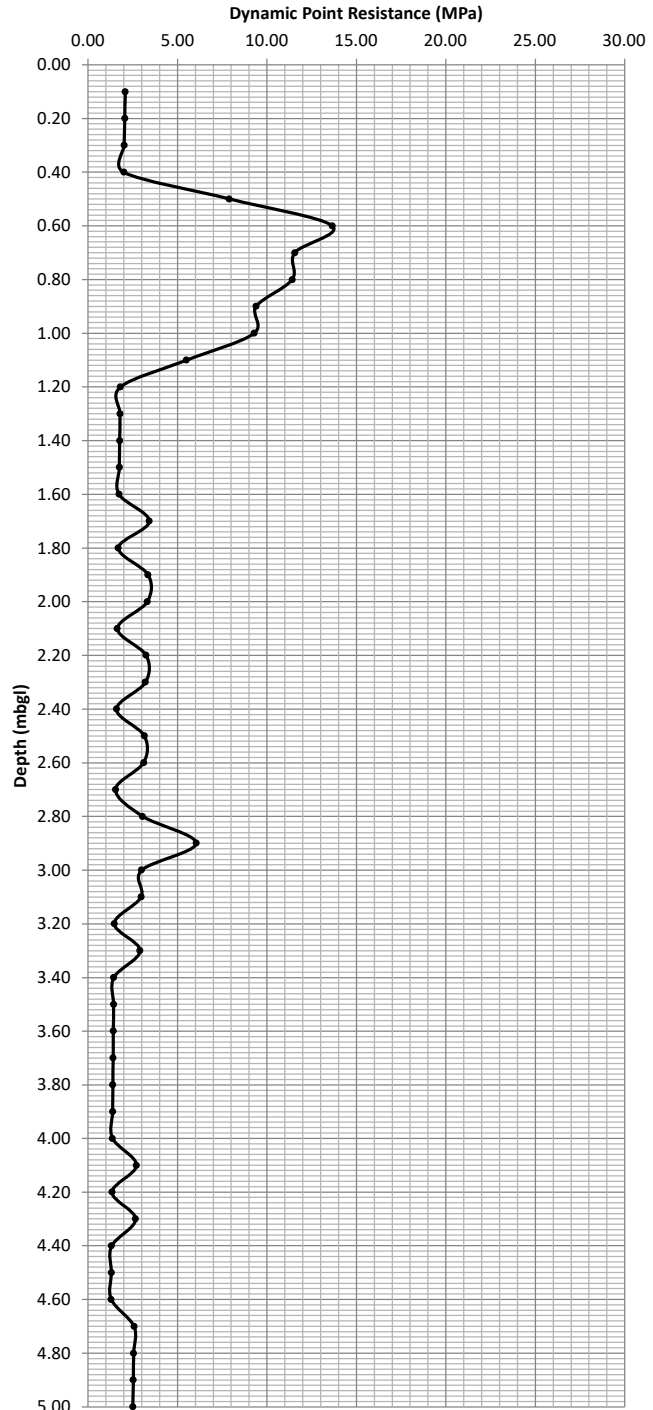
SITE Interbridges, New Brighton Road, Emsworth, Hampshire

Report Ref.

P16578

Test Location Reference **WS04**

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10	1	0.10	2.14	2.08
0.20	1	0.10	2.14	2.05
0.30	1	0.10	2.14	2.03
0.40	1	0.10	2.14	2.00
0.50	4	0.03	8.57	7.90
0.60	7	0.01	15.00	13.65
0.70	6	0.02	12.86	11.56
0.80	6	0.02	12.86	11.41
0.90	5	0.02	10.71	9.40
1.00	5	0.02	10.71	9.28
1.10	3	0.03	6.43	5.50
1.20	1	0.10	2.14	1.81
1.30	1	0.10	2.14	1.79
1.40	1	0.10	2.14	1.77
1.50	1	0.10	2.14	1.75
1.60	1	0.10	2.14	1.73
1.70	2	0.05	4.29	3.43
1.80	1	0.10	2.14	1.69
1.90	2	0.05	4.29	3.35
2.00	2	0.05	4.29	3.32
2.10	1	0.10	2.14	1.64
2.20	2	0.05	4.29	3.25
2.30	2	0.05	4.29	3.21
2.40	1	0.10	2.14	1.59
2.50	2	0.05	4.29	3.15
2.60	2	0.05	4.29	3.12
2.70	1	0.10	2.14	1.54
2.80	2	0.05	4.29	3.05
2.90	4	0.03	8.57	6.05
3.00	2	0.05	4.29	3.00
3.10	2	0.05	4.29	2.97
3.20	1	0.10	2.14	1.47
3.30	2	0.05	4.29	2.91
3.40	1	0.10	2.14	1.44
3.50	1	0.10	2.14	1.43
3.60	1	0.10	2.14	1.42
3.70	1	0.10	2.14	1.40
3.80	1	0.10	2.14	1.39
3.90	1	0.10	2.14	1.38
4.00	1	0.10	2.14	1.37
4.10	2	0.05	4.29	2.71
4.20	1	0.10	2.14	1.34
4.30	2	0.05	4.29	2.66
4.40	1	0.10	2.14	1.32
4.50	1	0.10	2.14	1.31
4.60	1	0.10	2.14	1.30
4.70	2	0.05	4.29	2.57
4.80	2	0.05	4.29	2.55
4.90	2	0.05	4.29	2.53
5.00	2	0.05	4.29	2.51



Notes:

Hammer Mass 63.5 kg
 Fall Height 0.76 m
 Cone Area 0.0019 m²
 E_{theor} 473 J
 Energy Ratio 0.86
 Anvil Mass 1 kg
 Rod Mass 8.79 kg/m

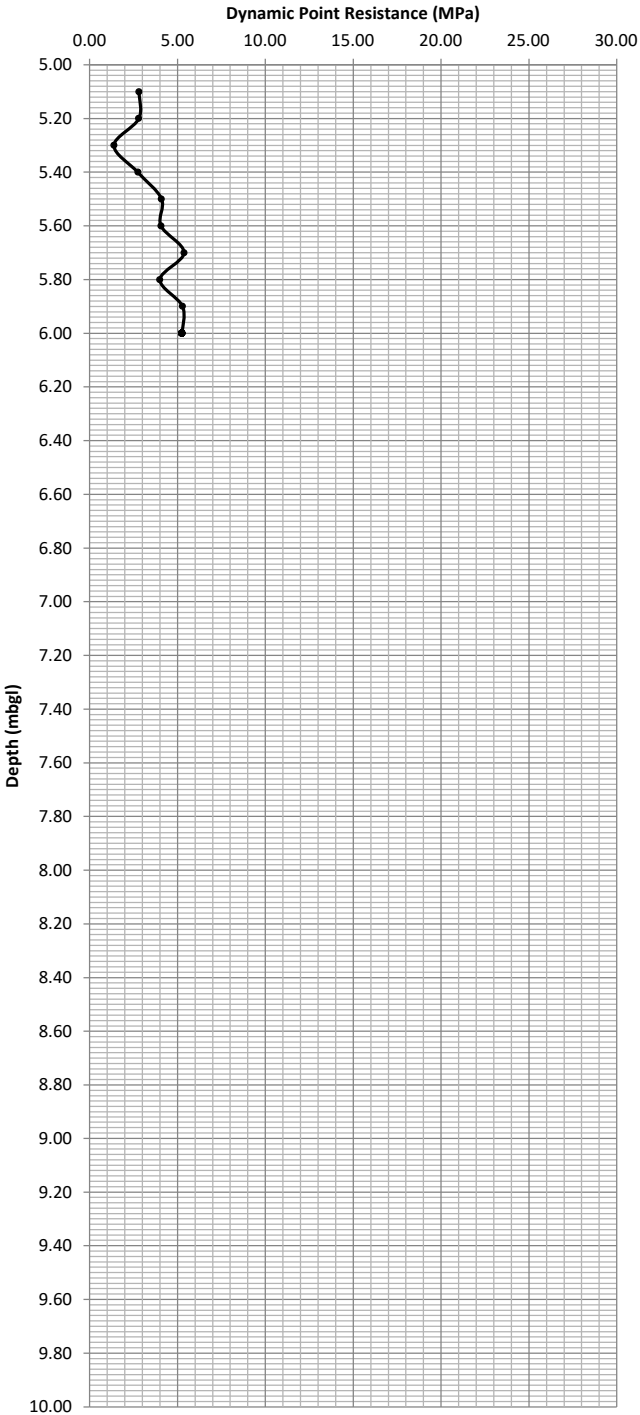
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Interbridges, New Brighton Road, Emsworth, Hampshire Report Ref. P16578

Test Location Reference WS04

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
5.10	2	0.05	4.85	2.82
5.20	2	0.05	4.85	2.79
5.30	1	0.10	2.42	1.39
5.40	2	0.05	4.85	2.75
5.50	3	0.03	7.27	4.09
5.60	3	0.03	7.27	4.06
5.70	4	0.03	9.70	5.38
5.80	3	0.03	7.27	4.00
5.90	4	0.03	9.70	5.29
6.00	4	0.03	9.70	5.25
6.10				
6.20				
6.30				
6.40				
6.50				
6.60				
6.70				
6.80				
6.90				
7.00				
7.10				
7.20				
7.30				
7.40				
7.50				
7.60				
7.70				
7.80				
7.90				
8.00				
8.10				
8.20				
8.30				
8.40				
8.50				
8.60				
8.70				
8.80				
8.90				
9.00				
9.10				
9.20				
9.30				
9.40				
9.50				
9.60				
9.70				
9.80				
9.90				
10.00				



Notes:

Hammer Mass	63.5 kg
Fall Height	0.86 m
Cone Area	0.0019 m ²
E _{theor}	536 J
Energy Ratio	0.86
Anvil Mass	1 kg
Rod Mass	8.79 kg/m

ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

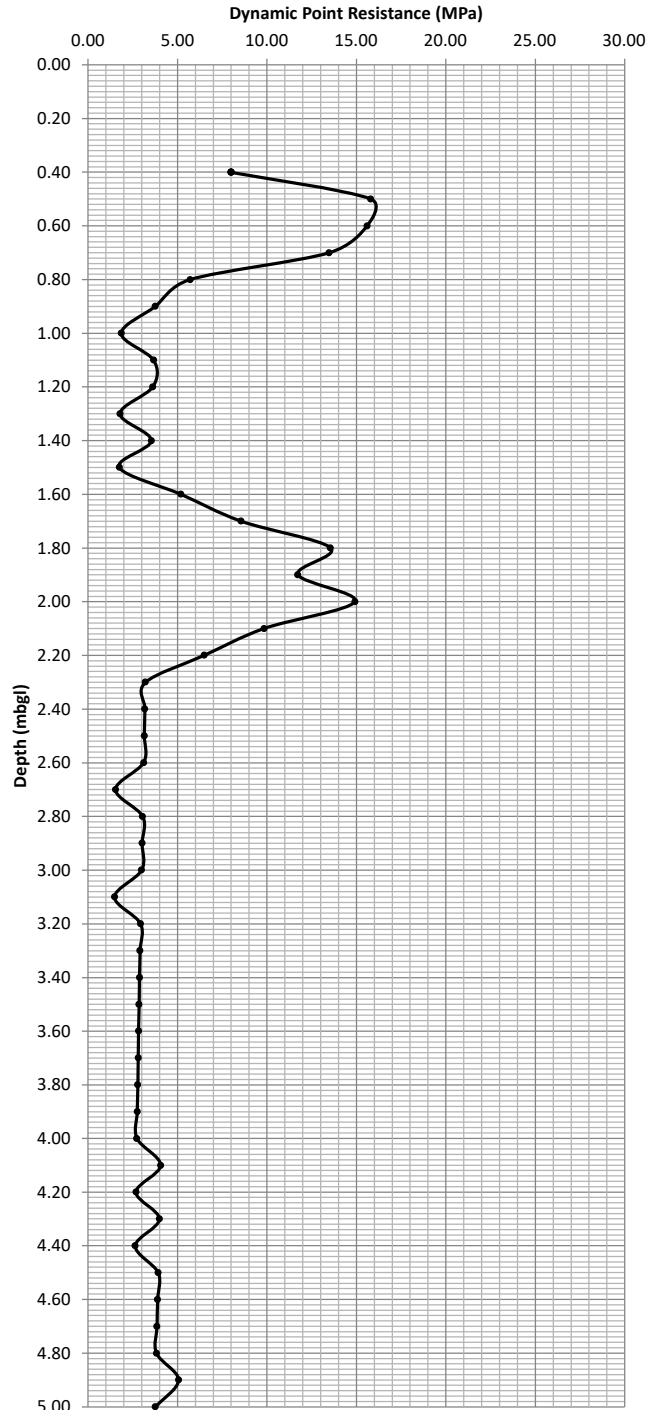
SITE Interbridges, New Brighton Road, Emsworth, Hampshire

Report Ref.

P16578

Test Location Reference **WS05**

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10				
0.20				
0.30				
0.40	4	0.03	8.57	8.00
0.50	8	0.01	17.14	15.80
0.60	8	0.01	17.14	15.60
0.70	7	0.01	15.00	13.48
0.80	3	0.03	6.43	5.71
0.90	2	0.05	4.29	3.76
1.00	1	0.10	2.14	1.86
1.10	2	0.05	4.29	3.67
1.20	2	0.05	4.29	3.63
1.30	1	0.10	2.14	1.79
1.40	2	0.05	4.29	3.54
1.50	1	0.10	2.14	1.75
1.60	3	0.03	6.43	5.20
1.70	5	0.02	10.71	8.57
1.80	8	0.01	17.14	13.55
1.90	7	0.01	15.00	11.73
2.00	9	0.01	19.29	14.92
2.10	6	0.02	12.86	9.84
2.20	4	0.03	8.57	6.49
2.30	2	0.05	4.29	3.21
2.40	2	0.05	4.29	3.18
2.50	2	0.05	4.29	3.15
2.60	2	0.05	4.29	3.12
2.70	1	0.10	2.14	1.54
2.80	2	0.05	4.29	3.05
2.90	2	0.05	4.29	3.02
3.00	2	0.05	4.29	3.00
3.10	1	0.10	2.14	1.48
3.20	2	0.05	4.29	2.94
3.30	2	0.05	4.29	2.91
3.40	2	0.05	4.29	2.88
3.50	2	0.05	4.29	2.86
3.60	2	0.05	4.29	2.83
3.70	2	0.05	4.29	2.81
3.80	2	0.05	4.29	2.78
3.90	2	0.05	4.29	2.76
4.00	2	0.05	4.29	2.73
4.10	3	0.03	6.43	4.06
4.20	2	0.05	4.29	2.68
4.30	3	0.03	6.43	3.99
4.40	2	0.05	4.29	2.64
4.50	3	0.03	6.43	3.92
4.60	3	0.03	6.43	3.89
4.70	3	0.03	6.43	3.86
4.80	3	0.03	6.43	3.83
4.90	4	0.03	8.57	5.06
5.00	3	0.03	6.43	3.77



Notes:

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.86
Anvil Mass	1 kg
Rod Mass	8.79 kg/m

ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

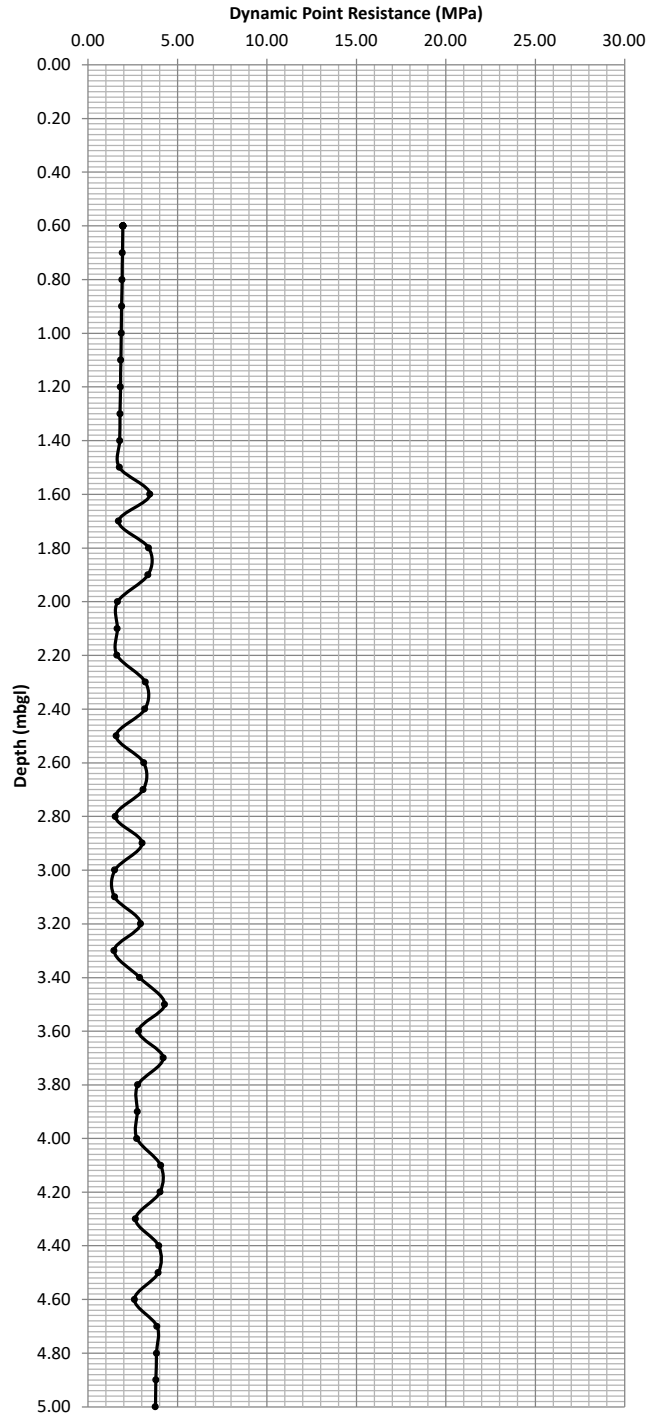
SITE Interbridges, New Brighton Road, Emsworth, Hampshire

Report Ref.

P16578

Test Location Reference **WS06**

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10				
0.20				
0.30				
0.40				
0.50				
0.60	1	0.10	2.14	1.95
0.70	1	0.10	2.14	1.93
0.80	1	0.10	2.14	1.90
0.90	1	0.10	2.14	1.88
1.00	1	0.10	2.14	1.86
1.10	1	0.10	2.14	1.83
1.20	1	0.10	2.14	1.81
1.30	1	0.10	2.14	1.79
1.40	1	0.10	2.14	1.77
1.50	1	0.10	2.14	1.75
1.60	2	0.05	4.29	3.46
1.70	1	0.10	2.14	1.71
1.80	2	0.05	4.29	3.39
1.90	2	0.05	4.29	3.35
2.00	1	0.10	2.14	1.66
2.10	1	0.10	2.14	1.64
2.20	1	0.10	2.14	1.62
2.30	2	0.05	4.29	3.21
2.40	2	0.05	4.29	3.18
2.50	1	0.10	2.14	1.57
2.60	2	0.05	4.29	3.12
2.70	2	0.05	4.29	3.08
2.80	1	0.10	2.14	1.53
2.90	2	0.05	4.29	3.02
3.00	1	0.10	2.14	1.50
3.10	1	0.10	2.14	1.48
3.20	2	0.05	4.29	2.94
3.30	1	0.10	2.14	1.46
3.40	2	0.05	4.29	2.88
3.50	3	0.03	6.43	4.29
3.60	2	0.05	4.29	2.83
3.70	3	0.03	6.43	4.21
3.80	2	0.05	4.29	2.78
3.90	2	0.05	4.29	2.76
4.00	2	0.05	4.29	2.73
4.10	3	0.03	6.43	4.06
4.20	3	0.03	6.43	4.03
4.30	2	0.05	4.29	2.66
4.40	3	0.03	6.43	3.96
4.50	3	0.03	6.43	3.92
4.60	2	0.05	4.29	2.59
4.70	3	0.03	6.43	3.86
4.80	3	0.03	6.43	3.83
4.90	3	0.03	6.43	3.80
5.00	3	0.03	6.43	3.77



Notes:

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.86
Anvil Mass	1 kg
Rod Mass	8.79 kg/m

ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

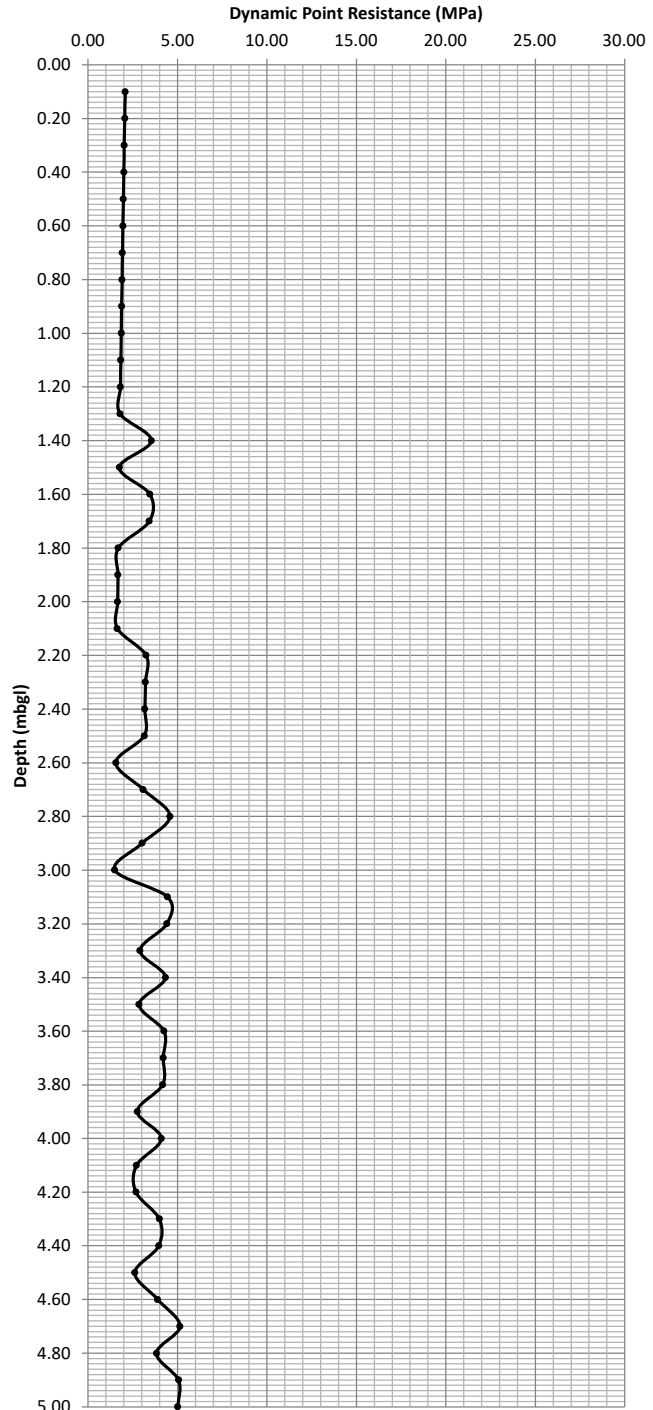
SITE Interbridges, New Brighton Road, Emsworth, Hampshire

Report Ref.

P16578

Test Location Reference **WS07**

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10	1	0.10	2.14	2.08
0.20	1	0.10	2.14	2.05
0.30	1	0.10	2.14	2.03
0.40	1	0.10	2.14	2.00
0.50	1	0.10	2.14	1.98
0.60	1	0.10	2.14	1.95
0.70	1	0.10	2.14	1.93
0.80	1	0.10	2.14	1.90
0.90	1	0.10	2.14	1.88
1.00	1	0.10	2.14	1.86
1.10	1	0.10	2.14	1.83
1.20	1	0.10	2.14	1.81
1.30	1	0.10	2.14	1.79
1.40	2	0.05	4.29	3.54
1.50	1	0.10	2.14	1.75
1.60	2	0.05	4.29	3.46
1.70	2	0.05	4.29	3.43
1.80	1	0.10	2.14	1.69
1.90	1	0.10	2.14	1.68
2.00	1	0.10	2.14	1.66
2.10	1	0.10	2.14	1.64
2.20	2	0.05	4.29	3.25
2.30	2	0.05	4.29	3.21
2.40	2	0.05	4.29	3.18
2.50	2	0.05	4.29	3.15
2.60	1	0.10	2.14	1.56
2.70	2	0.05	4.29	3.08
2.80	3	0.03	6.43	4.58
2.90	2	0.05	4.29	3.02
3.00	1	0.10	2.14	1.50
3.10	3	0.03	6.43	4.45
3.20	3	0.03	6.43	4.41
3.30	2	0.05	4.29	2.91
3.40	3	0.03	6.43	4.33
3.50	2	0.05	4.29	2.86
3.60	3	0.03	6.43	4.25
3.70	3	0.03	6.43	4.21
3.80	3	0.03	6.43	4.17
3.90	2	0.05	4.29	2.76
4.00	3	0.03	6.43	4.10
4.10	2	0.05	4.29	2.71
4.20	2	0.05	4.29	2.68
4.30	3	0.03	6.43	3.99
4.40	3	0.03	6.43	3.96
4.50	2	0.05	4.29	2.62
4.60	3	0.03	6.43	3.89
4.70	4	0.03	8.57	5.15
4.80	3	0.03	6.43	3.83
4.90	4	0.03	8.57	5.06
5.00	4	0.03	8.57	5.02



Notes:

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.86
Anvil Mass	1 kg
Rod Mass	8.79 kg/m

ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

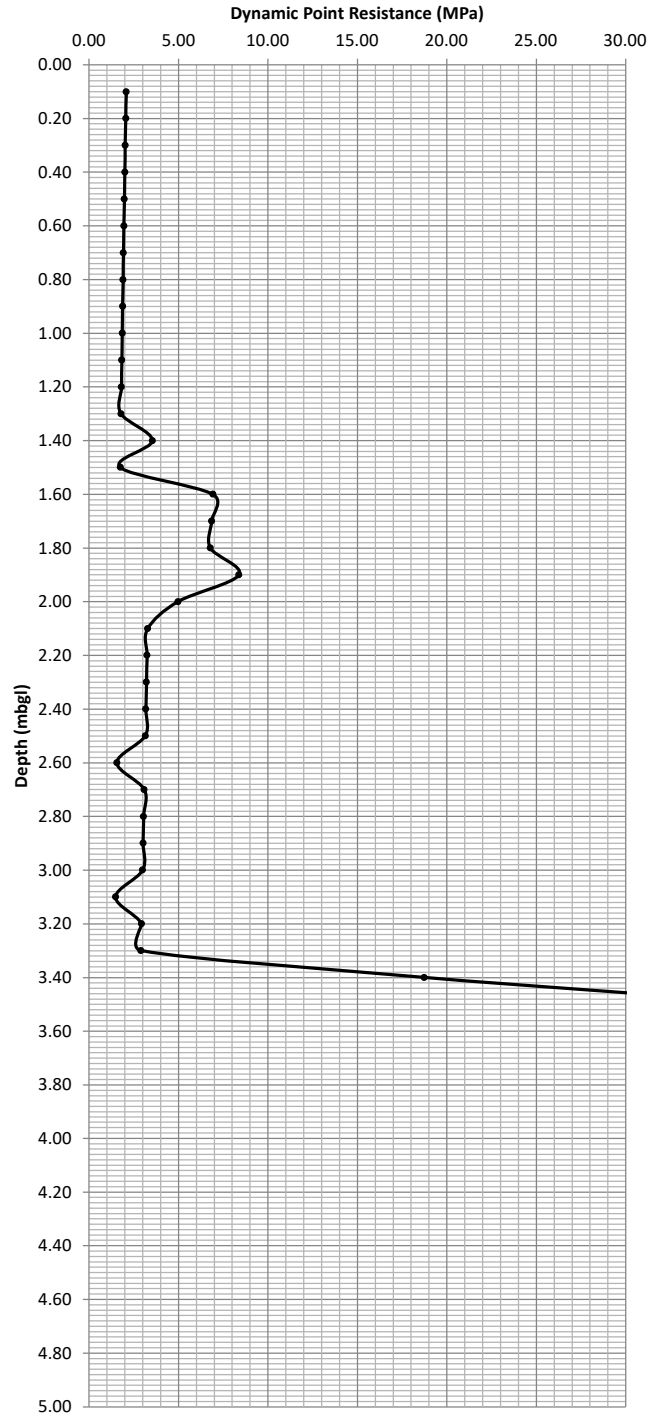
SITE Interbridges, New Brighton Road, Emsworth, Hampshire

Report Ref.

P16578

Test Location Reference **WS08**

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10	1	0.10	2.14	2.08
0.20	1	0.10	2.14	2.05
0.30	1	0.10	2.14	2.03
0.40	1	0.10	2.14	2.00
0.50	1	0.10	2.14	1.98
0.60	1	0.10	2.14	1.95
0.70	1	0.10	2.14	1.93
0.80	1	0.10	2.14	1.90
0.90	1	0.10	2.14	1.88
1.00	1	0.10	2.14	1.86
1.10	1	0.10	2.14	1.83
1.20	1	0.10	2.14	1.81
1.30	1	0.10	2.14	1.79
1.40	2	0.05	4.29	3.54
1.50	1	0.10	2.14	1.75
1.60	4	0.03	8.57	6.93
1.70	4	0.03	8.57	6.85
1.80	4	0.03	8.57	6.78
1.90	5	0.02	10.71	8.38
2.00	3	0.03	6.43	4.97
2.10	2	0.05	4.29	3.28
2.20	2	0.05	4.29	3.25
2.30	2	0.05	4.29	3.21
2.40	2	0.05	4.29	3.18
2.50	2	0.05	4.29	3.15
2.60	1	0.10	2.14	1.56
2.70	2	0.05	4.29	3.08
2.80	2	0.05	4.29	3.05
2.90	2	0.05	4.29	3.02
3.00	2	0.05	4.29	3.00
3.10	1	0.10	2.14	1.48
3.20	2	0.05	4.29	2.94
3.30	2	0.05	4.29	2.91
3.40	13	0.01	27.86	18.75
3.50	26	0.00	55.72	37.14
3.60	30	0.00	64.29	42.47
3.70				
3.80				
3.90				
4.00				
4.10				
4.20				
4.30				
4.40				
4.50				
4.60				
4.70				
4.80				
4.90				
5.00				



Notes:

No further progress below 3.60m depth - Hammer bouncing.

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.86
Anvil Mass	1 kg
Rod Mass	8.79 kg/m

ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

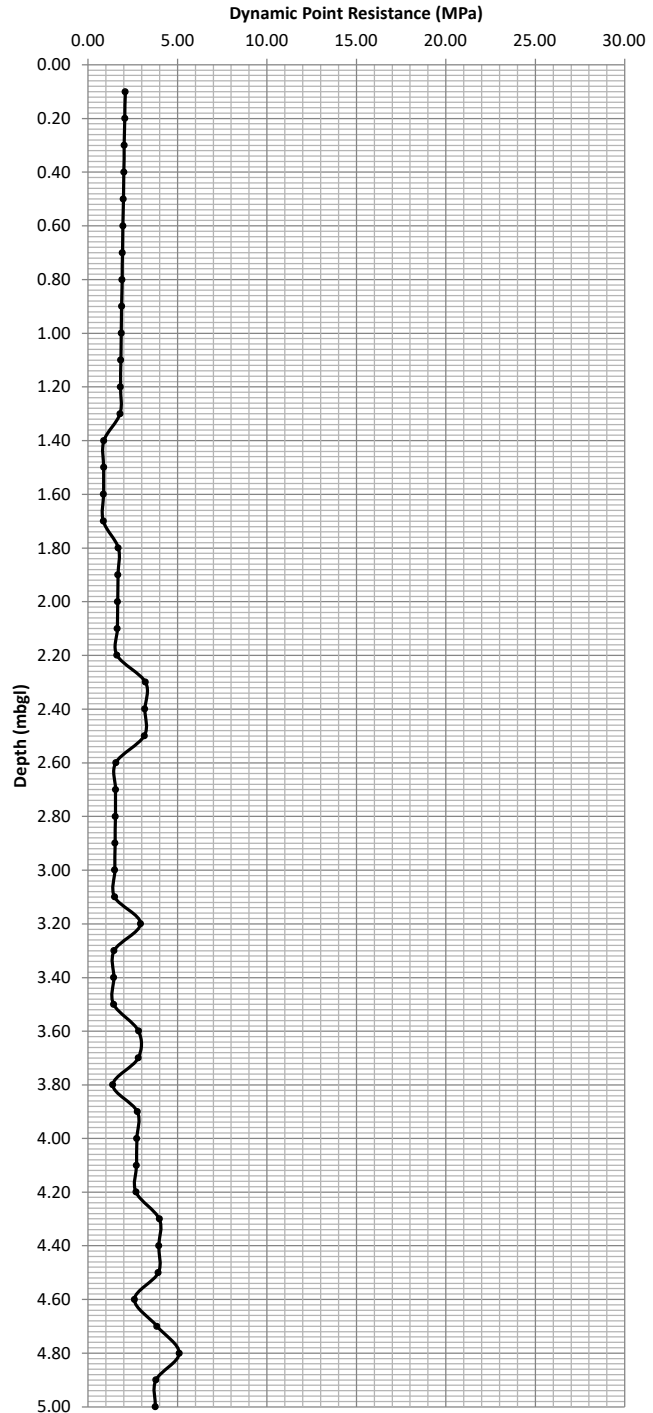
SITE Interbridges, New Brighton Road, Emsworth, Hampshire

Report Ref.

P16578

Test Location Reference **WS09**

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10	1	0.10	2.14	2.08
0.20	1	0.10	2.14	2.05
0.30	1	0.10	2.14	2.03
0.40	1	0.10	2.14	2.00
0.50	1	0.10	2.14	1.98
0.60	1	0.10	2.14	1.95
0.70	1	0.10	2.14	1.93
0.80	1	0.10	2.14	1.90
0.90	1	0.10	2.14	1.88
1.00	1	0.10	2.14	1.86
1.10	1	0.10	2.14	1.83
1.20	1	0.10	2.14	1.81
1.30	1	0.10	2.14	1.79
1.40	0.5	0.20	1.07	0.89
1.50	0.5	0.20	1.07	0.88
1.60	0.5	0.20	1.07	0.87
1.70	0.5	0.20	1.07	0.86
1.80	1	0.10	2.14	1.69
1.90	1	0.10	2.14	1.68
2.00	1	0.10	2.14	1.66
2.10	1	0.10	2.14	1.64
2.20	1	0.10	2.14	1.62
2.30	2	0.05	4.29	3.21
2.40	2	0.05	4.29	3.18
2.50	2	0.05	4.29	3.15
2.60	1	0.10	2.14	1.56
2.70	1	0.10	2.14	1.54
2.80	1	0.10	2.14	1.53
2.90	1	0.10	2.14	1.51
3.00	1	0.10	2.14	1.50
3.10	1	0.10	2.14	1.48
3.20	2	0.05	4.29	2.94
3.30	1	0.10	2.14	1.46
3.40	1	0.10	2.14	1.44
3.50	1	0.10	2.14	1.43
3.60	2	0.05	4.29	2.83
3.70	2	0.05	4.29	2.81
3.80	1	0.10	2.14	1.39
3.90	2	0.05	4.29	2.76
4.00	2	0.05	4.29	2.73
4.10	2	0.05	4.29	2.71
4.20	2	0.05	4.29	2.68
4.30	3	0.03	6.43	3.99
4.40	3	0.03	6.43	3.96
4.50	3	0.03	6.43	3.92
4.60	2	0.05	4.29	2.59
4.70	3	0.03	6.43	3.86
4.80	4	0.03	8.57	5.10
4.90	3	0.03	6.43	3.80
5.00	3	0.03	6.43	3.77



Notes:

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.86
Anvil Mass	1 kg
Rod Mass	8.79 kg/m

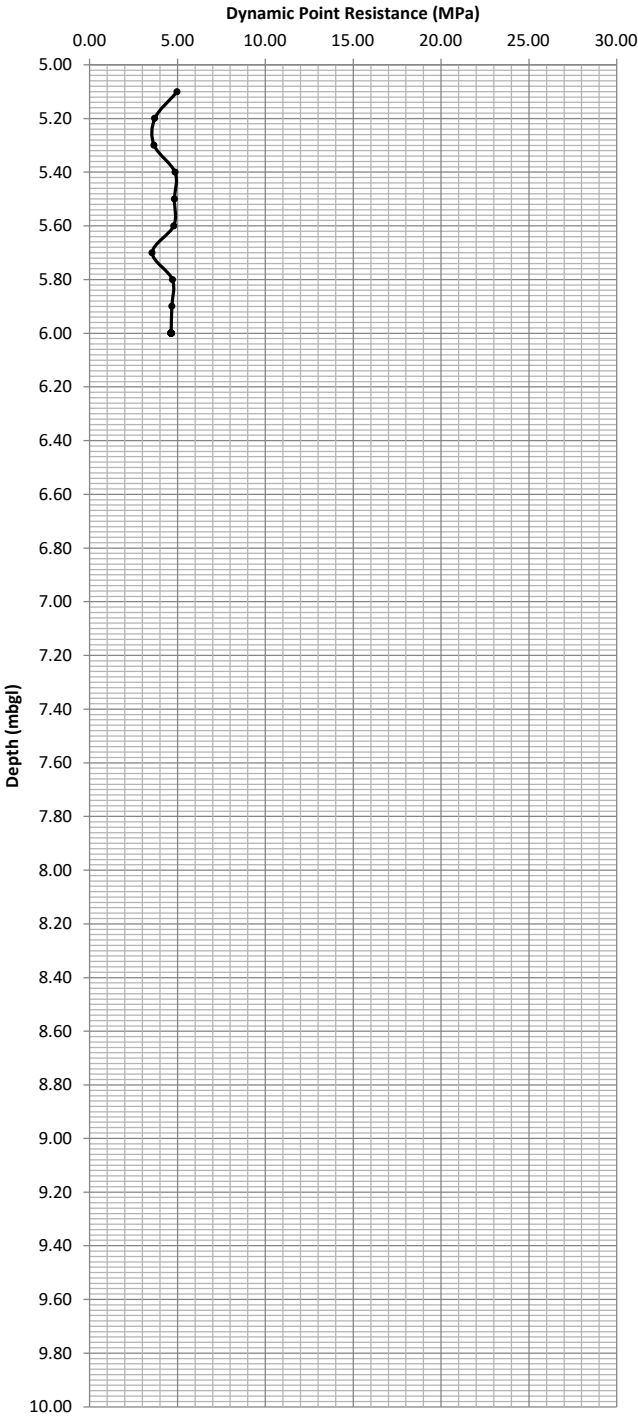
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Interbridges, New Brighton Road, Emsworth, Hampshire Report Ref. P16578

Test Location Reference WS09

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
5.10	4	0.03	8.57	4.98
5.20	3	0.03	6.43	3.70
5.30	3	0.03	6.43	3.68
5.40	4	0.03	8.57	4.86
5.50	4	0.03	8.57	4.82
5.60	4	0.03	8.57	4.79
5.70	3	0.03	6.43	3.56
5.80	4	0.03	8.57	4.71
5.90	4	0.03	8.57	4.68
6.00	4	0.03	8.57	4.64
6.10				
6.20				
6.30				
6.40				
6.50				
6.60				
6.70				
6.80				
6.90				
7.00				
7.10				
7.20				
7.30				
7.40				
7.50				
7.60				
7.70				
7.80				
7.90				
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8.10				
8.20				
8.30				
8.40				
8.50				
8.60				
8.70				
8.80				
8.90				
9.00				
9.10				
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9.50				
9.60				
9.70				
9.80				
9.90				
10.00				

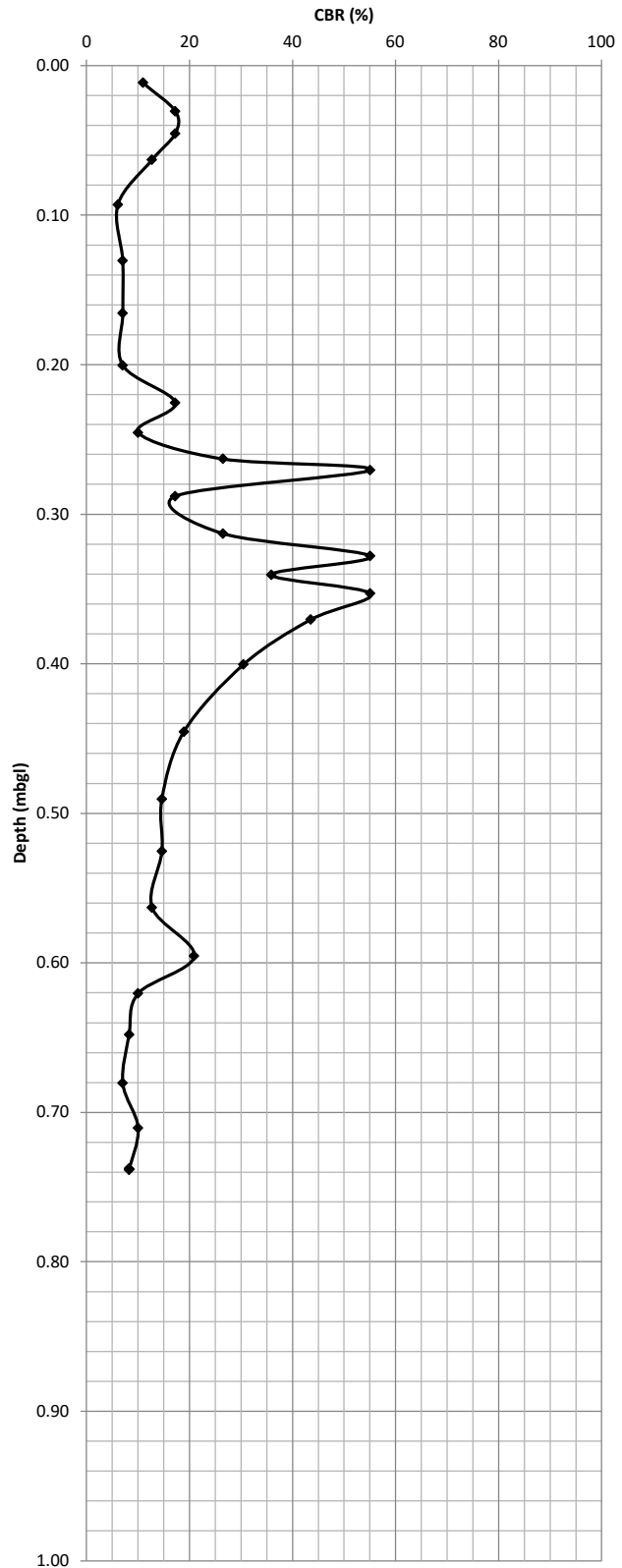


Notes:

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.86
Anvil Mass	1 kg
Rod Mass	8.79 kg/m

TRL Dynamic Cone Penetrometer Record

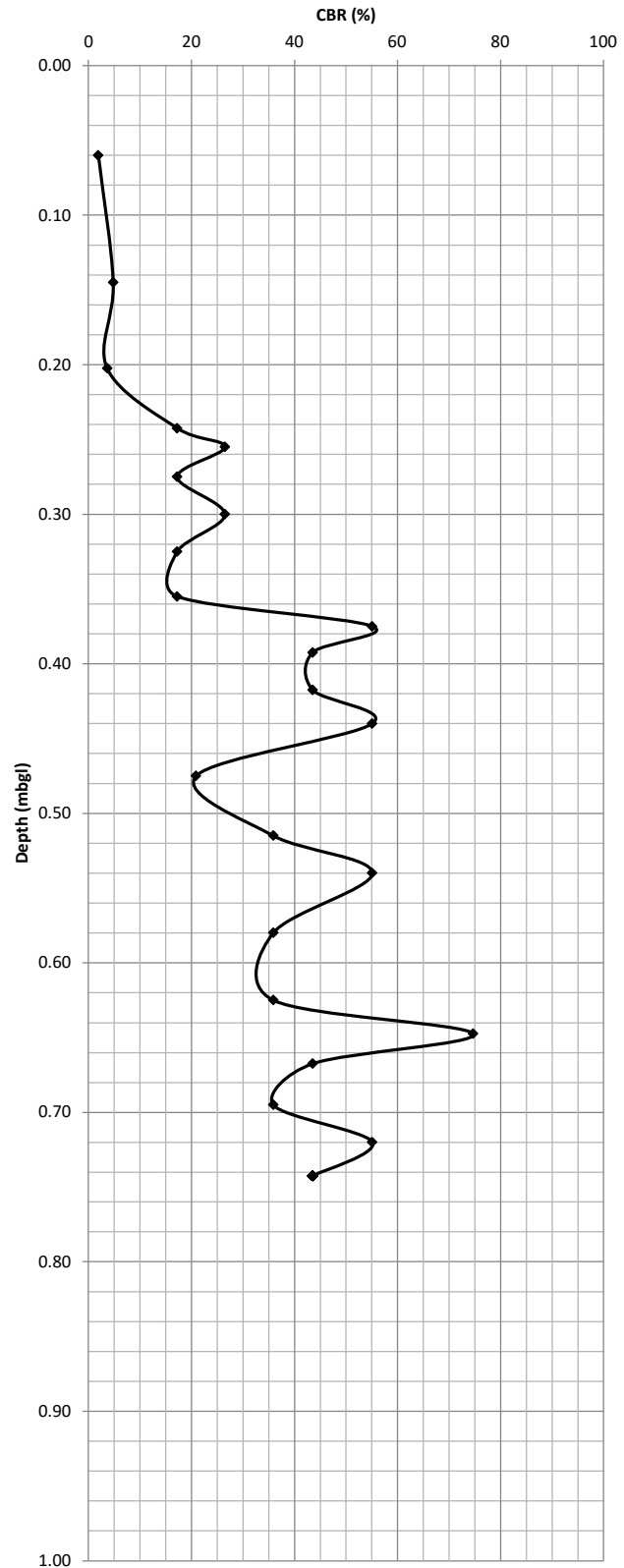
Project Ref. P16578



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

TRL Dynamic Cone Penetrometer Record

P16578



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

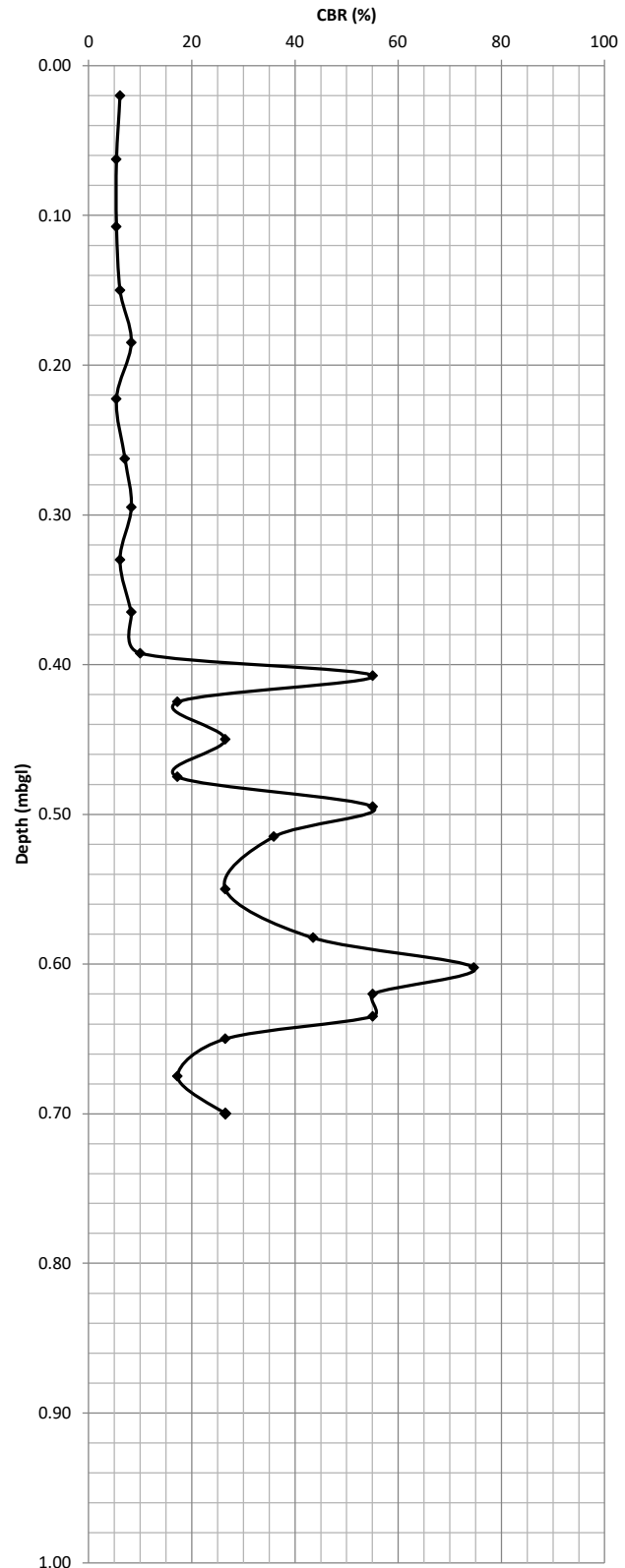
TRL Dynamic Cone Penetrometer Record

P16578

Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

TRL Dynamic Cone Penetrometer Record

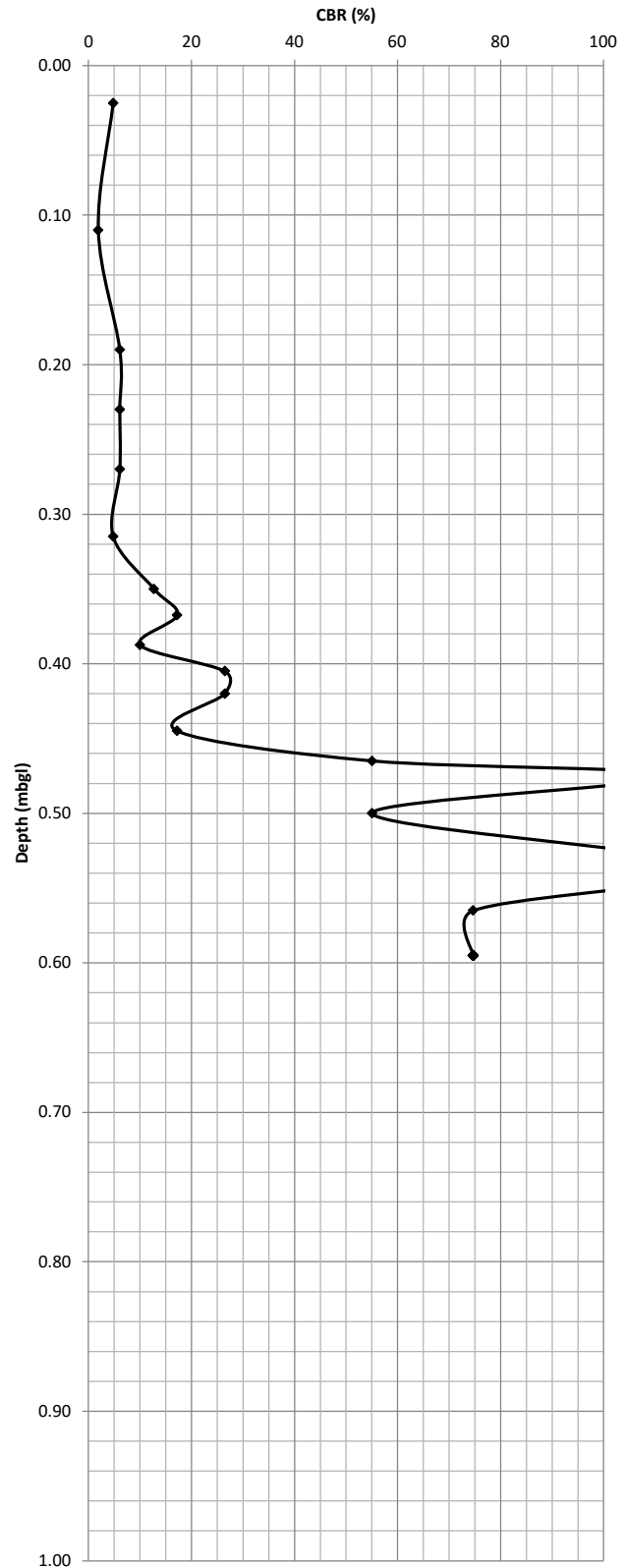
P16578



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

TRL Dynamic Cone Penetrometer Record

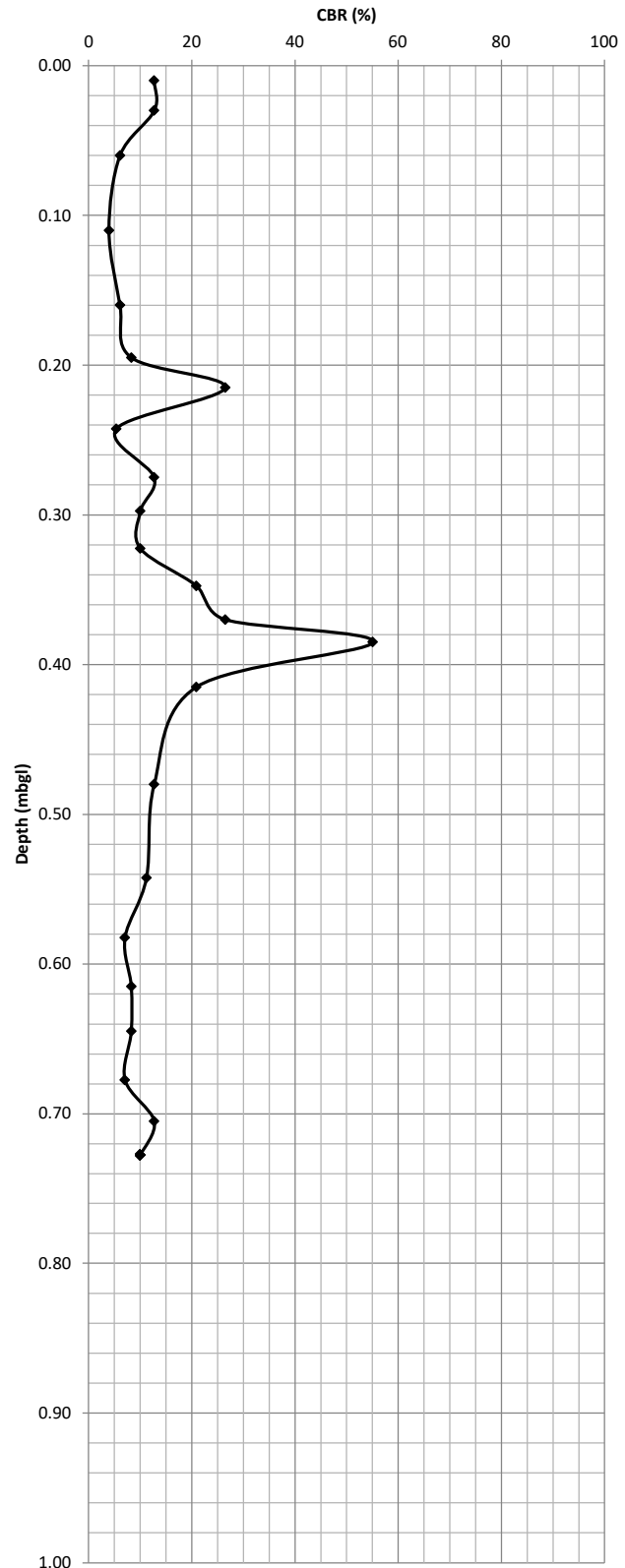
Project Ref. P16578



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

TRL Dynamic Cone Penetrometer Record

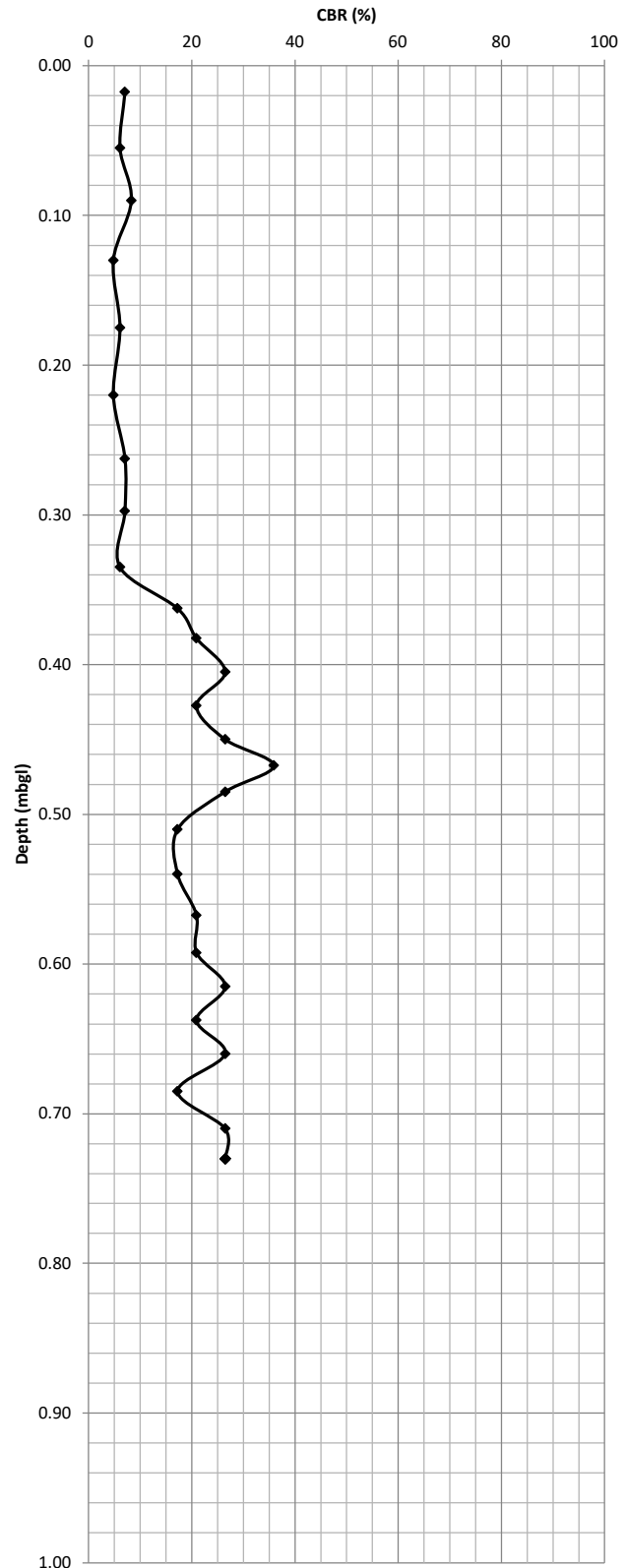
Project Ref. P16578



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

TRL Dynamic Cone Penetrometer Record

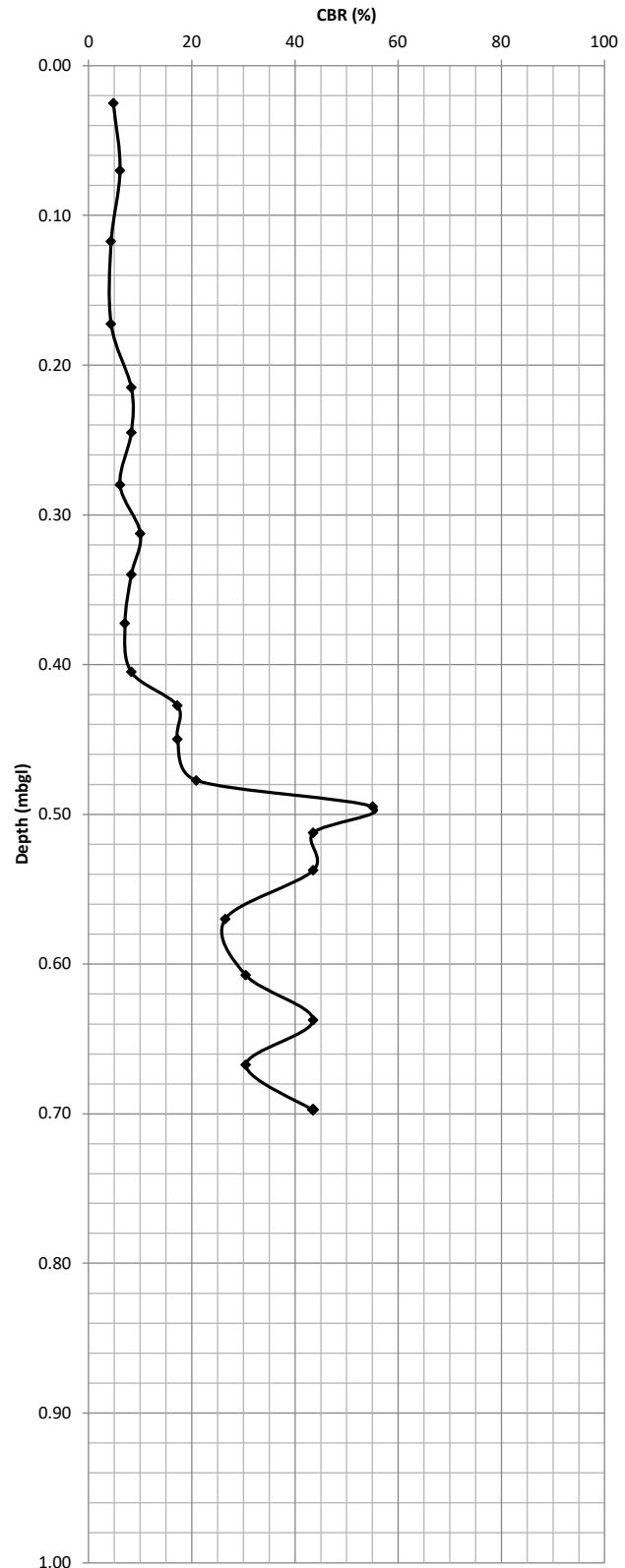
Project Ref. P16578

[illegible]

Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

TRL Dynamic Cone Penetrometer Record

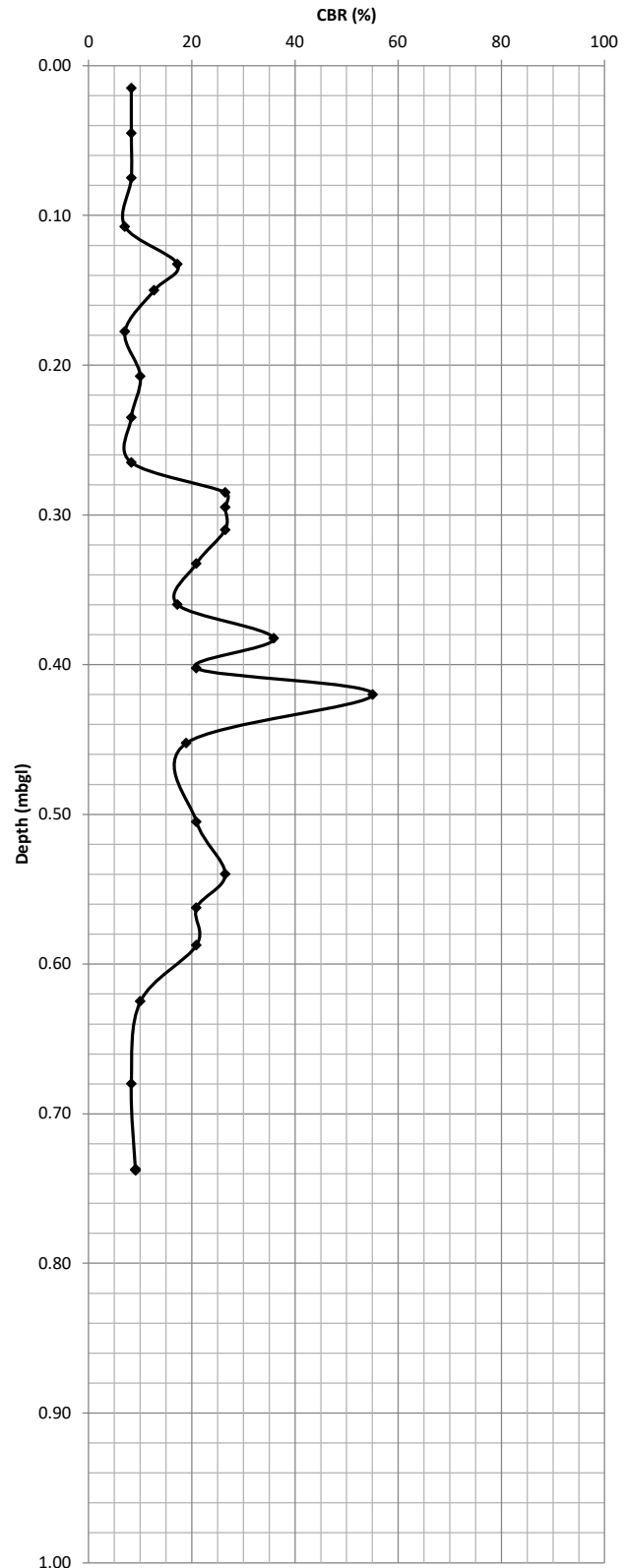
Project Ref. P16578



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

TRL Dynamic Cone Penetrometer Record

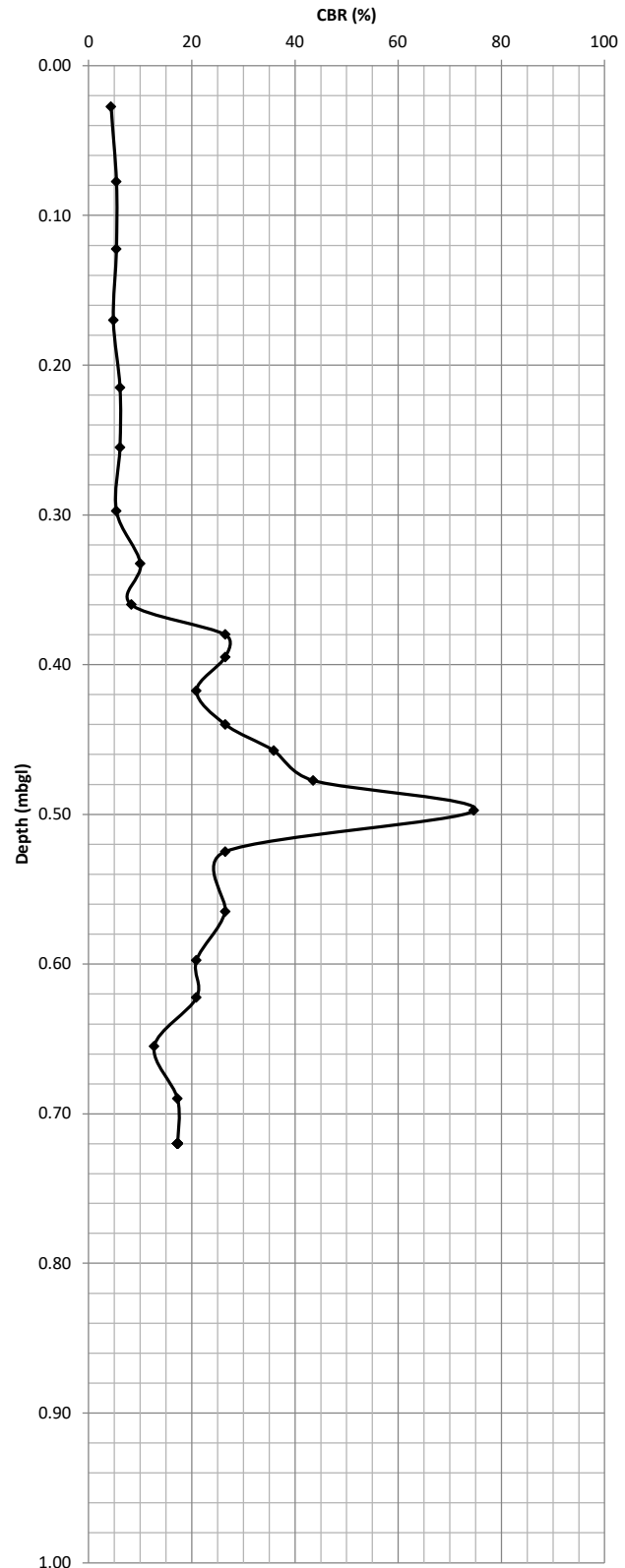
P16578



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

TRL Dynamic Cone Penetrometer Record

Project Ref. P16578

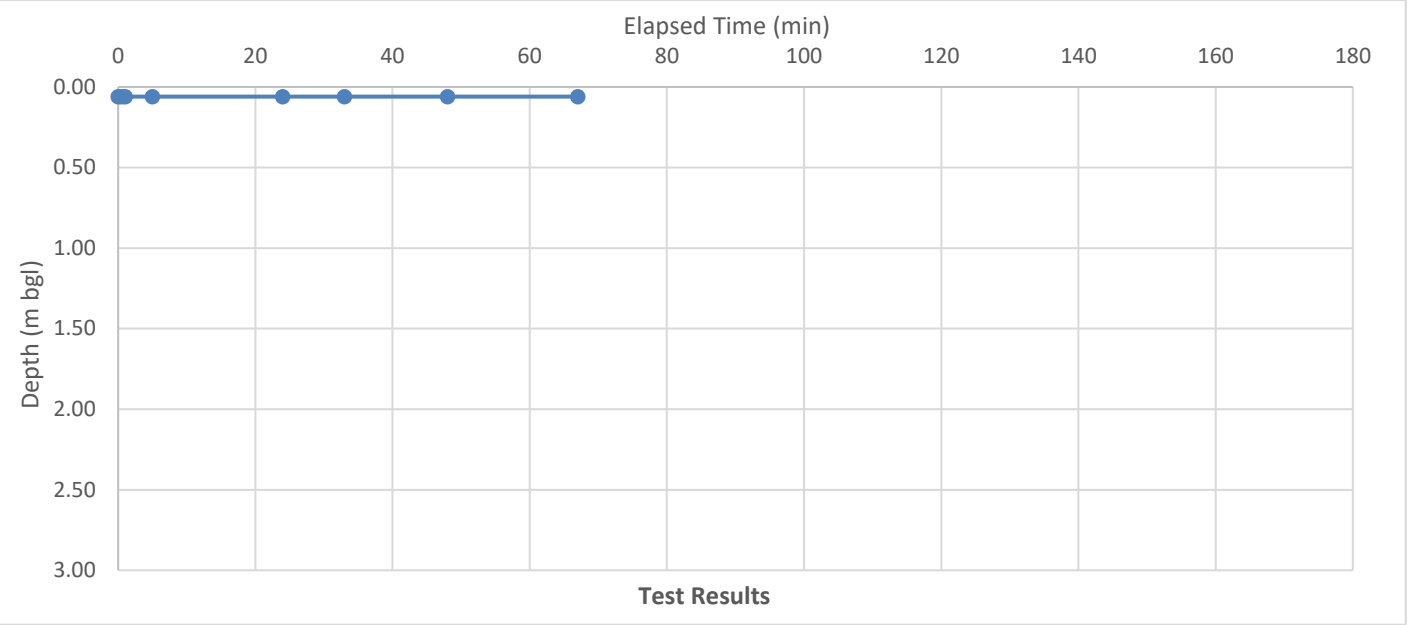


Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

Infiltration Test Results

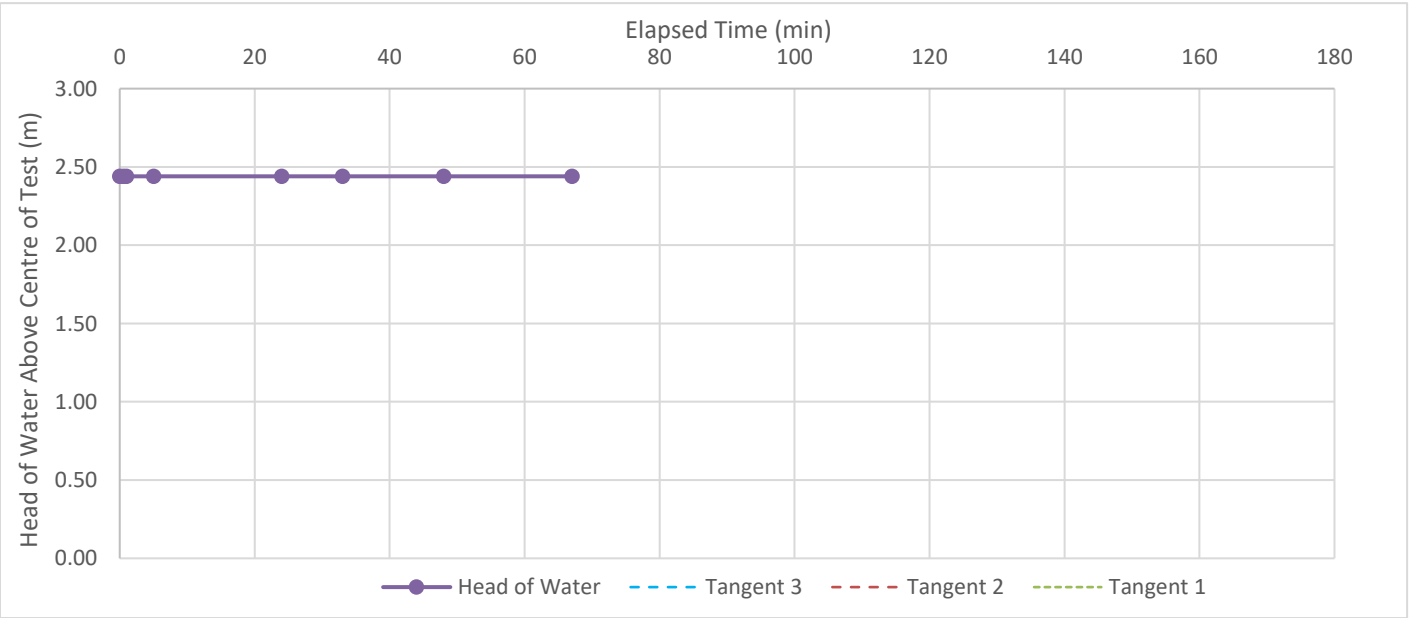
Test Position WS02
Test No. 1
Project No. P16578
Project Name Interbridges, New Brighton Road, Emsworth, Hampshire

Casing Depth 2.00 m bgl
Borehole Depth 3.00 m bgl
Casing Diameter 0.105 m
Average Borehole Diameter 0.079 m



Length of Test Zone 1.00 m L
Depth to Center of Test Zone 2.50 m X
Water level at start of test 0.06 m
Water level at end of test 0.06 m
Duration of test 67 min
Average Depth Of Water 2.94 m
Average Drained Area 0.73 m²
Volume of Water Lost 0.00 m³

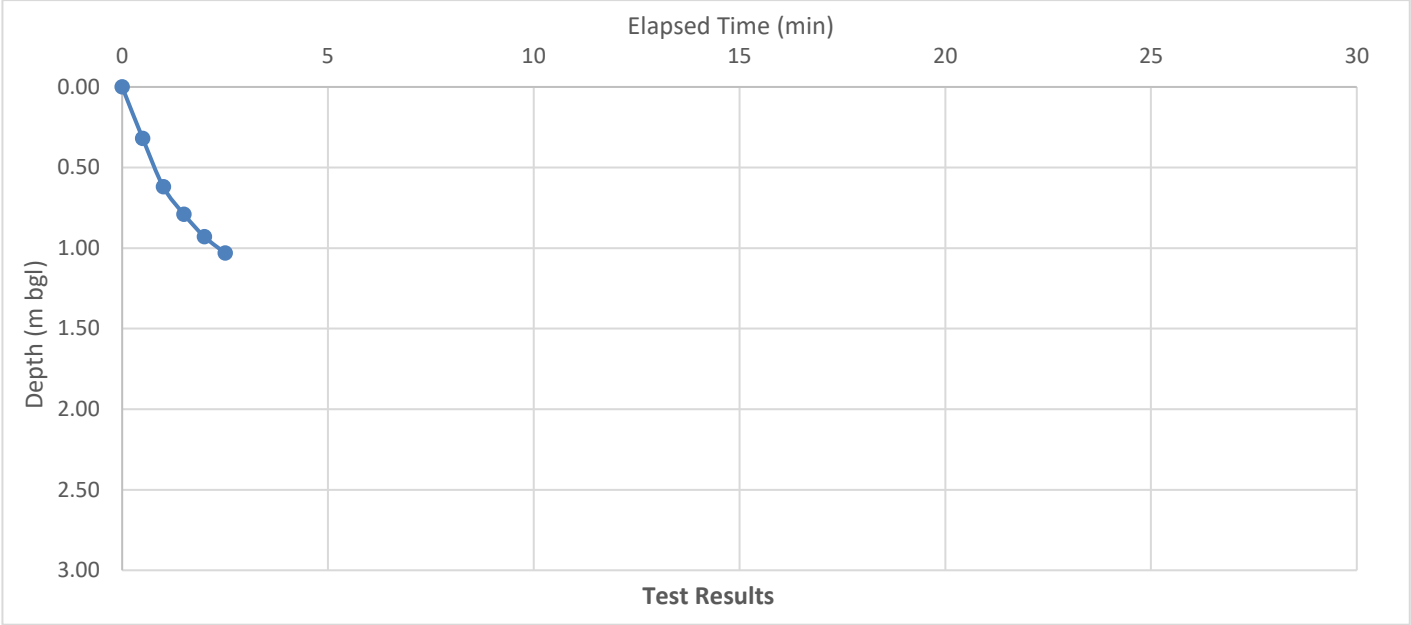
Driving Head m
Infiltration rate Negligible m/sec
Calculation method: No fall in water level recorded during test period.



Infiltration Test Results

Test Position WS05
Test No. 1
Project No. P16578
Project Name Interbridges, New Brighton Road, Emsworth, Hampshire

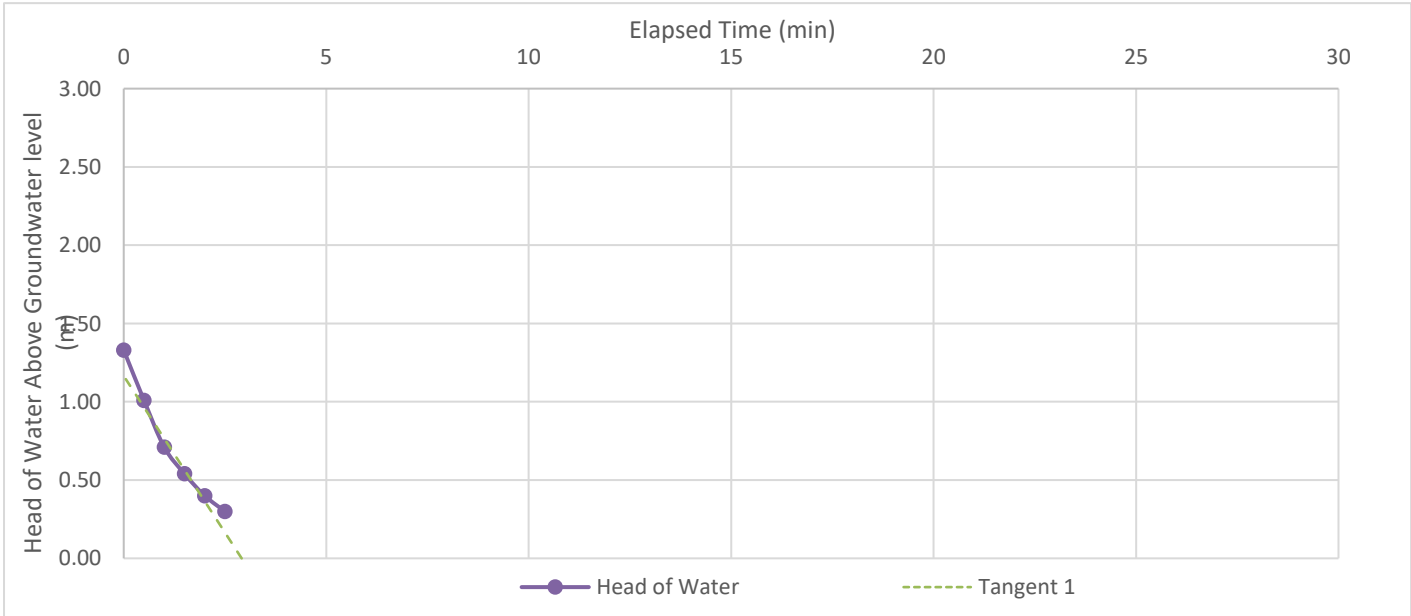
Casing Depth 1.00 m blg
Borehole Depth 3.00 m bgl
Casing Diameter 0.105 m
Average Borehole Diameter 0.086 m
Groundwater Depth 1.33 m bgl



Length of Test Zone 2.00 m L
Depth to Center of Test Zone 2.00 m X
Water level at start of test 0.00 m
Water level at end of test 1.03 m
Duration of test 3 min
Average Depth Of Water 2.49 m
Average Drained Area 0.67 m²
Volume of Water Lost 0.01 m³

Driving Head 0.7 m
Infiltration rate 1.07E-04 m/sec

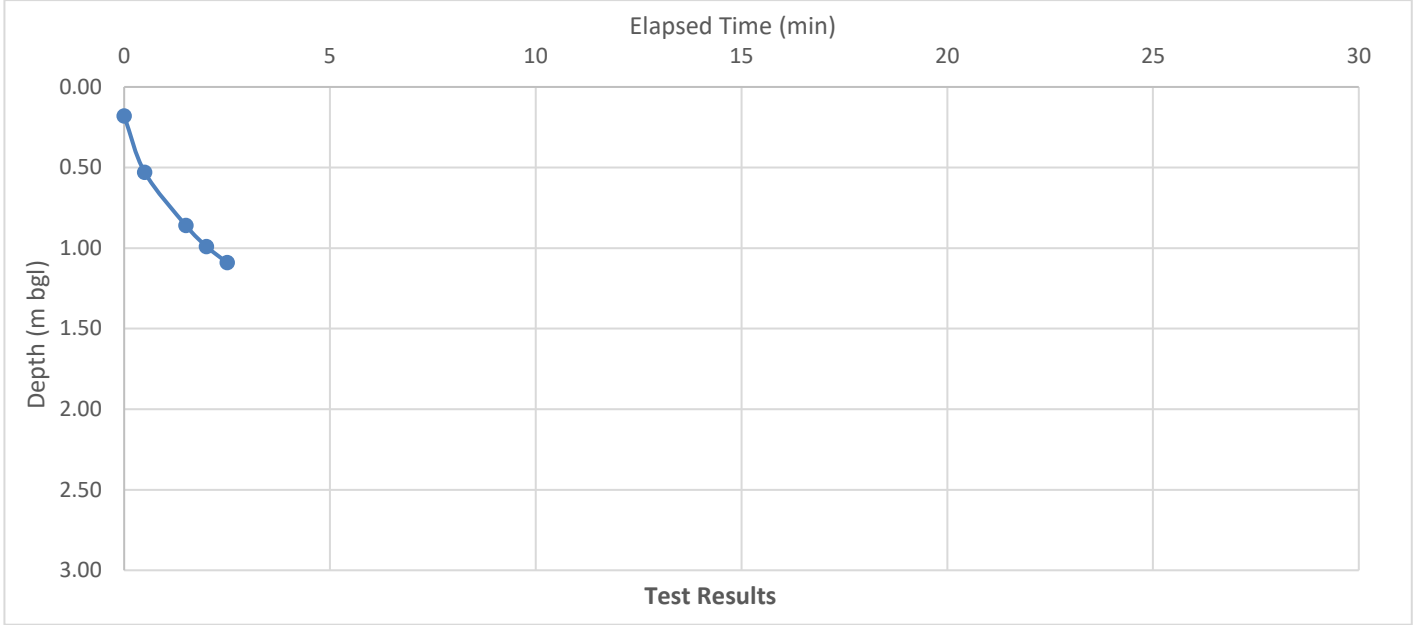
Calculation method: Calculated in accordance with The Soakaway Design Guide, published by Kent County Council, July 2000.



Infiltration Test Results

Test Position WS05
Test No. 2
Project No. P16578
Project Name Interbridges, New Brighton Road, Emsworth, Hampshire

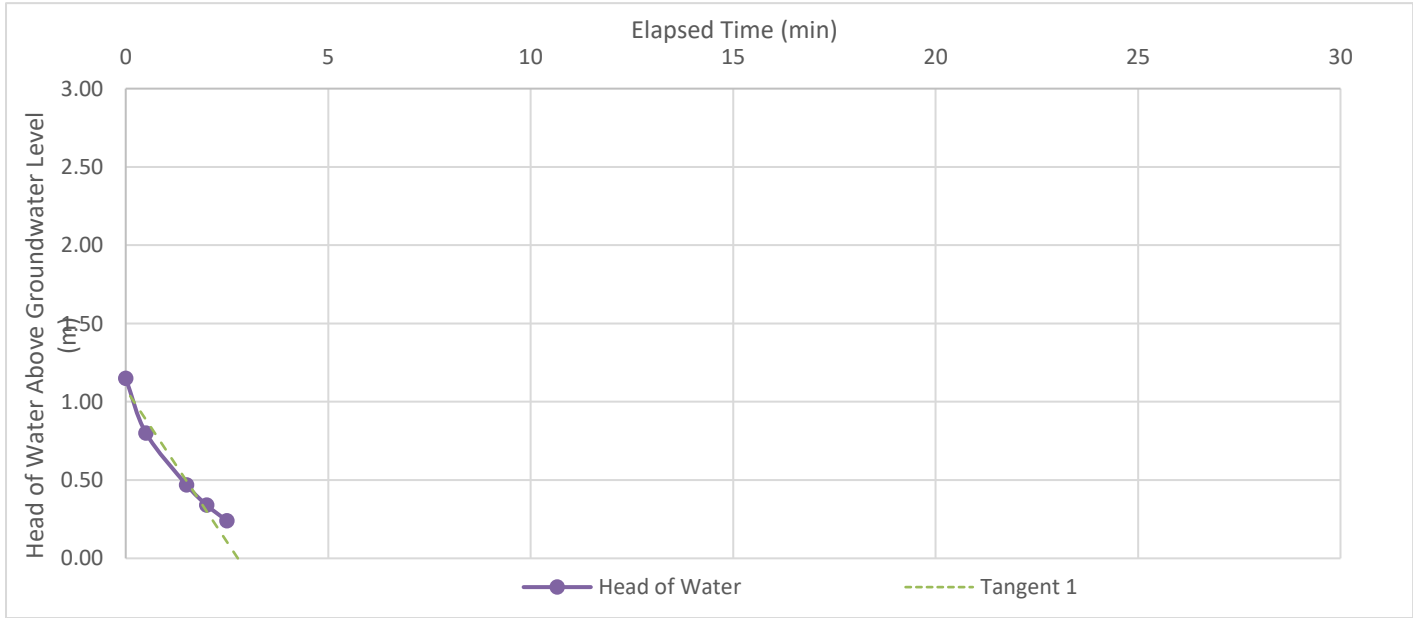
Casing Depth 1.00 m blg
Borehole Depth 3.00 m bgl
Casing Diameter 0.105 m
Average Borehole Diameter 0.086 m
Groundwater Depth 1.33 m bgl



Length of Test Zone 2.00 m L
Depth to Center of Test Zone 2.00 m X
Water level at start of test 0.18 m
Water level at end of test 1.09 m
Duration of test 3 min
Average Depth Of Water 2.37 m
Average Drained Area 0.64 m²
Volume of Water Lost 0.01 m³

Driving Head 0.7 m
Infiltration rate 1.05E-04 m/sec

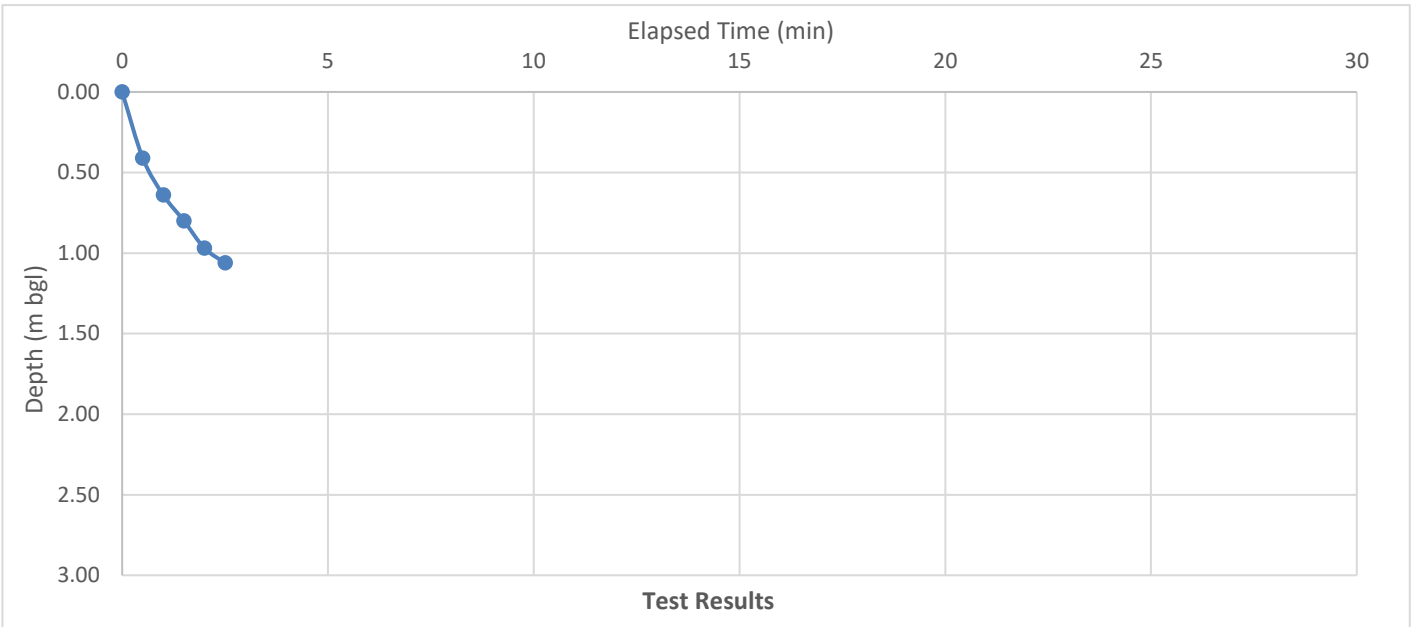
Calculation method: Calculated in accordance with The Soakaway Design Guide, published by Kent County Council, July 2000.



Infiltration Test Results

Test Position	WS05
Test No.	3
Project No.	P16578
Project Name	Interbridges, New Brighton Road, Emsworth, Hampshire

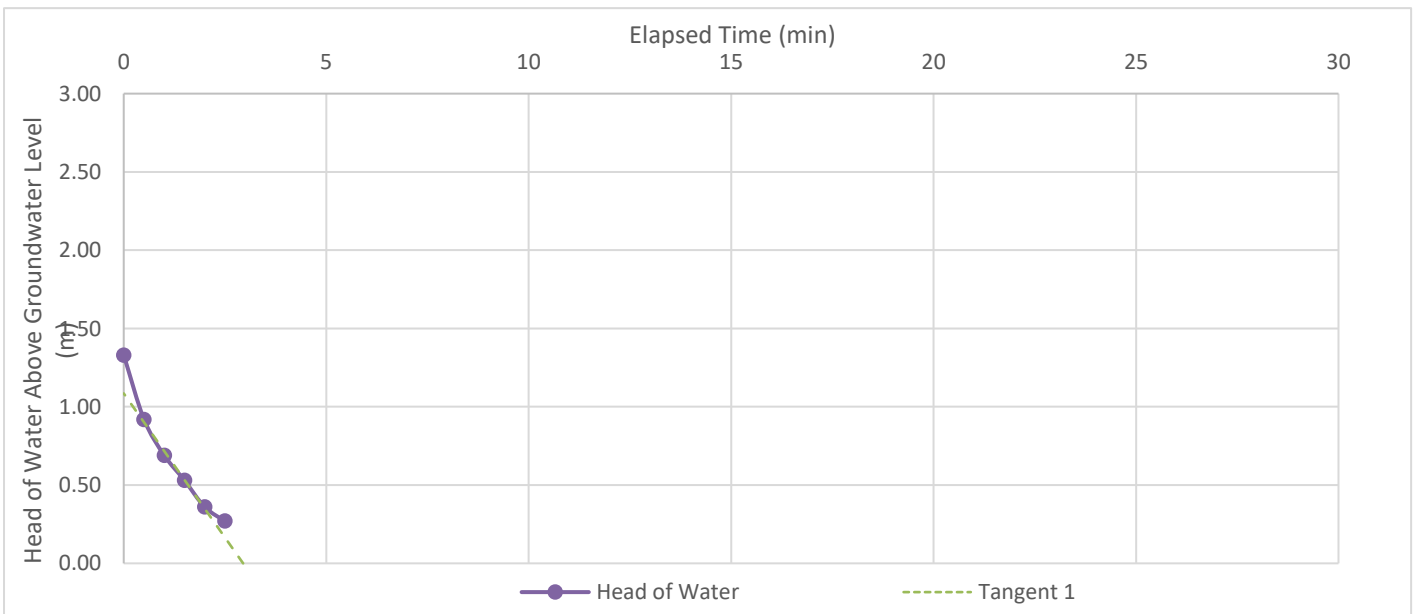
Casing Depth	1.00 m blg
Borehole Depth	3.00 m bgl
Casing Diameter	0.105 m
Average Borehole Diameter	0.086 m
Groundwater Depth	1.33 m bgl



Length of Test Zone	2.00 m	L
Depth to Center of Test Zone	2.00 m	X
Water level at start of test	0.00 m	
Water level at end of test	1.06 m	
Duration of test	3 min	
Average Depth Of Water	2.47 m	
Average Drained Area	0.67 m ²	
Volume of Water Lost	0.01 m ³	

Driving Head	0.6 m
Infiltration rate	9.89E-05 m/sec

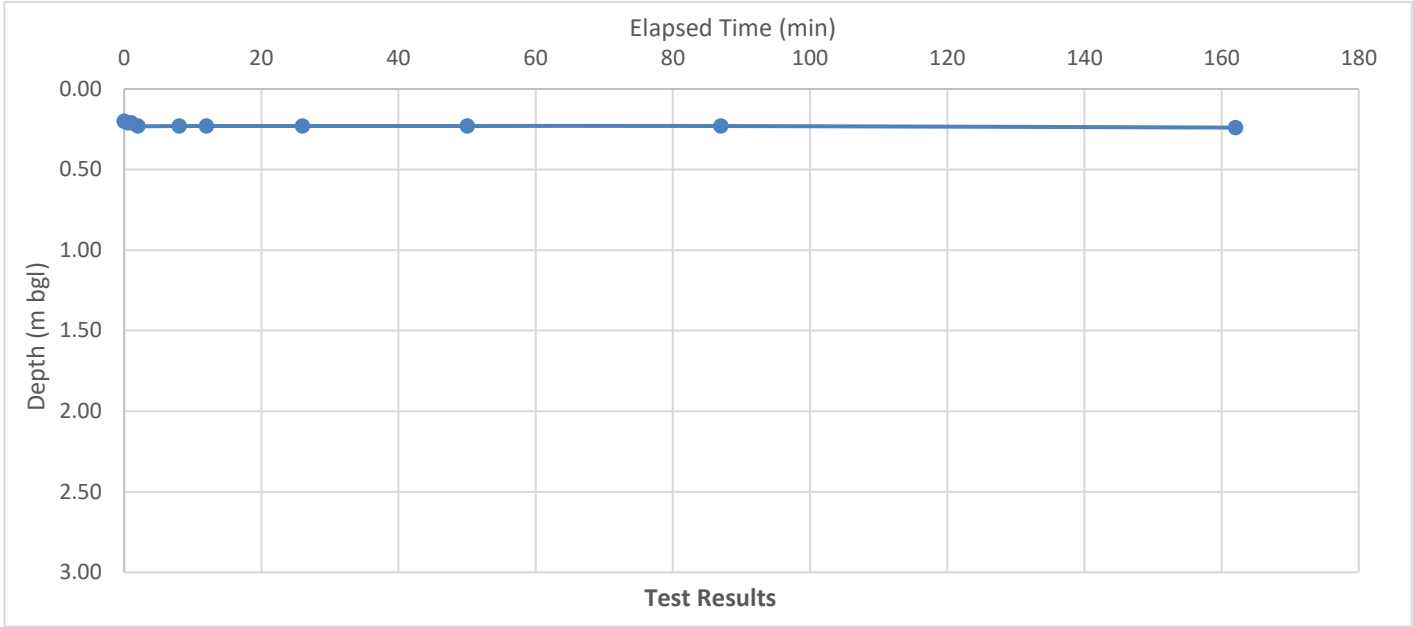
Calculation method: Calculated in accordance with The Soakaway Design Guide, published by Kent County Council, July 2000.



Infiltration Test Results

Test Position WS06
Test No. 1
Project No. P16578
Project Name Interbridges, New Brighton Road, Emsworth, Hampshire

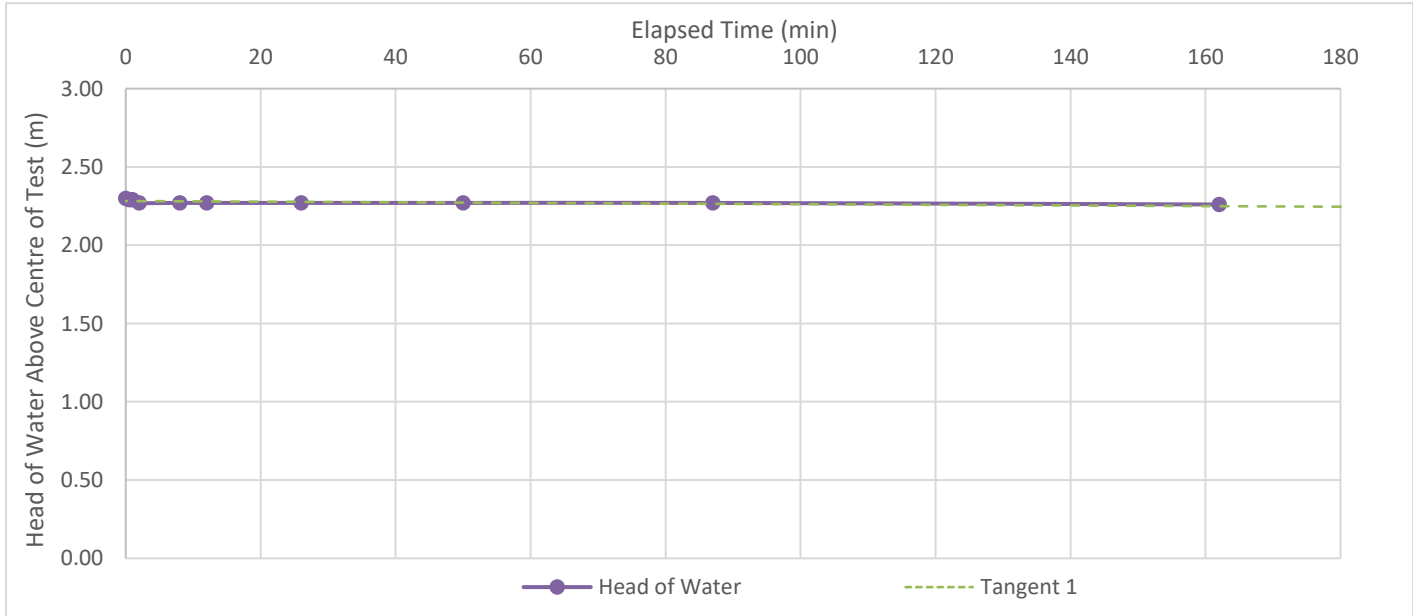
Casing Depth 2.00 m bgl
Borehole Depth 3.00 m bgl
Casing Diameter 0.105 m
Average Borehole Diameter 0.079 m



Length of Test Zone 1.00 m L
Depth to Center of Test Zone 2.50 m X
Water level at start of test 0.20 m
Water level at end of test 0.24 m
Duration of test 162 min
Average Depth Of Water 2.78 m
Average Drained Area 0.69 m²
Volume of Water Lost 0.00 m³

Driving Head 2.3 m
Infiltration rate 1.16E-07 m/sec

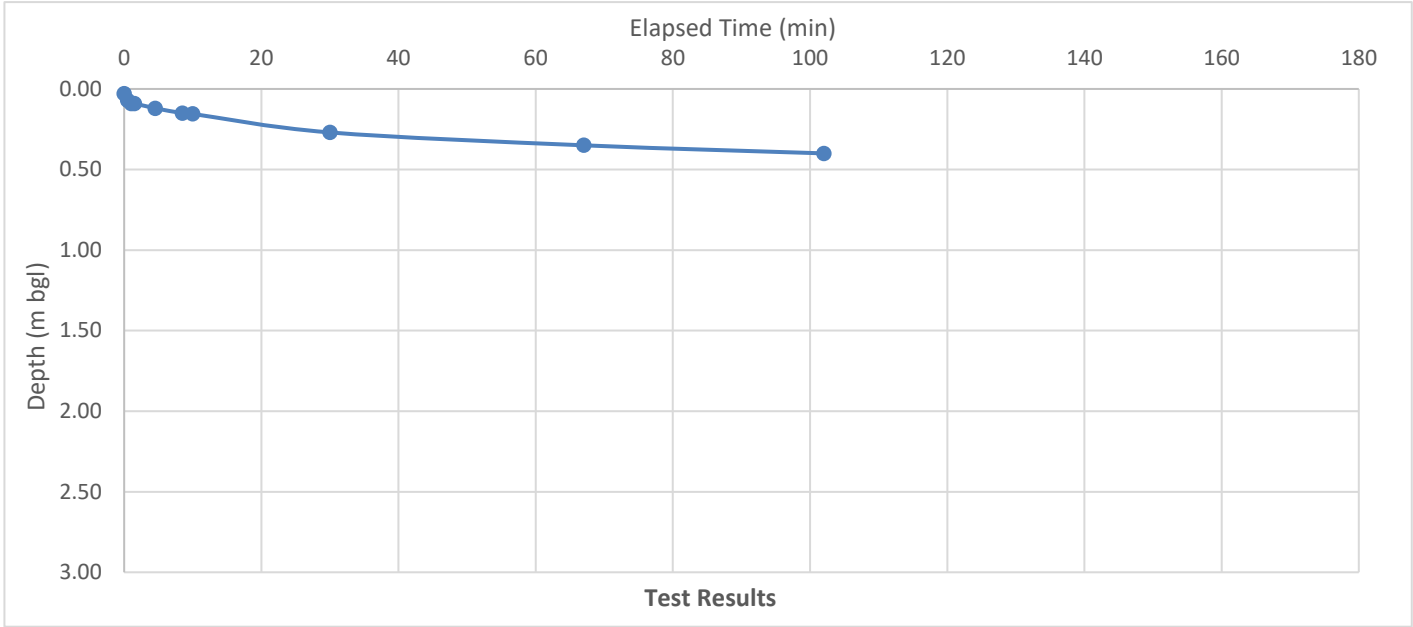
Calculation method: Calculated in accordance with The Soakaway Design Guide, published by Kent County Council, July 2000.



Infiltration Test Results

Test Position WS08
Test No. 1
Project No. P16578
Project Name Interbridges, New Brighton Road, Emsworth, Hampshire

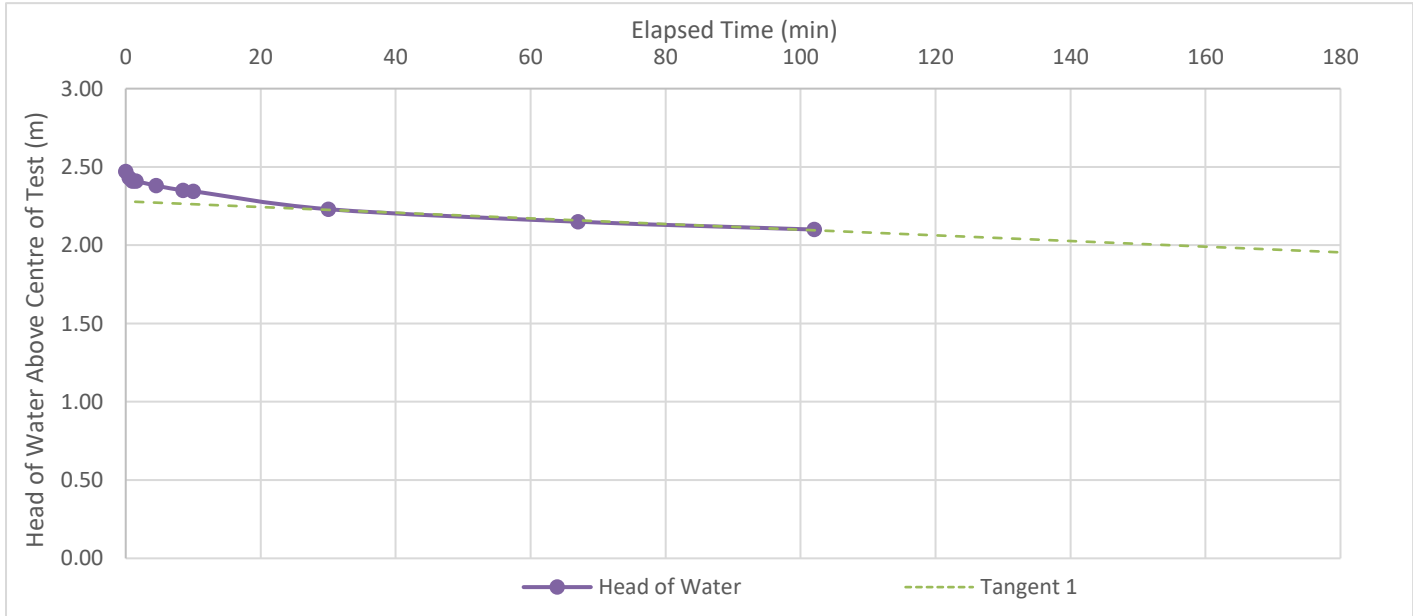
Casing Depth 2.00 m bgl
Borehole Depth 3.00 m bgl
Casing Diameter 0.105 m
Average Borehole Diameter 0.092 m



Length of Test Zone 1.00 m L
Depth to Center of Test Zone 2.50 m X
Water level at start of test 0.03 m
Water level at end of test 0.40 m
Duration of test 102 min
Average Depth Of Water 2.79 m
Average Drained Area 0.81 m²
Volume of Water Lost 0.00 m³

Driving Head 2.2 m
Infiltration rate 9.03E-07 m/sec

Calculation method: Calculated in accordance with The Soakaway Design Guide, published by Kent County Council, July 2000.

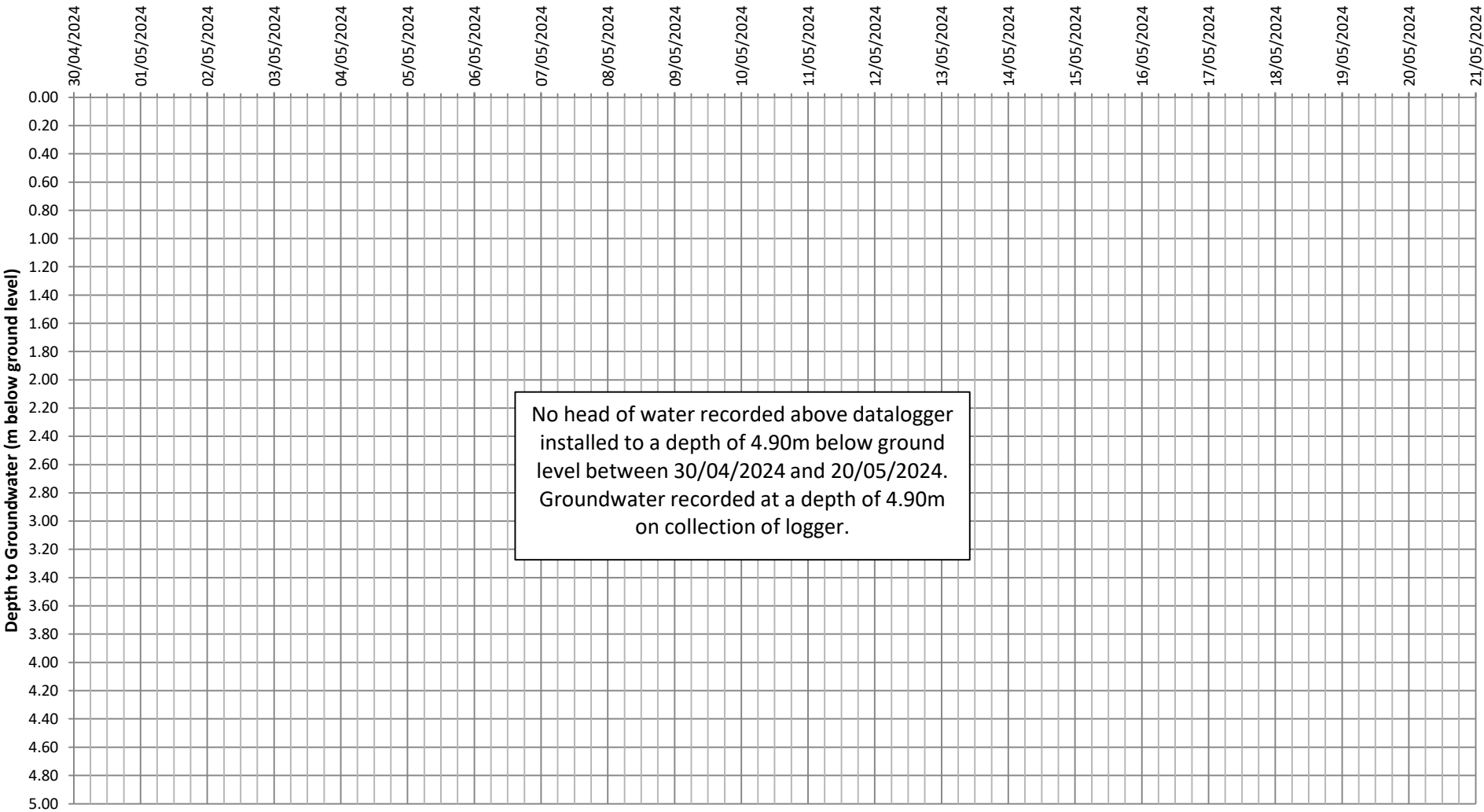


Ashdown Site Investigation Limited

Site: Interbridges, New Brighton Road, Emsworth, Hampshire

Project No. P16578

Groundwater Monitoring Results - WS01

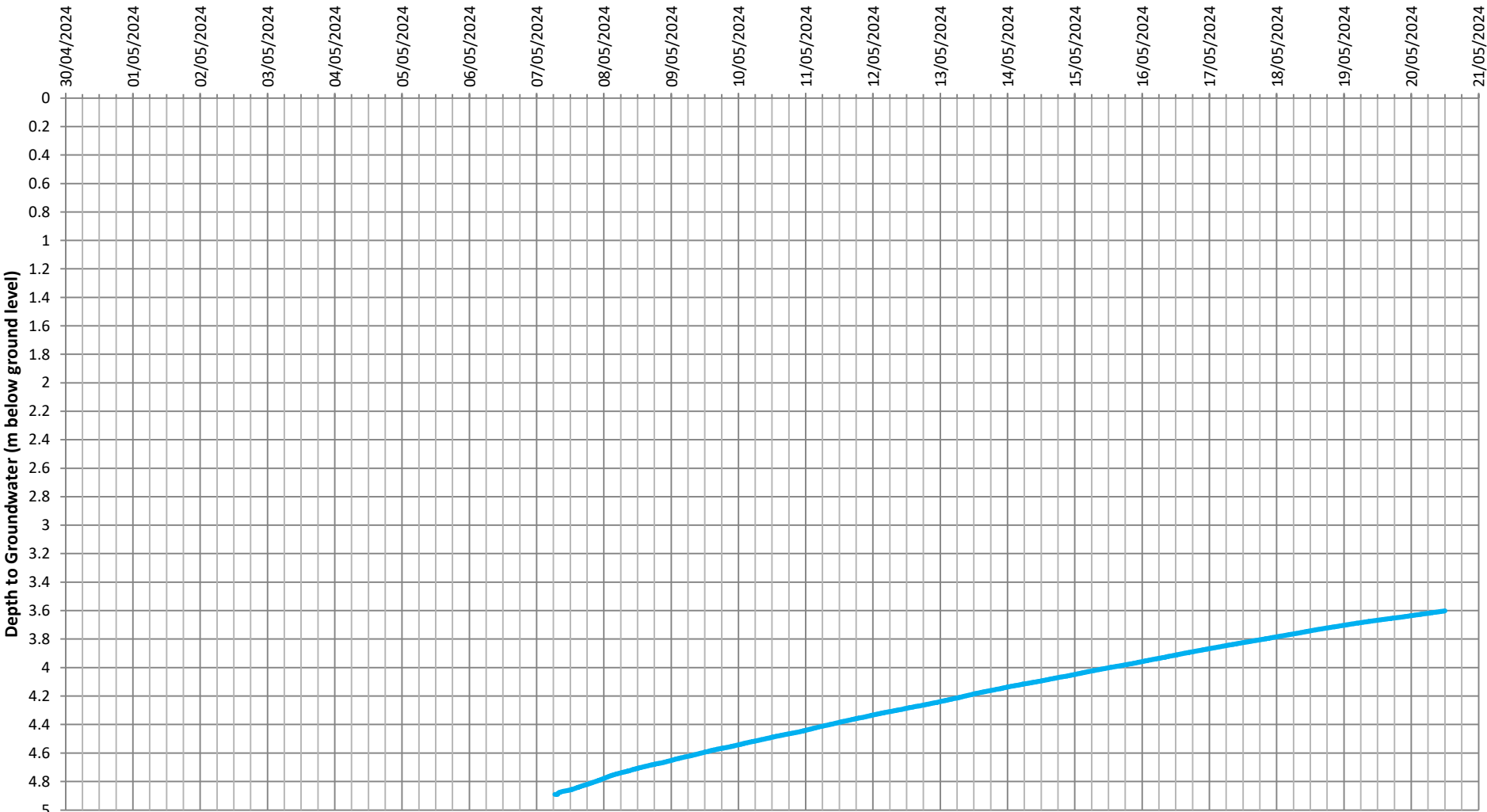


Ashdown Site Investigation Limited

Site: Interbridges, New Brighton Road, Emsworth, Hampshire

Project No. P16578

Groundwater Monitoring Results - WS04

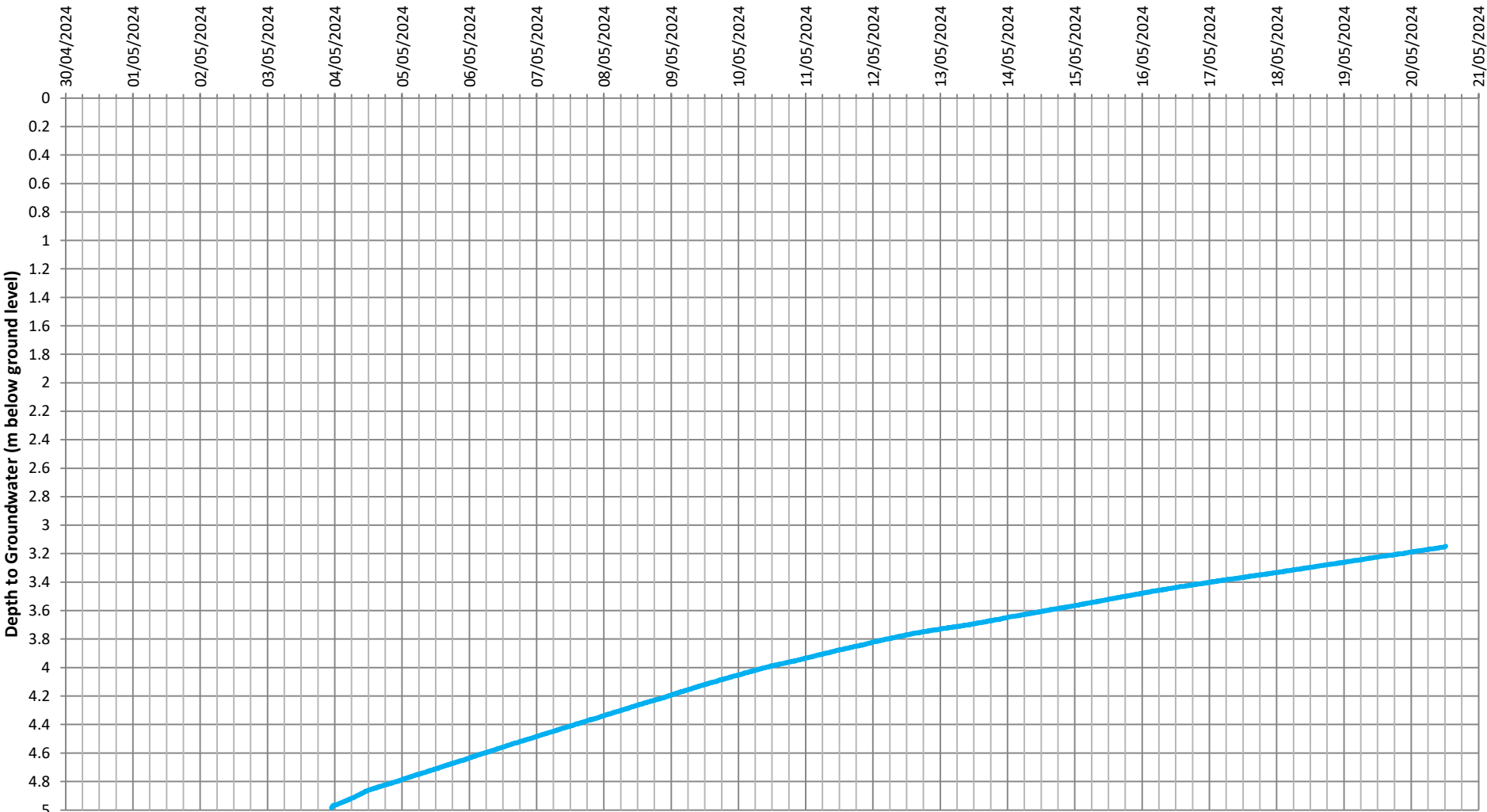


Ashdown Site Investigation Limited

Site: Interbridges, New Brighton Road, Emsworth, Hampshire

Project No. P16578

Groundwater Monitoring Results - WS07



APPENDIX C

Geotechnical Laboratory Test Results
Contamination Laboratory Test Results

ASHDOWN SITE INVESTIGATION LIMITED

Soil Classification Summary

Site Name:	Interbridges, New Brighton Road, Emsworth, Hampshire	Job No:	P16578
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BH/TP No.	Depth (m)	Nat. Moist. Cont. (w %)	Equiv. Moist. Cont. (w _a %)	Atterberg Limits			Class'n	Cons. Index (I _c)	% passing 425 µm sieve	Visual Description of Sample
				W _l %	W _p %	I _p %				
WS01	3.30	29		74	26	48	CIV	0.94*	100	Stiff brown and grey mottled CLAY.
WS02	1.90	22		70	26	44	CIH/CIV	1.09*	100	Very stiff brown, grey and orange brown mottled CLAY.
WS03	2.10	25		76	27	49	CIV	1.04*	100	Very stiff brown, orange brown and grey mottled CLAY.
WS04	0.60	19		52	19	33	CIH	1.00*	46	Very stiff brown gravelly slightly sandy CLAY. Gravel is fine to coarse flint.
WS05	1.10	18		29	18	11	CIL	1.00*	69	Very stiff brown and light brown slightly gravelly sandy CLAY. Gravel is fine to medium flint.
WS06	2.80	30		73	27	46	CIV	0.93*	100	Stiff orange brown, grey and light brown CLAY.
WS07	1.50	24		75	24	51	CIV	1.00*	100	Very stiff brown and light grey mottled orange brown CLAY.
WS08	2.40	33		73	27	46	CIV	0.87*	92	Stiff orange brown and dark brown slightly gravelly CLAY. Gravel is medium flint.
WS09	2.75	31		68	24	44	CIH	0.84*	100	Stiff dark grey CLAY.
TP04	0.80	28		73	23	50	CIV	0.90*	95	Stiff brown mottled orange brown slightly gravelly CLAY. Gravel is fine flint and chalk.

Test Method: Classification Tests BS1377: Part 2: 1990: Method 4.4, 5.3 and 5.4

* Consistency index based on natural moisture content and not the equivalent moisture content.

Sheet No. 1



Alex Bewick
Ashdown Site Investigations Ltd
Unit 3 The Grain Store
Ditchling Common Business Park
Ditchling Common
West Sussex
BN6 8SG

Normec DETS Limited
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 24-04897

Site Reference: Interbridges, New Brighton Road, Emsworth, Hampshire

Project / Job Ref: P16578 2192

Order No: 11639

Sample Receipt Date: 07/05/2024

Sample Scheduled Date: 07/05/2024

Report Issue Number: 1

Reporting Date: 13/05/2024

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.



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Soil Analysis Certificate						
DETS Report No: 24-04897	~Date Sampled	30/04/24	29/04/24	29/04/24	29/04/24	30/04/24
Ashdown Site Investigations Ltd	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Interbridges, New Brighton Road, Emsworth, Hampshire	~TP / BH No	WS01	WS02	WS04	WS05	WS06
~Project / Job Ref: P16578_2192	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11639	~Depth (m)	1.60	2.90	4.90	0.50	1.90
Reporting Date: 13/05/2024	DETS Sample No	713423	713424	713425	713426	713427

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	8.1	8.1	8.1	7.6	8.3
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	470	863	1329	< 200	672
Total Sulphate as SO ₄	%	< 0.02	MCERTS	0.05	0.09	0.13	< 0.02	0.07
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	183	307	467	13	152
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.18	0.31	0.47	0.01	0.15
Total Sulphur	%	< 0.02	NONE	0.02	0.04	0.40	< 0.02	0.03

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)

~ Sample details provided by the customer

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



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Soil Analysis Certificate						
DETS Report No: 24-04897	~Date Sampled	30/04/24	30/04/24	30/04/24		
Ashdown Site Investigations Ltd	~Time Sampled	None Supplied	None Supplied	None Supplied		
~Site Reference: Interbridges, New Brighton Road, Emsworth, Hampshire	~TP / BH No	WS07	WS08	WS09		
~Project / Job Ref: P16578_2192	~Additional Refs	None Supplied	None Supplied	None Supplied		
~Order No: 11639	~Depth (m)	2.30	1.20	1.00		
Reporting Date: 13/05/2024	DETS Sample No	713428	713429	713430		

Determinand	Unit	RL	Accreditation	(n)		
pH	pH Units	N/a	MCERTS	7.9	7.8	7.7
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	1654	235	243
Total Sulphate as SO ₄	%	< 0.02	MCERTS	0.17	0.02	0.02
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	449	34	13
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.45	0.03	0.01
Total Sulphur	%	< 0.02	NONE	0.06	< 0.02	< 0.02

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)

~ Sample details provided by the customer



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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 24-04897	
Ashdown Site Investigations Ltd	
~Site Reference: Interbridges, New Brighton Road, Emsworth, Hampshire	
~Project / Job Ref: P16578_2192	
~Order No: 11639	
Reporting Date: 13/05/2024	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
713423	WS01	None Supplied	1.60	15.2	Light brown clay
713424	WS02	None Supplied	2.90	13.4	Light brown clay
713425	WS04	None Supplied	4.90	17	Brown clay
713426	WS05	None Supplied	0.50	8.7	Light brown sandy clay with stones
713427	WS06	None Supplied	1.90	8.8	Light brown sandy clay with stones
713428	WS07	None Supplied	2.30	18.9	Brown clay
713429	WS08	None Supplied	1.20	17.6	Brown clay with stones
713430	WS09	None Supplied	1.00	12.2	Brown sandy clay with stones

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{U/S}

Unsuitable Sample ^{U/S}

~ Sample details provided by the customer



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 24-04897

Ashdown Site Investigations Ltd

~Site Reference: Interbridges, New Brighton Road, Emsworth, Hampshire

~Project / Job Ref: P16578 2192

~Order No: 11639

Reporting Date: 13/05/2024

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried

AR As Received

~ Sample details provided by the customer



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List of HWOL Acronyms and Operators	
DETS Report No: 24-04897	
Ashdown Site Investigations Ltd	
~Site Reference: Interbridges, New Brighton Road, Emsworth, Hampshire	
~Project / Job Ref: P16578_2192	
~Order No: 11639	
Reporting Date: 13/05/2024	

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#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 eg. EH+HS_Total or EH_CU+HS_Total
~	Sample details provided by the customer

Det - Acronym



Alex Bewick
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Ditchling Common Business Park
Ditchling Common
West Sussex
BN6 8SG

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DETS Report No: 24-04898

Site Reference: Interbridges, New Brighton Road, Emsworth, Hampshire

Project / Job Ref: P16578_2195

Order No: 11641

Sample Receipt Date: 07/05/2024

Sample Scheduled Date: 07/05/2024

Report Issue Number: 1

Reporting Date: 13/05/2024

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Soil Analysis Certificate						
DETS Report No: 24-04898	~Date Sampled	29/04/24	29/04/24	29/04/24	30/04/24	30/04/24
Ashdown Site Investigations Ltd	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Interbridges, New Brighton Road, Emsworth, Hampshire	~TP / BH No	WS02	WS03	WS05	WS07	WS08
~Project / Job Ref: P16578_2195	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11641	~Depth (m)	0.30	0.20	0.10	0.15	0.40
Reporting Date: 13/05/2024	DETS Sample No	713431	713432	713433	713434	713435

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	7.7	7.4	7.4	6.6	7.2
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	295	514	< 200	657	411
Total Sulphate as SO ₄	%	< 0.02	MCERTS	0.03	0.05	< 0.02	0.07	0.04
Organic Matter (SOM)	%	< 0.1	MCERTS	2.3	4.6	1.6	10.5	5.5
Arsenic (As)	mg/kg	< 2	MCERTS	13	12	2	11	11
W/S Boron	mg/kg	< 1	NONE	< 1	1.3	< 1	2	1.1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	0.4	< 0.2	0.4	0.5
Chromium (Cr)	mg/kg	< 2	MCERTS	30	25	6	18	22
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	29	98	12	118	100
Lead (Pb)	mg/kg	< 3	MCERTS	43	96	16	92	100
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	19	17	4	13	17
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Zinc (Zn)	mg/kg	< 3	MCERTS	60	99	17	126	132

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)

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Soil Analysis Certificate						
DETS Report No: 24-04898	~Date Sampled	30/04/24	30/04/24	29/04/24	30/04/24	30/04/24
Ashdown Site Investigations Ltd	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Interbridges, New Brighton Road, Emsworth, Hampshire	~TP / BH No	WS09	TP01	TP02	TP04	TP05
~Project / Job Ref: P16578_2195	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11641	~Depth (m)	0.50	0.05	0.10	0.10 - 0.15	0.30
Reporting Date: 13/05/2024	DETS Sample No	713436	713437	713438	713439	713440

Determinand	Unit	RL	Accreditation	(n)				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	7.5	7.0	7.2	7.2	8.4
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	394	< 200	572	309	247
Total Sulphate as SO ₄	%	< 0.02	MCERTS	0.04	< 0.02	0.06	0.03	0.02
Organic Matter (SOM)	%	< 0.1	MCERTS	4.8	1.4	9.9	2.5	1.3
Arsenic (As)	mg/kg	< 2	MCERTS	11	4	15	9	23
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	1.3	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.5	< 0.2	0.7	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	24	9	23	18	27
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	45	8	79	13	20
Lead (Pb)	mg/kg	< 3	MCERTS	293	13	322	19	13
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	19	6	19	12	34
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Zinc (Zn)	mg/kg	< 3	MCERTS	125	21	306	40	53

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)

~ Sample details provided by the customer



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 24-04898	~Date Sampled	29/04/24	29/04/24	29/04/24	30/04/24	30/04/24
Ashdown Site Investigations Ltd	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Interbridges, New Brighton Road, Emsworth, Hampshire	~TP / BH No	WS02	WS03	WS05	WS07	WS08
~Project / Job Ref: P16578_2195	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11641	~Depth (m)	0.30	0.20	0.10	0.15	0.40
Reporting Date: 13/05/2024	DETS Sample No	713431	713432	713433	713434	713435

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	0.11	0.28	< 0.1	< 0.1	0.29
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.25	< 0.1	< 0.1	0.24
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.15	< 0.1	< 0.1	0.13
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	0.18	< 0.1	< 0.1	0.19
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.21	< 0.1	< 0.1	0.18
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.18	< 0.1	< 0.1	0.16
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.13	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	0.14	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6

~ Sample details provided by the customer

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 24-04898	~Date Sampled	30/04/24	30/04/24	29/04/24	30/04/24	30/04/24
Ashdown Site Investigations Ltd	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Interbridges, New Brighton Road, Emsworth, Hampshire	~TP / BH No	WS09	TP01	TP02	TP04	TP05
~Project / Job Ref: P16578_2195	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11641	~Depth (m)	0.50	0.05	0.10	0.10 - 0.15	0.30
Reporting Date: 13/05/2024	DETS Sample No	713436	713437	713438	713439	713440

Determinand	Unit	RL	Accreditation	(n)				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.18	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	0.12	< 0.1	0.54	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.49	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.24	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.36	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.39	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.30	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.19	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.18	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	2.9	< 1.6	< 1.6

~ Sample details provided by the customer



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Soil Analysis Certificate - EPH Banded (Type F)						
DETS Report No: 24-04898	~Date Sampled	29/04/24	29/04/24	29/04/24	30/04/24	30/04/24
Ashdown Site Investigations Ltd	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Interbridges, New Brighton Road, Emsworth, Hampshire	~TP / BH No	WS02	WS03	WS05	WS07	WS08
~Project / Job Ref: P16578_2195	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11641	~Depth (m)	0.30	0.20	0.10	0.15	0.40
Reporting Date: 13/05/2024	DETS Sample No	713431	713432	713433	713434	713435

Determinand	Unit	RL	Accreditation					
EPH (>C8 - C10) : EH 1D Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH (>C10 - C12) : EH 1D Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH (>C12 - C16) : EH 1D Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH (>C16 - C21) : EH 1D Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH (>C21 - C40) : EH 1D Total	mg/kg	< 6	MCERTS	< 6	< 6	< 6	< 6	< 6
EPH (C8 - C40) : EH 1D Total	mg/kg	< 6	MCERTS	< 6	< 6	< 6	< 6	< 6

~ Sample details provided by the customer

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



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Soil Analysis Certificate - EPH Banded (Type F)						
DETS Report No: 24-04898	~Date Sampled	30/04/24	30/04/24	29/04/24	30/04/24	30/04/24
Ashdown Site Investigations Ltd	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Interbridges, New Brighton Road, Emsworth, Hampshire	~TP / BH No	WS09	TP01	TP02	TP04	TP05
~Project / Job Ref: P16578_2195	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11641	~Depth (m)	0.50	0.05	0.10	0.10 - 0.15	0.30
Reporting Date: 13/05/2024	DETS Sample No	713436	713437	713438	713439	713440

Determinand	Unit	RL	Accreditation	(n)				
EPH (>C8 - C10) : EH 1D Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH (>C10 - C12) : EH 1D Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH (>C12 - C16) : EH 1D Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH (>C16 - C21) : EH 1D Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH (>C21 - C40) : EH 1D Total	mg/kg	< 6	MCERTS	< 6	< 6	< 6	< 6	< 6
EPH (C8 - C40) : EH 1D Total	mg/kg	< 6	MCERTS	< 6	< 6	< 6	< 6	< 6

~ Sample details provided by the customer



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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 24-04898	
Ashdown Site Investigations Ltd	
~Site Reference: Interbridges, New Brighton Road, Emsworth, Hampshire	
~Project / Job Ref: P16578_2195	
~Order No: 11641	
Reporting Date: 13/05/2024	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
713431	WS02	None Supplied	0.30	12.6	Brown sandy clay with stones
713432	WS03	None Supplied	0.20	13.5	Brown sandy clay with stones
713433	WS05	None Supplied	0.10	10.7	Brown sandy clay with stones
713434	WS07	None Supplied	0.15	24.8	Brown loamy sand with stones and vegetation
713435	WS08	None Supplied	0.40	17.3	Brown sandy clay with stones and brick
713436	WS09	None Supplied	0.50	18.1	Brown clay
713437	TP01	None Supplied	0.05	15	Brown sandy clay with stones and vegetation
713438	TP02	None Supplied	0.10	33	Brown loamy sand with vegetation
713439	TP04	None Supplied	0.10 - 0.15	12.3	Light brown sandy clay with stones and vegetation
713440	TP05	None Supplied	0.30	16	Light brown clay with stones

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{U/S}

Unsuitable Sample ^{U/S}

~ Sample details provided by the customer



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Soil Analysis Certificate - Methodology & Miscellaneous Information	
DETS Report No: 24-04898	
Ashdown Site Investigations Ltd	
~Site Reference: Interbridges, New Brighton Road, Emsworth, Hampshire	
~Project / Job Ref: P16578_2195	
~Order No: 11641	
Reporting Date: 13/05/2024	

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

~ Sample details provided by the customer



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List of HWOL Acronyms and Operators	
DETS Report No: 24-04898	
Ashdown Site Investigations Ltd	
~Site Reference: Interbridges, New Brighton Road, Emsworth, Hampshire	
~Project / Job Ref: P16578_2195	
~Order No: 11641	
Reporting Date: 13/05/2024	

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#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 eg. EH+HS_Total or EH_CU+HS_Total
~	Sample details provided by the customer

EPH Banded (C10 - C12) - EH_1D_Total
EPH Banded (C12 - C16) - EH_1D_Total
EPH Banded (C16 - C21) - EH_1D_Total
EPH Banded (C21 - C40) - EH_1D_Total
EPH Banded (C8 - C10) - EH_1D_Total
EPH Banded (C8 - C40) - EH_1D_Total

APPENDIX D

Summary of In Situ CBR Test Results
Graph of Subgrade Surface Modulus vs Depth
Graph of CBR vs Depth

BH	Depth (m)	CBR (%)	Ks (Mpa)
WS01	0.02	11	82
WS01	0.04	17	109
WS01	0.05	17	109
WS01	0.07	13	90
WS01	0.11	6	56
WS01	0.15	7	61
WS01	0.18	7	61
WS01	0.22	7	61
WS01	0.23	17	109
WS01	0.26	10	77
WS01	0.27	26	143
WS01	0.27	55	229
WS01	0.30	17	109
WS01	0.32	26	143
WS01	0.33	55	229
WS01	0.35	36	174
WS01	0.36	55	229
WS01	0.38	44	197
WS01	0.42	30	157
WS01	0.47	19	116
WS01	0.51	15	98
WS01	0.54	15	98
WS01	0.58	13	90
WS01	0.61	21	123
WS01	0.63	10	77
WS01	0.66	8	68
WS01	0.70	7	61
WS01	0.72	10	77
WS01	0.75	8	68
WS02	0.12	2	27
WS02	0.17	5	48
WS02	0.24	4	40
WS02	0.25	17	109
WS02	0.26	26	143
WS02	0.29	17	109
WS02	0.31	26	143
WS02	0.34	17	109
WS02	0.37	17	109
WS02	0.38	55	229
WS02	0.41	44	197
WS02	0.43	44	197
WS02	0.45	55	229
WS02	0.50	21	123
WS02	0.53	36	174
WS02	0.55	55	229
WS02	0.61	36	174
WS02	0.64	36	174
WS02	0.66	75	278
WS02	0.68	44	197

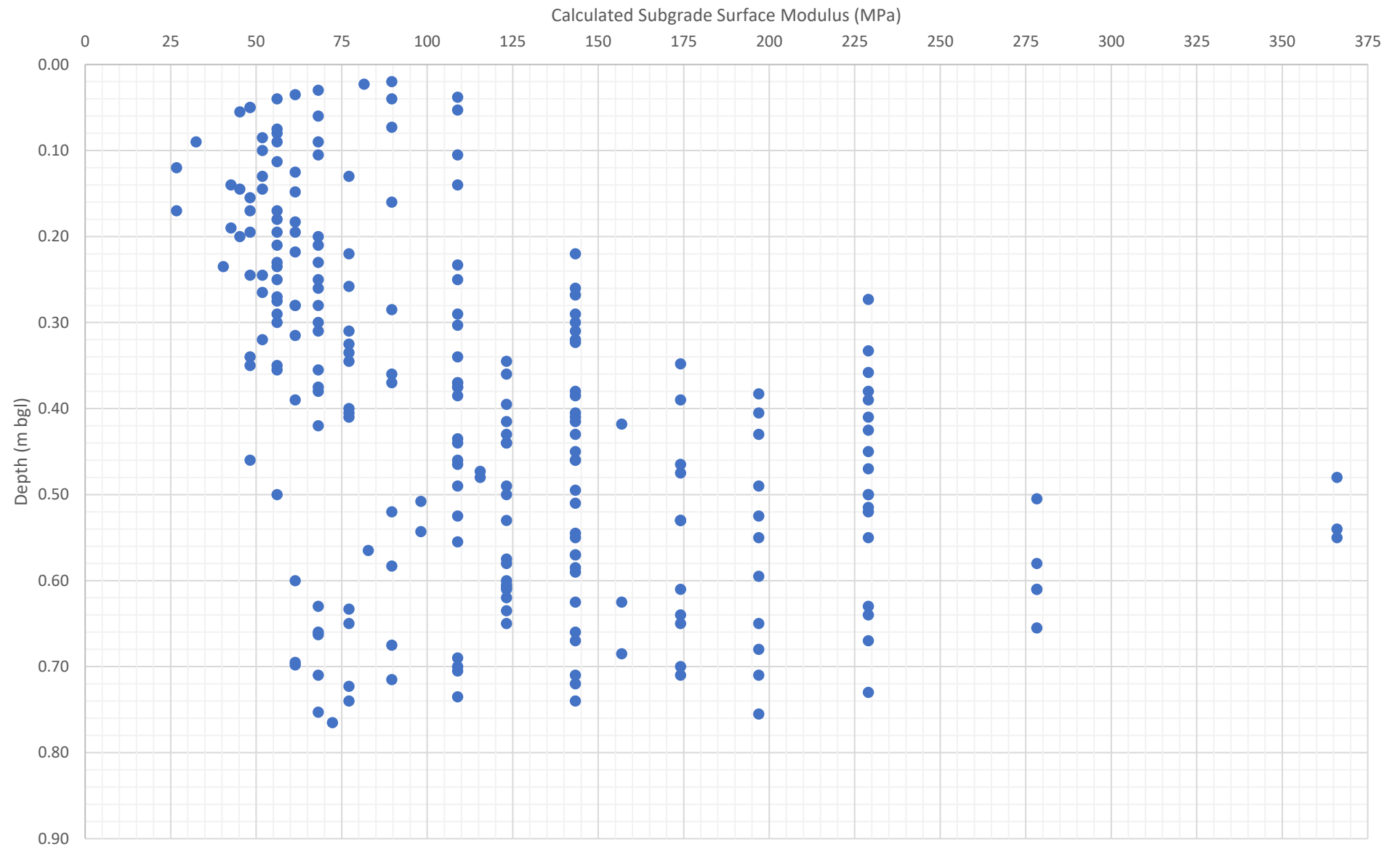
BH	Depth (m)	CBR (%)	Ks (Mpa)
WS02	0.71	36	174
WS02	0.73	55	229
WS02	0.76	44	197
WS04	0.09	3	32
WS04	0.11	17	109
WS04	0.13	10	77
WS04	0.19	4	43
WS04	0.23	6	56
WS04	0.27	6	56
WS04	0.30	8	68
WS04	0.35	5	48
WS04	0.37	13	90
WS04	0.39	17	109
WS04	0.41	10	77
WS04	0.46	5	48
WS04	0.50	6	56
WS04	0.51	26	143
WS04	0.52	55	229
WS04	0.53	36	174
WS04	0.57	26	143
WS04	0.62	21	123
WS04	0.65	36	174
WS04	0.67	55	229
WS04	0.70	36	174
WS06	0.04	6	56
WS06	0.09	5	52
WS06	0.13	5	52
WS06	0.17	6	56
WS06	0.20	8	68
WS06	0.25	5	52
WS06	0.28	7	61
WS06	0.31	8	68
WS06	0.35	6	56
WS06	0.38	8	68
WS06	0.41	10	77
WS06	0.41	55	229
WS06	0.44	17	109
WS06	0.46	26	143
WS06	0.49	17	109
WS06	0.50	55	229
WS06	0.53	36	174
WS06	0.57	26	143
WS06	0.60	44	197
WS06	0.61	75	278
WS06	0.63	55	229
WS06	0.64	55	229
WS06	0.66	26	143
WS06	0.69	17	109
WS06	0.71	26	143

BH	Depth (m)	CBR (%)	Ks (Mpa)
WS09	0.05	5	48
WS09	0.17	2	27
WS09	0.21	6	56
WS09	0.25	6	56
WS09	0.29	6	56
WS09	0.34	5	48
WS09	0.36	13	90
WS09	0.38	17	109
WS09	0.40	10	77
WS09	0.41	26	143
WS09	0.43	26	143
WS09	0.46	17	109
WS09	0.47	55	229
WS09	0.48	115	366
WS09	0.52	55	229
WS09	0.54	115	366
WS09	0.55	115	366
WS09	0.58	75	278
WS09	0.61	75	278
TP01	0.02	13	90
TP01	0.04	13	90
TP01	0.08	6	56
TP01	0.14	4	43
TP01	0.18	6	56
TP01	0.21	8	68
TP01	0.22	26	143
TP01	0.27	5	52
TP01	0.29	13	90
TP01	0.31	10	77
TP01	0.34	10	77
TP01	0.36	21	123
TP01	0.38	26	143
TP01	0.39	55	229
TP01	0.44	21	123
TP01	0.52	13	90
TP01	0.57	11	83
TP01	0.60	7	61
TP01	0.63	8	68
TP01	0.66	8	68
TP01	0.70	7	61
TP01	0.72	13	90
TP01	0.74	10	77
TP02	0.04	7	61
TP02	0.08	6	56
TP02	0.11	8	68
TP02	0.16	5	48
TP02	0.20	6	56
TP02	0.25	5	48
TP02	0.28	7	61

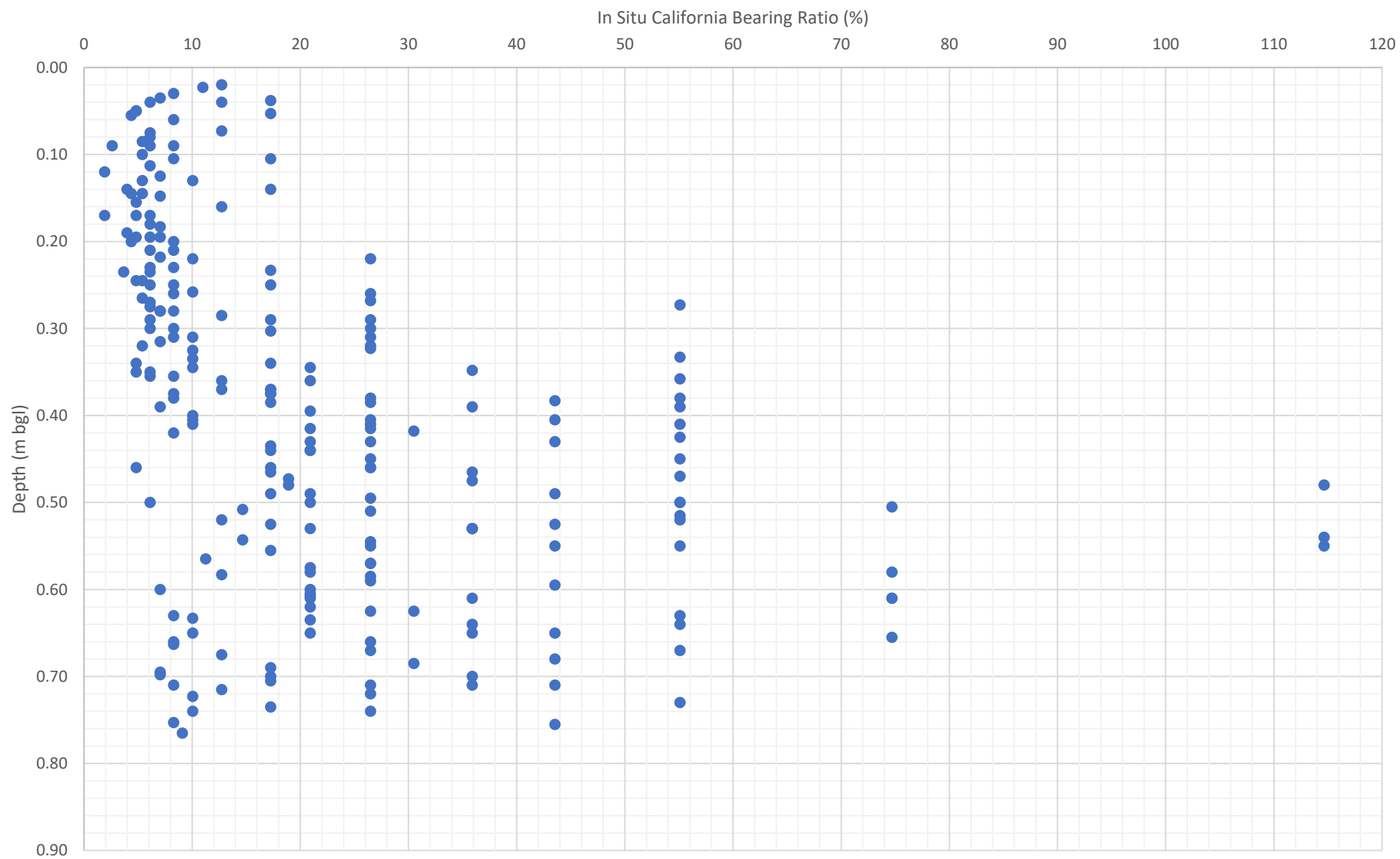
BH	Depth (m)	CBR (%)	Ks (Mpa)
TP02	0.32	7	61
TP02	0.36	6	56
TP02	0.37	17	109
TP02	0.40	21	123
TP02	0.42	26	143
TP02	0.44	21	123
TP02	0.46	26	143
TP02	0.48	36	174
TP02	0.50	26	143
TP02	0.53	17	109
TP02	0.56	17	109
TP02	0.58	21	123
TP02	0.61	21	123
TP02	0.63	26	143
TP02	0.65	21	123
TP02	0.67	26	143
TP02	0.70	17	109
TP02	0.72	26	143
TP02	0.74	26	143
TP03	0.05	5	48
TP03	0.09	6	56
TP03	0.15	4	45
TP03	0.20	4	45
TP03	0.23	8	68
TP03	0.26	8	68
TP03	0.30	6	56
TP03	0.33	10	77
TP03	0.36	8	68
TP03	0.39	7	61
TP03	0.42	8	68
TP03	0.44	17	109
TP03	0.47	17	109
TP03	0.49	21	123
TP03	0.50	55	229
TP03	0.53	44	197
TP03	0.55	44	197
TP03	0.59	26	143
TP03	0.63	30	157
TP03	0.65	44	197
TP03	0.69	30	157
TP03	0.71	44	197
TP04	0.03	8	68
TP04	0.06	8	68
TP04	0.09	8	68
TP04	0.13	7	61
TP04	0.14	17	109
TP04	0.16	13	90
TP04	0.20	7	61
TP04	0.22	10	77

BH	Depth (m)	CBR (%)	Ks (Mpa)
TP04	0.25	8	68
TP04	0.28	8	68
TP04	0.29	26	143
TP04	0.30	26	143
TP04	0.32	26	143
TP04	0.35	21	123
TP04	0.38	17	109
TP04	0.39	36	174
TP04	0.42	21	123
TP04	0.43	55	229
TP04	0.48	19	116
TP04	0.53	21	123
TP04	0.55	26	143
TP04	0.58	21	123
TP04	0.60	21	123
TP04	0.65	10	77
TP04	0.71	8	68
TP04	0.77	9	72
TP05	0.06	4	45
TP05	0.10	5	52
TP05	0.15	5	52
TP05	0.20	5	48
TP05	0.24	6	56
TP05	0.28	6	56
TP05	0.32	5	52
TP05	0.35	10	77
TP05	0.38	8	68
TP05	0.39	26	143
TP05	0.41	26	143
TP05	0.43	21	123
TP05	0.45	26	143
TP05	0.47	36	174
TP05	0.49	44	197
TP05	0.51	75	278
TP05	0.55	26	143
TP05	0.59	26	143
TP05	0.61	21	123
TP05	0.64	21	123
TP05	0.68	13	90
TP05	0.71	17	109
TP05	0.74	17	109

Calculated Subgrade Surface Modulus (MPa)



In Situ California Bearing Ratio (%)



APPENDIX E

Classification of Probability, Consequence and Risk

Probability of risk being realised	
Classification	Definition
High	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution.
Moderate	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place and is less likely in the shorter term.
Very Low	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

Consequence of risk being realised		
Classification	Category	Definition
Severe	Human Health	Short term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part IIA.
	Controlled Waters	Short term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource.
	Property	Catastrophic damage to buildings/property.
	Ecological Systems	A short term risk to a particular ecosystem or organisation forming part of such ecosystem.
Moderate	Human Health	Chronic damage to Human Health.
	Controlled Waters	Pollution of sensitive water resources (note: Water Resources Act contains no scope for considering significance of pollution).
	Ecological System	A significant change in a particular ecosystem or organism forming part of such ecosystem.
Minor	Controlled Waters	Pollution of non-sensitive water resources.
	Property	Significant damage to crops, buildings, structures and services.
	Ecological Systems	Damage to sensitive buildings/structures/services or the environment.
Very Minor	Human Health	Non-permanent health effects to human health (easily prevented by means such as personal protective clothing, etc).
	Property	Easily repairable effects of damage to buildings, structures and services.
	Project	Harm, although not necessarily significant harm, which may result in a financial loss or expenditure to resolve.

Risk classification definitions	
Very High	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	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 long term.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is 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.
Low	It is possible that harm could arise to a designated receptor from an identified hazard, but there is a low likelihood of this hazard occurring and if realised, harm would at worst normally be mild.
Very Low	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.

APPENDIX F

Preliminary Conceptual Model

Interbridges, New Brighton Road, Emsworth, Hampshire				Preliminary Conceptual Model		P16578	
Potential Source	Potential Receptor	Potential Contaminants	Potential Pathway	Complete Linkage Present?	Probability	Consequence	Risk
Potential made ground soils across the site	End Users	Asbestos, Heavy Metals and PAH Compounds	Dermal contact with soil and dust (indoor & outdoor)	Yes	P2: Low	C3: Moderate	Low/Moderate
			Ingestion of soil and indoor dust	Yes	P2: Low	C3: Moderate	Low/Moderate
			Consumption of home-grown produce and attached soil	No private gardens proposed			N/A
			Inhalation of soil dust (indoor and outdoor)	Yes	P2: Low	C3: Moderate	Low/Moderate
			Inhalation of soil vapours	Identified contaminant(s) do not pose a risk via this pathway			N/A
			Inhalation of soil gases/ Risk of explosion	Identified contaminant(s) do not pose a risk via this pathway			N/A
	End Users (via Water Supply Pipework)		Contamination of incoming services	Identified contaminant(s) do not pose a risk via this pathway			N/A
	Groundwater	Heavy Metals and PAH Compounds	Migration to groundwater	No significant pathway to groundwater exists			N/A
The site is reported to be within an area where between 5% and 10% of properties are above the action level requiring radon gas protection measures to be installed in new buildings	End Users	Radon	Dermal contact with soil and dust (indoor & outdoor)	N/A			N/A
			Ingestion of soil and indoor dust	N/A			N/A
			Consumption of home-grown produce and attached soil	N/A			N/A
			Inhalation of soil dust (indoor and outdoor)	N/A			N/A
			Inhalation of soil vapours	N/A			N/A
			Inhalation of soil gases/ Risk of explosion	Yes	P2: Low	C3: Moderate	Low/Moderate
	End Users (via Water Supply Pipework)		Contamination of incoming services	N/A			N/A
	Groundwater		Migration to groundwater	N/A			N/A

APPENDIX G

Quantitative Conceptual Model

Interbridges, New Brighton Road, Emsworth, Hampshire				Quantitative Conceptual Model		P16578	
Source	Receptor	Contaminants	Pathway	Complete Linkage Present?	Probability	Consequence	Risk
The site is reported to be within an area where between 5% and 10% of properties are above the action level requiring radon gas protection measures to be installed in new buildings	End Users	Radon	Dermal contact with soil and dust (indoor & outdoor)	N/A			N/A
			Ingestion of soil and indoor dust	N/A			N/A
			Consumption of home-grown produce and attached soil	N/A			N/A
			Inhalation of soil dust (indoor and outdoor)	N/A			N/A
			Inhalation of soil vapours	N/A			N/A
			Inhalation of soil gases/ Risk of explosion	Yes	P2: Low	C3: Moderate	Low/Moderate
	End Users (via Water Supply Pipework)		Contamination of incoming services	N/A			N/A
	Groundwater		Migration to groundwater	N/A			N/A

APPENDIX H

BGS Borehole Records



RECORD OF BOREHOLE 41

SU 70 NE 16

7500637

1" 316

Ground level: 5.65m above O.D.

Diameter of boring: 0.20m

Method of borings: Shell and Auger

Lining tubes: 0.20m to 1.15m

Daily Progress	Depth to Water m	Depth of Lining Tubes m	Samples		Legend	Depth m	Reduced level m	Description of Strata
			Depth	Type				
			0.50 - 0.95	U(3) D		0.35	5.30	TOPSOIL
			0.95			1.45	4.20	Fine to coarse flint GRAVEL with some sand in a matrix of firm brown sandy silty clay
20.4.72	DRY	1.75	1.50 - 1.95	U(4) D				Firm brown silty CLAY
	1.95	1.75	1.95					
			2.50 - 2.95	U(4) D				
			2.95					
			3.50 - 3.95	U(4) D		4.40	1.25	Firm fissured grey and brown silty CLAY
21.4.72	4.10	NONE	3.95					
			4.50 - 4.95	U(3) D		5.00	0.65	
			4.95					

Key to type of sample:

- U(3) - 102mm 4in. diameter undisturbed sample.
- D - disturbed sample.
- BD - bulk disturbed sample.
- V - vane test.
- S - standard penetration test.
- C - dynamic cone penetration test.

Figure in brackets is No. of blows for penetration given in sample column see Notes, page 11.

Remarks:

Ground-water was encountered as seepage at a depth of 1.30m.

Lab. Ref. No.
S/8979

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SITE EMSWORTH TO THORNHAM FOUL RELIEF SEWER

SU70NE/101
7502 0632

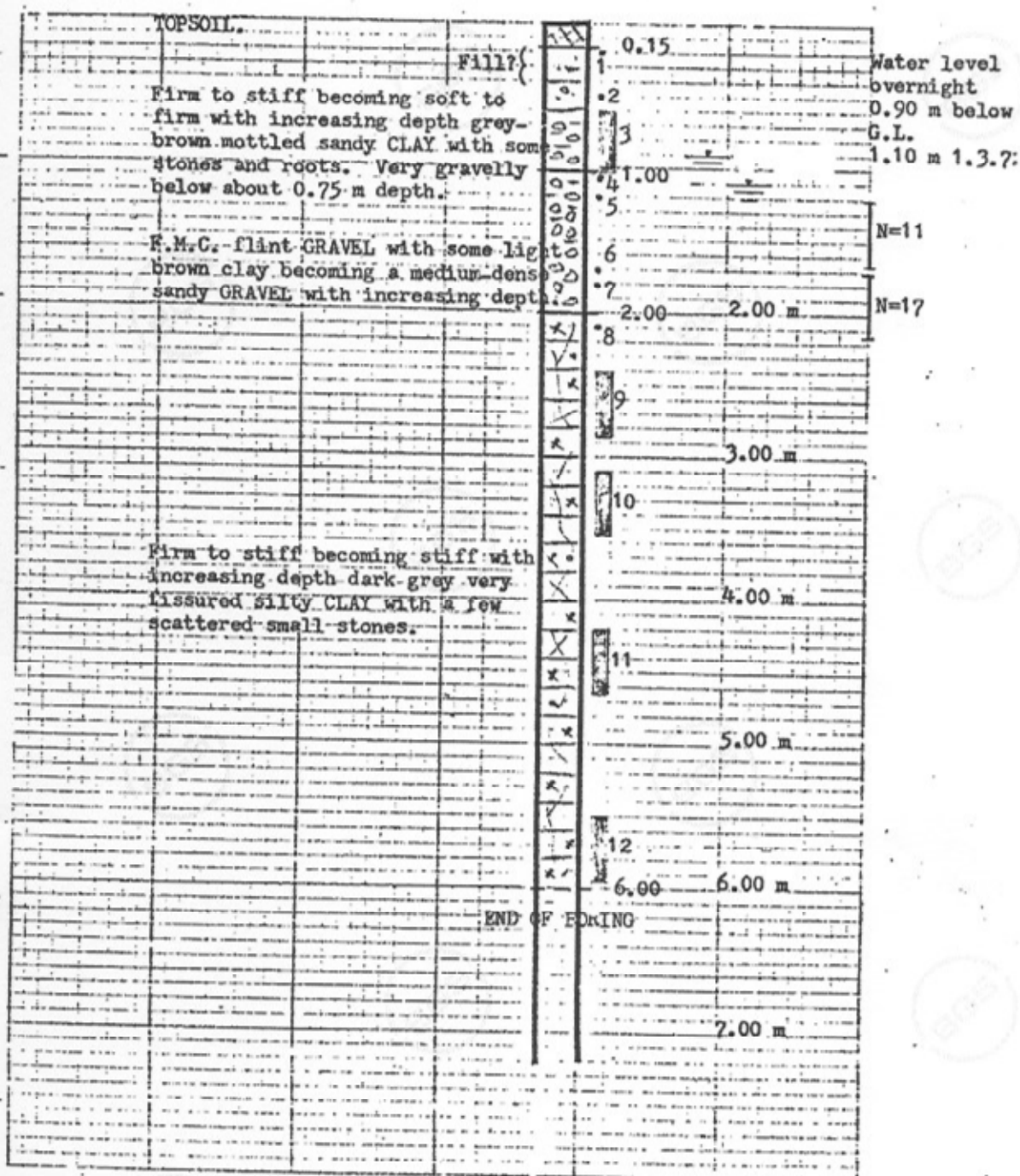
FIG. 1n

Borehole ET14

DIAMETER 150 mm

DEPTH 6.00 m

DATE 23 & 24.2.72





RECORD OF BOREHOLE 38

SU 70 NW41
74 90 0 635
1" 316.

Ground level: 7.80m above O.D.

Diameter of boring: 0.20m to 15.40m
0.15m to 30.00m

Method of boring: Shell and Auger

Lining tubes: 0.20m to 6.30m
0.15m to 21.60m

Daily Progress	Depth to Water m	Depth of Lining Tubes m	Samples		Legend	Depth m	Reduced level m	Description of Strata	
			Depth	Type					
			0.30 - 0.75 0.75	U(4) D		0.30	7.50	TOPSOIL	
			0.95 - 1.25 1.25	C(5) BD		1.20	6.60	Soft to firm orange-brown very sandy silty CLAY with some gravel	8E
			1.25 - 1.70 1.70	U(4) D		2.20	5.60	Firm mottled grey and brown silty CLAY	
			1.75 - 2.20 2.20	U(4) D					
			2.25 - 2.70 2.70	U(4) D					
			2.75 - 3.20 3.20	U(4) D				Stiff fissured mottled grey and brown silty CLAY	
			3.25 - 3.70 3.70	U(4) D		4.70	3.10		
			3.75 - 4.20 4.20	U(4) D					
			4.25 - 4.70 4.70	U(4) D					
			4.75 - 5.20 5.20	U(4) D					
			5.75 - 6.20 6.20	U(4) D					
			6.75 - 7.20 7.20	U(4) D				Stiff fissured grey silty CLAY with occasional claystone	
14.4.72	Dry	6.30	7.75 - 8.20 8.20	U(4) D					
	7.25		8.75 - 9.20 9.20	U(4) D		9.80	-1.60		LC
			9.75 - 10.20 10.20	U(4) D					
			10.75 - 11.20 11.20	U(4) D					
			11.75 - 12.20 12.20	U(4) D					
			12.75 - 13.20 13.20	U(4) D					
			13.75 - 14.20 14.20	U(4) D				Very stiff to hard grey sandy silty CLAY	
			14.75 - 15.20 15.20	U(4) D					
15.4.72	14.40	15.40	15.75 - 16.20 16.20	U(4) D					
	3.00		16.75 - 17.20 17.20	U(4) D					
			17.75 - 18.20	U(4)				(see over)	
Key to type of samples: U(4) - 102mm '4in' diameter undisturbed sample. D - disturbed sample. BD - bulk disturbed sample. V - vane test. S - standard penetration test. C - dynamic cone penetration test. Figure in brackets is No. of blows for penetration given in depth column (see Notes, page 1).					Remarks: † Unable to recover sample.				
Lab. Ref. No. S/8974					A77. HAVANT - CHICHESTER				



RECORD OF BOREHOLE 38 (sheet 2)

SO 70NW/41
74900635
1" 316.

Borehole Progress	Depth to Water m	Depth of Lining Tubes m	Samples		Legend	Depth m	Reduced level m	Description of Strata
			Depth	Type				
			18.20	D				
			18.75- 19.20 19.20	U(4) D				See previous sheet
			19.75- 20.20 20.00	U(4) D		20.00	-12.20	
			20.75- 21.20 21.20	U(4) D				
			21.75- 22.20 22.20	U(4) D				
17.4.72	Dry	21.60	22.75- 23.20 23.20	U(4) D				
	22.00		23.75- 24.20 24.20	U(4) D				
			24.75- 25.20 25.20	U(4) D				Very stiff fissured grey silty CLAY
			25.75- 26.20 26.20	U(4) D				
			26.75- 27.20 27.20	U(4) D				
			27.75- 28.20 28.20	U(4) D				
			28.75- 29.20 29.20	U(4) D				
18.4.72	25.50	6.30	29.50- 29.95 29.95	U(4) D		30.00	-22.20	
Key to type of sample: U(4) - 102mm (4in) diameter undisturbed sample. D - disturbed sample. BD - bulk disturbed sample. V - Vane test. S - standard penetration test. C - dynamic cone penetration test. Figure in brackets is No. of blows for penetration given in depth column see Notes, page 1.								
Remarks Ground-water was first encountered as seepage at 5.00m below ground level. Ground-water was again encountered as seepage at a depth of 13.20m and cut off by the lining tubes at 21.60m below ground level.								
Lab. Ref. No. 5/9078								
A27 HAVANT - CHICHESTER								

LC

R.J.W.
12.10.87