



PRELIMINARY GEOENVIRONMENTAL GROUND INVESTIGATION

Barnsley West

Reference

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Bond Bryan. Barnsley West Masterplan. Proposed Site Plan. Drawing No: BWM-BBA-ZZ-XX-DR-A-1004-S2-P05, dated May 2021 for Strata Sterling Barnsley West Limited.

JPG (Leeds) Ltd. Barnsley West, Barnsley. Exploratory Hole Location Plan (As-Built). Dwg. 4848-JPG-SW-XX-DR-G-1300-S2-P04. Dated May 2019. Last revision dated February 2021 (Rev. P04)

JPG (Leeds) Ltd. Barnsley West. Coal Mining Risks Plan. Dwg. 4848-JPG-SW-XX-DR-G-1301-S2-P03. Dated June 2019. Last revision dated February 2021 (Rev. P03)

JPG (Leeds) Ltd. Barnsley West. Conceptual Ground Model - Coal Mining Constraints Cross Sections. Dwg. 4848-JPG-SW-XX-DR-G-1302-S2-P02. Dated June 2019. Last revision dated February 2021 (Rev. P02)

JPG (Leeds) Ltd. Barnsley West. Conceptual Ground Model - Coal Mining Constraints Illustrative Cross Sections. Dwg. 4848-JPG-SW-XX-DR-G-1303-S2-P02. Dated June 2019. Last revision dated February 2021 (Rev. P02)

JPG (Leeds) Ltd. Barnsley West. Conceptual Ground Model - Illustrative Cross Sections A-A', B-B', C-C'. Dwg. 4848-JPG-SW-XX-DR-G-1304-S2-P02. Dated June 2019. Last revision dated February 2021 (Rev. P02)

JPG (Leeds) Ltd. Barnsley West. Conceptual Ground Model - Illustrative Cross Sections D-D'. Dwg. 4848-JPG-SW-XX-DR-G-1305-S2-P02. Dated June 2019. Last revision dated February 2021 (Rev. P02)

JPG (Leeds) Ltd. Barnsley West. Conceptual Ground Model - Illustrative Cross Sections E-E', F-F', G-G'. Dwg. 4848-JPG-SW-XX-DR-G-1306-S2-P02. Dated June 2019. Last revision dated February 2021 (Rev. P02)

JPG (Leeds) Ltd. Barnsley West. Conceptual Ground Model - Coal Mining Risk Level Assessment. Dwg. 4848-JPG-SW-XX-DR-G-1307-S2-P03. Dated July 2019. Last revision dated February 2021 (Rev. P03)

Appendix B Exploratory Hole Logs

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Appendix G Notes on Limitations



CONFIDENTIALITY STATEMENT

This report is addressed to and may be relied upon by the following:

Strata Sterling Barnsley West Limited
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This report has been prepared for the sole use and reliance of the above named parties. This report shall not be relied upon or transferred to any other parties without the express written authorisation of JPG (Leeds) Limited. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party.

DOCUMENT HISTORY

Rev	Date	Revision Details	Status	Author(s)	Approved
P01	July 2019	First Issue	Information	JAM	JBW
P02	May 2021	Second Issue - Updating information and drawings to latest site information and layouts.	Information	JAM	JBW



EXECUTIVE SUMMARY

Site Address	Barnsley West
NGR	Approximate NGR 431800 407100.
Current Site Use & Proposed Development	<p>The site predominantly consists of undulating arable and grazing farmland, which is separated into fields by hedgerows, fences and small watercourses. Hermit Lane, aligned approximately east to west, bisects the site. Hermit House Farm is located to the south of Hermit Lane in the centre-east of the site. Red Brook Farm is located on the north-eastern boundary.</p> <p>Large areas of the site have been historically opencast for coal.</p> <p>It is proposed to develop the site for a mixed end use, comprising residential with a school in the northern two thirds of the site, industrial/commercial land use including a pub/hotel in the southern third and residential in the east (land adjacent to Pogmoor).</p>
Previous Reports & Investigation	A desk study report for the site has been prepared by JPG, which should be read in conjunction with this report. As part of the JPG Desk Study report, a review of a previous report by Eastwood & Partners Consulting Engineers was carried out.
Fieldwork	Fieldwork comprised the drilling of 28 rotary open hole boreholes and the excavation of 14 trial pits. Samples of soil were obtained and submitted for chemical and geotechnical analysis. Gas and groundwater monitoring wells were installed in selected boreholes. The installations have been monitored for gas/groundwater on six occasions. Four extensometers have been installed in selected boreholes within each of the historical opencast coal sites (OCCS). The extensometers have been monitored on seven occasions to date.
Ground and Groundwater Conditions	<p>To summarise the ground conditions, the site has been split into the three proposed development areas:</p> <p>Employment Land (southern Third) – The ground conditions comprise reworked topsoil overlying localised pockets of cohesive made ground, firm medium strength residual soils and extremely weak mudstone of the Pennine Middle Coal Measures Formation, outside of the OCCSs. Cohesive and granular colliery spoil was encountered in the central part of the employment land to depths of between 1.50m bgl (TP109) and 13.00m bgl (BH108).</p> <p>Five rotary open hole boreholes were drilled in the employment land. BH108 proved the base of the OCCS at 13.00m bgl and the base of the Low Haigh Moor coal seam at 23.40m bgl (0.80m thick). BH109A proved the base of the opencast at 11.20m bgl and the base of the Low Haigh Moor coal seam at 18.70m bgl (0.40m thick). Neither borehole encountered any underground coal workings.</p> <p>BH121, BH122 and BH125 were drilled outside the Hunters Cottage OCCS. None of the boreholes encountered underground coal workings.</p> <p>The coal seams encountered in BH121 and BH125 are considered to represent the Gawber, a thin seam, the Swallow Wood, the Top Haigh Moor, the Low Haigh Moor and a thin coal seam.</p> <p>The thick coal seam in BH122 may represent either the Gawber or Top Haigh Moor. The borehole is located near a fault and its thickness does not correspond to the recorded coal seams thicknesses anticipated for either of these coal seams.</p> <p>Residential Land Adjacent to Pogmoor in the East - The ground conditions comprise reworked topsoil overlying localised pockets of cohesive made ground and colliery spoil. The cohesive and granular colliery spoil was encountered to depths of between 2.00m bgl (BH124) and 11.50m bgl (BH113). The underlying natural strata comprised stiff residual soils overlying interbedded mudstone, sandstone and coal seams.</p> <p>10 rotary open hole boreholes were generally drilled to investigate the geometry of the highwalls and depth, thickness and condition of the Barnsley coal seam and also the seams below the Barnsley.</p> <p>The Barnsley coal seam was proven in BH111, BH111A, BH111C and BH124 at depths of 3.80m, 5.70m, 3.50m and 16.50m bgl, with thicknesses of 2.50m, 1.70m, 1.40m and 3.00m, respectively.</p> <p>Coal seams encountered in BH123 may represent an unnamed seam between 16.40m and 17.10m bgl (0.70m thick), the Dunsil coal seam between 21.35m and 22.20m bgl (0.85m thick), the Gawber between 28.00m and 28.40m bgl (0.40m thick) and a thin coal seam between 34.80m and 35.20m bgl (0.40m thick).</p> <p>BH111B encountered the base OCCS at 10.10m bgl. BH111 also proved the unnamed coal seam between 20.30m and 20.60m bgl (0.30m thick) and the Dunsil between 25.10m and 25.40m bgl (0.30m thick) below the base of the OCCS. BH112, BH113, BH113A and BH113B were drilled in the east to investigate the highwall in this location. The base of the Farmhouse Lane OCCS was found to be at 11.40m bgl (BH112) and at 11.50m bgl (BH113).</p> <p>Residential land (remainder of site) – The ground conditions comprise reworked topsoil overlying localised pockets of cohesive made ground (a possible capping layer), cohesive and granular colliery spoil and natural strata consisting of firm to very stiff residual soil and interbedded mudstone, sandstone and coal seams.</p> <p>BH101, BH102, BH103, BH104, BH105, BH105B and BH106 were drilled within the Craven I and II OCCS. The base of Craven I was proven at depths of between 8.20m (BH103) and 13.00m bgl (BH102). The base of Craven II was proven in BH105A and BH106 at 38.00m and 38.50m bgl respectively. BH104 (in Craven II) possibly encountered the highwall at 31.00m bgl.</p> <p>BH107, BH117, BH118, BH119 and BH120 were drilled outside of the Craven I and II OCCS. The encountered coal seams are considered to represent the Gawber, the thin coal seam, the Swallow Wood, the Top Haigh Moor and the Low Haigh Moor. None of these boreholes encountered underground coal workings.</p> <p>Perched shallow groundwater was noted in TP109 and TP110. The majority of rotary open holed boreholes encountered groundwater strikes at depths of between 3.00m bgl and 31.00m bgl.</p>
Geotechnical	Foundations and Ground Floor Construction – Residential Units: It is assumed that houses may be built on natural strata or re-engineered colliery spoil. Where backfilled opencast materials are present, some



and Engineering Assessment

earthworks and/or ground improvement will be required in order to accommodate a reinforced strip foundation with a suspended ground floor. Where foundations are to bear onto natural strata, it is considered likely that shallow foundations could be utilised within the firm to stiff residual soil or the mudstone.

Commercial Units: Commercial units are proposed to be constructed in the southern third of the site, over natural strata and/or re-engineered colliery spoil and/or made ground. Depending on the loading associated with the commercial units, a piled foundation solution may be required for the superstructure over the backfilled OCCS. Alternatively, outside of the opencast areas, it may be possible to use shallow spread foundations within the firm to stiff residual soil or mudstone. Where foundations are to span over the highwall and therefore different materials, precautions will be required to limit potential differential settlement. Some form of ground treatment may be required in order to accommodate ground-bearing floor slabs to achieve typical bearing characteristics of say 25kN/m², based on typical warehouse loading. In addition, future settlement of the treated fill material shall not exceed 25mm.

Earthworks - The colliery spoil, cohesive made ground and natural strata are generally considered suitable for re-use in earthworks. Based on the current site levels, it is proposed to carry out a significant cut and fill exercise to create development platforms on the site.

Once the site has been cut to the desired formation level, typically the top 2.00m of untreated colliery spoil will need to be re-engineered. Where the site formation levels are to be significantly raised, the NHBC or other regulators may require treatment of the fill by either dynamic compaction, greater depth of re-engineered soils or surcharging/preloading. Any earthworks should be carried out in accordance with the Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works, Series 600 Earthworks.

Once final site formation levels have been agreed, it is recommended that a detailed Earthworks Specification is produced prior to commencement of works on the site.

Control of Groundwater - The groundwater monitoring and site investigation have indicated shallow depths to groundwater during the early summer months, especially within the backfilled opencast sites. Control of groundwater and surface water control will be required as part of the earthworks. Significant (fast) inflows into boreholes, BH108, BH109A, BH122 and BH125 suggest that control by pumping from sumps might not be possible in the area around the former Hunters Cottage Opencast site.

Reference should be made to guidance given in the Manual of Contract Documents for Highway Works, with respect to the control of surface water and shallow groundwater.

Settlement - The completion of resoiling, following opencast abstraction, at Craven I, Craven II, Hunters Cottage (including extensions) and Farmhouse Lane was completed between January 1950 (Hunters Cottage) and November 1960 (Farmhouse Lane). If development on the site was to commence in 2020, then between 60 and 70 years will have passed since the most recent backfilling. Consequently, most creep (self-weight) will have already occurred. Based on the time since pumping ceased, it is likely that the water levels within the OCCS will have fully rebounded by now. However, this will need to be confirmed by further groundwater monitoring/assessment.

Extensometer monitoring has been carried out on seven occasions and does not indicate any ongoing downward movement. It is considered that any immediate settlement in relation to the placement of re-engineered fill or for the residential units and commercial units will be accommodated during the earthworks. Consolidation settlement due to the placement of the re-engineered fill may vary from approximately 10mm to 100mm and for the applied loads should be less than 25mm. Based on published literature and ground investigations, it is likely that, depending on the thickness of colliery spoil, future self-weight settlement may vary from approximately 10mm to 30mm. Total predicted settlements across the site may vary between approximately 50mm and 160mm. Total differential settlement for a ground bearing floor slab for a large commercial unit has been calculated as approximately 25mm (1:4,000). Differential settlements for residential units have been assessed as no greater than 1 in 400. However, based on limited data obtained to-date and assumed worst-case soil parameters, differential settlement may be an issue for buildings constructed over the highwalls of the Farmhouse Lane OCCS.

Roads, Pavements and Hardstanding Surfaces - Laboratory CBR values for the cohesive colliery spoil, residual soil and granular colliery spoil are typically >5%. It is recommended that a preliminary design CBR of 3% is adopted for pavement design for the re-engineered colliery spoil, assuming any soft spots at formation level are removed.

Excavations - On completion of the earthworks, excavations through the compacted materials and exposed natural ground are likely to be unstable over the construction period and temporary side support is likely to be required.

Good working practice with respect to drainage of excavations and formations will be required to protect materials. Any excavation for structural foundations must be covered without delay with blinding concrete to prevent softening by water.

Obstructions - It is noted that the colliery spoil materials contain cobbles and boulders. An allowance for excavation and processing of over-sized materials for re-use on site should be made.

Concrete hardstanding is present in the vicinity of the farm buildings. Allowance should be made for the excavation and processing of these materials for re-use in the earthworks. In addition, breakers will be required for excavations in this area.

Chemical Attack on Buried Concrete - It is recommended that concrete should be designed to Aggressive Chemical Environment for Concrete (ACEC) Design Sulphate Class DS-1 and ACEC Class AC-1.

Coal Mining Constraints - Employment Land (southern third): Based on the coal seam depths, seam thicknesses, seam quality and other recorded information, the Gawber, Swallow Wood, Top Haigh Moor and Low Haigh Moor coal seams are all considered to pose a low to moderate risk of unrecorded underground coal workings. No underground coal workings, either outwith or below the base of the OCCS, have been proven to-date. There are no recorded mine entries on the site, although there remains a



	<p>residual risk of unrecorded mine entries.</p> <p>Residential Land Adjacent to Pogmoor to the East: the Barnsley seam was extensively extracted across the area. Due to the fact that the Barnsley coal seam was proven at very shallow depth, it remains a high risk of to the future development on the site where it remains on the western margin and also below the highwall in the east. Underground coal workings are indicated on abandonment plans extending to the east of the OCCS and evidence of mine workings in the form of adits and shafts are noted in the west. Where any structure or highway straddles the highwall in the east, it is likely that drill and grout treatment will be required. The recorded adits and mineshafts in the west will require targeted investigation and possible treatment.</p> <p>Residential Land (remainder of site): As no old workings are indicated on the abandonment plans for either the Craven I or Craven II OCCS, the potential for underground coal workings below the highwalls to these opencast sites is considered to be low. There remains a low to moderate risk elsewhere within this area, namely outside the opencasts and below the Hunters Cottage Extensions. Recorded mine entries (possible shallow coal pits) are indicated in the Hunters Cottage Extensions and proven during subsequent opencasting. It is possible that these old workings targeted the same seams as the opencasts, in which case they will have been removed as part of the opencast extraction. This will require confirmation through trial pitting/trenching and possibly rotary boreholes. A pumping shaft (CA mineshaft ref. 432407-008) is annotated on the Craven II abandonment plan. This mineshaft will need to be located and treated as part of the enabling works for the site.</p>
<p>Environmental Risk Assessment</p>	<p>Based on the identified potential sources of contamination and available pathways and receptors, the following linkage assessments have been considered. This assessment is based on current site conditions and does not consider exposure pathways following any remediation of the site.</p> <p>Sources – The following potential sources of contamination are considered to be present on the site:</p> <ul style="list-style-type: none"> • Potentially combustible cohesive made ground. • Hazardous ground gas. <p>Mitigation Measures – In order to mitigate the risk posed by the potential contaminants which are present on the site, consideration should be given to the following mitigation measures.</p> <p>Development and Maintenance Workers</p> <ul style="list-style-type: none"> • Site workers involved in groundworks should take the necessary measures to ensure that all works in excavations and confined spaces are carried out in accordance with best practice in order to prevent exposure to potentially hazardous gases. • Site workers involved in groundworks should use appropriate PPE, i.e. overalls and gloves. Appropriate health and safety measures, e.g. washing hands prior to eating or drinking, should also be enforced. • During development of the site, all workers should remain vigilant to the possible risk of encountering areas of potentially contaminated material. Should potentially contaminated material be encountered, site management should be informed. Further testing may then be required to assess the risk to health and safety of the site workers and the environment. • All employers involved in works at the site should produce an appropriate method statement and risk assessment, to which all employees should comply, e.g. working in confined spaces. Reference should also be made to the appropriate HSE and other guidance for working on contaminated and potentially contaminated sites. <p>Future Site Users</p> <ul style="list-style-type: none"> • No made ground soils with elevated calorific value (>2MJ/kg) shall remain within 1.00m of finished ground level in any gardens or soft landscaping. • It is recommended that a sufficient thickness of clean cover soils is placed in future landscaped areas. • Any imported or site-sourced material will need to be tested to confirm its suitability for use. In addition, any topsoil and subsoil which is to be used on site should not contain any manmade debris. <p>Classification of Materials for Disposal Off-Site – 21 samples (12 of topsoil, two of the capping layers, six of the colliery spoils and one of made ground) were classified as Non-Hazardous using HazWasteOnline™. The laboratory certificates and assessment should be forwarded to the landfill operator to confirm this classification and provide a price for disposal should soils be removed from site.</p>
<p>Hazardous Gas</p>	<p>Ground Gas Risk – Based on the gas results, in accordance with BS8485:2015, the site is classified as Characteristic Situation (CS) 2 due to concentrations of carbon dioxide of >5% v/v. It should be noted that this is a preliminary classification only; further ground gas assessment is required to confirm the ground gas regime. It may be possible for a lower classification to be applied outwith the OCCSs.</p> <p>Radon Risk –No radon protective measures are required.</p>
<p>Further Work Required</p>	<p>It is recommended that further ground investigation is carried out. The recommended scope of works is set out below.</p> <ul style="list-style-type: none"> • Rotary boreholes to target areas of uncertainty regarding unrecorded underground coal mine workings. • Targeted mine entry investigation regarding recorded mine entries on the site. • Delineation of the opencast highwalls using geophysics, rotary open hole probing and trial trenching. • Trial pits across the site in order to obtain more samples to submit for geotechnical and chemical testing. • Cable percussion boreholes with in-situ testing, to provide further geotechnical parameters and to obtain undisturbed geotechnical samples. Gas and groundwater monitoring wells to be installed in selected boreholes. • Quarterly monitoring of extensometers to be continued as long as possible to inform creep settlement assessment. • Static cone penetration testing to assess the in-situ geotechnical parameters. • Slope stability assessment of the existing slopes, especially those which will be subject to cut and fill,



	<p>potentially exposing slip surfaces, or surcharging of unstable slopes.</p> <ul style="list-style-type: none"> • Further chemical analysis of soil and water samples in order to determine the concentrations of potential contamination on the site and classify selected materials for disposal offsite. • Further geotechnical & chemical testing to classify materials and inform foundation design. • Further gas monitoring of monitoring installations will be required. • Further assessment of the groundwater regime below the site, to include groundwater contours. • Embankment testing is recommended to assess the effects of raising ground levels in areas of fill and also the effectiveness of surcharging in relation to future settlement.
<p style="text-align: center;">This sheet is intended as a summary only of the assessment of the site in relation to ground condition. It does not provide a definitive engineering analysis.</p>	



1.0 INTRODUCTION

1.1 Instruction

JPG (Leeds) Limited has been instructed by Strata Sterling Barnsley West Ltd to carry out a preliminary geoenvironmental ground investigation for a proposed mixed-use development (commercial and residential) at Barnsley West.

1.2 Objectives

The objective of the preliminary geotechnical ground investigation was to identify potential geotechnical and environmental issues that may represent constraints to the proposed development of the site.

1.3 Scope of Works

The scope of the investigation was set out in proposals during July 2018 and included the following works:

- Rotary open hole boreholes within the backfilled opencasts in order to confirm the depth to competent bedrock.
- Rotary open hole boreholes drilled outside the boundaries of the opencasts to investigate the extent of any possible shallow underground workings.
- Trial pitting across the site, primarily in areas of proposed cut, in order to obtain samples for geotechnical and chemical testing, to assess the shallow ground conditions at the site and to confirm the composition, extent, depth and nature of any made ground and the underlying natural strata.
- Installation and monitoring of extensometers within each backfilled opencast. Monitoring to be carried out quarterly over a two-year period.
- Geotechnical testing of soil samples.
- Groundwater and gas monitoring of standpipes installed in boreholes.
- A qualitative (Tier 1) screening assessment using source-pathway-receptor linkages.
- Assessment of the classification of materials for disposal off-site.
- An assessment of the suitability of the natural strata for re-use in earthworks.
- Preliminary engineering assessment to include recommendations with respect to earthworks and potential foundations, ground floor and pavement design.
- Comments on the likely requirements for any remedial measures which may be required, to address potential contamination or ground gas issues.
- Recommendations for further work.



1.4 Location

The site is located approximately 3km to the west of Barnsley town centre. The approximate centre of the site is located at NGR 431800 407100.

The site is located between Higham and Gawber, with the M1 motorway located to the west and south of the site. The A635 Barugh Green Road is located to the north of the site.

1.5 Site Description and Topography

The site is irregular in shape and covers an overall area of approximately 116ha, measuring approximately 1.85km along its northwest – south east axis and 1.20km along its east – west axis.

The highest point of the site (approximately 150m AOD) is located in the south, adjacent to the M1 motorway. Ground levels generally fall to the north to approximately 80m AOD.

The site predominantly consists of undulating arable and grazing farmland, which is separated into fields by hedgerows, fences and small watercourses. Hermit Lane, aligned approximately east to west, bisects the site.

A steep sided valley with a watercourse at its base extends from the south-western boundary and trends towards Hermit Lane to the north. Another steep sided valley, with an associated watercourse, trends from the central-eastern half of the site to Redbrook Farm, north of Hermit Lane.

A raised plateau of arable farmland is present adjacent to the residential suburb of Pogmoor in the eastern extent of the site. To the west of this plateau, the topography falls steeply forming the valley in the centre-east. Evidence of local landslide instability is noted in the central-eastern portion of the site, south of Hermit Lane, to the east of Hermit House Farm and alongside the steep sided valley.

The gradient of Hermit Lane undulates from west to east, with a steep gradient from the western boundary down into the valley bottom before rising steeply towards Hermit House Farm and again upwards to Gawber/Pogmoor to the east. The two watercourses within the two steep valleys are culverted below Hermit Lane and continue as streams and ponds to the north of Hermit Lane. The stream in the central part of the site is culverted in parts and joins the eastern stream close to Redbrook Farm. Both valleys are heavily wooded and overgrown to the north of Hermit Lane.

Adjacent to the culvert and a sharp bend in Hermit Lane, to the east of Hermit House Farm, an intact coal seam was noted within the watercourse.

Hermit House Farm is located to the south of Hermit Lane in the centre-east of the site. It consists of two single storey residential properties, several agricultural buildings and associated hard standing. The farm buildings are typically constructed with concrete blocks, timber and roofing of possible asbestos cement sheeting.



Redbrook farm is located adjacent to the north-eastern boundary, with access gained from Redbrook Road. The farm is made up of a large dilapidated agricultural barn, containing livestock, several outbuildings, and a large silo.

The northern site boundary is formed by Barugh Green Road and, in part, adjacent grazing farmland, beyond which lies the Metro Trading Centre and Claycliffe Business Park. Redbrook Plantation and residential properties (Gawber and Pogmoor) are present beyond the eastern boundary. Residential properties (Hunters Farm and Cottages) are located adjacent to the southern tip of the site. The south-western boundary is formed by the M1 motorway, beyond which lies further farms and woodland. The residential areas of Higham and Barugh Green are located to the west and northwest, respectively.

At the time of the site investigation the fields were locally very muddy due to farm animals and weather. Localised fly tipping (including tyres and household waste) was noticed within the wooded area in the centre of the site, immediately to the north of Hermit Lane.

1.6 Development Proposals

It is proposed to develop the site for a mixed end use, comprising residential with school in the northern two thirds of the site, industrial/commercial land use including a pub/hotel in the southern third and residential in the east (land adjacent to Pogmoor). The development also includes balancing ponds (SUDS) in the east and associated road network.

A drawing of the proposed commercial development has been provided, which is referenced below, and a copy is containing in Appendix A.

- Bond Bryan. Barnsley West Masterplan. Proposed Site Plan. Drawing No: BWM-BBA-ZZ-XX-DR-A-1004-S2-P05, dated May 2021 for Strata Sterling Barnsley West Limited.

1.7 Previous Reports

A desk study report for the site has been prepared by JPG, which is referenced below:

- JPG (Leeds) Limited. Geoenvironmental Desk Study Report. Barnsley West. Report Ref. JBW/DS/4848.v3. Dated July 2019 for Strata Sterling Barnsley West Ltd.

The desk study report includes a summary of potential geotechnical and environmental issues and should be read in conjunction with this report.



As part of the JPG Desk Study report, a review of the following Eastwood & Partners Consulting Engineers report was carried out. This report is referenced below:

- Eastwood and Partners Consulting Engineers. Geotechnical and Geo-Environmental Site Appraisal Commentary. Barnsley West. Report Ref. 36284. Dated 4 October 2013 for Strata.

1.8 Limitations

The general limitations to the nature of the investigation are outlined in Appendix G.



2.0 FIELDWORK

The intrusive investigation was designed to provide a preliminary assessment of the properties of the opencast backfill, potential underground coal workings below highwalls and elsewhere on the site, and the general ground, groundwater and hazardous gas conditions at the site.

The exploratory holes targeted the historical opencast coal sites (OCCSs), the areas outside the opencast highwalls, the proposed cut areas and two former infilled ponds.

The rationale behind each exploratory location is summarised in Table 2.0 below.

Table 2.0 – Exploratory Hole Rationale

Potential Issue	Exploratory Holes
Information on historical OCCSs, including depth to competent bedrock/base of the opencast.	BH101 – BH109A and BH111 – BH113B
Combined gas/groundwater monitoring wells were installed in selected boreholes.	BH101, BH102, BH105A, BH106, BH109, BH111C and BH112
Information on potential underground coal workings	BH107 and BH117 – BH125
Information on shallow ground conditions in OCCSs, proposed cut areas and two former ponds	TP101 – TP106, TP108 – TP113 and TP115
Extensometers were installed in selected boreholes.	BH103, BH104, BH109, BH113

TP107 and TP114 were not carried out due to access constraints. BH110, BH114, BH115 and BH116 were not carried out due to restrictions on site due to ongoing farming activities, steeply sloping ground and very wet ground conditions at the time of the intrusive investigation. In addition, it was not possible to access land in the southern-most part of the site due to landownership issues, which were not known to JPG ahead of the fieldwork.

2.1 Fieldwork

The fieldwork was carried out on over two time periods: from 11 March to 8 April 2019 and on the 16 May 2019. The works undertaken are summarised in Table 2.1 below.

Table 2.1 – Summary of Ground Investigation Works

Investigation Method	No of Positions	Maximum Depth (m bgl)	Monitoring Wells	Monitoring
Trial Pits.	14	5	-	-
Rotary Open Hole Boreholes.	28	8.35	7 x 50 mm. 4 x Ext	GG, WL. Set

bgl – below ground level

Ext – Extensometers

Set – Settlement within the OCCSs

GG – ground gas monitoring (methane, carbon dioxide, oxygen, hydrogen sulphide, gas flow and atmospheric pressure using a portable gas meter).

WL – standing groundwater level using an electric contact dip meter.



The ground investigation has been undertaken in general accordance with the techniques outlined in BS5930:2015 Code of Practice for Site Investigations. An exploratory hole location plan is contained in Appendix A and exploratory hole records are presented in Appendix B. The investigation was carried out under the full-time supervision of an engineer from JPG.

In situ standard penetration tests (SPTs) were performed within the rotary boreholes. The results are included on the exploratory hole logs provided in Appendix B.

2.2 Surveying

The exploratory locations were set out using a hand-held GPS unit. As-built locations were surveyed using a Leica GPS unit.



3.0 LABORATORY TESTING

3.1 Chemical Analysis

Samples obtained from the site were submitted for chemical analysis. The chemical analysis was designed to:

- Confirm that the existing topsoil is suitable for re-use on the site, i.e. within public open space (POS), soft landscaping or future gardens.
- Assess the concentrations of contaminants within any made ground on the site, including the colliery spoil.
- Provide information on the solubility of contaminants and therefore the potential for impact on controlled waters.

In addition, selected samples of made ground and near surface natural soils were submitted for analysis for classification for disposal off-site.

It should be noted that the sampling and testing carried out to-date is only a preliminary screening to provide an initial assessment and that no targeted sampling and testing, e.g. around the existing farm buildings, tanks, in the vicinity of the fly-tipped materials, has taken place.

Chemical testing was carried out for the following determinands by Derwentside Environmental Testing Services Limited (DETS) in County Durham. Chemical analysis certificates are presented in Appendix C.

Soils – General

Selected samples of soil were tested for the following contaminants on a total concentration basis:

Arsenic	Mercury	Copper
Cadmium	Lead	Nickel
Chromium	Zinc	Selenium
Cyanide (free)	Phenol	
Speciated Poly Aromatic Hydrocarbons (PAH)		
Soil Organic Matter		
Sulphate (water soluble) and pH		
Asbestos Screen		

In addition, selected samples were submitted for the following analysis:

- Hexavalent chromium, total chloride, total sulphate, total sulphide and ammoniacal nitrogen.
- Organochlorine pesticides, organophosphorus pesticides and triazine Herbicides.



Samples of soil leachate were tested for the following contaminants:

Arsenic	Mercury	Copper
Cadmium	Lead	Nickel
Chromium	Zinc	Selenium
Cyanide (free)	Phenol	
Speciated Poly Aromatic Hydrocarbons (PAH)		
Sulphate and pH		

In addition, calorific value (CV) testing was carried out on samples of the colliery spoil in order to assess the potential for combustion.

3.2 Geotechnical Testing

In situ standard penetration tests (SPT) were performed within the rotary boreholes. The results are presented on the exploratory hole records provided in Appendix B.

Laboratory geotechnical testing was carried out by Professional Soils Laboratory in Doncaster, in order to determine the physical characteristics of the substrata and comprised the following:

- Moisture content, Atterberg limits and particle size distributions (PSDs)/sedimentations to confirm the field descriptions of the soils encountered.
- Compaction tests (2.5kg and 4.5kg rammer) and particle density to determine the compaction properties of the soils.
- California Bearing Ratio (CBR) test (2.5kg and 4.5kg rammer, 28 day soaked) to determine the bearing characteristics of the proposed fill material.
- Moisture Condition Value 5 and 1 point.
- pH, 2:1 water soluble sulphate, acid soluble sulphate and total sulphur.
- Organic content.

The geotechnical testing was carried out in accordance with BS 1377:1990, "Methods of Test for Soils for Civil Engineering Purposes". The results of the geotechnical testing are contained in Appendix D.



4.0 GROUND AND GROUNDWATER CONDITIONS

4.1 Introduction

The ground conditions encountered during the investigation were consistent with the anticipated sequence of strata indicated by the desk study information and previous report.

4.2 Ground Conditions

The published information indicates that majority of the site is underlain by large areas of infilled ground associated with historical opencast coal sites (OCCSs).

Landslip deposits are indicated in two localised areas in the centre-east of the site. It is likely that the landslips are the result of the very steep valley sides in this location and possibly groundwater and/or surface water flow.

No superficial deposits are recorded on the site.

The bedrock geology predominantly comprises Pennine Middle Coal Measures strata of mudstone, siltstone, sandstone and coal seams. The Haigh Moor Rock, comprising sandstone, is shown in the northwest corner and central-eastern part of the site.

A fault, trending north east – south west with downthrown strata on the north-western side, is shown below the northwest of the site. Sandstone of the Haigh Moor Rock is shown to encroach onto the site on the downthrown side of this fault. A further four faults, generally trending north west – south east, are shown in the centre and south of the site.

The following coal seams are recorded to outcrop on the site or are anticipated to be present at shallow depth (<30m) below the site (youngest to oldest):

- Barnsley (recorded thickness = 2.29m to 3.10m).
- Thin coal/unnamed.
- Dunsil Coal (recorded thickness = 0.46m to 0.81m).
- Thin coal/unnamed.
- Gawber Coal (recorded thickness = 0.72m to 0.76m).
- Thin coal (recorded thickness = 0.38m).
- Swallow Wood Coal (recorded thickness = 0.30m to 1.15m).
- Top Haigh Moor (recorded thickness = 0.69m to 1.19m).
- Low Haigh Moor (recorded thickness = 0.43m to 1.02m).



The ground conditions across the whole site were found to comprise a general covering of reworked topsoil over locally made ground and/or colliery spoil, overlying natural strata comprising residual soils, extremely weak mudstone, sandstone and coal seams of the Pennine Middle Coal Measures.

The site has been split into the three proposed development areas for the purpose of summarising the ground conditions:

- Employment land (southern third).
- Residential land adjacent to Pogmoor in the east, and
- Residential land (remainder of site).

Employment Land (Southern Third)

Reworked topsoil, generally comprising soft to stiff dark brown, slightly sandy, slightly gravelly clay with rootlets was encountered to depths of between 0.10m bgl (TP108) and 0.50m bgl (BH122).

Localised pockets of made ground generally comprised:

- **Cohesive Made Ground:** Soft to stiff, light orangish brown, occasionally greyish brown, slightly gravelly, sandy clay with occasional cobbles and boulders of mudstone, siltstone, sandstone and rare brick.

Locally made ground was encountered beneath the reworked topsoil outside the OCCS. The made ground was encountered to depths of between 0.50m bgl (BH121) and 2.80m bgl (TP108), both located adjacent to the western boundary with Higham Lane. Possible reworked natural ground was also identified in TP110 to the east of the Hunters Cottage OCCS. This possible reworked ground comprised stiff, dark orangish brown and dark grey, slightly sandy, gravelly clay, and was encountered beneath colliery spoil. The cohesive made ground deposits are typically associated with reworked natural soils with some manmade debris. The made ground encountered in TP108 could potentially be associated with the construction of the M1 motorway to the south and the possible excess arisings.

Colliery spoil was encountered in the central part of the employment land corresponding to the Hunters Cottage OCCS. The colliery spoil typically comprised:

- **Cohesive Colliery Spoil:** Soft to firm, dark greyish brown, slightly sandy, gravelly clay with cobbles and boulders of mudstone and sandstone, or
- **Granular Colliery Spoil:** Dark brownish grey, slightly clayey, sandy gravel with cobbles and boulders of sandstone and mudstone.

The colliery spoil was generally encountered beneath the reworked topsoil or localised areas of made ground. The colliery spoil was encountered to depths of between 1.50m bgl (TP109 – to the north of the Hunters Cottage OCCS) and 13.00m bgl (BH108 – within the Hunters Cottage OCCS).



Underlying the made ground and/or the colliery spoil, natural strata consisting of firm, medium strength, thinly laminated, light grey and orangish brown, slightly sandy, slightly gravelly clay. This stratum is considered representative of residual soils of the Pennine Middle Coal Measures Formation. The residual soils were encountered to depths of between 1.10m bgl (BH122) and 3.40m bgl (TP108), both beyond the highwalls of the Hunters Cottage OCCS.

Bedrock was found to comprise extremely weak, thinly laminated, light grey occasionally brown, destructured mudstone (TP109), overlying stronger interbedded mudstone, sandstone, and coal seams of the Pennine Middle Coal Measures Formation.

Five rotary open hole boreholes were drilled within the proposed employment land area as part of the ground investigation.

BH108 and BH109A were carried out within Hunters Cottage OCCS, in which the Top Haigh Moor was the deepest coal seam extracted by opencast techniques; these boreholes were extended below the base of the opencast to establish the rock cover over the underlying coal seam (Low Haigh Moor). BH108 proved the base of the OCCS at 13.00m bgl and the base of the Low Haigh Moor coal seam at 23.40m bgl (0.80m thick). BH109A proved the base of the opencast at 11.20m bgl and the base of the Low Haigh Moor coal seam at 18.70m bgl (0.40m thick). Neither borehole encountered any underground coal workings. In both boreholes there is sufficient rock cover over the Low Haigh Moor coal seam so that if coal workings were present, they would not affect the surface stability of the site. It should be noted that access could not be gained to the southern part of the backfilled OCCS adjacent to the south-western boundary.

BH121, BH122 and BH125 were drilled outside the Hunters Cottage OCCS. None of the boreholes encountered underground coal workings.

BH121, drilled close to the western boundary of the proposed employment land, encountered coal seams between 6.30m and 8.00m (1.70m thick), between 14.60m and 15.00m bgl (0.40m thick), between 16.00m and 16.50m bgl, and between 29.20m and 29.50m bgl (0.30m thick). These coal seams have been interpreted as the Top Haigh Moor, the Low Haigh Moor (present as two leaves) and a thin coal seam. Based on the depths and thicknesses of the coal seams if underground coal workings were present in the Top Haigh Moor, remedial action would be required. In addition, if both leaves of the Low Haigh Moor coal seam have been worked, remedial action would be required.

BH122 was drilled close to the northern boundary of the employment land. A very thin coal seam (0.10m thick) was encountered at 8.10m bgl. A thick bed of coal was encountered between 15.40m and 17.70m bgl (2.30m). The latter coal seam may represent either the Gawber or Top Haigh Moor. The borehole is located near a fault and its thickness does not correspond to the recorded coal seams thicknesses anticipated for either of these coal seams.



BH125 was drilled close to the eastern boundary of the employment land. Coal seams were encountered between 3.30m and 4.30m bgl (1.00m thick), between 15.50m and 15.80m bgl (0.30m thick), between 23.90m and 24.00m bgl (0.10m thick), between 25.10m and 25.50m bgl (0.40m thick) and between 36.60m and 36.90m bgl (0.30m thick). The coal seams are considered to represent the Gawber, a thin seam, the Swallow Wood (two leaves) and the Top Haigh Moor. Only the Gawber coal seam poses a potential risk to the surface stability of the site, based on coal seam thickness and depth at this location.

Residential Land Adjacent to Pogmoor in the East

The reworked topsoil was generally found to comprise soft to firm, dark brown, slightly sandy, slightly gravelly clay, between 0.20m and 0.30m thick.

Locally made ground was generally encountered beneath the reworked topsoil. The made ground was encountered to a maximum depth of 1.05m bgl (in TP111 – to the south of the Farmhouse Lane OCCS). Reworked brown sandy clay was also encountered in BH123 (to the west of the Farmhouse Lane OCCS) to 2.60m bgl. The made ground generally comprised:

- **Cohesive Made Ground:** Firm to stiff, light orangish brown and grey slightly sandy gravelly clay with occasional cobbles of brick and sandstone.

Colliery spoil was generally encountered beneath the reworked topsoil or localised areas of made ground. The colliery spoil was encountered to depths of between 2.00m bgl (in BH124 – beyond the eastern highwall of the Farmhouse Lane OCCS) and 11.50m bgl (in BH113 – in the east of the Farmhouse Lane OCCS). Red burnt ash and red sandstone fill was noted within the colliery spoil to a depth of 11.40m bgl in BH112. The colliery spoil generally comprised:

- **Cohesive Colliery Spoil:** Firm to stiff, dark brown and grey, slightly sandy, gravelly clay with cobbles and boulders of sandstone, mudstone and siltstone and occasional pockets of dark brown, clayey, sandy gravel.
- **Granular Colliery Spoil:** Dark brownish grey, slightly clayey, sandy gravel with cobbles and boulders of sandstone, mudstone, siltstone, brick and rare slag. Metal, glass and plastic fragments were noted within this material.

Beneath the reworked topsoil, localised made ground and colliery spoil, natural strata comprising stiff brown clay was (BH111), overlying interbedded mudstone, sandstone and coal seams was proven to a maximum depth of 36.00m bgl (BH123). These strata are considered representative of the Pennine Middle Coal Measures.

10 rotary open hole boreholes were drilled within the proposed residential land adjacent to Pogmoor as part of the ground investigation. The boreholes were generally drilled to investigate the geometry of the highwalls and depth, thickness and condition of the Barnsley coal seam and also the seams below the Barnsley within potential influencing depth.



BH111, BH111A and BH111B investigated the highwall in the west. The Barnsley coal seam was proven in BH111 and BH111A at depths of 3.80m and 5.70m bgl, with thicknesses of 2.50m and 1.70m, respectively. BH111B was drilled to the east of the highwall and encountered the base of the Farmhouse Lane OCCS at 10.10m bgl. BH123 was drilled to the west of the highwall and outcrop of the Barnsley coal seam and confirmed the presence of an unnamed coal seam between 16.40m and 17.10m bgl (0.70m thick), the Dunsil coal seam between 21.35m and 22.20m bgl (0.85m thick), the Gawber between 28.00m and 28.40m bgl (0.40m thick) and a thin coal seam between 34.80m and 35.20m bgl (0.40m thick). BH111 also proved the unnamed coal seam between 20.30m and 20.60m bgl (0.30m thick) and the Dunsil between 25.10m and 25.40m bgl (0.30m thick) below the base of the OCCS.

BH111C, located adjacent to the northern boundary, encountered coal, described as shale by the driller between 3.50m and 4.90m bgl (1.40m thick). This coal seam is likely to be representative of the Barnsley, although it is likely to be of poor quality based on the driller's description hence why it was not removed.

BH112, BH113, BH113A, BH113B and BH124 were drilled in the east to investigate the highwall in this location. The base of the Farmhouse Lane OCCS was found to be 11.40m bgl in BH112 and 11.50m bgl in BH113. The Barnsley coal seam was proven in BH124 between 16.50m and 19.50m (3.00m thick). BH113 and BH113A were drilled to delineate the highwall. The boreholes confirmed the highwall location as indicated on abandonment plans.

Residential Land (Remainder of Site)

Reworked topsoil, generally comprising soft to firm, dark brown, slightly gravelly, silty clay with rootlets and brick gravels, was found to be typically 0.20m to 0.25m thick and locally between 0.40m (TP113, TP106 & TP107) and 0.50m (TP105) thick.

Localised made ground was encountered beneath the reworked topsoil within the areas of Craven I and II OCCS. Made ground generally comprised:

- **Cohesive Made Ground:** Firm, light orangish brown and grey, occasionally slightly sandy, slightly gravelly, silty clay with rootlets and occasional cobbles of brick.

The made ground was generally encountered below the reworked topsoil to depths of between 0.50m bgl (TP101) and 1.00m bgl (TP113). Possible reworked natural ground was encountered in TP103, near the western boundary, between 0.25m and 0.70m bgl and in TP102A in the central northern half of the site between 2.75m bgl and 3.60m bgl. The possible reworked ground comprised soft to firm, dark orangish brown and grey, slightly gravelly, sandy clay and stiff light orangish brown mottled grey, slightly gravelly, silty clay. This reworked ground is considered to be representative of a possible capping layer placed over the colliery spoil.

Colliery spoil was encountered across the majority of this part of the site. Colliery spoil typically comprised:

- **Cohesive Colliery Spoil:** Firm to stiff, light grey and brown, slight sandy, gravelly clay with occasional pieces of timber and cobbles and boulders of sandstone, mudstone and siltstone.



- **Granular Colliery Spoil:** Dark brownish grey, clayey, sandy gravel with cobbles of mudstone, siltstone and sandstone.

Colliery spoil was encountered beneath the reworked topsoil and the reworked natural strata (capping layer), where present, to proven depths of between 8.20m bgl (BH103) and 13.00m bgl (BH102) in Craven I and to depths of between 31.00m bgl (BH104) and 38.50m bgl (BH106) in Craven II.

TP113, excavated within the footprint of a former pond encountered reworked topsoil to 0.40m bgl, overlying cohesive made ground to 1.00m bgl, at which depth colliery spoil was encountered.

Underlying the made ground including colliery spoil, natural strata comprising firm to very stiff, high strength, light grey and brown, occasionally slightly sandy, slightly gravelly, silty clay was encountered. This stratum is considered representative of a residual soil of the Penning Middle Coal Measures Formation. The residual soils were encountered to depths of between 2.00m bgl (TP103 and BH107) and 3.75m bgl (TP102A).

Bedrock comprised extremely weak, thinly laminated, light grey, destructured mudstone (TP103), overlying interbedded mudstone, sandstone and coal seams of the Pennine Middle Coal Measures Formation.

BH101, BH102 and BH103 were drilled within the Craven I OCCS. The base of the OCCS was proven at depths of between 8.20m (BH103) and 13.00m bgl (BH102).

BH117 was drilled in the faulted zone within the Craven I OCCS. The Top Haigh Moor coal seam was encountered between 17.50m and 18.80m bgl (1.30m thick) and the Low Haigh Moor coal seam was encountered between 25.80m and 26.30m bgl (0.50m thick). Based on these depths and thicknesses the Top Haigh Moor coal seam and the Low Haigh Moor coal seam do not pose any risk to the surface stability of the site at this location.

BH118 was drilled between the Craven I and Craven II OCCSs. The borehole proved the Swallow Wood coal seam at 7.20m bgl (0.60m thick). Assuming residual soils extend to 2.00m bgl, there is insufficient competent rock cover over this seam. However, as no previous underground workings were encountered in either the Craven I and Craven II OCCSs, it is unlikely the seam has been worked in this location.

BH104, BH105, BH105B and BH106 were drilled within the Craven II OCCS. The base of the OCCS was proven in BH105A and BH106 at 38.00m and 38.50m bgl respectively. BH104 possibly encountered the highwall at 31.00m bgl.

BH119 was drilled to the north east of the Craven II OCCS. The Gawber coal seam was encountered as two leaves, between 6.00m and 6.30m bgl and 6.80m and 6.90m bgl. Again, as there were no former underground coal workings proven in the Craven II OCCS, it is unlikely the seam has been worked in this location.



BH120 and BH107 were drilled to the south east of the Craven II OCCS. BH120 (to the north of Hermit Lane) encountered coal seams between 11.70m and 12.20m bgl and between 14.00m and 14.15m bgl (considered to be two leaves of the Swallow Wood), and between 22.30m and 23.90m bgl, interpreted to be the Top Haigh Moor, and also from 31.40m to 32.40m bgl, interpreted to be the Low Haigh Moor.

BH107 encountered the Gawber coal seam as two leaves between 8.60m and 8.90m bgl and between 9.40m and 9.60m bgl, the thin coal seam from 18.50m to 19.30m bgl and the Swallow Wood as two leaves between 26.20m to 27.30m bgl and between 30.80m and 31.00m bgl.

Site Wide - Coal Seam Interpretation

Intact coal seams were encountered beyond the extent of the opencasts and beneath the base of Hunters Cottage and Farmhouse Lane OCCS. The proven coal seams are considered representative of the anticipated coal seam succession. No underground coal workings were proven as part of this preliminary ground investigation.

The majority of the intact coal seams proven as part of this preliminary investigation indicate thicknesses similar to those recorded on the BGS 1:10,000 scale geological map, the abandonment plans and those stated within the South Yorkshire Mining Advisory Service (SYMAS) report.

The site-wide coal seam information is summarised in Table 4.2.1 below.

**Table 4.2.1: Coal Seam Succession and Relevant Information**

Coal Seam (Youngest to Oldest)	BGS Thicknesses (m)	Recorded Thickness (m) (Abandonment Plans)	Proven Thickness (m) (JPG SI - 2019)	Proven Depth Range (m) (JPG SI - 2019)	Maximum Proven Seam Thickness (m)	Average Seam thickness according to SYMAS (m)	Coal Seam Thickness used on models (m)	
Barnsley	2.29 - 3.10	2.84	1.40 - 3.00	3.50 – 16.50	3.10	3.00	3.00	
Thin coal/unnamed	N/A	N/A	0.30 - 0.70	16.40 – 20.30	0.70	<0.40	0.70	
Dunsil Coal	0.46 - 0.81	N/A	0.30 - 0.85	21.35 – 25.10	0.85	0.60	0.85	
Thin coal/unnamed	N/A	N/A	N/A	N/A	N/A	<0.40	N/A	
Gawber Coal	0.72 - 0.76	0.76 - 0.90	0.4 – 1.00	3.30 – 28.00	1.00	0.70	1.00	
Thin coal	0.38	0.34 - 0.38	0.30 - 0.80	15.50 – 34.80	0.80	<0.40	0.80	
Swallow Wood Coal	0.30 - 1.15	0.36 - 0.91	0.50 - 1.60*	7.20 – 26.20	1.60*	0.90	1.60	
Top Haigh Moor	0.69 - 1.19	0.91 - 1.12	0.30 – 1.70	6.30 – 36.60	1.70	1.10	1.70	
Low Haigh Moor	0.43 - 1.02	0.89	0.40 - 1.90*	14.60 – 31.40	1.90*	0.80	Craven I	Rest of Site
							0.60	1.90
Lidgett	0.30 – 1.52	NR	-	-	-	-	1.52	

N/A: Not applicable – seam not encountered

* - Including partings and 2nd leaf

Based on the information in table 4.2.1, a series of conceptual ground models, including a coal mining constraints plan, and illustrative geological cross sections have been produced. The proven coal seams vary in thickness across the site. Therefore, for the basis of the models, the maximum proven thickness was generally applied to the site for a preliminary assessment unless the coal seam was confirmed to be thinner. A thickness of 1.70m was applied to the Top Haigh Moor as the maximum proven thickness of 2.30m is considered the result of faulting. A maximum proven thickness of 0.60m was proven adjacent to the Craven I OCCS for the Low Haigh Moor coal seam and this thickness has been applied to the coal mining risk plan and cross sections A-A' and D-D' (see appendix A) for the area around Craven I. Further investigation is required to delineate areas where underground coal workings may be present. Areas where further investigation is required are indicated on JPG Drawing No. 4848-JPG-SW-XX-DR-G-1307.



4.3 In Situ Testing

The results of the Standard Penetration Tests (SPTs) in the colliery spoil, which were carried out in the rotary boreholes, have been plotted against depth. The results have been corrected in accordance with the energy ratio of the testing equipment. The plots are presented as Figure 2 in Appendix A and the SPT data (uncorrected) is included on the exploratory hole logs contained in Appendix B.

The uncorrected SPT data taken from Eastwood and Partners Consulting Engineers site investigation logs has been included as part of the plot presented as Figure 2 in Appendix A.

The SPT data shows a spread of N-values which indicate the colliery spoil has medium dense to dense/ medium to high strength conditions. The SPT N-values tend to increase with depth. However, there is no obvious increase of density/strength with depth probably due to the presence of cobbles and boulders within the colliery spoil.

4.4 Laboratory Testing

Six samples of natural ground (Pennine Middle Coal Measures Formation), three samples of made ground (reworked natural) and 29 samples of colliery spoil were submitted for laboratory testing.

The testing suite was designed to classify the materials and assess the suitability of the materials for re-use in earthworks.

18 samples were submitted for moisture content testing and 12 samples were also submitted for Atterberg Limit testing. The results are summarised in Table 4.4.1 below.

Table 4.4.1 – Summary of Moisture Content and Atterberg Limit Testing

Material	Moisture Content (%)		Atterberg Limits Modified Plasticity Index (%)	
	No of samples	Range	No of samples	Range
Cohesive made ground: Reworked natural	3	11 to 14	2	15.04 to 16.15
Cohesive residual soil – Pennine Middle Coal Measures	2	17 - 18	1	24.75
Extremely weak mudstone – Pennine Middle Coal Measures	1	15	-	-
Cohesive Colliery Spoil	11	9.2 to 19	9	9.90 to 22.54
Granular Colliery Spoil	1	18	-	-

Typical moisture contents in the cohesive made ground ranged between 11% and 14%. Typical moisture contents in the natural ground ranged between 15% and 18%. The typical moisture content for the colliery spoil (cohesive and granular) ranged between 9.2% and 19%. A plot of Moisture Content versus Depth (m bgl) is presented as Figure 4 in Appendix A.

Typical Atterberg Limit tests in the cohesive made ground and cohesive colliery spoil gave modified plasticity indices which ranged between 15.04% to 16.15% and 9.90% to 22.54% respectively. The sample of residual soil gave a modified plasticity index of 24.75%.



The results of the Atterberg limits tests in the residual soil, cohesive made ground and cohesive colliery spoil indicate the materials to be of low to intermediate plasticity with a low to medium volume change potential.

Particle size distribution/sedimentation testing was carried out on six samples in order to confirm the field descriptions of the materials and determine the proportion of clay minerals in the material. The results are summarised in Table 4.4.2 below.

Table 4.4.2 – Summary of Particle Size Distribution/Sedimentation Testing

Exp Hole	Depth (m bgl)	Material	Cobbles (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
TP102	0.80 – 1.00	Cohesive colliery spoil	0	31	17	30	22
TP105	2.00 – 2.40	Cohesive colliery spoil	0	61	14	15	10
TP108	2.50 – 2.60	Cohesive made ground	0	33	22	24	21
TP111	2.20 – 2.50	Granular colliery spoil	0	69	20	9	2
TP113	2.00 – 2.40	Cohesive colliery spoil	0	49	16	20	15
TP115	2.50 – 3.00	Cohesive colliery spoil	0	52	10	27	11

Nine samples of cohesive colliery spoil, two samples of granular colliery spoil, one sample of cohesive made ground and two samples of natural strata (extremely weak mudstone and residual soil) were submitted for dry density/moisture content relationship testing.



The compaction tests were carried out using a 2.5kg and a 4.5kg hammer. The results are summarised in Table 4.4.2 below.

Table 4.4.2 – Summary of Compaction Test Results

Exp. Hole	Depth (m bgl)	Material	Weight of Rammer	Natural Moisture Content (NMC)	Max. Dry Density (Mg/m ³)	Optimum Moisture Content (OMC)	Suitability for Compaction and Range of Acceptable Moisture Contents*
TP101	1.50 – 2.00	Cohesive colliery spoil	2.5kg	14	1.89	14	OK, 13.2 – 17.3% (at OMC)
			4.5kg	14	1.99	11	OK, 10.5 – 15% (Towards higher end)
TP102	0.80 – 1.00	Cohesive colliery spoil	4.5kg	13	2.01	11	OK, 10 – 14.7% (Towards higher end)
TP102A	2.00 – 2.20	Cohesive colliery spoil	2.5kg	17	1.77	15	OK, 16.4 – 20.8% (Towards lower end)
			4.5kg	17	1.93	13	OK, 11.9 – 17.3% (Towards higher end)
TP103	2.00 – 2.50	Extremely weak mudstone	2.5kg	15	1.85	15	OK, 14.2 – 19.1% (at OMC)
			4.5kg	15	1.97	12	OK, 11 – 17% (Towards higher end)
TP104	2.50 – 3.00	Cohesive colliery spoil	4.5kg	12	2.02	10	OK, 9.7 – 13.6%
TP105	2.00 – 2.40	Cohesive colliery spoil	4.5kg	12	1.99	12	OK, 10.5 – 15.1% (at OMC)
TP106	1.50 – 2.00	Cohesive colliery spoil	2.5kg	15	1.84	15	OK, 14.4 – 19.7% (at OMC)
			4.5kg	15	2.01	11	Unsuitable (too wet), 9.8 – 14.6%
TP108	2.50 – 2.60	Cohesive made ground	2.5kg	13	1.91	13	OK, 12.5 – 17.6% (at OMC)
			4.5kg	13	2.05	10	OK, 9.2 – 13.8% (Towards higher end)
TP109	1.50 – 1.90	Residual soil	2.5kg	17	1.80	17	OK, 15.7 – 20.9% (at OMC)
			4.5kg	17	1.90	14	OK, 12.9 – 17.5% (Towards higher end)
TP110	2.00 – 2.50	Cohesive colliery spoil	4.5kg	18	1.97	12	Unsuitable (too wet), 11 – 16%
TP111	2.20 – 2.50	Granular colliery spoil	2.5kg	18	1.61	20	Unsuitable (too dry), 19.5 – 24.7%
TP112	2.50 – 2.80	Granular colliery spoil	4.5kg	10	2.09	8	OK, 7.7 – 12%
TP113	2.00 – 2.50	Cohesive colliery spoil	4.5kg	15	2.03	10	OK, 9.3 – 14% (Towards higher end)
TP115	2.50 – 3.00	Cohesive colliery spoil	4.5kg	12	2.05	9	OK, 8.6 – 13% (Towards higher end)

* To achieve >95% of Maximum Dry Density and <5% Air Voids

Based on the test results, the cohesive colliery spoil material is generally considered to be suitable for re-use on site in its current condition. A small number of the samples are above the optimum moisture content and are considered too wet for compaction with the 4.5kg rammer.



The granular colliery spoil material can be considered suitable for re-use on site in its current condition if a 4.5kg rammer is used, i.e. heavy compaction. The sample from TP111 was tested with a 2.5kg rammer and was considered too dry for compaction.

The natural strata (extremely weak mudstone and residual soil) can be considered suitable for re-use on site in their current condition.

The cohesive made ground sample from TP108 can be considered suitable for re-use on site in its current condition.

The results table indicates a range of moisture content for which >95% of maximum dry density and < 5% air voids can be achieved. The majority of results for all the materials, with the 2.5kg rammer, are at the lower limit of suitability for compaction, and are very close to being too dry. The majority of the results with the 4.5kg rammer are at the higher limit of suitability for heavier compaction and are very close to being too dry.

If larger compaction efforts are used on the cohesive colliery spoil, as illustrated by the use of the 4.5kg rammer, a small percentage of the cohesive colliery spoil may prove to be too wet to compact effectively. If smaller compaction efforts are used on the granular colliery spoil, as illustrated by the use of the 2.5kg rammer, the granular material may prove to be too dry to compact effectively. Therefore, care should be taken on site when selecting the compaction methods.

Five samples of cohesive colliery spoil, two samples of natural strata (extremely weak mudstone and residual soil), one sample of cohesive made ground and one sample of granular colliery spoil were submitted for particle density testing. The results are summarised in Table 4.4.3 below.

Table 4.4.3 – Summary of Particle Density

Exp. Hole	Material	Depth (m bgl)	Particle Density (Mg/m ³)
TP101	Cohesive colliery spoil	1.50 – 2.00	2.68
TP102	Cohesive colliery spoil	0.80 – 1.00	2.68
TP103	Extremely weak mudstone	2.00 – 2.50	2.68
TP104	Cohesive colliery spoil	2.50 – 3.00	2.68
TP105	Cohesive colliery spoil	2.00 – 2.40	2.66
TP108	Cohesive made ground	2.50 – 2.60	2.69
TP109	Residual soil	1.50 – 1.90	2.67
TP111	Granular colliery spoil	2.20 – 2.50	2.51
TP113	Cohesive colliery spoil	2.00 – 2.50	2.67

Three 5-point moisture condition value (MCV) calibrations were carried out on samples of cohesive colliery spoil and one was carried out on a sample of granular colliery spoil. Initial moisture contents for the cohesive colliery spoil ranged between 13 to 18% and the initial moisture content for the granular colliery spoil was 10%.

MCV values below 8.5 may be indicative of soils which would be too wet to compact and MCV values above 12 may be indicative of soils which are too dry to achieve adequate compaction. The results of the MCV calibrations plotted against moisture content are provided as Figure 3 in Appendix A.



Based on these results, the cohesive colliery spoil with moisture contents of 13% (TP104) and 14% (TP106) would be a typically acceptable range for compaction, with the material suitable for compaction. However, they are at the higher and lower limits of susceptibility and are almost too wet or too dry for compaction respectively.

The MCV result for TP110 shows a moisture content of 18%, the material will be unsuitable for compaction, with the material being too wet.

The MCV result for TP112 (granular colliery spoil) shows a moisture content of 10%, the material will be unsuitable for compaction, with the material being too dry.

Nine samples were submitted for a 1-point MCV test. The tests indicated a typical MCV range of 9.5 (TP109) and 11.8 (TP103), suggesting the sample was within the range of 8.5 and 12 and is suitable for compaction. Two tests indicate MCVs of 8.1 (TP113) and 8.3 (TP115), suggesting the samples were too wet for compaction.

The MCV results show a close correlation to the results of the compaction testing and indicate that the majority of the materials would be suitable for compaction, however a few tests suggest some material may be too wet or too dry (granular) to achieve suitable compaction, i.e. >95% maximum dry density and <5% air voids.

The results of the compaction tests and MCV tests indicate that the material is variable and careful consideration should be used when deciding what compaction method is to be used on site.

Eight samples were also submitted for laboratory California Bearing Ratio (CBR) testing. The results are summarised in Table 4.4.4 below.

Table 4.4.4 – Summary of California Bearing Ratio Results

Exp. Hole	Depth (m bgl)	Material	Compaction Conditions	As Received Moisture Content (%)	CBR Value (%)		Average CBR (%)
					Sample Top	Sample Base	
TP101	1.50 – 2.00	Cohesive colliery spoil	2.5kg	12	8.3	8.6	8.5
			4.5kg	12	10.3	12.7	11.5
TP102	0.80 – 1.00	Cohesive colliery spoil	4.5kg	12	23.2	18.8	21.0
TP104	2.50 – 3.00	Cohesive colliery spoil	2.5kg	13	12.2	9.4	10.8
TP105	2.00 – 2.40	Cohesive colliery spoil	4.5kg	12	22.3	14.3	18.3
TP106	1.50 – 2.00	Cohesive colliery spoil	4.5kg	14	17.5	16.0	16.8
TP109	1.50 – 1.90	Residual soil	2.5kg	17	9.7	10.1	9.9
			4.5kg	17	10.7	11.2	11.0
TP111	2.20 – 2.50	Granular colliery spoil	2.5kg	18	28.0	32.5	30.3
			4.5kg	18	49.2	56.0	53.0
TP115	2.50 – 3.00	Cohesive colliery spoil	2.5kg	12	6.8	7.2	7.0
			4.5kg	12	12.0	13.4	13.0



The average laboratory CBR results for the samples compacted using a 2.5kg rammer ranged between 7.0% (TP115) and 30.3% (TP111). Average CBR values for samples compacted using a 4.5kg rammer ranged between 11.0% (TP109) and 53.0% (TP111). Therefore, the average CBR results were greater than 5% across the site.

12 geotechnical samples were submitted for a mixture of pH testing, organic matter testing, sulphate (total and water soluble) and sulphur (total) testing in order to determine the total potential sulphate (TPS) and oxidisable sulphates (OS) which will give an indication of the potential for the material to swell.

Nine samples of cohesive colliery spoil, one sample of cohesive made ground and one sample of residual soil, have been subject to organic matter testing. Organic matter contents ranged between 0.6% and 4.3%. The results are summarised in Table 4.4.5 below.

Table 4.4.5 – Summary of chemical analysis testing.

Exp. Hole	Depth (m bgl)	Material	pH	Organic Matter (%)	Sulphate Aqueous Extract as SO ₄ (mg/l)	Total Sulphur (%)	Total Acid-Soluble Sulphate (% SO ₄)	Total Potential Sulphate (% SO ₄)	Oxidisable Sulphides (% SO ₄)
TP101	1.90 – 2.00	Cohesive colliery spoil	7.5	1.6	230	0.03	0.07	0.09	0.02
TP102	0.80	Cohesive colliery spoil	7.4	2.8	220	-	-	-	-
TP102A	2.00 – 2.20	Cohesive colliery spoil	7.2	1.6	180	0.02	0.05	0.06	0.01
TP103	2.00 – 2.20	Extremely weak mudstone	7.3	-	19	-	-	-	-
TP104	3.00	Cohesive colliery spoil	7.5	2.6	96	0.07	0.04	0.21	0.17
TP105	2.00 – 2.40	Cohesive colliery spoil	7.9	2.7	120	-	-	-	-
TP106	1.50 – 2.00	Cohesive colliery spoil	7.3	1.8	1100	0.10	0.20	0.30	0.10
TP108	2.70 – 2.80	Cohesive made ground	7.6	4.3	250	0.41	0.05	1.23	1.18
TP109	1.50 – 1.60	Residual soil	8.1	0.6	51	0.01	0.02	0.03	0.01
TP110	2.00 – 2.10	Cohesive colliery spoil	7.3	1.0	26	0.02	0.01	0.06	0.05
TP113	1.50 – 2.00	Cohesive colliery spoil	7.8	2.4	290	-	-	-	-
TP115	2.50 – 2.60	Cohesive colliery spoil	8.2	1.1	26	<0.01	0.01	0.03	0.02

Only one sample (TP108, 2.70m to 2.80m, located adjacent to the western boundary of the employment land) indicates oxidisable sulphides (OS) of greater than 0.3% SO₄. The sample comprised cohesive made ground which included coal. It is considered that this sample is not representative of the typical made ground soils present on the site but an outlier of the dataset.



4.5 Groundwater

During the site investigation, groundwater was not generally encountered in the trial pits within the shallow natural ground. Perched groundwater was noted in TP109 at 1.00m bgl, 1.50m bgl and 3.00m bgl and in TP110 from 2.50m bgl.

The majority of rotary open holed boreholes encountered groundwater strikes from depths between 3.00m bgl to 31.00m bgl.

TP112 encountered a small 12mm diameter black plastic pipe at 0.30m bgl with a slow continuous flow from the east.

Monitoring wells were installed in seven of the boreholes. All of the installations were sealed within the opencast backfill.

A summary of the monitored groundwater levels is presented in Table 4.5.1 below.

Table 4.5.1 – Summary of Recorded Groundwater Levels

Location		Water level during monitoring (m bgl)					
		11/04/2019	24/04/2019	01/05/2019	17/05/2019	23/05/2019	10/06/2019
BH101	50mm	4.51	4.74	4.92	5.13	5.19	5.34
BH102	50mm	6.89	6.89	6.95	7.00	7.01	7.05
BH105A	50mm	29.02	29.02	29.06	29.11	29.12	29.19
BH106	50mm	33.92	33.64	33.90	33.76	33.80	33.85
BH109A	50mm	Dry	Dry	Dry	Dry	Dry	Dry
BH111C	50mm	8.81	8.76	8.80	8.87	8.88	8.94
BH112	50mm	Dry	Dry	Dry	10.08	10.30	10.40

m bgl – metres below ground level; NR – Not Recorded

Groundwater monitoring has been carried out on six occasions during which the levels have stayed mostly consistent. Water levels decreased in BH101 and BH102. Water levels in BH106 and BH111C slowly fluctuated between monitoring visits. Water levels increased in BH112 from being dry in the first three visits to between 10.08m bgl and 10.40m bgl in the final three visits.

It should be noted that the groundwater conditions recorded are based on observations made at the time that site work was carried out. Groundwater levels will vary owing to seasonal and weather-related effects. It should also be noted that these groundwater readings were carried out within the backfilled opencast and may not show the groundwater regime within the surrounding natural strata.

4.6 Ground Gas

Ground gas monitoring has been undertaken on six occasions. The works were carried out using a portable gas meter in accordance with the standard JPG methodology and included measurements of methane, carbon dioxide, oxygen, hydrogen sulphide, carbon monoxide, gas flows and atmospheric pressure. The results of the gas monitoring are presented in Appendix F and discussed in Section 6.7 of this report.



4.7 Extensometer (Settlement) Monitoring

Extensometers were monitored by JPG on seven occasions, 11 April and 18 April 2019, 14 June 2019, 13 September 2019, 21 January 2020, 28 May 2020, 20 November 2020 and 28 April 2021. The monitoring was carried out using a reed switch probe. The results are included in the summary tables for each extensometer installation below.

The results for extensometer referenced BH103 are presented in Table 4.7.1 below.

Table 4.7.1 – Summary of Extensometer Results (BH103)

	Depth to Extensometer Magnet (m bgl)			O/A Difference Between Top & Btm Magnets (m)
Date Surveyed	1	2	3 (Base Magnet)	3 - 1
11.04.19	2.223	6.712	11.667	9.444
14.06.19	2.224	6.712	11.667	9.443
13.09.19	2.222	6.712	11.666	9.444
21.01.20	2.223	6.712	11.666	9.443
Difference (mm)	0	0	-1	
Overall Difference – Top and Btm Magnets (mm)				-1

The overall change in difference between the top and bottom magnets in BH103 has been calculated as 1mm. The variation recorded on these visits is attributed to accuracy of the readings.

It should be noted that the extensometer installation in BH103 has been damaged. Therefore, no accurate readings after the fourth visit, on 21 January 2020, have been recorded.

The results for extensometer referenced BH104 are presented in Table 4.7.2 below.

Table 4.7.2 – Summary of Extensometer Results (BH104)

	Depth to Extensometer Magnet (m bgl)				O/A Difference Between Top & Btm Magnets (m)
Date Surveyed	1	2	3	4 (Base Magnet)	4 - 1
18.04.19	8.753	15.382	27.519	37.179	28.426
14.06.19	8.754	15.383	27.520	37.178	28.424
13.09.19	8.753	15.381	27.520	37.176	28.423
21.01.20	8.751	15.380	27.518	37.175	28.424
28.05.20	8.745	15.371	27.510	37.166	28.421
28.04.21	8.744	15.371	27.508	37.165	28.421
Difference (mm)	-9	-11	-11	-14	
Overall Difference – Top and Btm Magnets (mm)					-5

The overall change in difference between the top and bottom magnets in BH104 has been calculated as 5mm. The variation recorded on these visits is attributed to accuracy of the readings.

It should be noted that the extensometer installation in BH104 was buried during the sixth monitoring visit (20 November 2020). Therefore, no results have been recorded.



The results for extensometer referenced BH109 are presented in Table 4.7.3 below.

Table 4.7.3 – Summary of Extensometer Results (BH109)

Date Surveyed	Depth to Extensometer Magnet (m bgl)			O/A Difference Between Top & Btm Magnets (m)
	1	2	3 (Base Magnet)	3 - 1
18.04.19	2.231	7.070	14.251	12.020
14.06.19	2.232	7.069	14.250	12.018
13.09.19	2.230	7.069	14.250	12.020
21.01.20	2.231	7.069	14.254	12.023
28.05.20	2.231	7.071	14.252	12.021
20.11.20	2.232	7.070	14.253	12.021
28.04.21	2.232	7.071	14.254	12.022
Difference (mm)	1	1	3	
Overall Difference – Top and Btm Magnets (mm)				2

The overall change in difference between the top and bottom magnets in BH109 has been calculated as 2mm. The variation recorded on these visits is attributed to accuracy of the readings.

The results for extensometer referenced BH113 are presented in Table 4.7.4 below.

Table 4.7.4 – Summary of Extensometer Results (BH113)

Date Surveyed	Depth to Extensometer Magnet (m bgl)			O/A Difference Between Top & Btm Magnets (m)
	1	2	3 (Base Magnet)	3 - 1
18.04.19	3.920	8.135	14.918	10.998
14.06.19	3.920	8.134	14.918	10.998
13.09.19	3.921	8.134	14.918	10.997
21.01.20	3.914	8.133	14.924	11.010
28.05.20	3.921	8.134	14.924	11.003
20.11.20	3.919	8.134	14.920	11.001
28.04.21	3.920	8.133	14.920	11.000
Difference (mm)	0	-2	2	
Overall Difference – Top and Btm Magnets (mm)				2

The overall change in difference between the top and bottom magnets in BH113 has been calculated as 2mm. The variation recorded on these visits is attributed to accuracy of the readings.

Assessment of the results of extensometer monitoring to date does not highlight any general settlement trends, either downward or upward. A negative change in difference between the top and bottom magnets indicate the magnets are getting further apart, however a positive difference could confirm the magnets are getting closer together and therefore could potentially indicate settlement.

The monitoring should be extended as long as possible to confirm the absence of any downward trend.

Based on the results obtained to-date, values of the creep compression factor alpha (α) have been calculated below, where possible. The results are presented in Table 4.7.5 below.

**Table 4.7.5 – Summary of Extensometer Results**

Extensometer ref.	BH103	BH104	BH109	BH113
OCCS	Craven I	Craven II	Hunters Cott	Pogmoor
Backfill Midpoint (t1)	01/03/1952	01/11/1963	10/10/1949	01/11/1960
First monitoring visit (t2)	11/04/2019	18/04/2019	11/04/2019	11/04/2019
t2 - t1 (days)	24512	20257	25385	21345
Latest Monitoring visit (t3)	21/01/2020	28/04/2021	28/04/2021	28/04/2021
t3 - t1 (days)	24797	20998	26133	22093
MG thickness (m)	8.20	31.00	11.20	11.50
Recorded Settlement (mm)	0	-5	2	2
Settlement as % MG Thickness	0.0000	-0.0161	0.0179	0.0174
Alpha	0.0	-1.0	1.4	1.2

It can be seen that where no settlement has been recorded in the extensometers (BH103), an alpha of 0 has been calculated. Where an increase between the top and bottom magnets has been recorded, the alpha is discounted (e.g., BH104).

It can be seen that based on the seven monitoring visits, a small amount of settlement has been recorded in BH109 and BH113, an alpha of 1.4 and 1.2 has been calculated, respectively.

As it is considered that the extensometer readings can be no more accurate than +/-2mm, the calculated values for alpha are not considered reliable. Therefore, empirical alpha values will be used for the self-weight settlement analysis at this stage.



5.0 GEOTECHNICAL AND ENGINEERING ASSESSMENT

5.1 Development Proposals

It is proposed to develop the site for a mixed end use which will include large scale earthworks on the site in order to create the development platform. The site will comprise residential units, a school and a mixture of commercial and industrial units. The development also includes balancing ponds and associated road network.

A drawing of the proposed development has been provided, which is referenced below, and a copy is contained in Appendix A.

- Bond Bryan. Barnsley West Masterplan. Proposed Site Plan. Drawing No: BWM-BBA-ZZ-XX-DR-A-1004-S2-P05, dated May 2021 for Strata Sterling Barnsley West Limited.

5.2 Foundations and Ground Floor Construction

It is proposed to carry out earthworks across the site in order to create a suitable development platform for the proposed development areas on the site.

Based on the current topography including steeply sloping ground, significant cut and fill earthworks will be required in order to create level development platforms.

Large areas of the site are underlain by significant thicknesses of non-engineered colliery spoil associated with backfilled OCCSs. Outside of the backfilled opencast sites, the natural strata comprise residual soil and extremely weak mudstone of the Pennine Middle Coal Measures Formation with locally shallow coal seams.

The deep colliery spoil in its current condition is considered unsuitable for the support of structural loads, due to the variation in geotechnical properties. If shallow foundations were to be used, the colliery spoil would become over-stressed, leading to significant settlement.

Residential Units

It is assumed at this preliminary stage that houses may be built over natural strata or re-engineered colliery spoil.

Some earthworks and/or ground improvement will be required in order to accommodate a reinforced strip foundation with a suspended ground floor. At this stage, it is assumed that the earthworks contractor will be required to improve the bearing characteristics of re-engineered fill under the proposed residential development areas to provide an appropriate bearing capacity for the residential units and limit settlement to acceptable levels. It may be possible to improve the bearing and settlement characteristics of the re-engineered fill by adding lime and/or cement, or other ground improvement technique should higher bearing pressures be required.



Outside of the backfilled opencast sites, it is considered likely that shallow foundations could be utilised within the firm to stiff residual soil or onto the mudstone. If shallow coal seams are encountered in foundation excavations, the coal should be removed at least 1m from the face of the foundation.

Foundations for plots should avoid the OCCS highwalls due to potential differential settlement and underground coal workings below the highwalls.

Commercial Units

Commercial units are proposed to be constructed in the southern third of the site, over natural strata and/or re-engineered colliery spoil and/or made ground.

At this stage the design loads and proposed levels are not confirmed. Depending on the loading associated with the commercial units, a piled foundation solution may be required for the superstructure over the backfilled OCCS. Alternatively, outside of the opencast areas, it may be possible to use shallow spread foundations within the firm to stiff residual soil or extremely weak mudstone. If ground levels are reduced within the backfilled OCCS, it may be possible to remove the full thickness of made ground and replace with engineered fill.

Where foundations are to span over the highwall and therefore different materials, precautions will be required to limit potential differential settlement. This may require a piled foundation within the colliery spoil and pad foundations over the natural strata to ensure that the foundations are bearing onto similar materials.

Some form of ground treatment may be required in order to accommodate ground-bearing floor slabs to achieve typical bearing characteristics of say 25kN/m², based on typical warehouse loading. In addition, future settlement of the treated fill material shall not exceed 25mm.

The advice of a specialist piling/ground improvement contractors will be required to confirm that ground conditions are suitable for these techniques.

5.3 Earthworks

Based on the laboratory results, the colliery spoil, cohesive made ground and natural strata are generally considered suitable for re-use in earthworks. Based on the current site levels, it is proposed to carry out a significant cut and fill exercise to create development platforms on the site.

Proper selection and control will be required as part of the works to use the materials on the site. The material should not be allowed to deteriorate during excavation and compaction and must be sufficiently protected from traffic after placement.

Once the site has been cut to the desired formation level, typically the top 2.00m of untreated colliery spoil will need to be re-engineered. Where the site formation levels are to be significantly raised, the NHBC or other regulators may require treatment of the fill by either dynamic compaction, greater depth of re-engineered soils or surcharging/preloading. Settlement of the untreated colliery spoil as the result of raising of ground levels with re-engineered fill is addressed in Section 5.5.



Any earthworks should be carried out in accordance with the Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works, Series 600 Earthworks.

Once final site formation levels have been agreed, it is recommended that a detailed Earthworks Specification is produced prior to commencement of works on the site. This should be developed in conjunction with the Earthworks Contractor/Stabilisation Contractor and should include a strategy to deal with the treatment of the materials during the works.

5.4 Control of Groundwater

The groundwater monitoring and site investigation have indicated shallow depths to groundwater during the early summer months, especially within the backfilled opencast sites. Control of groundwater and surface water control will be required as part of the earthworks. Significant (fast) inflows into boreholes, BH108, BH109A, BH122 and BH125 suggest that control by pumping from sumps might not be possible in the area around the former Hunters Cottage Opencast site.

Reference should be made to guidance given in the Manual of Contract Documents for Highway Works, Volume 1: Specification for Highway Works, Series 600 Earthworks. In particular the following recommendations are made with respect to the control of surface water and shallow groundwater.

The contractor shall keep earthworks free of water including:

- Arranging for the rapid removal of water which is shed on the earthworks or enter the earthworks from any source.
- Lowering and maintaining by appropriate measures, the water level in excavations sufficiently to enable the permanent works to be constructed.

In order to keep the site free of water the contractor shall do the following:

- Form and maintain cuttings, embankments and other areas of fill with appropriate falls, gradients and sealed surfaces.
- Provide where necessary temporary watercourses, drains, and pumping.
- Discharge accumulated water and groundwater into the permanent outfalls of the drainage system where practicable; and
- Provide adequate means for trapping silt on temporary systems discharging into permanent drainage systems.

5.5 Settlement

The completion of resoiling at Craven I, Craven II, Hunters Cottage (and extensions) and Farmhouse Lane was completed between January 1950 (Hunters Cottage) and November 1960 (Farmhouse Lane). If development on the site was to commence in 2020, then between 60 and 70 years will have passed since the most recent backfilling.



To evaluate the settlement within the backfilled opencast sites, assumed parameters based on published literature have been used. Generally, guidance given in BRE document FB 75 '*Building on fill: geotechnical aspects*' (Third edition, 2015) has been followed.

Settlement Following Placement of Engineered Fill

Where ground levels are to be raised, settlement will be induced in the underlying untreated colliery spoil. The settlement will be a combination of consolidation and self-weight settlement, assuming that any immediate settlement will be accommodated during the earthworks.

Future Settlement

After the completion of the development platforms, settlement within the backfilled opencasts will be the result of the following processes:

- Immediate settlement: This is assumed to take place at the time of or shortly after placing the load on the fill.
- Primary (consolidation) settlement: This will occur in the cohesive fill due to loading of the development. This can be calculated based on the applied static and/or live loads and the material properties of the backfilled material within the zone of influence of the applied load.
- Secondary (creep) settlement: This is due to longer-term self-weight settlement of the re-engineered fill and the untreated backfilled material.
- Inundation settlement: Rebound of the groundwater within the backfilled material to the natural level. Water ingress into the fill material can change the equilibrium and cause the soil void spaces to collapse, thus leading to settlement.

Immediate Settlement

Immediate settlement is determined using deformation (secant) modulus (E). Empirical values of Young's modulus were taken from Table 11.7 in *Handbook of Geotechnical Investigation and Design Tables* (Look, B. 2014. Second edition, 2014).

The placement of the fill material in areas where site levels are to be raised could bear onto untreated colliery spoil thus potentially causing immediate settlement. However, it is considered that this settlement will be accommodated during the earthworks.

Residential Units

As the foundations will bear onto treated, re-engineered colliery spoil (stiff clay), an E of 15MPa is considered applicable. In relation to the underlying untreated colliery spoil (stiff clay) an E of 10MPa is considered applicable. Assuming a reinforced strip foundation with dimensions of 9.00m by 0.75m and a design load of 60kN/m², an immediate settlement of 12mm has been calculated using Settle3D (see Appendix E).



Based on the SPT N values, the strength of the colliery spoil in Farmhouse Lane OCCS is considered to have a lower strength than Craven I and II. The foundations will bear onto treated, re-engineered colliery spoil (stiff clay), an E of 15MPa is considered applicable. However, in the underlying untreated colliery spoil (firm clay and medium dense sand) an E of 5MPa and 25MPa, respectively, is considered applicable. Assuming the same foundation type, dimensions and design load, an immediate settlement of 10mm has been calculated using Settle3D (see Appendix E).

Commercial Units

It is likely that the foundations for the superstructure of future commercial units constructed over the backfilled OCCS will require piling combined with ground improvement to accommodate ground-bearing floor slabs.

As the ground-bearing floor slabs could potentially bear onto treated, re-engineered colliery spoil (stiff clay), an E of 15MPa is considered applicable. However, the underlying untreated colliery spoil (firm clay and medium dense gravel), an E of 5MPa and 25MPa, respectively, is considered applicable. Assuming a ground-bearing slab with nominal dimensions of 100m by 50m and a design load of 25kN/m², an immediate settlement of 15mm has been calculated using Settle3D (see Appendix E).

It is considered that any immediate settlement for the residential units and commercial units will be accommodated during the earthworks.

Primary (Consolidation) Settlement

Consolidation settlement is considered to occur within the re-engineered fill and the underlying untreated colliery spoil as well as the foundations acting on the re-engineered fill. SPT N values were obtained within the backfilled opencast sites. Due to the absence of laboratory data or in situ testing in relation to compressibility, the SPT N values and the plasticity index can be used to obtain a value for the coefficient of compressibility (M_v) after Stroud. Where the Stroud correlation cannot be used, empirical values for M_v have been taken from Table 2.11 in *Foundation Design and Construction* (Tomlinson, M.J. 7th edition, 2001).

Craven I

It is assumed the re-engineered fill varies in thickness across the western area of Craven I to approximately 1.00m in height (above original ground levels) and overlies approximately 13.00m of untreated colliery spoil. Based on the SPT N values from BH102 and a plasticity index of 21% (TP102) an assumed M_v of 0.05m²/MN for untreated cohesive colliery spoil and 0.01m²/MN for untreated granular colliery spoil can be considered applicable. For an applied load of 20kN/m² (based on raising site levels by 1m) over a nominal area of 100m by 100m, a consolidation settlement of approximately 7mm under the re-engineered fill is calculated using Settle3D (see Appendix E).



Craven II

It is assumed the re-engineered fill varies in thickness across the north eastern area of Craven II to approximately 4.00m in height (above original ground levels) and overlies approximately 35.00m of untreated colliery spoil. Based on the SPT N values from BH106 and plasticity indices of between 21% (TP105) and 23% (TP106) an assumed M_v range of 0.11 m^2/MN to 0.063 m^2/MN for the untreated cohesive colliery spoil can be considered applicable. An assumed M_v of 0.01 m^2/MN was considered applicable for the untreated granular colliery spoil. Based on nominal dimensions of 100m by 100m, with an applied load of 80kN/m², a consolidation settlement of approximately 100mm under the re-engineered fill is calculated using Settle3D (see Appendix E).

Farmhouse Lane

Assuming the re-engineered fill varies in thickness across the northern boundary of the Farmhouse Lane OCCS to approximately 2.00m in height (above original ground levels) and overlies approximately 11.50m of untreated colliery spoil. Based on the SPT N values from BH111B and a plasticity index of 15% (TP115) an assumed M_v of 0.12 m^2/MN for the untreated cohesive colliery spoil and an assumed M_v of 0.01 m^2/MN for the untreated granular colliery spoil can be considered appropriate. Based on the dimensions of 40m by 100m, with an applied load of 40kN/m², a consolidation settlement of approximately 22mm is calculated, for the untreated colliery spoil, using Settle3D (see Appendix E).

Hunters Cottage

Assuming the re-engineered fill varies in thickness across the area of Hunters Cottage OCCS to approximately 6.00m in height (above original ground levels) and overlies approximately 13.00m of untreated colliery spoil. Based on empirical values for firm clay and medium dense granular colliery spoil, assumed M_v of 0.10 m^2/MN and 0.05 m^2/MN , respectively, are considered acceptable. Based on the dimensions of 100m by 100m, with an applied load of 120kN/m², a consolidation settlement of approximately 90mm is calculated, for the untreated colliery spoil, using Settle3D (see Appendix E).

Residential Units

Assuming that 1.00m of re-engineered colliery spoil is present below the base of the shallow foundation and that any softer, highly compressible materials are treated/removed as part of the earthworks, an empirical M_v of 0.10 m^2/MN can be considered appropriate for the re-engineered colliery spoil. For an applied load of 60kN/m², a consolidation settlement of approximately 10mm can be calculated using Settle3D (see Appendix E).

Commercial Units

Assuming that at least 2.00m of re-engineered colliery spoil is present below the base of the ground-bearing floor slab and that any softer, highly compressible materials are treated/removed as part of the earthworks, an empirical M_v of 0.10 m^2/MN can be considered appropriate for the re-engineered colliery spoil. For an applied load of 25kN/m², a consolidation settlement of approximately 20mm can be calculated using Settle3D (see Appendix E).

It is recommended that further site investigation is carried out to obtain in-situ M_v values and/or undisturbed samples of the colliery spoil.



Secondary (Creep) Settlement

The colliery spoil below the footprint of the proposed foundations is to be improved by re-engineering, dynamic compaction and/or surcharging.

Where the colliery spoil is not subject to treatment, it is anticipated that further creep settlement will occur within the untreated materials.

Sowers Method, used to estimate the creep settlement within each backfilled opencast, is expressed as the following equation:

$$S = \alpha (\log t_2 - \log t_1).$$

Where:

α is alpha.

t_1 is time since infilling.

t_2 is time since development start.

For the treated colliery spoil, the creep settlement can be calculated using an assumed alpha of 0.2 (based on the Institution of Civil Engineers, *Earthworks: A guide*, second edition, 2015). The predicted creep settlement for different thicknesses of treated fill over the 60-year design life (residential) and the 50-year design life (commercial) for each opencast site is presented in the Tables 5.5.1, 5.5.2 and 5.5.3 below.

Table 5.5.1: Creep Settlement ($\alpha = 0.2\%$) for Treated Fill Thickness – Craven I & Farmhouse Lane

Time Since Treatment		Settlement (%)	Settlement (mm) for Thickness of Treated Fill (m) as below				
Years	Months		1	2	3	4	5
0	1	NA					
1	12	0.22	2	4	6	9	11
2	24	0.28	3	6	8	11	14
5	60	0.36	4	7	11	14	18
10	120	0.42	4	8	12	17	21
20	240	0.48	5	10	14	19	24
40	480	0.54	5	11	16	21	27
60	720	0.57	6	11	17	23	29

Table 5.5.2: Creep Settlement ($\alpha = 0.2\%$) for Treated Fill Thickness – Craven II

Time Since Treatment		Settlement (%)	Settlement (mm) for Thickness of Treated Fill (m) as below			
Years	Months		2	4	6	8
0	1	NA				
1	12	0.22	4	9	13	17
2	24	0.28	6	11	17	22
5	60	0.36	7	14	21	28
10	120	0.42	8	17	25	33
20	240	0.48	10	19	29	38
40	480	0.54	11	21	32	43
60	720	0.57	11	23	34	46

**Table 5.5.3: Creep Settlement ($\alpha = 0.2\%$) for Treated Fill Thickness – Hunters Cottage (Commercial)**

Time Since Treatment		Settlement (%)	Settlement (mm) for Thickness of Treated Fill (m) as below			
Years	Months		1	2	3	4
0	1	NA				
1	12	0.22	2	4	6	9
2	24	0.28	3	6	8	11
5	60	0.36	4	7	11	14
10	120	0.42	4	8	12	17
20	240	0.48	5	10	14	19
30	360	0.54	5	10	15	20
50	600	0.59	6	11	17	22

It is anticipated that most of the creep compression in the untreated material beneath the treated zone will have already occurred due to the time since infilling. However, where ground levels are to be raised in particular, further self-weight settlement may occur.

At this stage, accurate alpha values for the untreated colliery spoil are not possible to calculate as there is no reliable settlement data, i.e. the extensometers have not been the ground for a significant period of time, and they have not (to-date) given any indication of ongoing settlement. Therefore, assumed parameters from published literature have been used in the assessments below. Sensitivity analysis using different alpha values for different thicknesses of colliery spoil has also been carried out for each backfilled OCCS.

Craven I

Taking t_1 (time since infilling) as July 1952, t_2 (time since development start) as January 2020 and an initial alpha of 0.5 (based on the SPT N values of BH102 and empirical data), the creep settlement that has already occurred for the untreated fill and the remaining creep settlement predicted for the 60 years post the development start date for differing thicknesses of colliery spoil is presented in Table 5.5.3 below.

Table 5.5.3: Creep Settlement ($\alpha = 0.5\%$) for Untreated Fill Thickness – Craven I

Time Since Development Start	Time Since Infilling		Settlement (%)	Settlement (mm) for Thickness of Untreated Fill (m) as below					
	Years	Months		2.0	4.0	6.0	8.0	10.0	13.0
-	0	1	-						
0	68	816	1.46	29	58	87	116	146	189
5	73	876	1.47	29	59	88	118	147	191
10	78	936	1.49	30	59	89	119	149	193
20	88	1056	1.51	30	60	91	121	151	197
40	108	1296	1.56	31	62	93	125	156	202
60	128	1536	1.59	32	64	96	127	159	207
Estimated Future Creep Settlement (mm)				3	5	8	11	14	18

Craven II

For the creep assessment for Craven II OCCS, t_1 was taken as September 1963, t_2 as January 2020 and an initial alpha of 0.5 (based on the SPT N values from BH106), the creep settlement that has already occurred for the untreated fill and the remaining creep settlement predicted for the 60 years past the development start date for differing thicknesses of colliery spoil is presented in Table 5.5.4.

**Table 5.5.4: Creep Settlement ($\alpha = 0.5\%$) for Untreated Fill Thickness – Craven II**

Time Since Development Start	Time Since Infilling		Settlement (%)	Settlement (mm) for Thickness of Untreated Fill (m) as below						
	Years	Months		4.5	9.0	13.5	18.0	22.5	35.0	38.0
-	0	1	-							
0	57	684	1.42	64	128	191	255	319	496	539
5	62	744	1.44	65	129	194	258	323	503	546
10	67	804	1.45	65	131	196	261	327	508	552
20	77	924	1.48	67	133	200	267	334	519	563
40	97	1164	1.53	69	138	207	276	345	537	583
60	117	1404	1.57	71	142	212	283	354	551	598
Estimated Future Creep Settlement (mm)				7	14	21	28	35	55	59

Farmhouse Lane

Taking t1 as November 1960, t2 as January 2020, and an assumed initial alpha of 1.0 (based on the SPT N values from BH111B), the creep settlement that has already occurred for the untreated fill and the remaining creep settlement predicted for the 60 years post the development start date for differing thicknesses of colliery spoil is presented in Table 5.5.5 below.

Table 5.5.5: Creep Settlement ($\alpha = 1.0\%$) for Untreated Fill Thickness – Farmhouse Lane

Time Since Development Start	Time Since Infilling		Settlement (%)	Settlement (mm) for Thickness of Untreated Fill (m) as below						
	Years	Months		2.0	4.0	6.0	8.0	10.0	11.5	
-	0	1	-							
0	60	720	2.86	57	114	171	229	286	329	329
5	65	780	2.89	58	116	174	231	289	333	333
10	70	840	2.92	58	117	175	234	292	336	336
20	80	960	2.98	60	119	179	239	298	343	343
40	100	1200	3.08	62	123	185	246	308	354	354
60	120	1440	3.16	63	126	190	253	316	363	363
Estimated Future Creep Settlement (mm)				6	12	18	24	30	35	35

Hunters Cottage

Taking t1 as January 1950, t2 as January 2020, and an assumed initial alpha as 0.8 for uncompacted fill. The creep settlement that has already occurred for the untreated fill and the remaining creep settlement predicted for the 50 years past the development start date for differing thicknesses of colliery spoil is presented in Table 5.5.6 below.

Table 5.5.6: Creep Settlement ($\alpha = 0.8\%$) for Untreated Fill Thickness – Hunters Cottage (Commercial)

Time Since Development Start	Time Since Infilling		Settlement (%)	Settlement (mm) for Thickness of Untreated Fill (m) as below						
	Years	Months		2.0	4.0	6.0	8.0	10.0	13.0	
-	0	1	-							
0	70	840	2.34	47	94	140	187	234	304	304
5	75	900	2.36	47	95	142	189	236	307	307
10	80	960	2.39	48	95	143	191	239	310	310
20	90	1080	2.43	49	97	146	194	243	315	315
30	100	1200	2.46	49	99	148	197	246	320	320
50	120	1440	2.53	51	101	152	202	253	328	328
Estimated Future Creep Settlement (mm)				4	7	11	15	19	24	24



It is assumed the colliery spoil from the opencast site, Hunters Cottage Extension, will be removed/treated during the earthworks operation.

All of the above tables are considered conservative as the alpha value is assumed to be the same throughout the full thickness of colliery spoil

Based on the SPT N values and assuming that the colliery spoil was placed without any compaction, it is considered acceptable to assume that the strength and density of the colliery spoil increases with depth due to the self-weight settlement that has already occurred. Further investigation is recommended to help estimate a lower alpha value for the colliery spoil, in order to predict future self-weight settlement.

To be more realistic with increasing strength/density with depth, tables 5.5.7, 5.5.8, 5.5.9 and 5.5.10 below show variations in alpha with different thicknesses of colliery spoil.

Table 5.5.7: Creep Settlement (α = variable) for Untreated Fill Thickness – Craven I

Time Since Development Start	Time Since Infilling		Settlement (mm) for Thickness of Untreated Fill (m) as below					
	Years	Months	2.0	4.0	6.0	8.0	10.0	13.0
-	0	1						
0	68	816	29	52	70	82	87	96
5	73	876	29	53	71	82	88	97
10	78	936	30	53	71	83	89	98
20	88	1056	30	54	73	85	91	100
40	108	1296	31	56	75	87	93	103
60	128	1536	32	57	76	89	96	105
Assumed α over depth range			0.5	0.4	0.3	0.2	0.1	0.1
Estimated Future Creep Settlement (mm)			3	5	7	8	8	9

Table 5.5.7 shows, for a range of alpha values from 0.1 to 0.5, decreasing with depth, creep settlement for the maximum proven thickness of untreated colliery spoil in Craven I will approximately be 9mm.

Table 5.5.8: Creep Settlement (α = variable) for Untreated Fill Thickness – Craven II

Time Since Development Start	Time Since Infilling		Settlement (mm) for Thickness of Untreated Fill (m) as below						
	Years	Months	4.5	9.0	13.5	18.0	22.5	35.0	38.0
-	0	1							
-	0	1							
0	57	684	64	115	153	179	204	240	248
5	62	744	65	116	155	181	207	243	251
10	67	804	65	118	157	183	209	245	254
20	77	924	67	120	160	187	214	251	259
40	97	1164	69	124	166	193	221	259	268
60	117	1404	71	127	170	198	227	266	275
Assumed α over depth range			0.5	0.4	0.3	0.2	0.2	0.1	0.1
Estimated Future Creep Settlement (mm)			7	13	17	20	22	26	27

Table 5.5.8 shows decreasing the alpha from 0.5 to 0.1 over a maximum colliery spoil thickness of 38m gives a creep settlement result of approximately 27mm in Craven II.

**Table 5.5.9: Creep Settlement (α = variable) for Untreated Fill Thickness – Farmhouse Lane**

Time Since Development Start	Time Since Infilling		Settlement (mm) for Thickness of Untreated Fill (m) as below					
	Years	Months	2.0	4.0	6.0	8.0	10.0	11.5
-	0	1						
0	60	720	57	109	154	194	229	250
5	65	780	58	110	156	197	231	253
10	70	840	58	111	158	199	234	256
20	80	960	60	113	161	203	239	261
40	100	1200	62	117	166	209	246	269
60	120	1440	63	120	171	215	253	276
Assumed α over depth range			1.00	0.90	0.80	0.70	0.60	0.50
Estimated Future Creep Settlement (mm)			6	11	16	20	24	26

Table 5.5.9 shows, decreasing the alpha with depth from 1.0 to 0.5 over the range of colliery spoil thickness encountered in Farmhouse Lane gives a creep settlement of approximately 26mm over 11.50m of colliery spoil.

Table 5.5.10 Creep Settlement (α = variable) for Untreated Fill Thickness – Hunters Cottage

Time Since Development Start	Time Since Infilling		Settlement (mm) for Thickness of Untreated Fill (m) as below					
	Years	Months	2.0	4.0	6.0	8.0	10.0	13.0
-	0	1						
0	70	840	58	105	140	164	175	193
5	75	900	59	106	142	165	177	195
10	80	960	60	107	143	167	179	197
20	90	1080	61	109	146	170	182	200
30	100	1200	62	111	148	172	185	203
50	120	1440	63	114	152	177	190	208
Assumed α over depth range			1.00	0.80	0.60	0.40	0.20	0.20
Estimated Future Creep Settlement (mm)			5	8	11	13	14	15

Table 5.5.10 show, for a range of alpha values ranging from 1.0 to 0.2, decreasing with depth, creep settlement for a maximum colliery spoil thickness of 13.00m is approximately 15mm in Hunters Cottage OCCS.

It is considered that the alpha values used in the tables above are more reflective of the conditions present on the site.

To conclude, although there are reservations with regard to the magnitude of future creep settlement, based on published literature and the ground investigation carried out on site, the future self-weight settlement of untreated fill will vary in each opencast site. The future self-weight settlement will generally vary from approximately 3mm to 9mm in Craven I, 7mm to 27mm in Craven II, 6mm to 26mm in Farmhouse Lane and 5mm to 15mm in Hunters Cottage.

It is recommended further monitoring of the extensometers should be carried out for as long as possible, to provide more accurate alpha values for the site. However, due to the time since backfill varies on site from 57 years to 70 years before development starts, the majority of self-weight settlement will have occurred, and the extensometers would have to be monitored for a significant amount of time in order to be able to calculate a realistic value for alpha for each OCCS.



Inundation Settlement

The water levels in the colliery spoil were generally consistent over the monitoring period, see section 4.5. It is recommended groundwater monitoring wells are installed outside of the OCCSs to give an indication of the natural groundwater level (within bedrock).

It is understood that from the abandonment plan for the Craven II OCCS, water was pumped from a shaft at the base of the OCCS to facilitate the extraction of the coal. Based on the time since pumping ceased, it is likely that the water levels within the OCCS will have fully rebounded by now. However, this will need to be confirmed by further groundwater monitoring.

Total Predicted Settlement

Total settlement is the combined results of immediate, consolidation and creep settlement. Typical total settlements for across the site are estimated to vary between 50mm to 160mm. The settlement results for each OCCS are presented in Table 5.5.11 below.

Table 5.5.11 – Settlement Results for Each OCCS.

OCCS	Immediate Settlement (mm)	Secondary (Consolidation) Settlement (mm)		Secondary (Creep) Settlement * (mm)	Secondary (Creep) Settlement ** (mm)	Total Predicted Settlement
		Due to Placement of Re-engineered Fill	Applied Loading			
Craven I	12	7	10	11	9	49
Craven II	12	100	10	11	27	160
Farmhouse Lane	10	22	10	11	26	79
Hunters Cottage	15	90	20	11	15	151

* - Creep settlement in treated colliery spoil (assumed 2.00m of treated material).

** - Creep settlement in untreated colliery spoil

Differential Settlement over Buried Highwalls

Where highwalls are present, there is the potential for differential settlement. Depth to the highwall varies in each opencast, differential creep settlement of the fill needs to be considered. Differential consolidation settlement also needs to be considered for the ground bearing floor slabs of the commercial units.



Craven I

The highwalls for Craven I are represented on cross sections A-A' and D-D' (presented in Appendix A). Assuming a typical house span of 10m between each reinforced strip footing, the depth to rock head varies between 6.00m to 8.00m, 2.70m to 6.50m and 2.00m to 6.70m. Based on an alpha of 0.3, differential settlement over three areas of highwall is estimated to be approximately between 2mm (1:5000), 3mm (1:3333) and 4mm (1:2000) for a design life of 60 years. The assessment is presented in Tables 5.5.12, 5.5.13 and 5.5.14 below.

Table 5.5.12 - Differential Creep Settlement ($\alpha = 0.3\%$) – Craven I - Highwall 1

Time Since Development Start	Time Since Infilling		Settlement (%)	Settlement (mm) for Thickness of MG (H) as Below	
	Years	Months		6.0	8.0
-	0	1	NA		
0	68	816	0.87	52	70
5	73	876	0.88	53	71
10	78	936	0.89	53	71
20	88	1056	0.91	54	73
40	108	1296	0.93	56	75
60	128	1536	0.96	57	76
Estimated Future Creep Settlement (mm)				5	7
Differential Creep Settlement (mm & ratio)				2 (1:5,000)	

Table 5.5.13 - Differential Creep Settlement ($\alpha = 0.3\%$) – Craven I - Highwall 2

Time Since Development Start	Time Since Infilling		Settlement (%)	Settlement (mm) for Thickness of MG (H) as Below	
	Years	Months		2.70	6.50
-	0	1	NA		
0	68	816	0.87	24	57
5	73	876	0.88	24	57
10	78	936	0.89	24	58
20	88	1056	0.91	24	59
40	108	1296	0.93	25	61
60	128	1536	0.96	26	62
Estimated Future Creep Settlement (mm)				2	5
Differential Creep Settlement (mm & ratio)				3 (1:3,333)	

Table 5.5.14 - Differential Creep Settlement ($\alpha = 0.3\%$) – Craven I - Highwall 3

Time Since Development Start	Time Since Infilling		Settlement (%)	Settlement (mm) for Thickness of MG (H) as Below	
	Years	Months		2.70	6.50
-	0	1	NA		
0	68	816	0.87	17	59
5	73	876	0.88	18	59
10	78	936	0.89	18	60
20	88	1056	0.91	18	61
40	108	1296	0.93	19	63
60	128	1536	0.96	19	64
Estimated Future Creep Settlement (mm)				2	6
Differential Creep Settlement (mm & ratio)				4 (1:2,000)	



Craven II

The highwalls for Craven II are represented on cross sections B-B' and D-D' (presented in Appendix A). Over a span of 10m, depth to rock head varies between 20.00m to 25.00m, 2.00m to 14.22m and 29.00m to 31.00m. Based on an alpha value of 0.2, differential settlement of the over highwall locations estimate to be approximately between 4mm (1:2,500), 8mm (1:1,250) and 1mm (1:10,000) for a 60-year design life. This assessment is presented in tables 5.5.15, 5.5.16 and 5.5.17 below.

Table 5.5.15 - Differential Creep Settlement ($\alpha = 0.2\%$) – Craven II - Highwall 1

Time Since Development Start	Time Since Infilling		Settlement (%)	Settlement (mm) for Thickness of MG (H) as Below	
	Years	Months		20.00	25.00
-	0	1	NA		
0	57	684	0.57	113	142
5	62	744	0.57	115	144
10	67	804	0.58	116	145
20	77	924	0.59	119	148
40	97	1164	0.61	123	153
60	117	1404	0.63	126	157
Estimated Future Creep Settlement (mm)				12	16
Differential Creep Settlement (mm & ratio)				4 (1:2,500)	

Table 5.5.16 - Differential Creep Settlement ($\alpha = 0.2\%$) – Craven II - Highwall 2

Time Since Development Start	Time Since Infilling		Settlement (%)	Settlement (mm) for Thickness of MG (H) as Below	
	Years	Months		2.00	14.22
-	0	1	NA		
0	57	684	0.57	11	81
5	62	744	0.57	11	82
10	67	804	0.58	12	83
20	77	924	0.59	12	84
40	97	1164	0.61	12	87
60	117	1404	0.63	13	90
Estimated Future Creep Settlement (mm)				1	9
Differential Creep Settlement (mm & ratio)				8 (1:1,250)	

Table 5.5.17 - Differential Creep Settlement ($\alpha = 0.2\%$) – Craven II - Highwall 3

Time Since Development Start	Time Since Infilling		Settlement (%)	Settlement (mm) for Thickness of MG (H) as Below	
	Years	Months		29.00	31.00
-	0	1	NA		
0	57	684	0.57	164	176
5	62	744	0.57	167	178
10	67	804	0.58	169	180
20	77	924	0.59	172	184
40	97	1164	0.61	178	190
60	117	1404	0.63	183	195
Estimated Future Creep Settlement (mm)				18	19
Differential Creep Settlement (mm & ratio)				1 (1:10,000)	



Farmhouse Lane

The highwalls for Farmhouse Lane are represented on cross sections F-F' and G-G' (presented in Appendix A). Over a span of 10m, depth to rock head varies between 4.50m to 7.80m and 2.00 to 11.50m. Based on alpha values of 0.9 and 1.0 differential settlement of the over highwall locations estimate to be approximately between 9mm (1:1,111) and 29mm (1:345) for a 60-year design life. This assessment is presented in tables 5.5.18 and 5.5.19 below.

Table 5.5.18 - Differential Creep Settlement ($\alpha = 0.9\%$) – Farmhouse Lane - Highwall 1

Time Since Development Start	Time Since Infilling		Settlement (%)	Settlement (mm) for Thickness of MG (H) as Below	
	Years	Months		4.50	7.80
-	0	1	NA		
0	60	720	2.57	116	201
5	65	780	2.60	117	203
10	70	840	2.63	118	205
20	80	960	2.68	121	209
40	100	1200	2.77	125	216
60	120	1440	2.84	128	222
Estimated Future Creep Settlement (mm)				12	21
Differential Creep Settlement (mm & ratio)				9 (1:1,111)	

Table 5.5.19 - Differential Creep Settlement ($\alpha = 1.0\%$) – Farmhouse Lane - Highwall 2

Time Since Development Start	Time Since Infilling		Settlement (%)	Settlement (mm) for Thickness of MG (H) as Below	
	Years	Months		2.00	11.50
-	0	1	NA		
0	60	720	2.86	57	329
5	65	780	2.89	58	333
10	70	840	2.92	58	336
20	80	960	2.98	60	343
40	100	1200	3.08	62	354
60	120	1440	3.16	63	363
Estimated Future Creep Settlement (mm)				6	35
Differential Creep Settlement (mm & ratio)				29 (1:345)	



Hunters Cottage

The highwalls for Farmhouse Lane are represented on cross sections C-C' and D-D' (presented in Appendix A). Over a span of 100m, depth to rock head varies between 1.00m to 9.45m, 2.50m to 11.00m and 6.00 to 14.50m. Based on alpha values of 0.4, 0.6 and 1.0 differential settlement of the over highwall locations estimate to be approximately between 19mm (1:5,263), 12mm (1:8,333) and 7mm (1:14,285) for a 50-year design life. This assessment is presented in tables 5.5.20, 5.5.21 and 5.5.22 below.

Table 5.5.20 - Differential Creep Settlement ($\alpha = 1.0\%$) – Hunters Cottage - Highwall 1

Time Since Development Start	Time Since Infilling		Settlement (%)	Settlement (mm) for Thickness of MG (H) as Below	
	Years	Months		1	9.45
-	0	1	NA		
0	70	840	2.92	29	276
5	75	900	2.95	30	279
10	80	960	2.98	30	282
20	90	1080	3.03	30	287
30	100	1200	3.08	31	291
50	120	1440	3.16	32	298
Estimated Future Creep Settlement (mm)				3	22
Differential Creep Settlement (mm & ratio)				19 (1:5,263)	

Table 5.5.21 - Differential Creep Settlement ($\alpha = 0.6\%$) – Hunters Cottage - Highwall 2

Time Since Development Start	Time Since Infilling		Settlement (%)	Settlement (mm) for Thickness of MG (H) as Below	
	Years	Months		2.5	11
-	0	1	NA		
0	70	840	1.75	44	193
5	75	900	1.77	44	195
10	80	960	1.79	45	197
20	90	1080	1.82	46	200
30	100	1200	1.85	46	203
50	120	1440	1.90	47	208
Estimated Future Creep Settlement (mm)				3	15
Differential Creep Settlement (mm & ratio)				12 (1:8333)	

Table 5.5.22 - Differential Creep Settlement ($\alpha = 0.4\%$) – Hunters Cottage - Highwall 3

Time Since Development Start	Time Since Infilling		Settlement (%)	Settlement (mm) for Thickness of MG (H) as Below	
	Years	Months		2.5	11
-	0	1	NA		
0	70	840	1.17	70	170
5	75	900	1.18	71	171
10	80	960	1.19	72	173
20	90	1080	1.21	73	176
30	100	1200	1.23	74	179
50	120	1440	1.26	76	183
Estimated Future Creep Settlement (mm)				6	13
Differential Creep Settlement (mm & ratio)				7 (1:14,285)	



Over the dimensions 100m by 50m, depth to rock head varies between 2.00m bgl and 10.00m bgl. Based on an applied load of 25kN/m² the minimum consolidation settlement has been calculated as approximately 7mm and the maximum consolidation settlement has been calculated as approximately 12mm. Therefore, the differential consolidation settlement for the ground floor slab of a commercial unit is estimated to be approximately 5mm (1:18,416) presented in Appendix E.

The total differential settlement for a ground floor slab combines the differential consolidation settlement and the worst-case differential creep settlement. It is assumed that the differential immediate settlement will be accommodated during the earthworks. Total differential settlement for a ground bearing floor slab has been calculated as approximately 25mm (1:4,000).

5.6 Roads, Pavements and Hardstanding Surfaces

Laboratory CBR values for the cohesive colliery spoil, residual soil and granular colliery spoil are typically >5%. It is recommended that a design CBR of 3% is adopted for pavement design for the re-engineered colliery spoil, assuming any soft spots at formation level are removed.

It is likely that for adoptable highways (Section 38 and Section 278), the local authority will require at least 3m of colliery spoil to be re-engineered below the footprint and two layers of geogrid to be placed at the base, no greater than 300mm apart, and below all services.

5.7 Excavations

On completion of the earthworks, excavations through the compacted materials and exposed natural ground are likely to be unstable over the construction period and temporary side support is likely to be required.

Occasional perched groundwater has been encountered at shallow depth within the southern half of the site and could potentially be encountered in excavations.

Good working practice with respect to drainage of excavations and formations will be required to protect materials. Any excavation for structural foundations must be covered without delay with blinding concrete to prevent softening by water.

The requirement for temporary support of excavations should be assessed on an individual basis and in any case, excavations of greater than 1.20m depth requiring man entry will require temporary support in accordance with HSE guidance. Alternatively, the sides of the excavation will need to be battered back for the safety of operatives. Guidance on safe batter slopes can be obtained from CIRIA Report 97 Trenching Practice.



5.8 Obstructions

Most of the site is open farmland and as such there is limited potential for near surface obstructions. However, it is noted that the colliery spoil materials do contain cobbles and boulders from the historically excavated bedrock material. An allowance for excavation and processing of this material for re-use on site should be made.

The majority of the existing Hermit House farm area is covered in hardstanding with potential for reinforced concrete. A small amount of hardstanding is noted in the south western corner of the site, adjacent to Higham Lane. As part of the earthworks, allowance may need to be made for the excavation and processing of these materials for re-use in the earthworks. In addition, breakers will be required for excavations in this area.

5.9 Chemical Attack on Buried Concrete

Laboratory testing has been undertaken on samples of the topsoil, colliery spoil, made ground and natural ground to determine the sulphate content and acidity and hence the concrete class required for buried concrete.

Laboratory testing in the topsoil, colliery spoil and made ground recorded water-soluble sulphate contents ranging between <10mg/l and 1100mg/l and pH values between 6.7 and 9.2.

In the natural strata, recorded water-soluble sulphate contents of 19mg/l and 51mg/l and pH values of 7.3 and 8.1.

Foundations are likely to come into contact with both the made ground and underlying natural ground. On this basis it is recommended that concrete should be designed to Aggressive Chemical Environment for Concrete (ACEC) Design Sulphate Class DS-1 and ACEC Class AC-1. This assessment has been made in accordance with BRE Special Digest 1: 2005, entitled 'Concrete in Aggressive Ground'.

5.10 Coal Mining Constraints

The coal seams and the likelihood of underground workings affecting the surface stability of the future development on the site have been assessed in relation to the three separate development areas:

- Employment land (southern third).
- Residential land adjacent to Pogmoor in the east, and
- Residential land (remainder of site).



The coal seams which are within influencing distance of the surface are indicated on the illustrative cross sections A-A' to G-G' and also the coal mining risks plan, JPG Drawing No. 4848-JPG-SW-XX-DR-G-1301, revision dated February 2021. These cross sections are presented in Appendix A. The assessment does not consider future changes in levels at the site, i.e. where significant areas of cut are required, the thickness of competent rock cover over the coal seam may be reduced. Therefore, this assessment should be repeated once final cut – fill levels are ascertained.

Employment Land (Southern Third)

Based on the proven coal seam information and recorded seam quality the likelihood of any underground workings is shown in Table 5.10.1 below.

Table 5.10.1: Likelihood of Underground Workings – Employment Land

Seams	Min Seam Depth (m)	Max Seam Thickness (m)	Seam Quality - based on SYMAS report	Likelihood of Underground Workings Affecting Surface Stability of Site (Low/Moderate/High)
Gawber	3.30	1.00	Inferior/ medium	Low to Moderate
Thin	15.50	0.30	Inferior	Low
Swallow Wood	8.10	1.60*	Good	Moderate
Top Haigh Moor	6.30	1.70	Medium/good	Moderate
Low Haigh Moor	14.60	1.90*	Medium/good	Low (below Hunters Cottage OCCS) Low to Moderate (to west of Hunters Cottage OCCS)

* - Including partings and the 2nd leaf

Based on the coal seam depths, seam thicknesses, seam quality and other recorded information, the Gawber, Swallow Wood, Top Haigh Moor and Low Haigh Moor coal seams are all considered pose a low to moderate risk of unrecorded underground workings and more investigation is required to confirm the presence or absence of workings in these seams outside the Hunters Cottage OCCS. The Coal Authority abandonment plan for the Hunters Cottage OCCS records old workings in the Top Haigh Moor coal seam (annotated as Swallow Wood Bottom) approximately 150m to the south east of the proposed employment land. No evidence of coal workings has been identified to date in any of the aforementioned coal seams.

The typical proven thickness of the Top Haigh Moor across the area is between 0.30m (BH125) and 1.70m (BH121). As there is some uncertainty over the coal seam encountered in BH122, this has been left out of this preliminary assessment. However, further mining investigation will be required in the area immediately to the north of the Hunters Cottage OCCS should development be proposed in this location.

The Low Haigh Moor is shown to split into two leaves towards the western boundary of the site (BH121). The possibility of both coal leaves having been extracted by underground methods cannot be dismissed at this stage.



Based on the recorded thicknesses of the Low Haigh Moor below the base of the Hunters Cottage OCCS, any coal workings (if present) would not have the potential to affect the surface stability of the site. However, it would be prudent to drill further boreholes to confirm that the Low Haigh Moor does not come within influencing depth.

It is recommended that further site investigation is carried out both to the east and west of the Hunters Cottage OCCS to confirm the absence of workings in the aforementioned coal seams.

There are no recorded mine entries on the site, although there remains a residual risk of unrecorded mine entries. Should an unrecorded mine entry be encountered, a suitably qualified person should be consulted.

Residential Land Adjacent to Pogmoor in the East

A summary of the intact coal seams and the likelihood of underground workings is provided in Table 5.10.2 below.

Table 5.10.2: Likelihood of Underground Workings - Pogmoor

Seams	Min Seam Depth (m)	Max Seam Thickness (m)	Seam Quality - Based on SYMAS Report	Likelihood of Underground Workings (Low/Moderate/High)
Barnsley	3.50	3.00	Very good	High
Thin/Unnamed	16.40	0.70	Inferior	Low
Dunsil	21.35	0.85	Inferior	Low
Gawber	28.00	0.40	Inferior /medium	Low
Thin	34.80	0.40	Inferior	Low

Recorded information suggests that the Barnsley seam was extensively extracted across the area, in old underground workings and then by opencast techniques. A maximum seam thickness of 3.00m was encountered in the land adjacent to Pogmoor. As part of the desk study, mine entries and adits were noted on the western side of the land adjacent to Pogmoor. The abandonment plans show underground workings were encountered on the eastern margin, extending beyond the highwall of the OCCS.

Due to the fact that the Barnsley coal seam was proven at very shallow depth, it remains a high risk of to the future development on the site where it remains on the western margin and also below the highwall in the east. However, it is possible that the coal is of inferior quality in the west, as it has not been previously extracted even though its presence at shallow depth was known (adits and mine entries proven).

The other coal seams (below the Barnsley) are considered to be too deep, too thin and/or of inferior quality to pose any risk of affecting the future development on the site.



Further investigation in relation to the Barnsley coal seam is recommended on the eastern and western margins. It may be possible that the Barnsley seam and associated mine entries can be removed as part of the earthworks based on their shallow depth. However, where any structure or highway straddles the highwall in the east, it is likely that drill and grout treatment will be required.

As detailed in the desk study report for the overall site area, there are recorded adits and mineshafts which require targeted investigation and possible treatment.

There is also the potential for unrecorded mineshafts and adits. Vigilance will be required during the earthworks operation and if a suspected mine entry is encountered, advice should be sought from a suitably qualified person.

Residential – Remainder of the Site

A summary of the coal seams is presented in table 5.10.3 below.

Table 5.10.3: Likelihood of Underground Workings – Remainder of the Site

Seams	Min Seam Depth (m)	Max Seam Thickness (m)	Seam Quality - based on SYMAS report	Likelihood of Underground Workings (Low/Moderate/High)
Gawber	6.00	1.00*	Inferior/medium	Moderate
Thin	18.50	0.80	Inferior	Low – moderate
Swallow Wood	7.20	1.10	Good	Moderate
Top Haigh Moor	17.50	1.60	Medium/good	Low
Low Haigh Moor	25.80	1.00	Medium/good	Low

* - Including partings and the 2nd leaf

It is not considered that underground coal workings below the base of the Craven I or Craven II OCCS have the potential to affect the surface stability of the site, if present. As no old workings are indicated on the abandonment plans for either the Craven I or Craven II OCCS, the potential for underground coal workings below the highwalls to these opencast sites is also considered to be low.

There remains a low to moderate risk elsewhere within this area, namely outside the opencasts and below the Hunters Cottage Extensions. In these areas further mining investigation will be required to confirm the absence of any workings.

Recorded mine entries (possible shallow coal pits) are indicated in the Hunters Cottage Extensions and proven during subsequent opencasting. It is possible that these old workings targeted the same seams as the opencasts, in which case they will have been removed as part of the opencast extraction. This will require confirmation through trial pitting/trenching and possibly rotary boreholes.

A pumping shaft (CA mineshaft ref. 432407-008) is annotated on the Craven II abandonment plan. The shaft has a recorded diameter of 0.91m, the centre of which is at NGR 432004.353, 407547.744. The shaft is reported to have been capped at a level of 87.88m AOD. This mineshaft will need to be located and treated as part of the enabling works for the site.



5.11 Geotechnical Risk Register

Table 5.11.4 shows details of the Geotechnical Risk Register for the remediation and construction for the entire site.

A risk register uses a qualitative approach and the following equation to determine the degree of risk per hazard.

$$\text{Degree of Risk} = \text{Likelihood} \times \text{Effect}$$

The likelihood and the scale of effect are determined using tables 5.11.1 and 5.11.2 respectively, which together provide the degree of risk, table 5.11.3.

Table 5.11.1: Scale of Likelihood

Likelihood (L)	Scale
Very Likely	4
Likely	3
Unlikely	2
Negligible	1

Table 5.11.2: Scale of Effects

Effect (E)	Scale
Very High	4
High	3
Low	2
Very Low	1

Table 5.11.3: Degree of Risk

Degree of Risk	Risk Level	Recommended Response
1 to 4	Trivial	None
5 to 8	Significant	Consider attention
9 to 12	Substantial	Attention required
16	Intolerable	Work must not start until risk is reduced

**Table 5.11.4: Geotechnical Risk Register – Based on Preliminary Findings**

No.	Hazard	Risk/ undesirable consequence	Risk assessment (current)				Practicable mitigation	Risk assessment (mitigation)			
			L	E	R	Risk level		L	E	R	Risk level
1	Deep untreated colliery spoil.	Damage caused by consolidation, creep and differential settlement of proposed structures.	3	3	9	Substantial	Treatment/re-engineering of the top few metres of the colliery spoil should reduce the effects of settlement. Consideration should be given to other treatment options, e.g. surcharging or dynamic compaction, in order to reduce the risk further.	2	2	4	Trivial
2	Rebounding groundwater	Damage caused by inundation settlement.	2	3	6	Significant	Further assessment of groundwater regime within and outwith the OCCSs.	1	3	3	Trivial
3a	Shallow Groundwater	Excavations becoming unstable, softening of materials and moisture content of site won materials increasing.	2	3	6	Significant	Measures put in place to control water and protect the formation from water. Observation of cut faces for any seepages, if noted slope drainage is required.	1	2	2	Trivial
3b		Failure of slopes	2	3	6	Significant		1	3	3	Trivial
4	Coal mining	Unrecorded underground mine workings / mine entries (shafts and adits)	3	3	9	Substantial	Further site investigation is recommended. Shafts and shallow seams to be treated. Near surface coal seams to be removed as part of the earthworks.	1	2	2	Trivial
5	Unexpected strata	Unexpected ground conditions may require a change in design approach.	2	3	6	Significant	Further site investigation recommended.	1	3	3	Trivial
6	Fill material not achieving desired strength	Damage to foundations due to settlement (total and differential) and/or failures of slopes/embankments	3	3	6	Significant	Further assessment of material properties. An earthworks specification should be published and followed.	1	3	3	Trivial



6.0 ENVIRONMENTAL RISK ASSESSMENT

6.1 Introduction

Legislation and guidance on the assessment of contaminated sites acknowledges the need for a tiered risk based approach comprising:

- Tier 1 Assessment** Comparison of site contaminant concentrations against generic assessment criteria (GAC), i.e. a generic quantitative risk assessment (GQRA). Including an assessment of risk using the source-pathway-receptor model.
- Tier 2 Assessment** Derivation of site specific risk assessment criteria and calculation of site specific clean up goals, i.e. a detailed quantitative risk assessment (DQRA).

A Tier 1 Assessment has been completed; however, a Tier 2 Assessment has not been undertaken as part of this report.

The statutory definition of contaminated land is given in the Environmental Protection Act, Part IIA, Section 78, 1990, which was introduced by the Environment Act, Section 57, Department of Environment, 1995 and is defined as:

Land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land that:

- Significant harm is being caused or there is a significant possibility of such harm being caused (where harm is defined as harm to health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property); and/or
- Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused (by the land).

The presence of contaminated materials on a site is generally only of concern if an actual or potentially unacceptable risk exists. The potential for harm to occur requires three conditions to be satisfied:

- Sources – The presence of substances (potential contaminants/pollutants), in or under the ground, that may cause harm or pollution.
- Receptors - The presence of a receptor which may be harmed, e.g. the water environment or humans, buildings, fauna and flora; and
- Pathway - The existence of a linkage between the Source and the Receptor.

In order to assess the contamination risk at the site, the above rationale has been applied and is discussed in the context of Contamination Sources and Potential Pollutant Linkages.



In summary, the presence of measurable concentrations of contaminants within the ground and sub-surface environment does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and an unacceptable risk of harm to available receptors.

The nature and importance of both pathways and receptors, which are relevant to a particular site, will vary according to the sensitivity of the intended end use of the site and the sites characteristics and environmental setting.

6.2 Assessment Approach

The results of the chemical analysis for each determinand will be assessed against their respective GAC.

These include the LQM/CIEH Suitable 4 Use Levels (S4UL) and Category 4 Screening Levels (C4SL) which were developed using the UK Contaminated Land Exposure Assessment (CLEA) Framework Documents and Software.

The CLEA model uses generic assumptions about the fate and transport of chemicals in the environment and a generic conceptual model (referred to as generic land use scenarios) for site conditions and human behaviour, to estimate child and adult exposures to soil contaminants for those living, working and/or playing on contaminated sites over long time periods.

The S4UL and C4SL screening levels have been derived for a variety of land uses including residential, allotments, commercial and public open space.

In the absence of S4UL and C4SL for potential contaminants, appropriate alternative GAC will be used.

Controlled Waters

No standards currently exist in the UK which provides threshold values for potential contamination in groundwater. Alternative guidance is therefore used, against which the significance of potential contaminants can be assessed.

The results of the leachate analyses will be compared to the same standards as for groundwater.

6.3 Evaluation of Soils Analysis

Initially, the results of the chemical analysis for each potential contaminant will be compared directly with their respective GAC. Based on the current development proposals for the site, i.e. mixed use, including residential and commercial, the results of the chemical analysis for the soil samples have been assessed against GAC for a residential with home grown produce end use.

If any significant exceedences of the GAC are noted, then the results will be subject to statistical analysis. An outline of the methodology of the statistical analysis is presented in Appendix C.



In total, 21 samples, 12 of topsoil, two of the colliery spoil capping layer, six of the colliery spoil and one of made ground, were submitted for chemical analysis.

Human Health

The results have been compared directly with their respective GAC. The results are summarised in Table 6.3.1 below.

Table 6.3.1 – Summary of Chemical Analysis Results

Determinand	GAC for Residential with Home Grown Produce End Use (mg/kg)	Sample Mean (mg/kg)	Range of Results (mg/kg)	Do any samples exceed the GAC?
Arsenic	37(1)	11.09	2.70 – 23.00	No
Cadmium	11(1)	0.16	<0.10 – 0.30	No
Chromium	910(1)	18.25	8.20 – 26.00	No
Hexavalent Chromium	6(1)	1.00	<1.00	No
Copper	2,400(1)	30.67	20.00 – 63.00	No
Lead	200(2)	34.24	14.00 – 68.00	No
Mercury	40(1)	0.07	0.05 – 0.13	No
Nickel	180(1)	23.52	11.00 – 39.00	No
Selenium	250(1)	0.51	<0.50 – 0.70	No
Zinc	3,700(1)	90.00	40.00 – 150.00	No
Cyanide (free)	20(3)	0.14	<0.10 – 0.50	No
Total Phenols	120(1)	0.38	<0.30 – 1.00	No
Naphthalene	2.3 f (1)	<0.10	<0.10	No
Acenaphthylene	170 (1)	0.11	<0.10 – 0.20	No
Acenaphthene	210 (1)	<0.10	<0.10	No
Fluorene	170 (1)	0.10	<0.10 – 0.10	No
Phenanthrene	95 (1)	0.17	<0.10 – 1.10	No
Anthracene	2,400 (1)	0.11	<0.10 – 0.40	No
Fluoranthene	280 (1)	0.30	<0.10 - 2.50	No
Pyrene	620 (1)	0.28	<0.10 - 2.30	No
Benzo(a)anthracene	7.2 (1)	0.19	<0.10 – 1.30	No
Chrysene	15 (1)	0.19	<0.10 - 1.50	No
Benzo(b)fluoranthene	2.6 (1)	0.19	<0.10 – 0.90	No
Benzo(k)fluoranthene	77 (1)	0.15	<0.10 - 0.70	No
Benzo(a)pyrene	2.2 (1)	0.16	<0.10 – 1.10	No
Indeno(1,2,3-c,d)pyrene	27 (1)	0.13	<0.10 – 0.70	No
Dibenzo(a,h)anthracene	0.24 (1)	0.10	<0.10 – 0.10	No
Benzo(g,h,i)perylene	320 (1)	0.13	<0.10 – 0.70	No

(1) S4UL, (2) C4SL, (3) DUTCH

None of the above determinands were detected at concentrations in excess of their respective GAC.

Six samples were submitted for analysis for organochlorine pesticides, organophosphorus pesticides and triazine herbicides. No elevated concentrations of pesticides or herbicides were detected above their respective laboratory limits of detection.

Nine samples were submitted for an asbestos screen. No asbestos fibres or asbestos containing materials were detected in any of them samples.



Calorific value (CV) tests were carried out on nine samples of colliery spoil, one of made ground and one of residual soil. The test results ranged between <math><1.0\text{MJ/kg}</math> and

Based on the limited testing carried out to-date, it is considered that the existing topsoil is suitable for re-use in future gardens and/or POS.



6.4 Evaluation of Controlled Waters Analysis

Six samples were submitted for leachability analysis. The result for each determinand was compared directly against their respective GAC. The results are summarised in Table 6.4.1 on the following page.

Table 6.4.1 – Summary of Leachability Results

Determinand	GAC (µg/l)	TP101 (0.00 – 0.20)	TP103 (0.00 – 0.25)	TP108 (2.60 – 2.70)	TP111 (2.00 – 2.20)	TP112 (2.20 – 2.40)	TP113 (0.00 – 0.40)
Arsenic	50 (1)	0.27	<0.16	0.19	1.2	0.28	0.21
Cadmium	5 (1)	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chromium	50 (1)	0.33	2.7	<0.25	3.2	<0.25	1.9
Copper	2000 (1)	0.8	3.1	<0.4	1.5	<0.4	1.5
Lead	10 (1)	0.26	0.27	<0.09	0.16	<0.09	0.2
Mercury	1 (1)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	20 (1)	<0.5	<0.5	0.5	<0.5	<0.5	<0.5
Selenium	10 (1)	0.3	<0.25	<0.25	<0.25	<0.25	<0.25
Zinc	5000 (1)*	2.8	1.6	4.2	2.5	2.8	13
pH	6.5 – 9.5 (1)	6.7	6.5	7.6	8.8	8.7	6.3
Cyanide Free	50 (1)	<20	<20	<20	<20	<20	<20
Sulphate	250000 (1)	4	1.8	24	6.8	3.6	2.2
Naphthalene	4.24 (2)	<0.05	<0.05	0.06	<0.05	0.05	<0.05
Anthracene	0.193 (2)	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Fluoranthene	0.0122 (2)	<0.01	<0.01	<0.01	0.02	0.01	<0.01
Benzo (a) pyrene	0.1 (1)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sum of: Benzo (b) fluoranthene, Benzo (k) fluoranthene, Indeno (1,2,3-c,d) pyrene, and; Benzo (g,h,i) perylene.	0.1 (1)	<0.04	<0.04	<0.04	<0.05	<0.04	<0.04
Phenol	14.9 (2)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

(1) Water Supply (Water Quality) Regulations 2000.

*Historical 1989 Threshold Value.

(2) Water Framework Directive 2015, Surface Water, Maximum Threshold Value.



One elevated concentration of potentially leachable fluoranthene was recorded within TP111 (0.02µg/l). The sample consisted of granular colliery spoil.

6.5 Evaluation of Hazardous Gases

Based on the desk study information and ground conditions encountered, i.e. topsoil overlying colliery spoil with shallow coal seams also present, it is considered that there is potential for the presence of hazardous gases on the site.

6.6 Ground Gas Monitoring

In order to assess the potential risks posed to the proposed development from hazardous gases, monitoring wells were installed in seven of the rotary open hole boreholes.

Ground gas monitoring has been undertaken on six occasions. The works were carried out using a portable infra-red gas meter in accordance with the standard JPG methodology and included the measurement of methane, carbon dioxide, oxygen, hydrogen sulphide, carbon monoxide, gas flows and atmospheric pressure.

6.7 Summary of Results

The results of the gas monitoring are presented on the site visit record sheets in Appendix F and are summarised below:

- A maximum methane concentration of 0.1% v/v was recorded during visits 3, 4, 5 and 6 for BH101, BH109A and BH111C.
- Carbon dioxide has been recorded in all of the monitoring wells, maximum steady concentrations ranged between 1.1% v/v and 24.4% v/v.
- Reduced oxygen concentrations (i.e. <16% v/v) were recorded in all of the monitoring visits in BH101, BH102, BH105A, BH106 and BH111C. The lowest recording being 0.1% v/v.
- A maximum peak and steady flow of 0.4 l/hr was recorded in BH102.

Four of the monitoring visits were carried out during periods of regionally falling atmospheric pressure, the remaining two were carried out during periods of regionally rising atmospheric pressure. Barometric pressures during the monitoring period ranged between 979mB and 1012mB.

6.8 Requirements for Gas Protection Measures

The results of the gas monitoring have been assessed in accordance with the following:

- BS8485:2015, 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'.



A maximum steady concentration of carbon dioxide (CO₂) of 24.4% v/v was recorded in BH105A during the third monitoring visit. The other visits identified carbon dioxide above 5% v/v within BH101, BH102, BH106 and BH111C. The source of the carbon dioxide is considered to be the colliery spoil within the backfilled opencast sites.

Based on the maximum steady concentration of CO₂ and the maximum steady flow. The Gas Screening Value (GSV) for carbon dioxide is 0.098 l/hr. Based on this result, and the elevated concentrations (>5% v/v) of CO₂ recorded on the site, the site would be classified as Characteristic Situation (CS) 2 in accordance with BS8485:2015.

It should be noted that the proposed development includes residential developments and commercial units with offices.

Further ground gas monitoring is required to confirm that the ground gas regime is no worse than CS 2 across the site.

6.9 Radon Risks

The site is located in a radon affected area, as between 1% and 3% of properties are above the action level. Based on this information, no radon protective measures are therefore required in the construction of new dwellings or extensions in these areas.

6.10 Summary of Sources, Pathways and Receptors

Sources

Based on the results of the analysis carried out, the following potential sources of contamination are considered to be present on the site:

- Potentially combustible cohesive made ground.
- Slightly elevated concentrations of potentially leachable PAH species (fluoranthene).
- Hazardous ground gases.

Pathways

Based on the available information and the proposed development of the site for a mixed end use, the following potential exposure pathways will require consideration, both during the development works and on completion of the construction.

- Potential for combustion of made ground, as a result of heat/ignition sources within areas of soft landscaping.
- Leaching/migration of potential contaminants from soil into groundwater and surface water via groundwater and surface water flow.
- Inhalation of hazardous gases.



Receptors

The potential receptors are considered to be:

- Development workers and future maintenance workers involved in excavations, e.g. foundations or where services are being installed or repaired following development.
- Future end users of the site (e.g. residents, general public and employees).
- Groundwater in the underlying Secondary A Aquifer (bedrock).
- Nearby surface waters; and,
- Buildings and services

6.11 Source – Pathway – Receptor Linkages

Based on the above potential sources, pathways and receptors, the following linkage assessments have been considered. A conceptual site model illustrating the pollutant linkages at the site is presented as Figure 5 in Appendix A and discussed below.

This assessment is based on current site conditions (unless stated) and does not consider exposure pathways following any further works on the site.

Development Workers and Future Maintenance Workers

Based on the sources of potential contamination which have been identified on the site, there is a risk to development and maintenance workers involved in groundworks at the site. There is the potential for exposure to the following:

- Elevated concentrations of hazardous ground gases (carbon dioxide).

Future End Users of the Site

There is potential for exposure to the following:

- Potentially combustible made ground.
- Elevated concentrations of hazardous ground gases (carbon dioxide).

Groundwater in the Underlying Aquifers and Nearby Surface Watercourse

Based on the site in its current condition, there is potential for exposure to the following:

- Slightly elevated concentrations of potentially PAH species (fluoranthene) within the soils.



An assessment of risk to controlled waters should consider the environmental setting of the site, which is summarised below:

- The Water Supply (Water Quality) Regulations, from which the majority of the GAC for leachate have been derived is considered to be conservative when applied to an assessment of controlled waters. They are based on the concentrations of potential contaminants at the point of use, i.e. consumers' taps.
- There are several 'Inland Rivers' on the site, including two streams in the east.
- The shallow ground comprises firm to very stiff cohesive residual soil and backfilled opencast overlying the bedrock. The colliery spoil is predominantly cohesive in nature. The cohesive residual soil and colliery spoil will limit the downward migration of potential contaminants to the underlying Principle and Secondary B Aquifer.
- There are no active groundwater abstraction licences within 1km of the site. The site does not lie within an Environment Agency Groundwater Source Protection Zone.
- The nature of the proposed development comprises residential housing with a school, an area for industrial/ commercial units and associated areas of hard cover and road networks. The development also includes balancing ponds (SUDS). The buildings and hard cover will form a barrier to the downward migration of rainwater and therefore reduce the potential for infiltration and leaching of potential contaminants.

Bases on the factors above, i.e. the presence of cohesive residual soil and colliery spoil, which will act as a barrier to limit the downward migration of potential contaminants and absence of significant water receptors, it is concluded that there are no plausible linkages to controlled water receptors. Therefore, the risk to controlled waters is considered to be low.

Buildings and Services

Recommendations with respect to the chemical attack on buried concrete are given section 5.8.

6.12 Mitigation Measures

In order to mitigate the risks posed by the potential contaminants which are present on the site, consideration should be given to the following mitigation measures.

Development and Maintenance Workers

- Site workers involved in groundworks should take the necessary measures to ensure that all works in excavations and confined spaces are carried out in accordance with best practice in order to prevent exposure to potentially hazardous gases.
- Site workers involved in groundworks should use appropriate PPE, i.e. overalls and gloves. Appropriate health and safety measures, e.g. washing hands prior to eating or drinking, should also be enforced.



- During development of the site, all workers should remain vigilant to the possible risk of encountering areas of potentially contaminated material. Should potentially contaminated material be encountered, site management should be informed. Further testing may then be required to assess the risk to health and safety of the site workers and the environment.
- All employers involved in works at the site should produce an appropriate method statement and risk assessment, to which all employees should comply, e.g. working in confined spaces. Reference should also be made to the appropriate HSE and other guidance for working on contaminated and potentially contaminated sites.

Future Site Users

No made ground soils with elevated calorific value (>2MJ/kg) shall remain within 1.00m of finished ground level in any gardens or soft landscaping. Confirmatory testing will be required as part the earthworks in order to confirm that the soils retained within 1.00m of the finished surface are not potentially combustible.

It is recommended that a sufficient thickness of clean cover soils is placed in future landscaped areas. Chemical test results indicate that the existing topsoil is suitable for re-use on the site. Any imported or site-sourced material will need to be tested to confirm its suitability for use. In addition, any topsoil and subsoil which is to be used on site should not contain any manmade debris, e.g. brick, concrete or metal.

Mitigation measures against the ingress of hazardous gases into buildings are presented in Section 6.8 of this report.

6.13 Classification of Materials for Disposal Off-Site

21 samples (12 of topsoil, two of the capping layers, six of the colliery spoil and one of made ground), were assessed using HazWasteOnline™ in order to determine the classification of the materials for disposal off-site.

Based on the results of the chemical analysis, all the samples can be classified as non-hazardous.

Details of the classification generated by HazWasteOnline™, is presented in Appendix C.

The results of the chemical analysis and the waste classification should be forwarded to the landfill operator to confirm this assessment and provide a price for disposal.



7.0 FURTHER WORKS

It is recommended that further ground investigation is carried out in order to further assess potential environmental and geotechnical constraints to the development and confirm the preliminary recommendations set out in this report.

The scope of works below is designed to provide a more detailed review of the site and to target areas of concern identified within this preliminary investigation.

- Rotary boreholes to target areas of uncertainty regarding unrecorded underground coal mine workings.
- Targeted mine entry investigation regarding recorded mine entries on the site.
- Delineation of the opencast highwalls using geophysics, rotary open hole probing and trial trenching.
- Trial pits across the site in order to obtain more samples to submit for geotechnical and chemical testing.
- Cable percussion boreholes with in-situ testing, to provide further geotechnical parameters and to obtain undisturbed geotechnical samples. Gas and groundwater monitoring wells to be installed in selected boreholes.
- Quarterly monitoring of extensometers to be continued as long as possible to inform creep settlement assessment.
- Static cone penetration testing to assess the in-situ geotechnical parameters.
- Slope stability assessment of the existing slopes, especially those which will be subject to cut and fill, potentially exposing slip surfaces, or surcharging of unstable slopes.
- Further chemical analysis of soil and water samples in order to confirm the concentrations of potential contamination on the site and classify selected materials for disposal offsite.
- Further geotechnical & chemical testing to classify materials and inform foundation design.
- Further ground gas monitoring of monitoring installations will be required.
- Further assessment of the groundwater regime below the site, to include groundwater contours.
- Embankment testing is recommended to assess the effects of raising ground levels in areas of fill and also the effectiveness of surcharging in relation to future settlement.



Appendix A Figures/Drawings

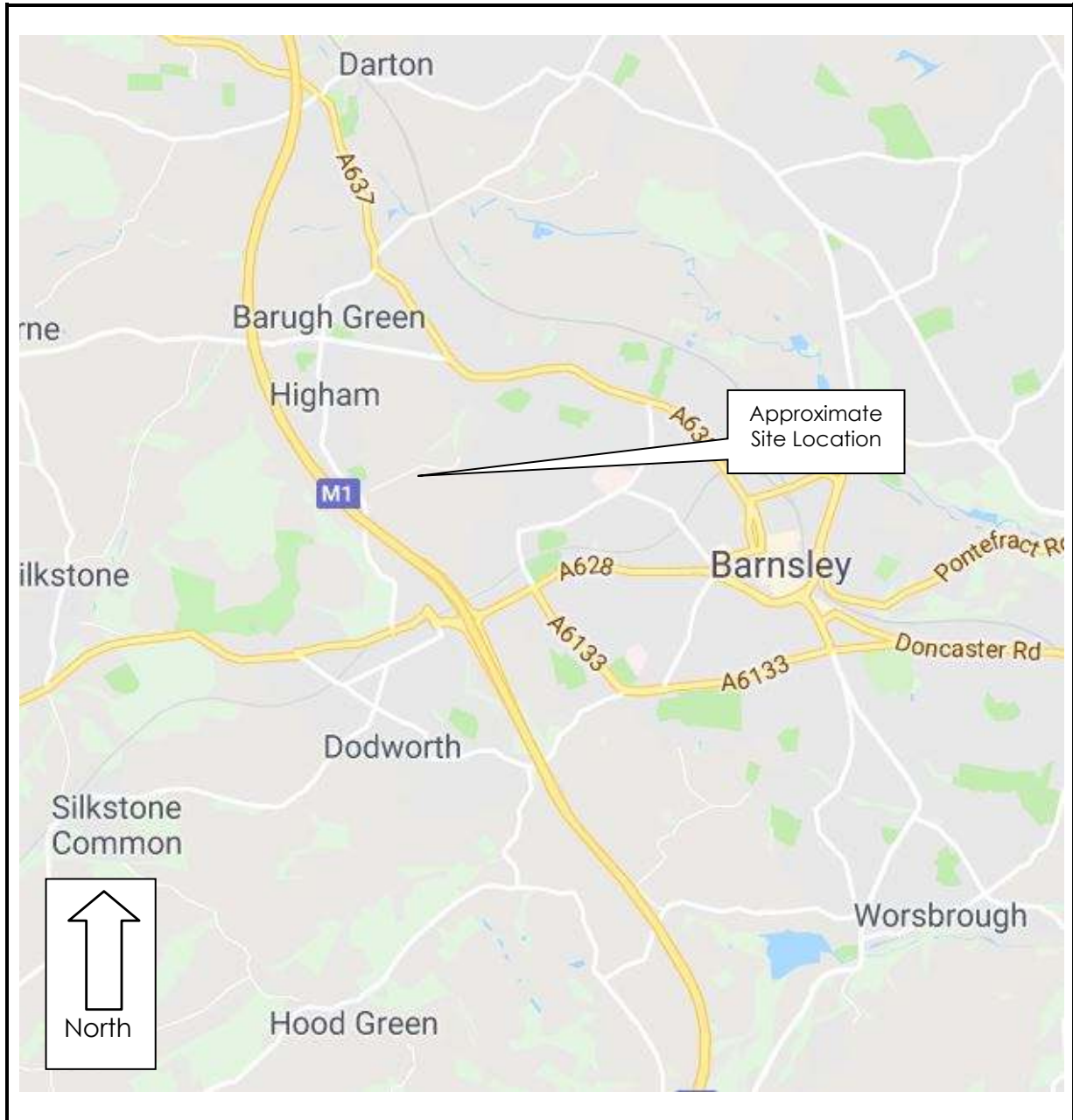


Figure 1 – Site Location Plan

Site	Barnsley West
Client	Strata Sterling Barnsley West Ltd
Job Number	4848
Scale	NTS

Figure 2: SPT N Value (Extrapolated) vs Depth (m bgl)

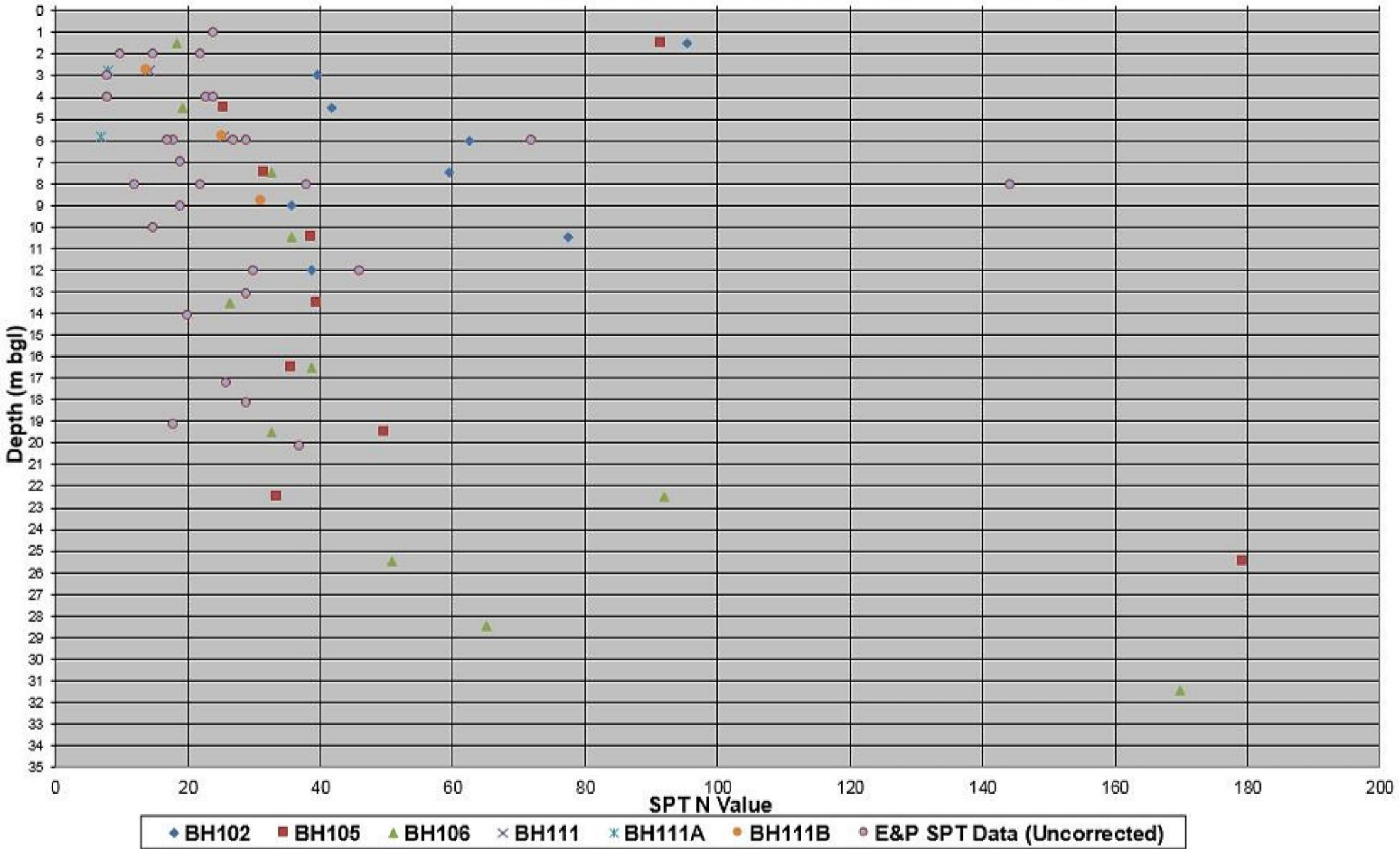


Figure 3: Plot of Moisture Condition Value vs Moisture Content

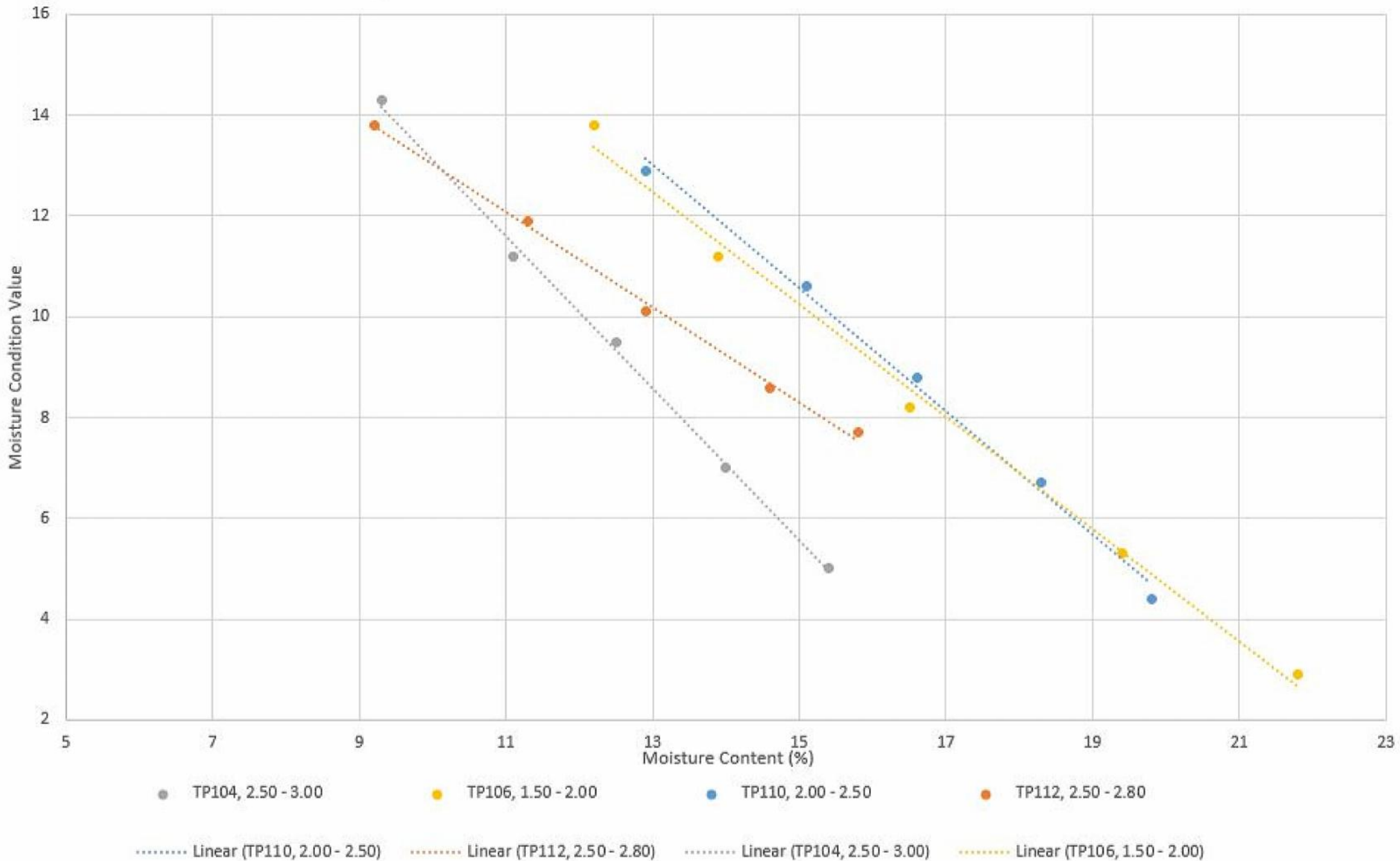
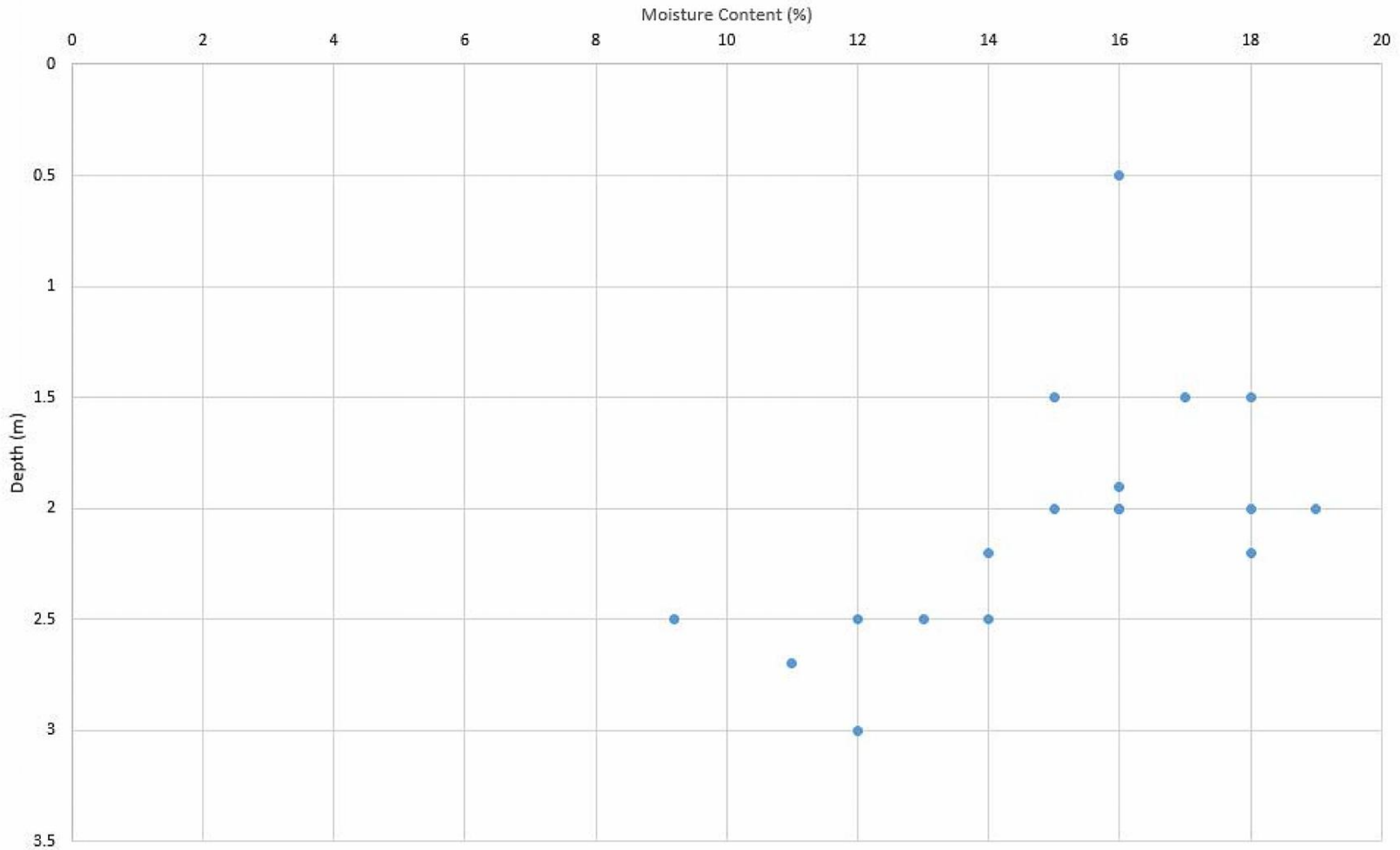


Figure 4: Moisture Content v Depth



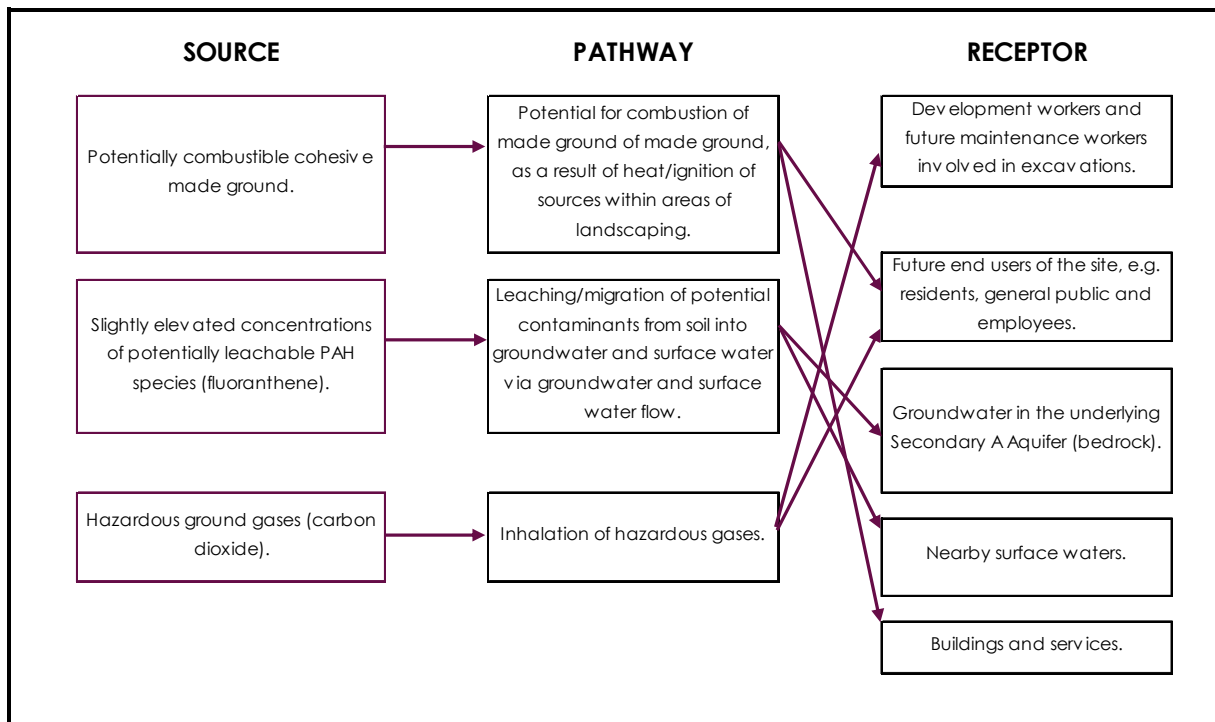
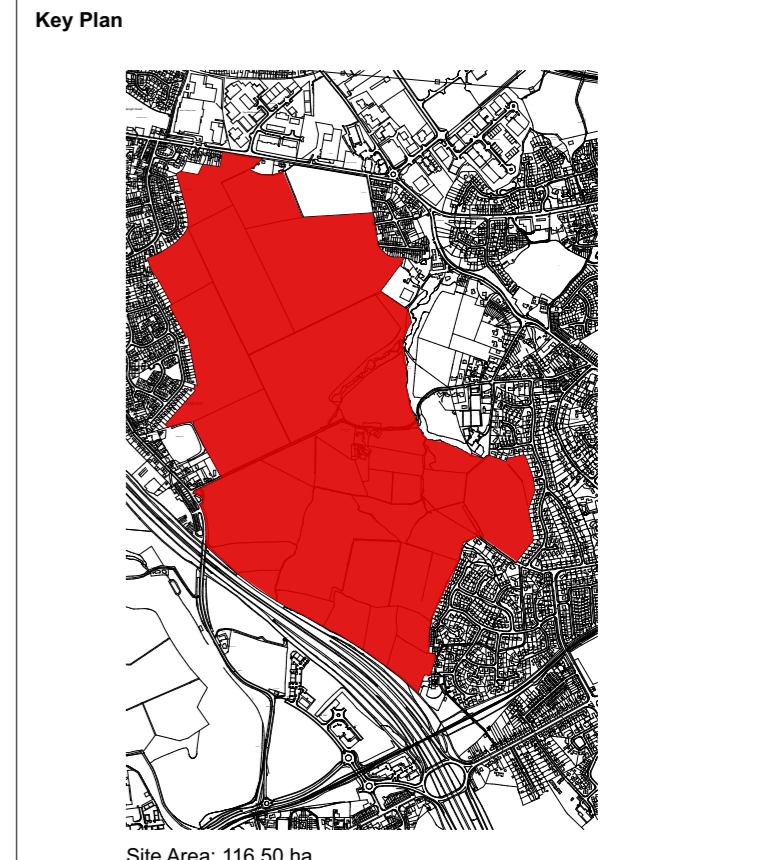
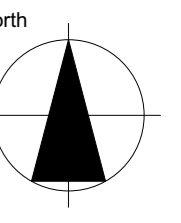
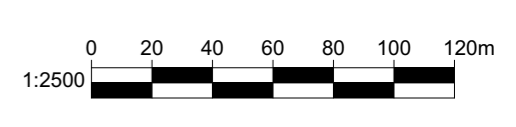


Figure 5 – Conceptual Site Model

Site	Barnsley West
Client	Strata Sterling Barnsley West Ltd
Job Number	4848



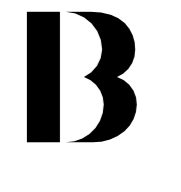
- Key**
- Local Plan Boundary
 - Private Garden
 - Public Landscape
 - Highway - Roads & Side Walk
 - Homezone
 - Formal Play
 - Informal Play
 - Existing Pedestrian Access
 - ⇄ Proposed Pedestrian Access
 - 1 Commercial
 - 2 School
 - 3 Employment Zone



Note:
The drawing is based upon survey information provided by others, no guarantee of its accuracy can be given.

P05	Consultation issue.	AS	TR	12/05/21
P04	Consultation issue.	YF	TR	11/05/21
P03	Revised layout to suit proposed levels	AG	TR	11/09/19
P02	Consultation issue	AG	TR	12/08/19
P01	First issue	AM	TR	02/08/19

rev	description	drawn	checked	date
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BOND BRYAN

The Church Studio Springvale Road Sheffield S10 1LP
 t 0114 266 2040
 e info@bondbryan.co.uk
 w www.bondbryan.co.uk

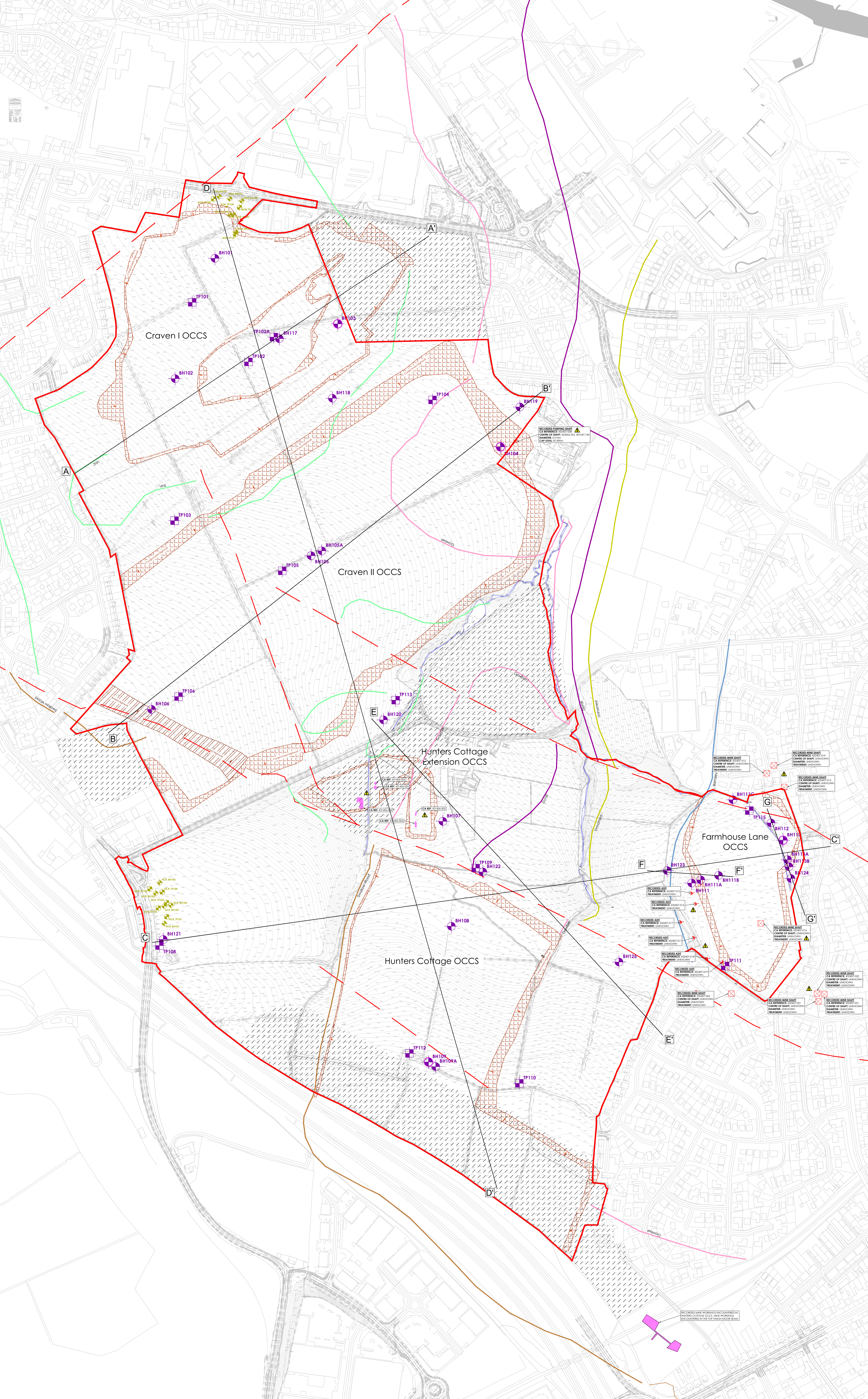
Strata Sterling Barnsley West Ltd

Barnsley West Masterplan

Proposed Site Plan

Originator project ref	Purpose of Issue
19028	CONSULTATION
Scale(s)	Status
1:2500	S2 SUITABLE FOR INFORMATION
Paper size	Revision
A1	P05 PRELIMINARY

project	originator	volume	level	type	role	number	status	revision
BWM	BBA	ZZ	XX	DR	A	1004	S2	P05



LEGEND

- Denotes areas not included in the site investigation
- Denotes conjectured highwall location (arrow indicating dip direction)
- Denotes conjectured buried highwall location (arrow indicating dip direction)

PROJECTED HIGHWALLS HAVE BEEN ESTABLISHED USING HISTORICAL OPENCAST MINE ABANDONMENT PLANS:
 GEOLOGICAL SURVEY MAP 110300 SHEET 5303W (BARBULEY) - HUNTERS COTTAGE & EXTENSION, FARMHOUSE LANE COALLEY - NO. 2 MINE - BARBULEY BED PILLAR, N.E.15 FARM HOSE LANE PRIVATE OPENCAST SITE.
 FURTHER SITE INVESTIGATION IS REQUIRED TO CONFIRM HIGHWALL LOCATIONS.

- Conjectured fault
- Conjectured Barnsley Seam outcrop
- Conjectured Dunsley Seam outcrop
- Conjectured Gawber Seam outcrop
- Conjectured Thin Seam outcrop
- Conjectured Swallow Wood Seam outcrop
- Conjectured (unnamed) seam above Dunsley seam

COAL SEAM OUTCROPS HAVE BEEN DETERMINED USING BRITISH GEOLOGICAL SURVEY MAP 110300 SHEET 5303W (BARBULEY) OR SEAM OUTCROPS RECORDED IN OCCS ABANDONMENT PLANS WHERE POSSIBLE.

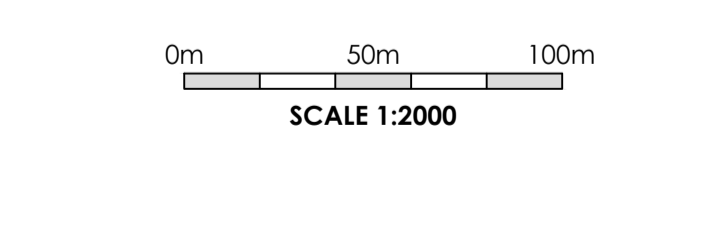
- Recorded mine entry
- Recorded mine entry - adit
- Recorded mine workings encountered during opencast extraction

JPG GROUP - 2020
(S278 GROUND INVESTIGATION)

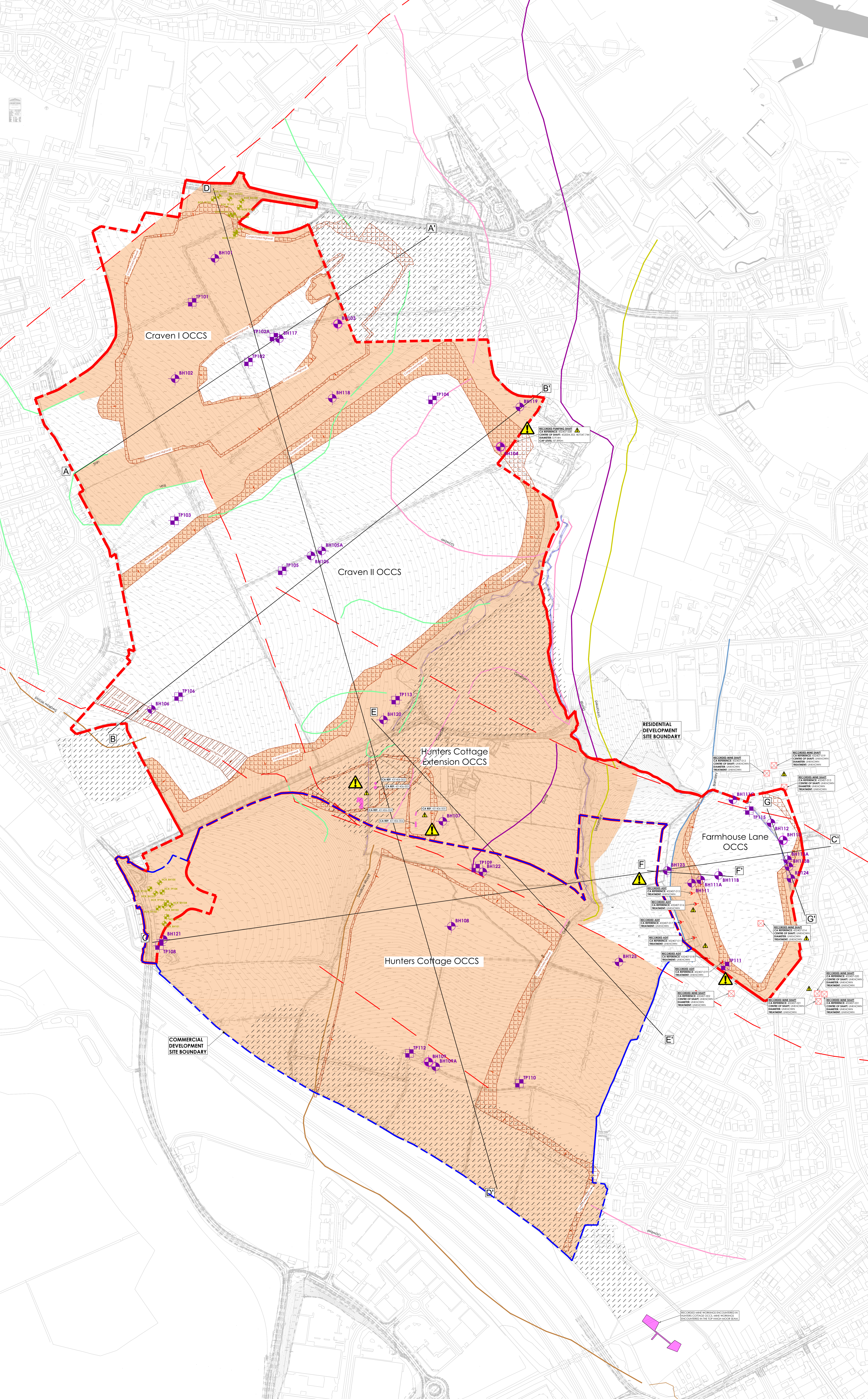
- Rotary borehole location
- Trial pit location

JPG GROUP - 2019
(PRELIMINARY GROUND INVESTIGATION)

- Rotary borehole location
- Rotary borehole location with subsurface highwall
- Trial pit location



P04	ADDITION OF S278 INVESTIGATIONS	24.02.21	CLT	CLT
P03	GENERAL DRAWING UPDATE	29.10.20	CLT	LSG
P02	AMENDED RED-LINE BOUNDARY	31.07.19	CLT	CLT
P01	FIRST ISSUE	17.07.19	CLT	CLT
REV	DESCRIPTION	DATE	CHK	BY
Project: BARNSELY WEST				
Drawing Title: EXPLORATORY HOLE LOCATION PLAN (AS BUILT)				



GENERAL NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, M & E CONSULTANTS AND JPG CONSULTANTS DRAWINGS & REPORTS.
- ANY DISCREPANCIES SHOULD BE REPORTED TO THE ENGINEER IMMEDIATELY SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO COMMENCEMENT OF WORKS.
- EXTENT OF RISK AREA HAS BEEN GENERATED FROM A CONCEPTUAL GROUND MODEL AND GROUND CONDITIONS MAY DIFFER TO WHAT HAS BEEN SHOWN.
- PROJECTED SEAM OUTCROPS AND COAL SEAM THICKNESS ARE LIKELY TO DIFFER TO RECORDED INFORMATION; FURTHER SITE INVESTIGATION IS REQUIRED TO CONFIRM.

LEGEND

- Denotes areas not included in the site investigation
- Denotes conjectured highwall location (arrow indicating dip direction)
- Denotes conjectured buried highwall location (arrow indicating dip direction)
- Denotes conjectured area of potential shallow coal mine workings within influencing depth*

PROJECTED HIGHWALLS HAVE BEEN ESTABLISHED USING HISTORICAL OPTICAL WIRE PHOTOGRAMMETRY PLANS: OECOMP/03/011 - CRAVEN I & OECOMP/03/021 - HUNTERS COTTAGE & EXTENSION; FARMHOUSE LANE COALPIE; NO. 2 MINE - BARNSELY RED PILLARS; NE.415 FARMHOUSE LANE PRIVATE OPERCAST SITE.

*AREAS OF POTENTIAL SHALLOW COAL MINE WORKINGS WITHIN INFLUENCING DEPTH OF SURFACE LEVEL ARE INDICATED WITHIN THE RED LINE BOUNDARY ONLY. MAXIMUM RECORDED COAL SEAM THICKNESS USED TO DETERMINE AREA OF RISK. THE MAXIMUM RECORDED COAL SEAM THICKNESS HAS BEEN ESTABLISHED USING JPG 2019 INTRUSIVE SITE INVESTIGATION FINDINGS AND HAVE BEEN STATED IN REPORT REF: 1848-JPG-XX-XX-DR-G-02/11 - PRELIMINARY GEOTECHNICAL GROUND INVESTIGATION.

THE MAXIMUM RECORDED COAL SEAM THICKNESS USED ARE AS FOLLOWS (IN SEQUENCE ORDER):

- UNNAMED SEAM: 0.70m
- DUNBELL SEAM: 1.00m
- GAWBER SEAM: 1.00m
- SWALLOW WOOD SEAM: 1.60m
- TOP HATCH WOOD SEAM: 1.20m
- LOW HATCH WOOD SEAM: 1.90m
- LOCUST SEAM: 1.20m (TAKEN FROM BGS RECORDS)
- JOAN SEAM: 0.41m (TAKEN FROM BGS RECORDS)
- FLOCTION THICK SEAM: 2.6m (TAKEN FROM BGS RECORDS)

COAL SEAM OUTCROPS HAVE BEEN DETERMINED USING BRITISH GEOLOGICAL SURVEY MAP 1:10000 SHEET S278 BARSELEY OR SEAM OUTCROPS RECORDED IN OCCS ABANDONMENT PLANS WHERE POSSIBLE.

- CONJECTURED FAULT
- CONJECTURED BARNSELY SEAM OUTCROP
- CONJECTURED DUNBELL SEAM OUTCROP
- CONJECTURED GAWBER SEAM OUTCROP
- CONJECTURED THIN SEAM OUTCROP
- CONJECTURED SWALLOW WOOD SEAM OUTCROP
- CONJECTURED UNNAMED SEAM ABOVE DUNBELL SEAM

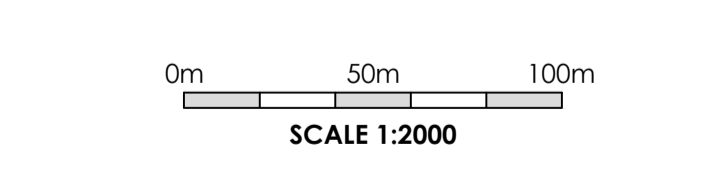
- RECORDED MINE ENTRY
- RECORDED MINE ENTRY - ADIT
- RECORDED MINE WORKINGS ENCOUNTERED DURING OPERCAST EXTRACTION
- ADITS, MINE ENTRIES AND/OR SHALLOW MINE WORKINGS RECORDED IN THIS AREA. FEATURES MAY STILL EXIST, THE CURRENT STATE OF WHICH IS UNKNOWN. CAUTION TO BE EXERCISED IN THIS AREA AS OPEN VOID MAY BE PRESENT BELOW GROUND LEVEL. SEEK ADVICE FROM ACTING ENGINEER BEFORE WORKS COMMENCE IN THIS AREA.

JPG GROUP - 2020 (S278 GROUND INVESTIGATION)

- ROTARY BOREHOLE LOCATION
- TRIAL PIT LOCATION

JPG GROUP - 2019 (PRELIMINARY GROUND INVESTIGATION)

- ROTARY BOREHOLE LOCATION
- ROTARY BOREHOLE LOCATION (WITH STRINGS/SCAFFOLDING)
- TRIAL PIT LOCATION



REV	DESCRIPTION	DATE	CHK	BY
P03	ADDITION OF S278 INVESTIGATIONS	25.02.21	GL1	GL1
P02	AMENDMENT TO RED-LINE BOUNDARY	31.07.19	JBW	GL1
P01	FIRST ISSUE	17.07.19	JBW	GL1

Project: BARNSELY WEST
 Drawing Title: COAL MINING RISKS PLAN

INFORMATION ISSUE

4848-JPG-SW-XX-DR-G-1301 S2 P03

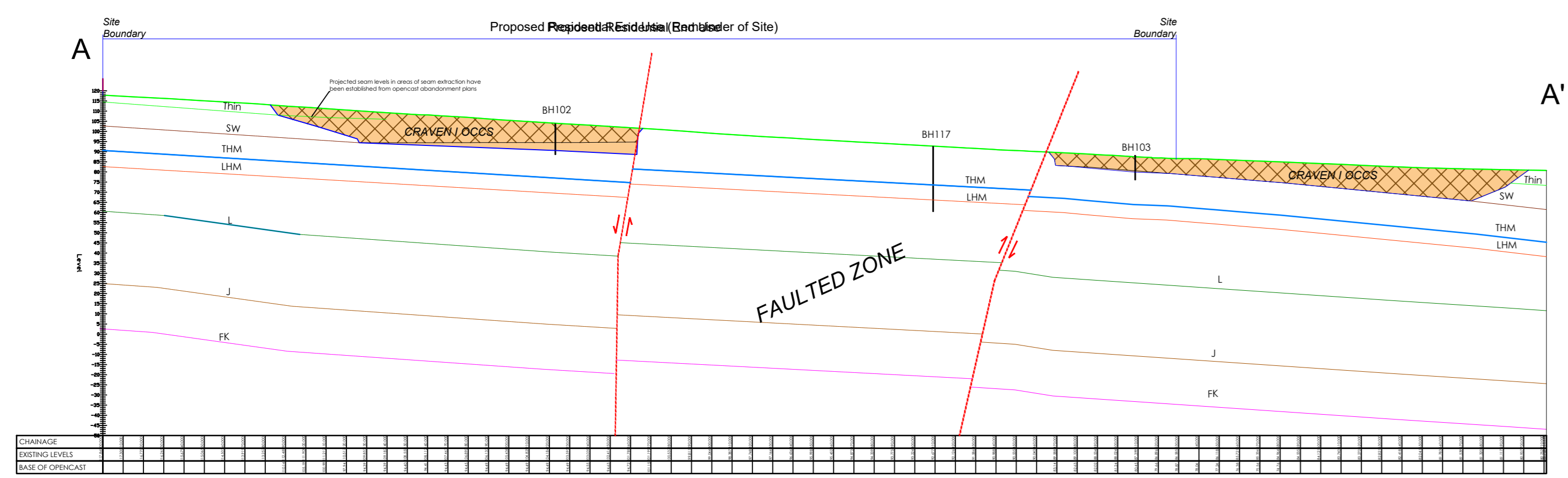
REFER TO JPG DRAWING NO. 4848-JPG-SW-XX-DR-G-1301-S0-P01 FOR PLAN VIEW OF CROSS SECTION LINE POSITIONS.

COAL SEAM DATA.
 COAL SEAM INFLUENCE LEVELS HAVE BEEN INDICATED TO HIGHLIGHT ZONES WITH SETTLEMENT RISK AS A RESULT OF SHALLOW COAL VANE WORKINGS IN ACCORDANCE WITH CRMA SPECIAL PUBLICATION 32 - CONSTRUCTION OVER ABANDONED VANE WORKINGS (CRMA 3P2). THE INFLUENCE LEVELS HAVE BEEN SHOWN AT X10 SEAM THICKNESS FROM THE TOP OF THE COAL SEAM USING THE MAXIMUM RECORDED COAL SEAM THICKNESS.
 THE MAXIMUM RECORDED COAL SEAM THICKNESS HAS BEEN ESTABLISHED USING JPG 2019 INTRUSIVE SITE INVESTIGATION AND HAVE BEEN STATED IN REPORTS:
 4848-JPG-XX-RP-G-9603-S2-P01, PRELIMINARY, GEOTECHNICAL, GEOPHYSICAL INVESTIGATION;
 THE MAXIMUM RECORDED COAL SEAM THICKNESS USED ARE AS FOLLOWS (IN DESCENDING ORDER):
 BARNLEY SEAM: 3.00m
 UNNAMED SEAM: 0.70m
 DUNSEL SEAM: 0.60m
 GAWBER SEAM: 1.00m
 THIN SEAM: 0.80m
 SWALLOW WOOD SEAM: 1.60m
 TOP HAIGH MOOR SEAM: 1.20m
 LOW HAIGH MOOR SEAM: 1.90m
 LIDGETT SEAM: 1.50m (TAKEN FROM BGS RECORDS)
 JOAN SEAM: 0.41m (TAKEN FROM BGS RECORDS)
 FLOCKTON THICK SEAM: 2.16m (TAKEN FROM BGS RECORDS)

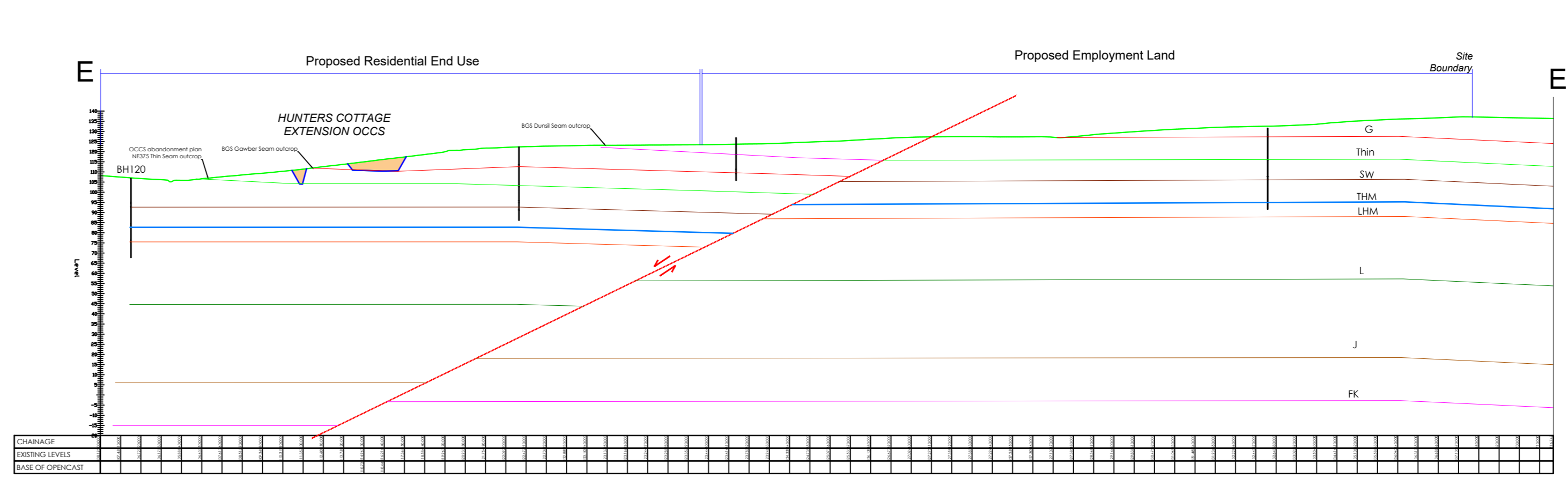
- B - Unworked Coal
- D - BARNLEY SEAM
- G - DUNSEL SEAM
- SW - GAWBER SEAM
- THN - THIN SEAM
- THM - SWALLOW WOOD SEAM
- LHM - TOP HAIGH MOOR SEAM
- L - LOW HAIGH MOOR SEAM
- J - LIDGETT SEAM
- JK - JOAN SEAM
- FK - FLOCKTON THICK SEAM

- [Pattern] - POST-SITE INVESTIGATION OPENCAST BACKFILL
- [Pattern] - PRE-SITE INVESTIGATION OPENCAST BACKFILL
- [Symbol] - PROJECTED FAULT
- [Line] - CONNECTED BARNLEY SEAM
- [Line] - CONNECTED DUNSEL SEAM
- [Line] - CONNECTED UNNAMED SEAM
- [Line] - CONNECTED GAWBER SEAM
- [Line] - CONNECTED THIN SEAM
- [Line] - CONNECTED SWALLOW WOOD SEAM
- [Line] - CONNECTED TOP HAIGH MOOR SEAM
- [Line] - CONNECTED LOW HAIGH MOOR SEAM
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- [Line] - CONNECTED JOAN SEAM
- [Line] - CONNECTED FLOCKTON THICK SEAM

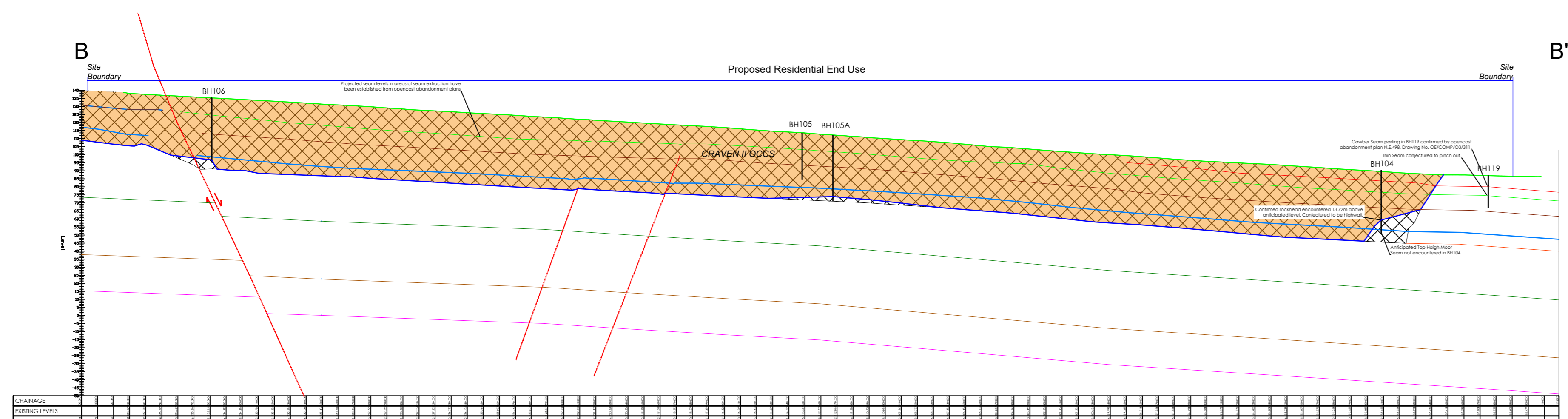
BORHOLES DISPLAYED ON THE CROSS SECTIONS ARE FROM THE JPG 2019 INTRUSIVE SITE INVESTIGATION. REFER TO JPG DRAWING NO. 4848-JPG-SW-XX-DR-G-1301-S0-P01 FOR SURVEYED BORHOLE LOCATIONS.



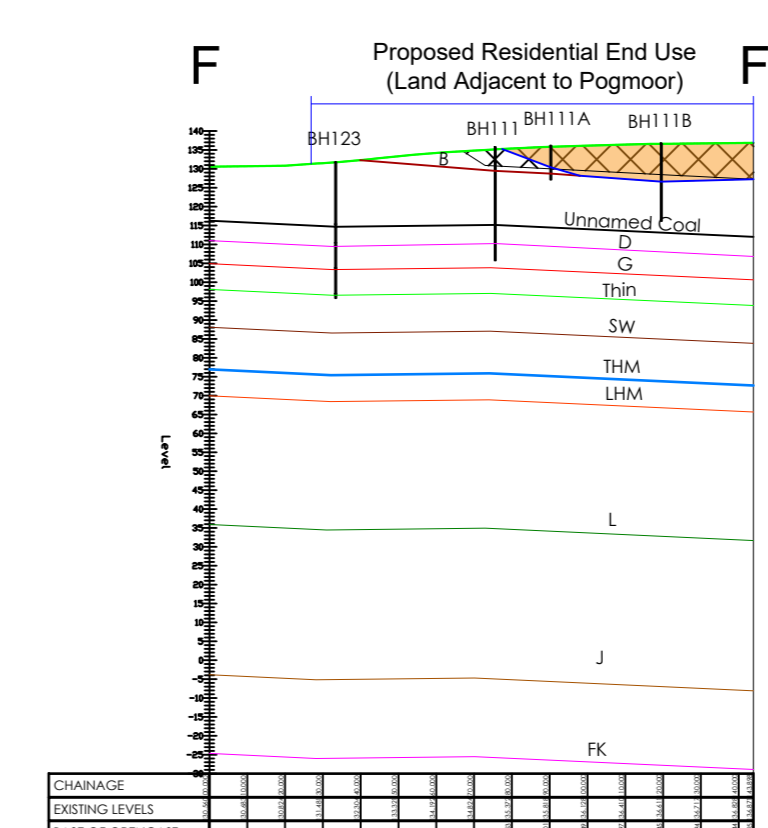
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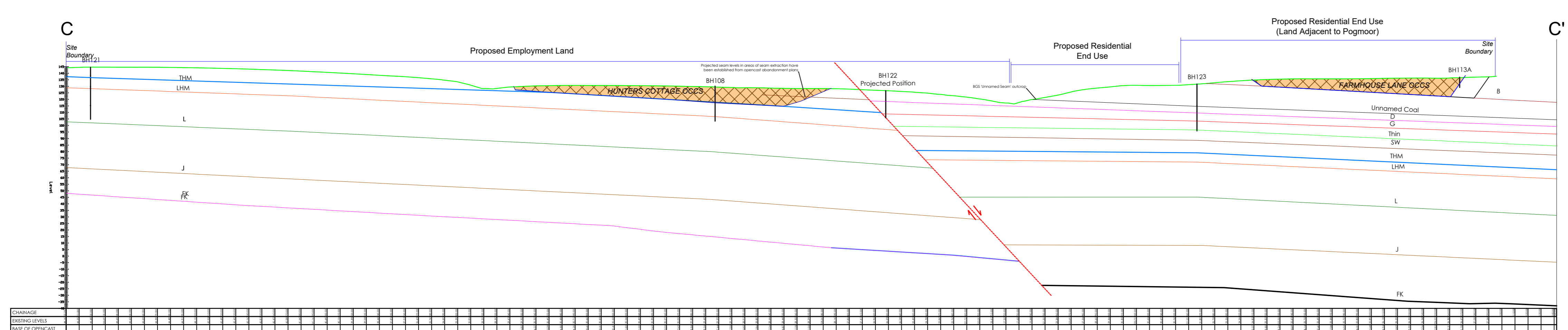
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 SCALE: 1:2000



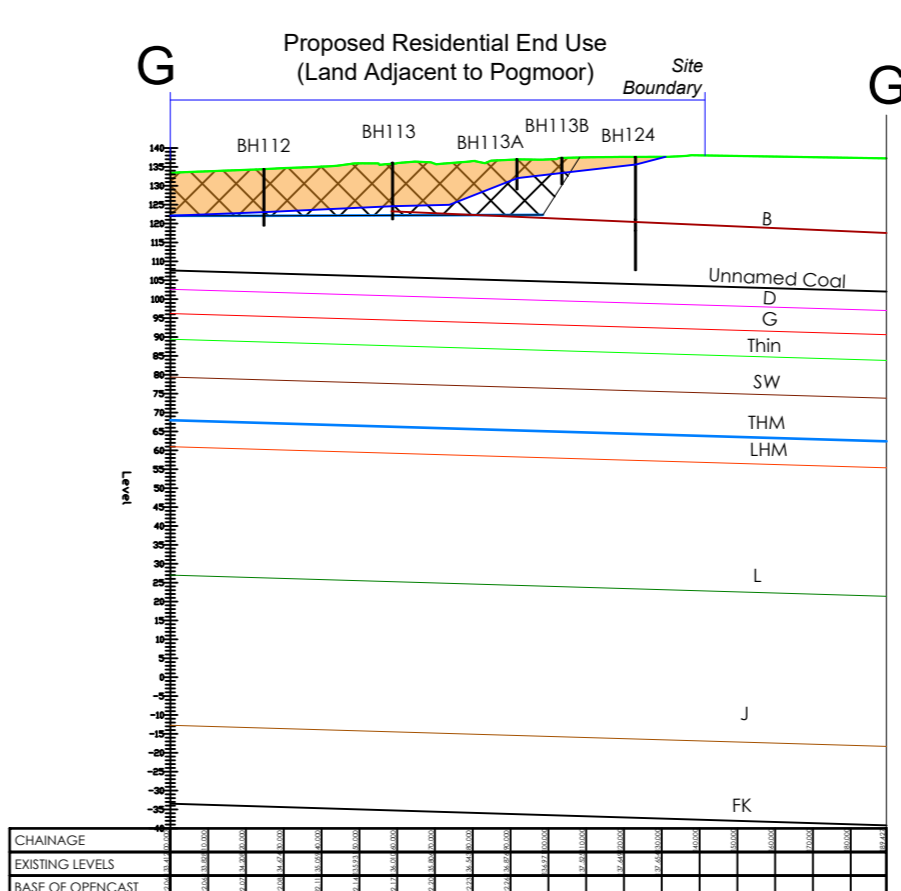
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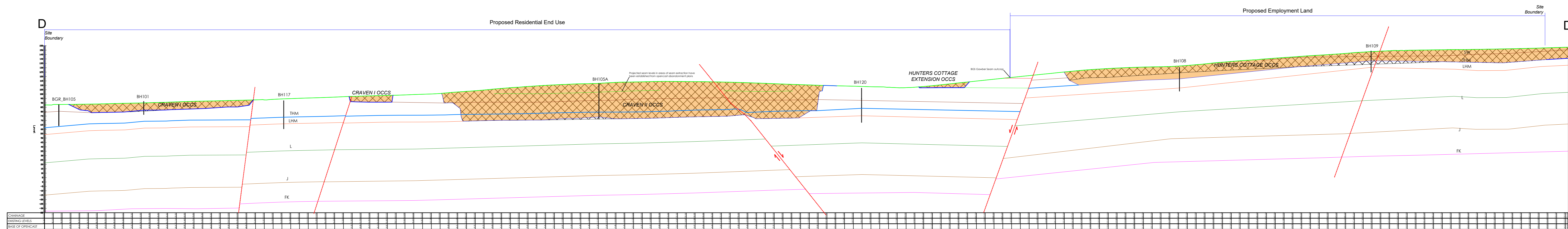
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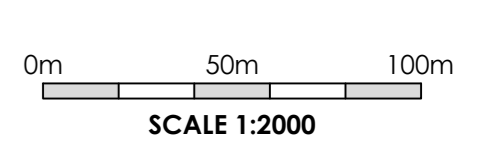
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 POGMOOR & HUNTERS COTTAGE AND EXTENSION
 SCALE: 1:2000



CROSS SECTION G-G'
 FARMHOUSE LANE
 SCALE: 1:2000



CROSS SECTION D-D'
 SITE OVERVIEW
 SCALE: 1:2000



P02	ADDITION OF 5278 INVESTIGATIONS	25.02.21	OLT	OLT
P01	FIRST ISSUE	27.06.19	JBW	OLT
REV	DESCRIPTION	DATE	CHK	BY

Project
 BARNLEY WEST

Drawing Title
 CONCEPTUAL GROUND MODEL - COAL MINING CONSTRAINTS CROSS SECTIONS

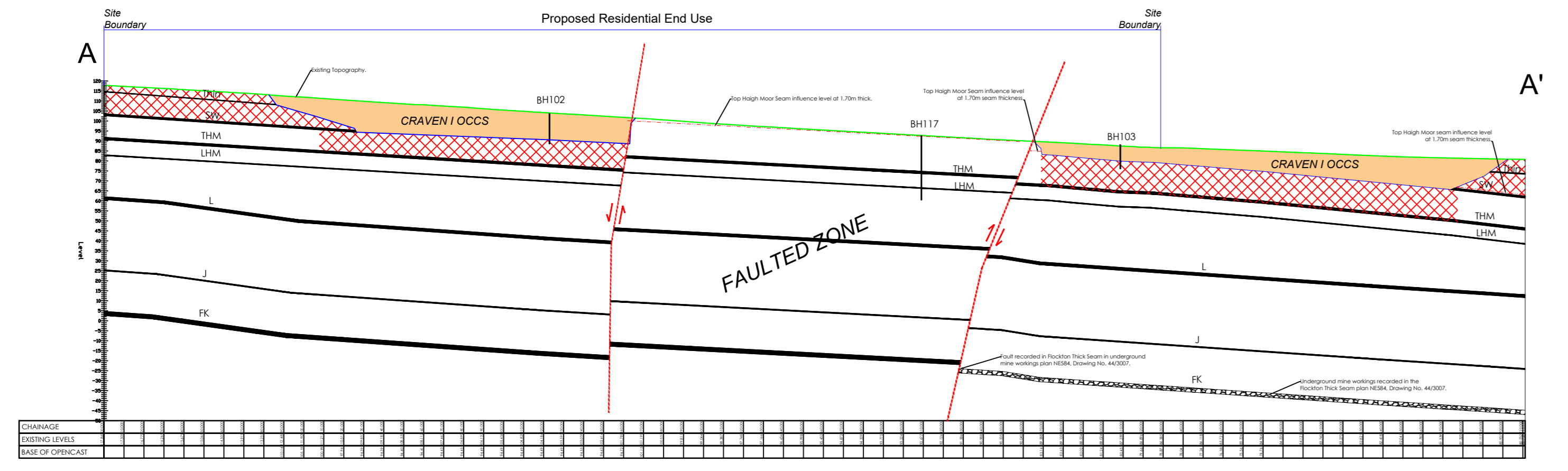
INFORMATION ISSUE

REFER TO JPG DRAWING NO. 4848-JPG-SW-XX-DR-G-1301-S0-P01 FOR PLAN VIEW OF CROSS-SECTION LINE POSITIONS.

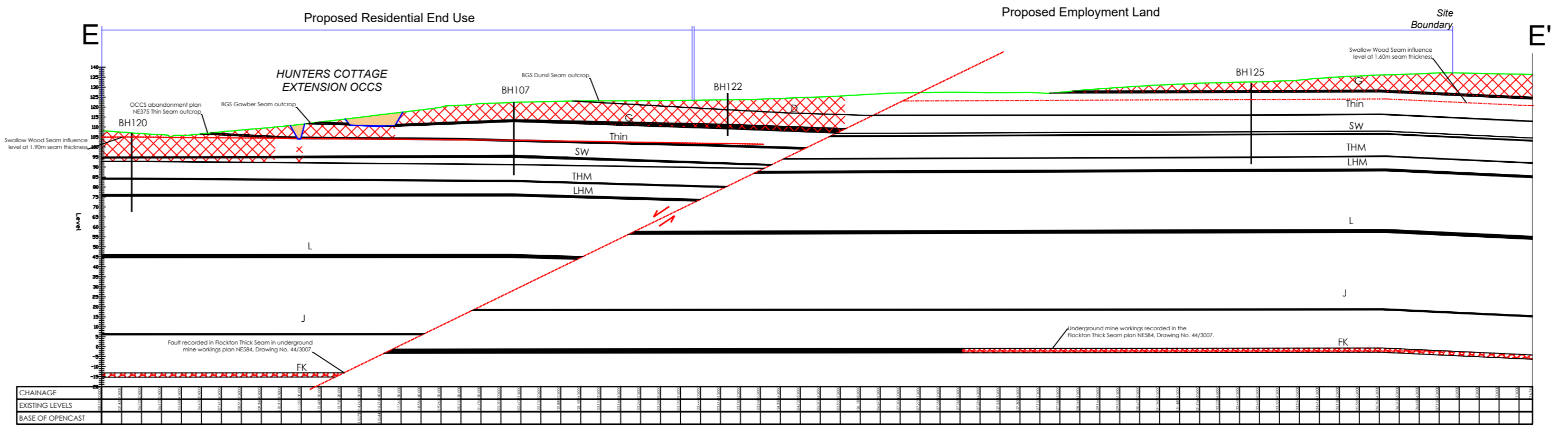
COAL SEAM DATA.
COAL SEAM INFLUENCE LEVELS HAVE BEEN INDICATED TO HIGHLIGHT ZONES WITHIN SETTLEMENT RISK AS A RESULT OF SHALLOW COAL MINE WORKINGS IN ACCORDANCE WITH CRMA SPECIAL PUBLICATION 22 - CONSTRUCTION OVER ABANDONED MINE WORKINGS (CORA SP22). THE INFLUENCE LEVELS HAVE BEEN SHOWN AT 10% SEAM THICKNESS FROM THE TOP OF THE COAL SEAM, USING THE MAXIMUM RECORDED COAL SEAM THICKNESS. THE MAXIMUM RECORDED COAL SEAM THICKNESS HAS BEEN ESTABLISHED USING JPG 2019 INTRUSIVE SITE INVESTIGATION AND HAS BEEN STATED IN REPORT REF: 4848-JPG-EX-00-88-G-0603-S2-P01, PRELIMINARY, GEOTECHNICAL, GROUND INVESTIGATION. THE MAXIMUM RECORDED COAL SEAM THICKNESS USED ARE AS FOLLOWS (IN SEQUENCE ORDER):
BARNLEY SEAM: 3.00m
BIRKBECK SEAM: 0.70m
DUNLS SEAM: 0.80m
GARNER SEAM: 1.00m
THIN SEAM: 0.80m
SMALLOW WOOD SEAM: 1.60m
TOP HATCH MOOR SEAM: 1.70m
LOW HATCH MOOR SEAM: 1.90m
LIDGETT SEAM: 1.52m (TAKEN FROM BGS RECORDS)
LOAKS SEAM: 0.41m (TAKEN FROM BGS RECORDS)
FLOCKTON THICK SEAM: 2.16m (TAKEN FROM BGS RECORDS)

- B - BARNLEY SEAM
 - D - BIRKBECK SEAM
 - G - DUNLS SEAM
 - SW - GARNER SEAM
 - TH - THIN SEAM
 - SMW - SMALLOW WOOD SEAM
 - THM - TOP HATCH MOOR SEAM
 - LHM - LOW HATCH MOOR SEAM
 - L - LIDGETT SEAM
 - J - JOAKS SEAM
 - FK - FLOCKTON THICK SEAM
- OPENCAST BACKFILL
 - PROJECTED COAL SEAM
 - PROJECTED AREA WITHIN INFLUENCE OF POSSIBLE UNRECORDED SHALLOW MINE WORKINGS
 - RECORDED UNDERGROUND MINE WORKINGS
 - PROJECTED UNRECORDED MINE WORKINGS INFLUENCE LEVEL (SEAM SPECIFIC)
 - PROJECTED FAULT

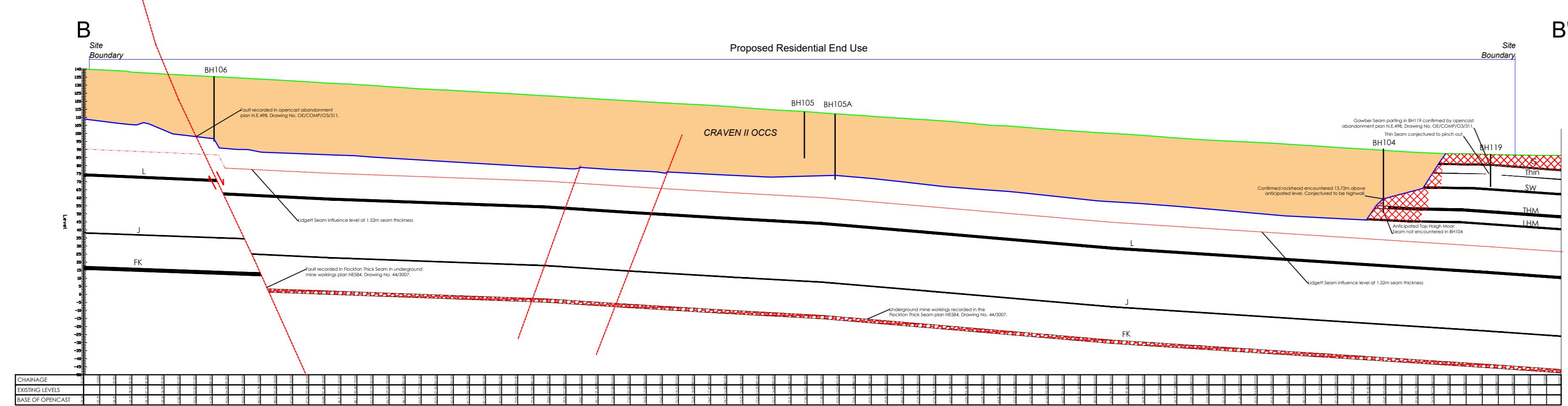
BORHOLES DISPLAYED ON THE CROSS-SECTIONS ARE FROM THE JPG 2019 INTRUSIVE SITE INVESTIGATION. REFER TO JPG DRAWING NO. 4848-JPG-SW-XX-DR-G-1301-S0-P01 FOR SURVEYED BORHOLE LOCATIONS.



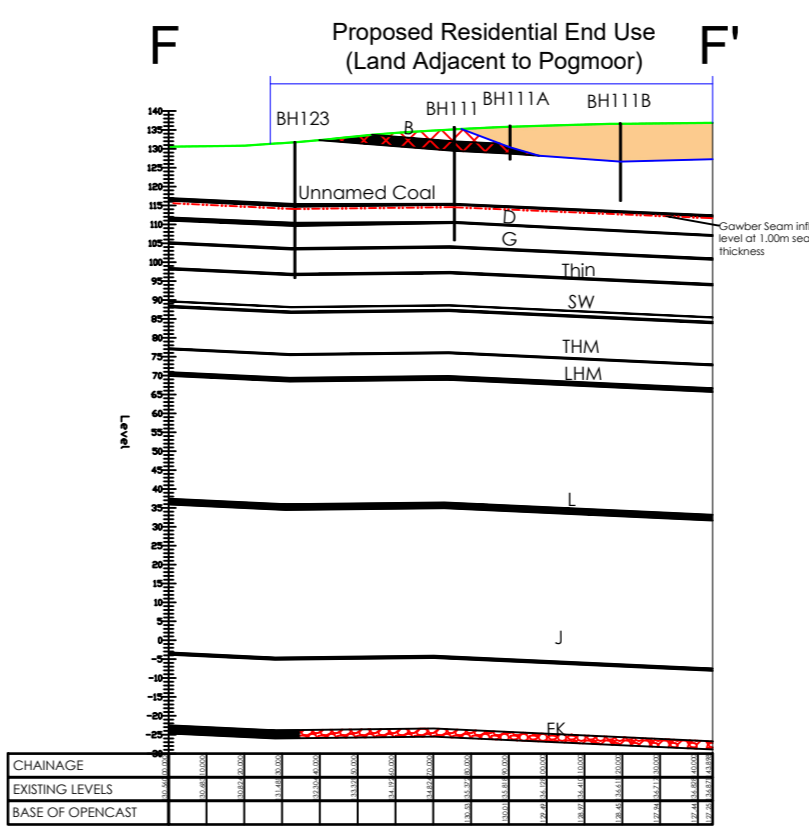
CROSS SECTION A-A', CRAVEN I
SCALE: 1:2000



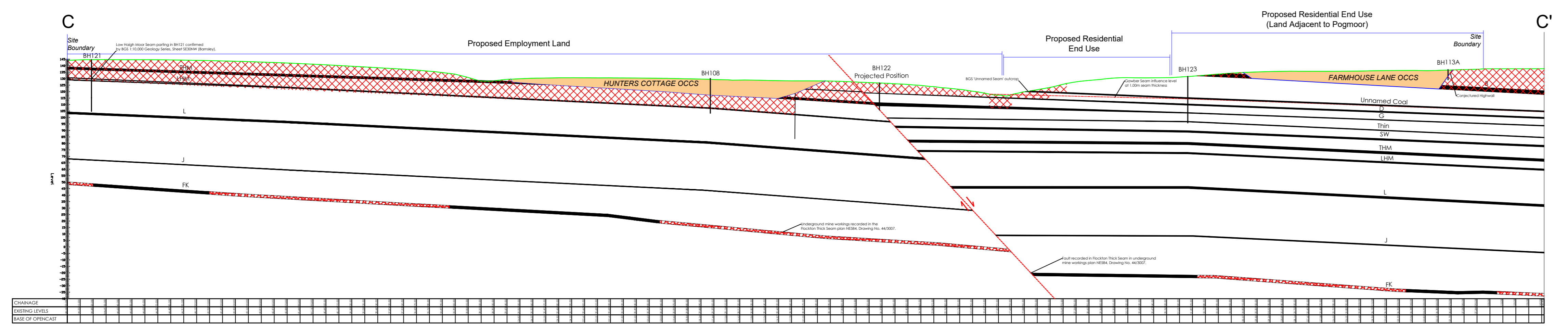
CROSS SECTION E-E'
HUNTERS COTTAGE EXTENSION
SCALE: 1:2000



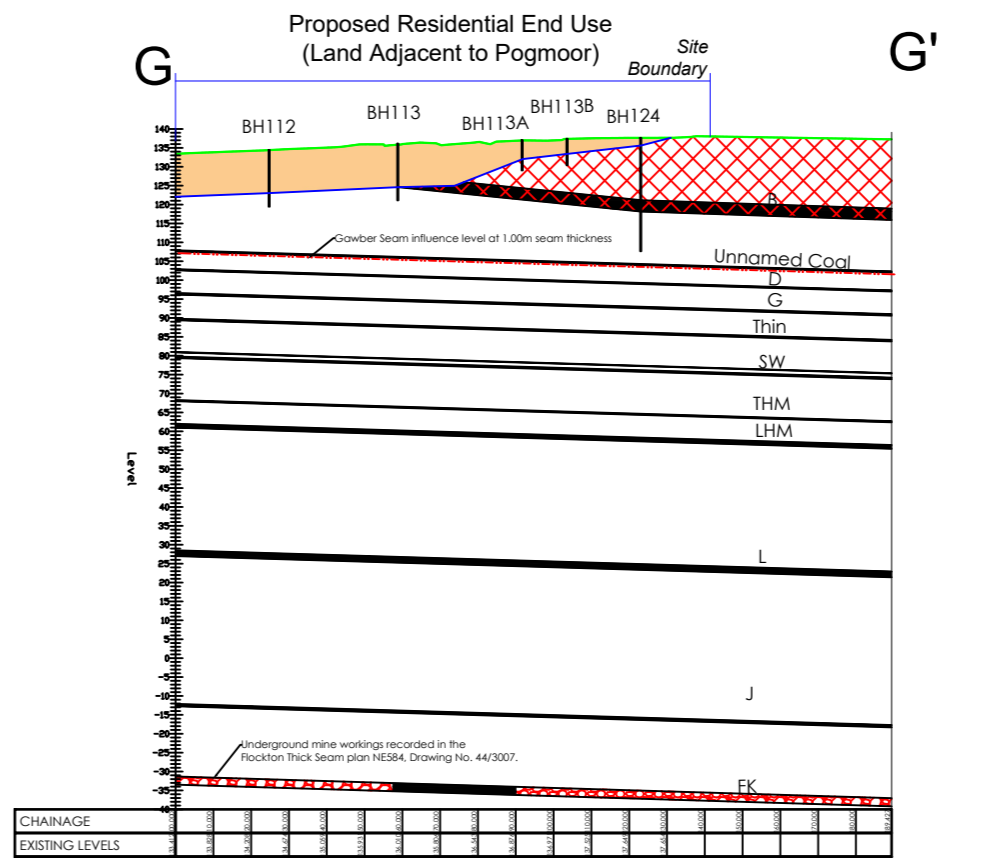
CROSS SECTION B-B', CRAVEN II
SCALE: 1:2000



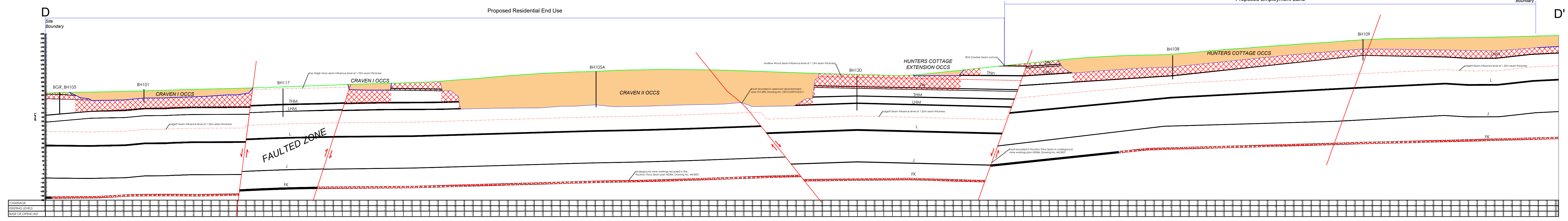
CROSS SECTION F-F'
FARMHOUSE LANE
SCALE: 1:2000



CROSS SECTION C-C'
POGMOOR & HUNTERS COTTAGE AND EXTENSION
SCALE: 1:2000



CROSS SECTION G-G'
FARMHOUSE LANE
SCALE: 1:2000



CROSS SECTION D-D'
SITE OVERVIEW
SCALE: 1:2000

P02	ADDITION OF 2278 INVESTIGATIONS	25.02.21	OLT	OLT
P01	FIRST ISSUE	27.06.19	JBW	OLT
REV	DESCRIPTION	DATE	CHK	BY

Project
BARNLEY WEST

Drawing Title
CONCEPTUAL GROUND MODEL - COAL MINING CONSTRAINTS ILLUSTRATIVE CROSS SECTIONS

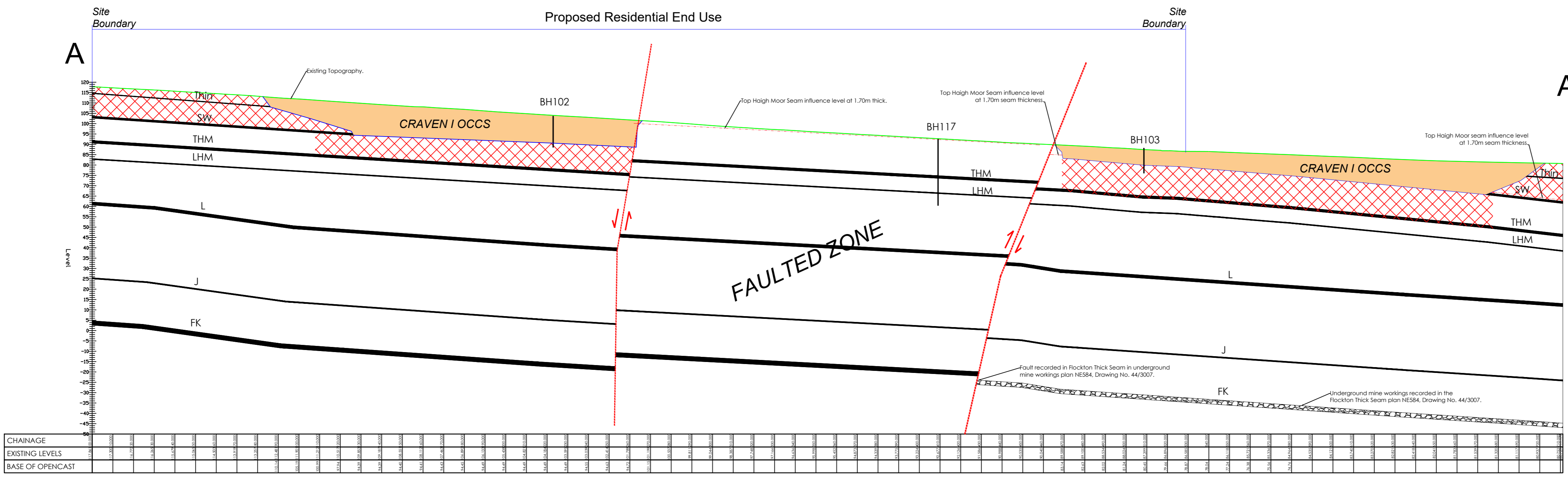
PLAN VIEW OF CROSS-SECTION LINE POSITIONS.

COAL SEAM DATA.
 COAL SEAM INFLUENCE LEVELS HAVE BEEN INDICATED TO HIGHLIGHT ZONES WITHIN SETTLEMENT RISK AS A RESULT OF SHALLOW COAL AINE WORKINGS IN ACCORDANCE WITH CRBA SPECIAL PUBLICATION 32 CONSTRUCTION OVER ABANDONED AINE WORKINGS (CORA SP2). THE INFLUENCE LEVELS HAVE BEEN SHOWN AS 1X10 SEAM THICKNESS FROM THE TOP OF THE COAL SEAM, USING THE MAXIMUM RECORDED COAL SEAM THICKNESS.
 THE MAXIMUM RECORDED COAL SEAM THICKNESS HAS BEEN ESTABLISHED USING JPG'S 2019 INDEPENDENT SITE INVESTIGATION AND HAS BEEN STATED IN REPORT REF: 8B48-JPG-SW-XX-DR-G-1301-00-P01, PRELIMINARY, GEOTECHNICAL, GEOLAND INVESTIGATION.
 THE MAXIMUM RECORDED COAL SEAM THICKNESS USED ARE AS FOLLOWS (IN SEQUENCE ORDER):
 BARNSELEY SEAM: 3.00m
 UNNAMED SEAM: 2.70m
 DUNSL SEAM: 2.70m
 GANBER SEAM: 1.00m
 THIN SEAM: 0.85m
 SWALLOW WOOD SEAM: 1.65m
 TOP HAUGH MOOR SEAM: 1.70m
 LOW HAUGH MOOR SEAM: 1.80m
 LUGGETT SEAM: 1.52m (TAKEN FROM BGS RECORDS)
 L20M SEAM: 2.40m (TAKEN FROM BGS RECORDS)
 FLOCKTON THICK SEAM: 2.16m (TAKEN FROM BGS RECORDS)

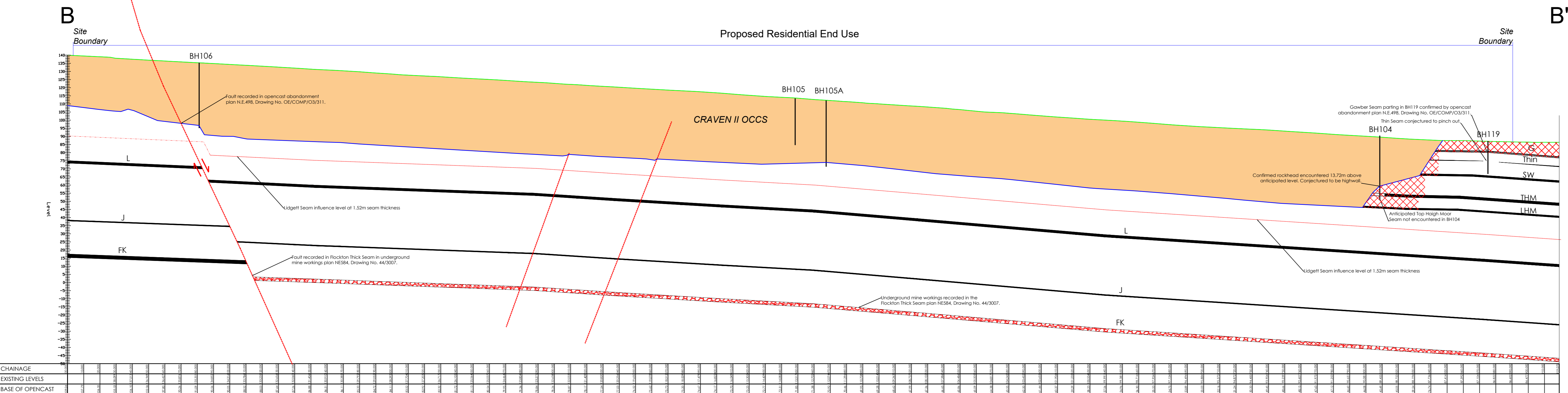
- | | |
|-----|-----------------------|
| B | - BARNSELEY SEAM |
| U | - UNNAMED SEAM |
| D | - DUNSL SEAM |
| G | - GANBER SEAM |
| T | - THIN SEAM |
| SW | - SWALLOW WOOD SEAM |
| THM | - TOP HAUGH MOOR SEAM |
| LHM | - LOW HAUGH MOOR SEAM |
| L | - LUGGETT SEAM |
| L20 | - L20M SEAM |
| FK | - FLOCKTON THICK SEAM |

- | | |
|--|--|
| | - OPENCAST BACKFILL |
| | - PROJECTED COAL SEAM |
| | - PROJECTED AREA WITHIN INFLUENCE OF POSSIBLE UNRECORDED SHALLOW AINE WORKINGS |
| | - RECORDED UNDERGROUND AINE WORKINGS |
| | - PROJECTED UNRECORDED AINE WORKINGS INFLUENCE LEVEL (SEAM SPECIFIC) |
| | - PROJECTED FAULT |

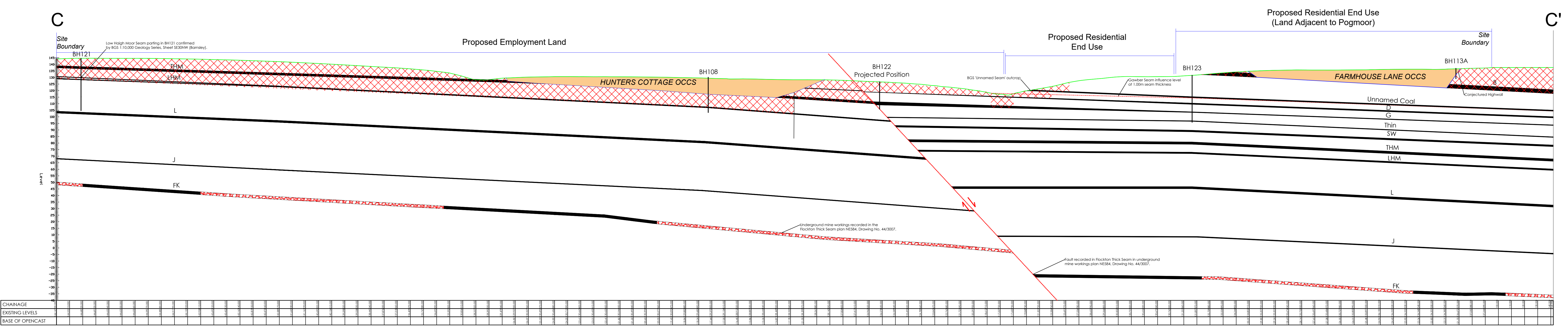
BORHOLES DISPLAYED ON THE CROSS-SECTIONS ARE FROM THE JPG 2019 INDEPENDENT SITE INVESTIGATION, REFER TO JPG DRAWING NO. 8B48-JPG-SW-XX-DR-G-1301-00-P01 FOR SURVEYED BORHOLE LOCATIONS.



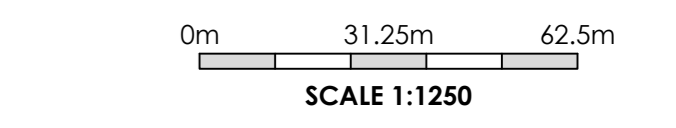
CROSS SECTION A-A', CRAVEN I
 SCALE: 1:1250



CROSS SECTION B-B', CRAVEN II
 SCALE: 1:1250



CROSS SECTION C-C'
POGMOOR & HUNTERS COTTAGE AND EXTENSION
 SCALE: 1:1250



P02	ADDRESS OF 5278 INVESTIGATIONS	25.02.21	CLT	CLT
P01	FIRST ISSUE	27.06.19	JBW	CLT
REV	DESCRIPTION	DATE	CHK	BY

Project
BARNSELEY WEST

Drawing Title
CONCEPTUAL GROUND MODEL - ILLUSTRATIVE CROSS SECTIONS, CROSS SECTIONS A-A', B-B' & C-C'

INFORMATION ISSUE

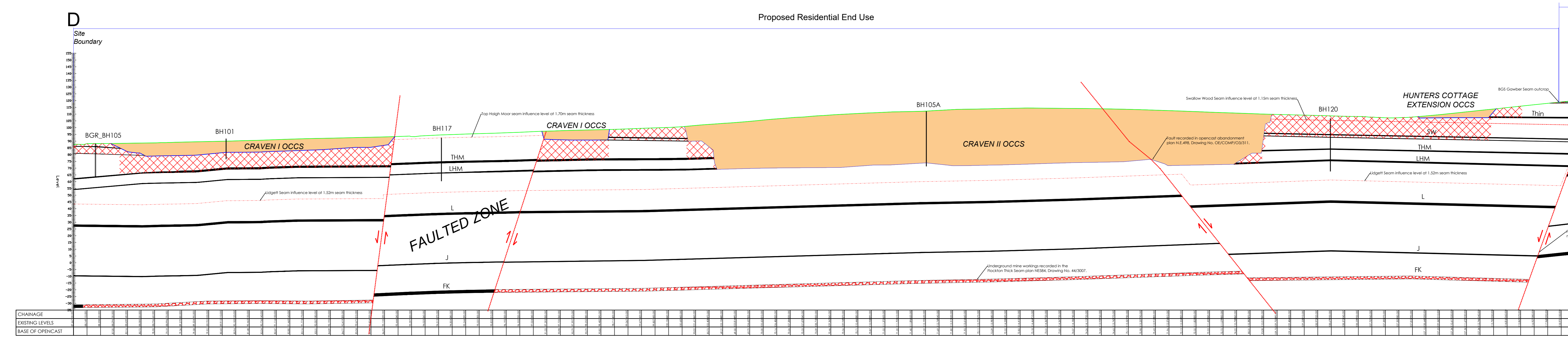
REFER TO JPG DRAWING NO. 4848-JPG-SW-XX-DR-G-1301-S0-P01 FOR PLAN VIEW OF CROSS-SECTION LINE POSITIONS.

COAL SEAM DATA.
 COAL SEAM INFLUENCE LEVELS HAVE BEEN INDICATED TO HIGHLIGHT ZONES WITH SETTLEMENT RISK AS A RESULT OF SHALLOW COAL MINE WORKINGS IN ACCORDANCE WITH CIRIA SPECIAL PUBLICATION 22 - CONSIDERATION OVER ABANDONED MINE WORKINGS (CIRIA 2015). THE INFLUENCE LEVELS HAVE BEEN SHOWN AT X10 SEAM THICKNESS FROM THE TOP OF THE COAL SEAM, USING THE MAXIMUM RECORDED COAL SEAM THICKNESS.
 THE MAXIMUM RECORDED COAL SEAM THICKNESS HAS BEEN ESTABLISHED USING JPG 2019 INTRUSIVE SITE INVESTIGATION AND HAVE BEEN STATED IN REPORT REF:
 4848-JPG-SW-XX-DR-G-0603-S2-P01 - PRELIMINARY_GEO-TECHNICAL_GROUND INVESTIGATION
 THE MAXIMUM RECORDED COAL SEAM THICKNESS USED ARE AS FOLLOWS (IN SEQUENCE ORDER):
 BARNSELEY SEAM: 3.50m
 UNNAMED SEAM: 0.70m
 DUNNELL SEAM: 0.80m
 GAMBER SEAM: 1.00m
 THIN SEAM: 0.80m
 SWALLOW WOOD SEAM: 1.60m
 TOP HAUGH MOOR SEAM: 1.70m
 LOW HAUGH MOOR SEAM: 1.90m
 LOGGETT SEAM: 1.52m (TAKEN FROM BGS RECORDS)
 COALS SEAM: 2.61m (TAKEN FROM BGS RECORDS)
 FLOCKTON THICK SEAM: 2.16m (TAKEN FROM BGS RECORDS)

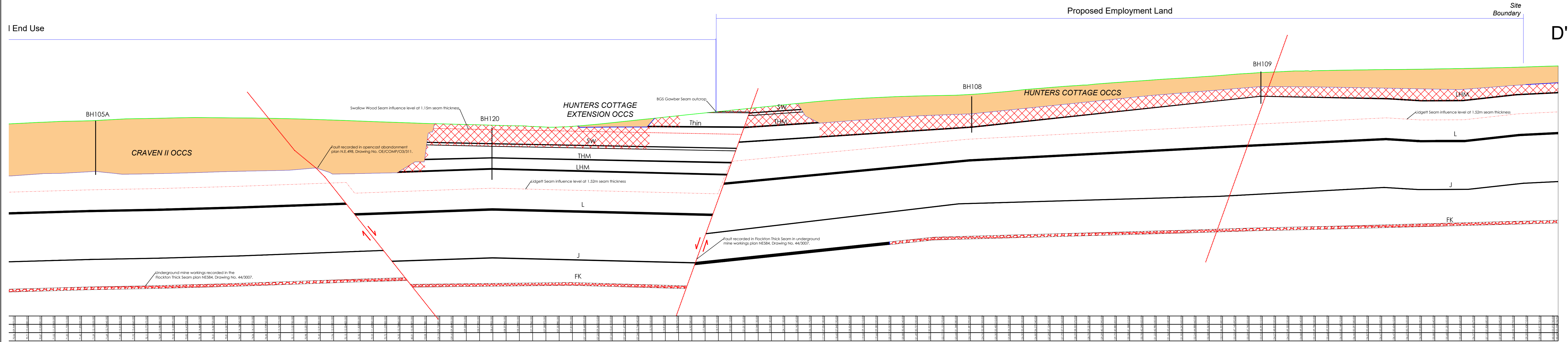
- B - BARNSELEY SEAM
- U - UNNAMED SEAM
- D - DUNNELL SEAM
- G - GAMBER SEAM
- T - THIN SEAM
- SW - SWALLOW WOOD SEAM
- HM - TOP HAUGH MOOR SEAM
- L - LOW HAUGH MOOR SEAM
- LOG - LOGGETT SEAM
- C - COALS SEAM
- F - FLOCKTON THICK SEAM

- PROJECTED AREA WITHIN INFLUENCE OF POSSIBLE UNRECORDED SHALLOW MINE WORKINGS
- RECORDED UNDERGROUND MINE WORKINGS
- PROJECTED UNRECORDED MINE WORKINGS INFLUENCE LEVEL (SEAM SPECIFIC)
- PROJECTED FAULT

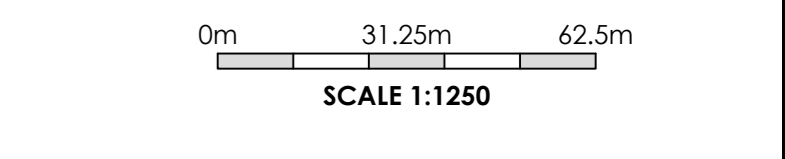
BORHOLES DISPLAYED ON THE CROSS-SECTIONS ARE FROM THE JPG 2019 INTRUSIVE SITE INVESTIGATION. REFER TO JPG DRAWING NO. 4848-JPG-SW-XX-DR-G-1301-S0-P01 FOR SURVEYED BORHOLE LOCATIONS.



CROSS SECTION D-D'
SITE OVERVIEW
SCALE: 1:1250



CROSS SECTION D-D'
SITE OVERVIEW
SCALE: 1:1250



REV	DESCRIPTION	DATE	CHK	BY
P02	ADDITION OF SECTION 278 INVESTIGATIONS	25.02.21	OLT	OLT
P01	FIRST ISSUE	27.06.19	JBW	OLT

Project
BARNSELEY WEST

Drawing Title
CONCEPTUAL GROUND MODEL - ILLUSTRATIVE CROSS-SECTION, SECTION D-D'

INFORMATION ISSUE

Leeds 0113 263 1155 | London 0207 947 4148

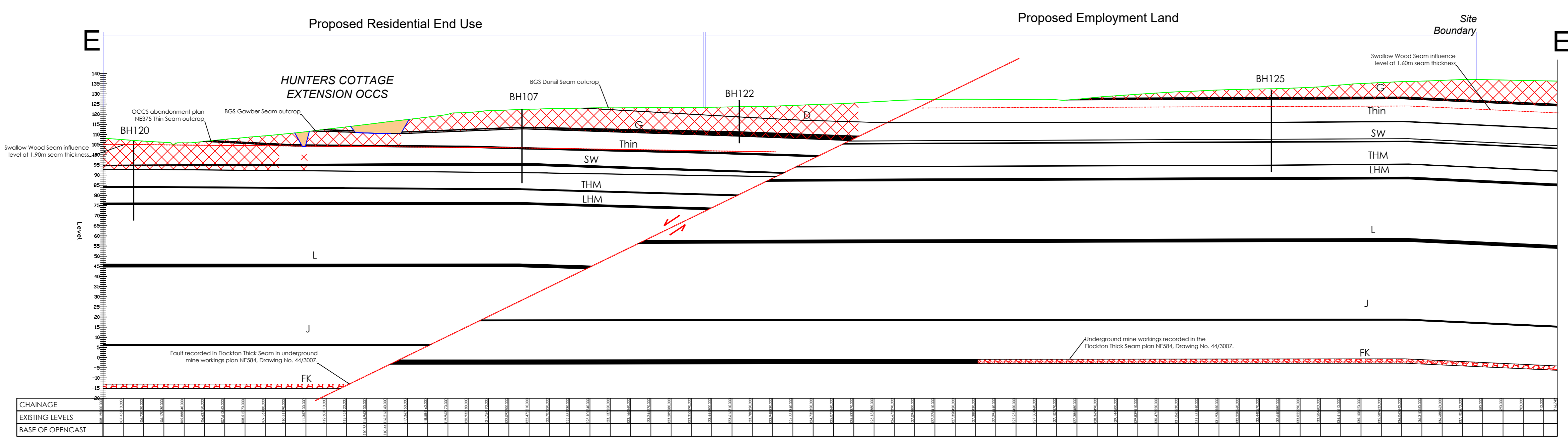
REFER TO JPG DRAWING NO. 4848-JPG-SW-XX-DR-G-1301-S0-P01 FOR PLAN VIEW OF CROSS-SECTION LINE POSITIONS.

COAL SEAM DATA.
COAL SEAM INFLUENCE LEVELS HAVE BEEN INDICATED TO HIGHLIGHT ZONES WITH SETTLEMENT RISKS AS A RESULT OF SHALLOW COAL WINE WORKINGS IN ACCORDANCE WITH CIRIA SPECIAL PUBLICATION 32 - CONSTRUCTION OVER ABANDONED WINE WORKINGS (COP 32). THE INFLUENCE LEVELS HAVE BEEN SHOWN AT X10 SEAM THICKNESS FROM THE TOP OF THE COAL SEAM. DATA USING THE MAXIMUM RECORDED COAL SEAM THICKNESS.
THE MAXIMUM RECORDED COAL SEAM THICKNESS HAS BEEN ESTABLISHED USING: JPG 2019 INTRUSIVE SITE INVESTIGATION AND HAVE BEEN STATED IN REPORT REF: 4848-JPG-XX-XX-RP-G-0603-S2-P01-PRILIMINARY_GEOECHANICAL_GROUND_INVESTIGATION.
THE MAXIMUM RECORDED COAL SEAM THICKNESS USED ARE AS FOLLOWS (IN SEQUENCE ORDER):
BARNLEY SEAM: 3.00m
UNNAMED SEAM: 0.70m
DUNNELL SEAM: 0.85m
GAMBER SEAM: 1.00m
THIN SEAM: 0.80m
SWALLOW WOOD SEAM: 1.40m
TOP HAZEL MOOR SEAM: 1.70m
LOW HAZEL MOOR SEAM: 1.90m
LIDGETT SEAM: 1.50m (TAKEN FROM BGS RECORDS)
JOHN SEAM: 0.6m (TAKEN FROM BGS RECORDS)
FLOCKTON THICK SEAM: 2.16m (TAKEN FROM BGS RECORDS)

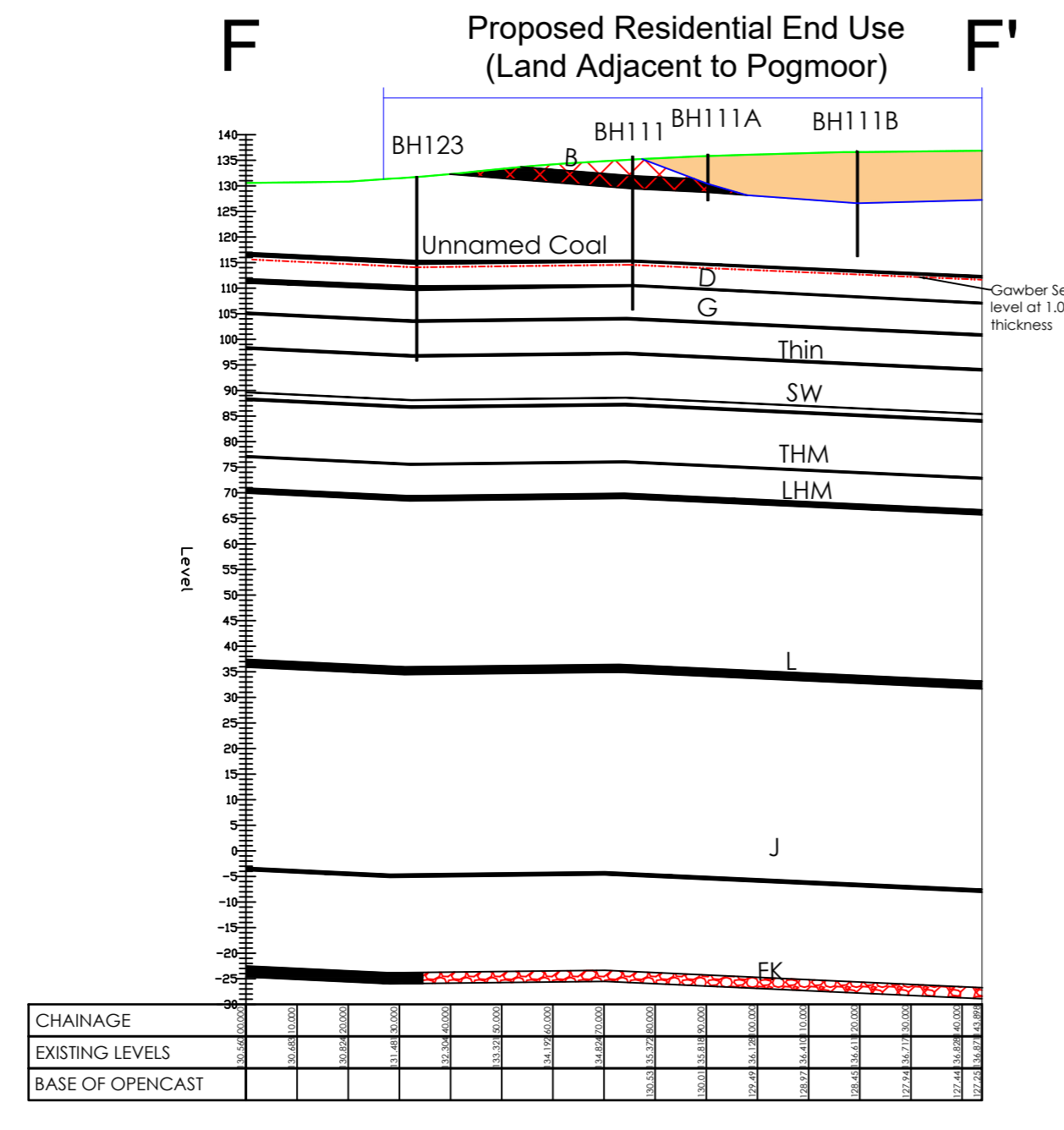
B	-	BARNLEY SEAM
UNNAMED COAL	-	UNNAMED SEAM
D	-	DUNNELL SEAM
G	-	GAMBER SEAM
THIN	-	THIN SEAM
SW	-	SWALLOW WOOD SEAM
THM	-	TOP HAZEL MOOR SEAM
LHM	-	LOW HAZEL MOOR SEAM
L	-	LIDGETT SEAM
J	-	JOHN SEAM
FK	-	FLOCKTON THICK SEAM

- OPENCAST BACKFILL
- PROJECTED COAL SEAM
- PROJECTED AREA WITHIN INFLUENCE OF POSSIBLE UNRECORDED SWALLOW WINE WORKINGS
- RECORDED UNDERGROUND WINE WORKINGS
- PROJECTED UNRECORDED WINE WORKINGS INFLUENCE LEVEL (SEAM SPECIFIC)
- PROJECTED FAULT

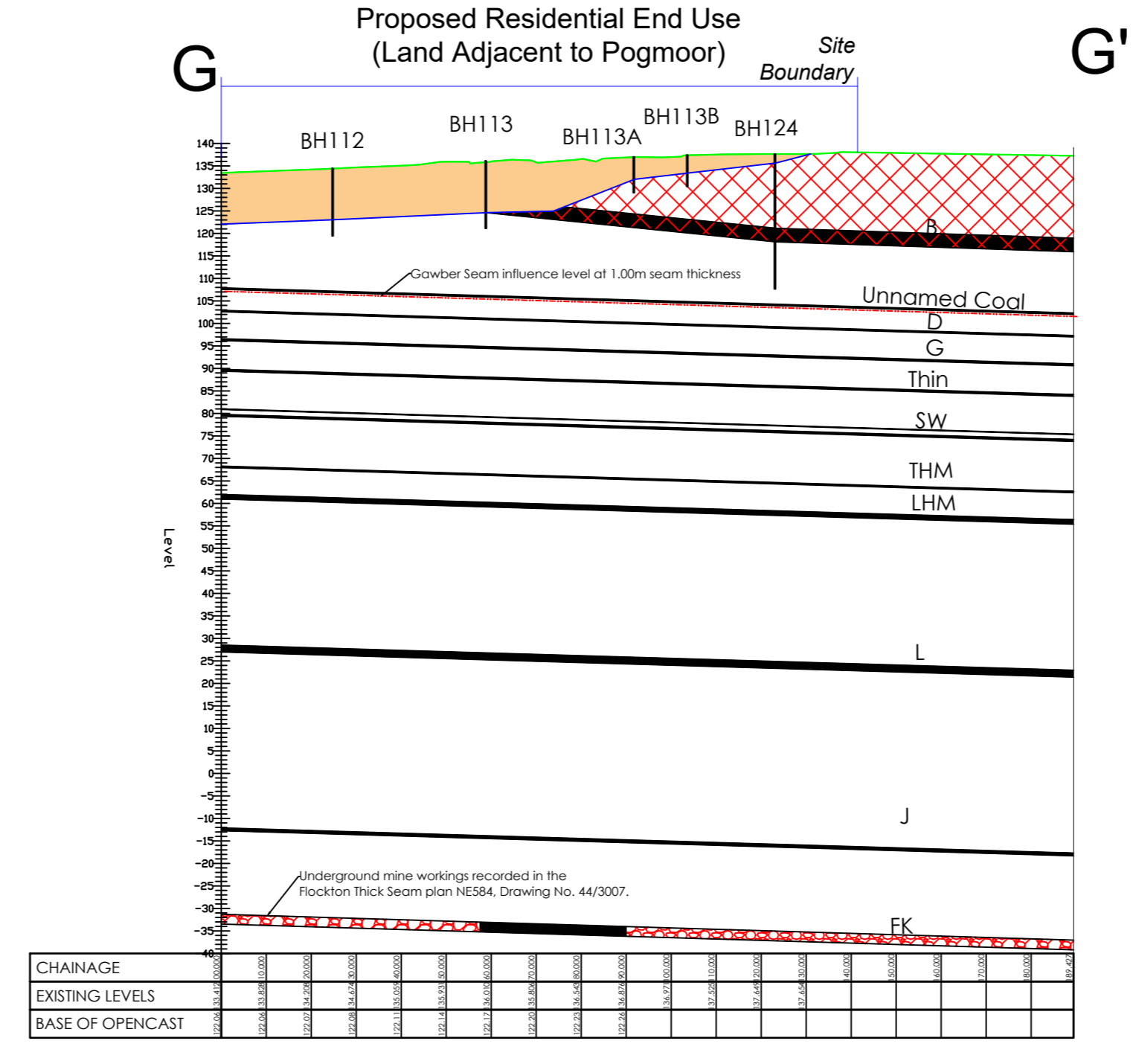
BORHOLES DISPLAYED ON THE CROSS-SECTIONS ARE FROM THE JPG 2019 INTRUSIVE SITE INVESTIGATION. REFER TO JPG DRAWING NO. 4848-JPG-SW-XX-DR-G-1301-S0-P01 FOR SURVEYED BORHOLE LOCATIONS.



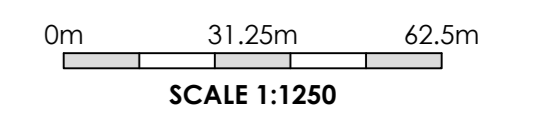
CROSS SECTION E-E'
HUNTERS COTTAGE EXTENSION
SCALE: 1:1250



CROSS SECTION F-F'
FARMHOUSE LANE
SCALE: 1:1250



CROSS SECTION G-G'
FARMHOUSE LANE
SCALE: 1:1250



P02	ADDITION OF S2/8 INVESTIGATIONS	25.02.21	CLT	CLT
P01	FIRST ISSUE	27.06.19	JBW	CLT
REV	DESCRIPTION	DATE	CHK	BY

Project
BARNLEY WEST

Drawing Title
CONCEPTUAL GROUND MODEL - ILLUSTRATIVE CROSS SECTIONS, CROSS SECTIONS E-E', F-F' & G-G'

INFORMATION ISSUE



Appendix B Exploratory Hole Logs



5 John Charles Way
Leeds
LS12 6QA

Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 13/03/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431503.18 N407852.92
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Comacchio 205

Borehole Number BH101	Hole Type RO	Level 91.68m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
					0.20	91.48		Grass over TOPSOIL. Brown grey COLLIERY SPOIL with coal.	1	
										2
										3
										4
										5
										6
										7
										8
										9
						10.00	81.68		Black grey MUDSTONE.	10
						10.50	81.18		Grey SANDSTONE.	11
						11.50	80.18		Grey MUDSTONE.	12
						12.50	79.18		Hard Grey SANDSTONE.	13
										14
						15.00	76.68		End of Borehole at 15.00m	15
								16		
								17		
								18		
								19		
								20		
								21		
								22		
								23		
								24		
								25		
								26		
								27		
								28		
								29		
								30		

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
2.00	120	Polycarbonate drillbit	2.00	123	0.00	15.00	90		15.00	0.00	Air
15.00	143										

Remarks
Groundwater encountered at 6.00m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





5 John Charles Way
Leeds
LS12 6QA

Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 12/03/2019 - 13/03/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431436.86 N407652.47
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Comacchio 205

Borehole Number BH102	Hole Type RO	Level 103.78m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	103.58		Grass over TOPSOIL. Grey brown COLLIERY SPOIL.	1
		1.50	SPT	50 (3,7/50 for 160mm)				2	
	▼	3.00	SPT	N=39 (7,8/8,9,10,12)				3	
		4.50	SPT	N=41 (5,5/6,7,9,19)				4	
	▼	6.00	SPT	N=50 (7,9/50 for 244mm)				5	
		7.50	SPT	N=50 (6,8/50 for 257mm)				6	
	▼	9.00	SPT	N=35 (5,7/7,8,10,10)				7	
		10.50	SPT	50 (7,10/50 for 197mm)				8	
		12.00	SPT	N=38 (4,5/7,7,9,15)				9	
	▼	13.50	SPT	50 (25 for 12mm/50 for 16mm)	13.00	90.78		10	
		14.50	SPT	50 (25 for 10mm/50 for 12mm)	14.50	89.28		11	
		15.00	SPT	50 (25 for 10mm/50 for 12mm)	15.00	88.78		12	
								13	
							14		
							15		
						16			
						17			
						18			
						19			
						20			
						21			
						22			
						23			
						24			
						25			
						26			
						27			
						28			
						29			
						30			

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
3.00	120	Polycarbonate drillbit	3.00	123	0.00	15.00	90		15.00	0.00	Air
15.00	143										

Remarks
Pockets of groundwater at 3.00m bgl, 7.00m bgl, 9.00m bgl and 13.00m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





5 John Charles Way
Leeds
LS12 6QA

Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 21/03/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431707.97 N407743.74
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Comacchio 205

Borehole Number BH103	Hole Type RO	Level 88.09m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	87.89		Grass over TOPSOIL. COLLIERY SPOIL.	1
									2
									3
									4
									5
					8.20	79.89		IRONSTONE and SANDSTONE.	8
									9
					11.00	77.09		Grey MUDSTONE.	11
					11.90	76.19			12
					12.00	76.09		Grey SANDSTONE.	12
							End of Borehole at 12.00m		
									13
									14
									15
									16
									17
									18
									19
									20
									21
									22
									23
									24
									25
									26
									27
									28
									29
									30

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
3.00	120	Rock roller	3.00	123	0.00	12.00	90		0.00	12.00	Air
12.00	143										

Remarks
Groundwater encountered at 8.20m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.
Extensometer Details: Datum magnet is at 11.665m bgl, Spider 1 is at 6.71m bgl and Spider 2 is at 2.22m bgl





5 John Charles Way
Leeds
LS12 6QA

Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd		Date: 21/03/2019 - 29/03/2019	
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd		Co-ords: E431979.01 N407538.76	
Project No. : 4848		Crew Name: L. Hayes & K. Fullard		Drilling Equipment: Comacchio 205 & Boart Longyear DB520	
Borehole Number BH104	Hole Type RO	Level 90.31m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 2

Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.25	90.06		Grass over TOPSOIL. Grey brown loose COLLIERY SPOIL with large boulders.	1
									2
									3
									4
									5
									6
									7
									8
									9
								at 9.00m BGL ... obstruction in borehole.	10
									11
									12
									13
									14
									15
									16
									17
									18
								at 18.00m BGL ... Very loose ground - borehole collapsing. Flush lost and regained at 19.20m bgl.	19
									20
									21
									22
									23
									24
									25
									26
									27
									28
								at 28.00m BGL ... Flush lost and regained at 30.50m bgl.	29
									30

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
21.00	143	Rock roller	8.90	150	0.00	39.00	90		0.00	21.00	Air mist
39.00	120		31.10	123					21.00	39.00	Air

Remarks
Groundwater encountered at 19.30m bgl and 31.00m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record. Extensometer Details: Datum magnet is at 37.22m bgl, spider 1 is at 27.52m bgl, spider 2 is at 15.42m bgl and spider 3 is at 8.62m bgl.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd		Date: 21/03/2019 - 29/03/2019	
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd		Co-ords: E431979.01 N407538.76	
Project No. : 4848		Crew Name: L. Hayes & K. Fullard		Drilling Equipment: Comacchio 205 & Boart Longyear DB520	
Borehole Number BH104	Hole Type RO	Level 90.31m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 2 of 2

Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
					31.00	59.31		Grey brown loose COLLIERY SPOIL with large boulders.	31		
									Grey MUDSTONE.	32	
										33	
										34	
							35.60	54.71		Hard brown SANDSTONE.	35
							36.40	53.91		Grey MUDSTONE.	36
								Brown SANDSTONE.	37		
					38.00	52.31			38		
					39.00	51.31		End of Borehole at 39.00m	39		
									40		
									41		
									42		
									43		
									44		
									45		
									46		
									47		
									48		
									49		
									50		
									51		
									52		
									53		
									54		
									55		
									56		
									57		
									58		
									59		
									60		

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
21.00	143	Rock roller	8.90	150	0.00	39.00	90		0.00	21.00	Air mist
39.00	120		31.10	123					21.00	39.00	Air

Remarks
Groundwater encountered at 19.30m bgl and 31.00m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record. Extensometer Details: Datum magnet is at 37.22m bgl, spider 1 is at 27.52m bgl, spider 2 is at 15.42m bgl and spider 3 is at 8.62m bgl.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 19/03/2019 - 20/03/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431663.34 N407357.48
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Comacchio 205

Borehole Number BH105	Hole Type RO	Level 113.26m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	113.06		Grass over TOPSOIL. COLLIERY SPOIL with large boulders.	1
		1.50	SPT	50 (10,12/50 for 167mm)					2
		4.50	SPT	N=25 (5,5/6,6,6,7)					4
		7.50	SPT	N=31 (4,5/6,7,9,9)					7
		10.50	SPT	N=38 (5,6/7,9,10,12)					10
		13.50	SPT	N=39 (4,7/8,8,10,13)					13
		16.50	SPT	N=35 (5,9/10,7,9,9)					16
		19.50	SPT	N=49 (6,8/10,15,12,12)					19
		22.50	SPT	N=33 (5,7/7,8,9,9)					22
		25.50	SPT	50 (25 for 98mm/50 for 85mm)				at 23.00m BGL ... Large sandstone boulders between 23.00m and 27.00m bgl.	23
								at 27.00m BGL ... Flush lost and borehole collapsing on rods.	27
					28.50	84.76		End of Borehole at 28.50m	28

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
3.00	120	Rock roller	3.00	123	0.00	28.50	90		0.00	28.50	Air
25.50	143										
28.50	120										

Remarks
Groundwater not encountered. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record. Borehole terminated at 28.50m bgl due to loss of flush and borehole collapsing on rods.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 20/03/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431681.23 N407365.62
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Comacchio 205

Borehole Number BH105A	Hole Type RO	Level 111.95m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	111.75		Grass over TOPSOIL. COLLIERY SPOIL.	1
									2
									3
									4
									5
									6
									7
									8
									9
									10
									11
									12
									13
									14
									15
									16
									17
									18
									19
									20
									21
									22
									23
									24
									25
									26
									27
									28
									29
									30

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
3.00	143	Rock roller	3.00	123	0.00	40.50	90		0.00	40.50	Air
6.00	120										
40.50	92										

Remarks
Groundwater not encountered. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record. Borehole collapsed prior to install from 38.00m to 34.00m bgl.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 20/03/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431681.23 N407365.62
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Comacchio 205

Borehole Number BH105A	Hole Type RO	Level 111.95m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 2 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
							COLLIERY SPOIL. at 30.00m BGL ... Colliery spoil becoming very loose.	31	
				38.00	73.95		Grey MUDSTONE.	32 33 34 35 36 37 38	
				40.50	71.45		End of Borehole at 40.50m	39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60	

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
3.00	143	Rock roller	3.00	123	0.00	40.50	90		0.00	40.50	Air
6.00	120										
40.50	92										

Remarks
Groundwater not encountered. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record. Borehole collapsed prior to install from 38.00m to 34.00m bgl.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 18/03/2019 - 19/03/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431397.56 N407101.38
Project No. : 4848		Crew Name: L. Hayes & L. Kitson	Drilling Equipment: Comacchio 205

Borehole Number BH106	Hole Type RO	Level 135.24m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	135.04		Grass over TOPSOIL.	
		1.50	SPT	N=18 (2,2/2,3,6,7)				Grey brown COLLIERY SPOIL with sandstone boulders.	1
		4.50	SPT	N=19 (2,3/4,5,5,5)					2
		7.50	SPT	N=32 (3,4/7,9,8,8)					3
		10.50	SPT	N=35 (4,5/9,7,9,10)					4
		13.50	SPT	N=26 (3,4/5,7,7,7)					5
		16.50	SPT	N=38 (4,6/7,9,10,12)					6
		19.50	SPT	N=32 (5,6/7,8,8,9)					7
		22.50	SPT	50 (5,5/50 for 166mm)					8
		25.50	SPT	N=50 (6,7/8,9,9,24)					9
		28.50	SPT	N=50 (5,7/50 for 235mm)					10
									11
									12
									13
									14
									15
									16
									17
									18
									19
									20
									21
									22
									23
									24
									25
									26
									27
									28
									29
									30

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
3.00	143	Rock roller	3.00	123	0.00	40.00	90		0.00	40.00	Air
40.00	120										

Remarks
Damp strata at 38.50m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 18/03/2019 - 19/03/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431397.56 N407101.38
Project No. : 4848		Crew Name: L. Hayes & L. Kitson	Drilling Equipment: Comacchio 205

Borehole Number BH106	Hole Type RO	Level 135.24m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 2 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		31.50	SPT	50 (10,12/50 for 90mm)	38.50	96.74		Grey brown COLLIERY SPOIL with sandstone boulders.	31
		34.50	SPT	50 (25 for 12mm/50 for 17mm)					32
		37.50	SPT	50 (25 for 9mm/50 for 7mm)					33
									34
									35
									36
									37
									38
					40.00	95.24		Hard grey SANDSTONE.	39
									40
								End of Borehole at 40.00m	41
									42
									43
									44
									45
									46
									47
									48
									49
									50
									51
									52
									53
									54
									55
									56
									57
									58
									59
									60

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
3.00	143	Rock roller	3.00	123	0.00	40.00	90		0.00	40.00	Air
40.00	120										

Remarks
Damp strata at 38.50m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 27/03/2019 - 28/03/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431883.08 N406914.83
Project No. : 4848		Crew Name: P. Dixon & L. Kitson	Drilling Equipment: Comacchio 305

Borehole Number BH107	Hole Type RO	Level 122.31m AoD	Logged By P. Dixon	Scale 1:150	Page Number Sheet 1 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.40	121.91		TOPSOIL	1
					2.00	120.31		Firm brown CLAY with mudstone.	2
								Brown/grey MUDSTONE.	3
									4
									5
									6
									7
					7.30	115.01		Grey MUDSTONE.	8
					8.60	113.71		COAL	9
					8.90	113.41		Grey MUDSTONE.	9
					9.40	112.91		COAL	10
					9.60	112.71		Grey MUDSTONE.	10
					10.80	111.51		Grey SANDSTONE.	11
					13.10	109.21		Grey MUDSTONE.	13
					18.50	103.81		COAL	19
				19.30	103.01		Grey MUDSTONE with sandstone bands.	20	
				26.20	96.11		COAL	26	
				27.30	95.01		Grey MUDSTONE.	27	
				27.60	94.71		Grey SANDSTONE.	28	
								29	
								30	

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
3.00	165	Rockbit	1.70	150	0.00	36.00	90		0.00	36.00	Air
36.00	146										

Remarks
Groundwater encountered overnight at 21.80m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 27/03/2019 - 28/03/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431883.08 N406914.83
Project No. : 4848		Crew Name: P. Dixon & L. Kitson	Drilling Equipment: Comacchio 305

Borehole Number BH107	Hole Type RO	Level 122.31m AoD	Logged By P. Dixon	Scale 1:150	Page Number Sheet 2 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					30.80	91.51	Grey SANDSTONE.	
					31.00	91.31	=====	COAL	31
							=====	Grey MUDSTONE.	32
					33.40	88.91	Grey SANDSTONE.	33
					36.00	86.31	End of Borehole at 36.00m	34
									35
									36
									37
									38
									39
									40
									41
									42
									43
									44
									45
									46
									47
									48
									49
									50
									51
									52
									53
									54
									55
									56
									57
									58
									59
									60

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
3.00	165	Rockbit	1.70	150	0.00	36.00	90		0.00	36.00	Air
36.00	146										

Remarks
Groundwater encountered overnight at 21.80m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 29/03/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431897.22 N406740.14
Project No. : 4848		Crew Name: P. Dixon & L. Kitson	Drilling Equipment: Comacchio 305

Borehole Number BH108	Hole Type RO	Level 130.24m AoD	Logged By P. Dixon	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.40	129.84		TOPSOIL. Stiff grey COLLIERY WASTE.	1
									2
									3
									4
									5
									6
									7
									8
									9
									10
									11
									12
						13.00	117.24		Grey MUDSTONE.
					14.10	116.14		Grey SANDSTONE.	14
					15.40	114.84		Grey MUDSTONE.	15
					17.00	113.24		Grey SANDSTONE	17
					17.70	112.54		Grey MUDSTONE.	18
									19
									20
									21
					22.60	107.64		COAL.	22
					23.40	106.84		Grey MUDSTONE.	23
									24
									25
									26
					27.00	103.24		End of Borehole at 27.00m	27
									28
									29
									30

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
12.00	159	Rockbit	13.50	123	0.00	27.00	90		0.00	27.00	Air
27.00	120										

Remarks
Fast groundwater flow encountered at 5.10m bgl, rose to 4.20m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 04/04/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431858.63 N406514.84
Project No. : 4848		Crew Name: P. Dixon & L. Kitson	Drilling Equipment: Comacchio 305

Borehole Number BH109	Hole Type RO	Level 149.00m AoD	Logged By P. Dixon	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.30	148.70		Stiff brown CLAY. Compact COLLIERY WASTE.	1
					11.20	137.80		Grey MUDSTONE.	2
					15.15	133.85		End of Borehole at 15.15m	3

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
11.60	146	Rockbit	1.00	150	0.00	15.15	90		0.00	15.15	Air
15.15	120		11.60	123							

Remarks
Groundwater not encountered. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 01/04/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431859.20 N406513.88
Project No. : 4848		Crew Name: P. Dixon & L. Kitson	Drilling Equipment: Comacchio 305

Borehole Number BH109A	Hole Type RO	Level 149.01m AoD	Logged By P. Dixon	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.30	148.71		Stiff brown CLAY. Compact COLLIERY WASTE.	1
									2
									3
									4
									5
					11.20	137.81		Grey MUDSTONE.	11
									12
									13
									14
									15
					18.30	130.71		COAL. Grey MUDSTONE.	18
					18.70	130.31			19
									20
					21.50	127.51		Grey SANDSTONE with mudstone bands.	21
									22
									23
					24.00	125.01		End of Borehole at 24.00m	24
									25
									26
									27
									28
									29
									30

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
11.50	146	Rockbit	1.00	150	0.00	24.00	90		0.00	24.00	Air
24.00	120		11.30	123							

Remarks
Fast groundwater flow encountered at 5.10m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 02/04/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E432297.79 N406812.03
Project No. : 4848		Crew Name: P. Dixon & L. Kitson	Drilling Equipment: Comacchio 305

Borehole Number BH111	Hole Type RO	Level 135.75m AoD	Logged By P. Dixon	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					2.00	133.75	Stiff brown CLAY.	1	
		2.80	SPT	N=14 (2,2/2,4,4,4)	3.80	131.95	Stiff brown/grey clayey MUDSTONE.	2	
							COAL	3	
		5.80	SPT	N=25 (6,9/9,6,6,4)	6.30	129.45	Weathered brown SANDSTONE.	4	
							Grey MUDSTONE.	5	
					9.50	126.25	Grey SANDSTONE.	6	
							Grey MUDSTONE.	7	
					13.00	122.75	Grey MUDSTONE.	8	
							COAL	9	
					17.20	118.55	Grey MUDSTONE.	10	
					20.30	115.45	COAL	11	
					20.60	115.15	Grey MUDSTONE.	12	
					25.10	110.65	COAL	13	
				25.40	110.35	Grey MUDSTONE with thin sandstone bands.	14		
				30.00	105.75	End of Borehole at 30.00m	15		

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
5.80	146	Rockbit	1.00	150	0.00	30.00	90		0.00	30.00	Air
30.00	120		5.80	123							

Remarks
Slow groundwater flow encountered at 23.50m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 03/04/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E432312.90 N406817.26
Project No. : 4848		Crew Name: P. Dixon & L. Kitson	Drilling Equipment: Comacchio 305

Borehole Number BH111A	Hole Type RO	Level 136.13m AoD	Logged By P. Dixon	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.30	135.83		Stiff brown CLAY.	1
		2.80	SPT	N=7 (1,2/2,2,1,2)				Stiff brown/grey CLAY with mudstone, sandstone and coal. (Colliery waste)	2
									3
		5.80	SPT	N=6 (2,2/1,1,2,2)	5.70	130.43		COAL	4
					7.40	128.73		Brown SANDSTONE.	5
		8.80	SPT	50 (18 for 75mm/50 for 60mm)	9.00	127.13			6
								End of Borehole at 9.00m	7
									8
									9
									10
									11
									12
									13
									14
									15
									16
									17
									18
									19
									20
									21
									22
									23
									24
									25
									26
									27
									28
									29
									30

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
5.80	146	Rockbit	1.00	150	0.00	9.00	90		0.00	9.00	Air
9.00	120		5.50	123							

Remarks
Groundwater not encountered. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 03/04/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E432342.72 N406824.72
Project No. : 4848		Crew Name: P. Dixon & L. Kitson	Drilling Equipment: Comacchio 305

Borehole Number BH111B	Hole Type RO	Level 136.70m AoD	Logged By P. Dixon	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.30	136.40		Stiff brown CLAY. Stiff COLLIERY WASTE with occasional boulders.	1
		2.80	SPT	N=12 (3,2/2,3,3,4)					2
									3
									4
		5.80	SPT	N=22 (1,4/5,6,6,5)					5
									6
									7
									8
		8.80	SPT	N=27 (7,6/6,7,7,7)					9
									10
					10.10	126.60		Grey SANDSTONE with occasional thin mudstone bands.	11
									12
									13
									14
									15
									16
									17
									18
									19
									20
					20.50	116.20		End of Borehole at 20.50m	21
									22
									23
									24
									25
									26
									27
									28
									29
									30

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
8.80	146	Rockbit	1.00	150	0.00	20.50	90			20.50	Air
20.50	120		8.70	123							

Remarks
Groundwater encountered at 17.60m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 04/04/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E432366.58 N406950.77
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Boart Longyear DB520

Borehole Number BH111C	Hole Type RO	Level 130.82m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	130.62		Grass over TOPSOIL. Brown clay FILL.	1
					1.50	129.32			COLLIERY SPOIL.
					3.50	127.32			COAL (Shale)
					4.90	125.92			Grey MUDSTONE.
					9.00	121.82			End of Borehole at 9.00m
									6
									7
									8
									9
									10
									11
									12
									13
									14
									15
									16
									17
									18
									19
									20
									21
									22
									23
									24
									25
									26
									27
									28
									29
									30

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
9.00	120	Rock Roller	1.50	123	0.00	9.00	90		0.00	9.00	Air

Remarks
Groundwater not encountered. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 02/04/2019 - 03/04/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E432430.03 N406912.29
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Boart Longyear DB520

Borehole Number BH112	Hole Type RO	Level 134.44m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	134.24		Grass over TOPSOIL. Red burnt ASH?	1
									2
									3
									4
									5
					6.10	128.34		Red sandstone FILL (Burnt ash)	6
									7
									8
									9
									10
									11
					11.40	123.04		Grey SANDSTONE.	12
					12.00	122.44			Grey MUDSTONE.
									15
				14.10	120.34		Grey SANDSTONE.	16	
				14.30	120.14			Grey MUDSTONE.	17
				15.00	119.44			End of Borehole at 15.00m	18
								19	
								20	
								21	
								22	
								23	
								24	
								25	
								26	
								27	
								28	
								29	
								30	

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
15.00	120	Rock Roller	1.50	123	0.00	15.00	90		0.00	15.00	Air

Remarks
Groundwater not encountered. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 03/04/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E432450.20 N406883.33
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Boart Longyear DB250

Borehole Number BH113	Hole Type RO	Level 136.11m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	135.91		Grass over TOPSOIL	1
					1.50	134.61		Brown clay FILL.	
								Grey brown COLLIERY SPOIL.	3
								Grey MUDSTONE.	4
					11.50	124.61		5	
					15.00	121.11		6	
								7	
								8	
								9	
								10	
								11	
								12	
								13	
								14	
								15	
								16	
								17	
								18	
								19	
								20	
								21	
								22	
								23	
								24	
								25	
								26	
								27	
								28	
								29	
								30	

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
15.00	120	Rock Roller	9.40	123	0.00	15.00	90		0.00	15.00	Air

Remarks
Groundwater not encountered. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 04/04/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E432457.62 N406851.01
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Boart Longyear DB520

Borehole Number BH113A	Hole Type RO	Level 137.03m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	136.83		Grass over TOPSOIL. Clay FILL with colliery spoil.	1
					5.00	132.03		Brown grey MUDSTONE.	2 3 4 5
					8.00	129.03		End of Borehole at 8.00m	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
8.00	120	Rock Roller	1.50	123	0.00	8.00	90		0.00	8.00	Air

Remarks
Groundwater not encountered. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 04/04/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E432460.04 N406839.31
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Boart Longyear DB520

Borehole Number BH113B	Hole Type RO	Level 137.41m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	137.21		Grass over TOPSOIL	1
					1.50	135.91		COLLIERY SPOIL.	
					4.00	133.41		Brown grey MUDSTONE.	4
					7.00	130.41		End of Borehole at 7.00m	7
								8	
								9	
								10	
								11	
								12	
								13	
								14	
								15	
								16	
								17	
								18	
								19	
								20	
								21	
								22	
								23	
								24	
								25	
								26	
								27	
								28	
								29	
								30	

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
7.00	120	Rock Roller	1.50	123	0.00	7.00	90		0.00	7.00	Air

Remarks
Groundwater not encountered. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 13/03/2019 - 14/03/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431610.58 N407719.05
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Comacchio 205

Borehole Number BH117	Hole Type RO	Level 92.47m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	92.27		Grass over TOPSOIL. Highly weathered grey brown MUDSTONE.	1
					2.30	90.17		Hard brown SANDSTONE.	2
					5.30	87.17		Grey brown MUDSTONE.	3
					6.60	85.87		Hard grey SANDSTONE.	4
					7.00	85.47		Grey MUDSTONE.	5
					7.80	84.67		Hard grey SANDSTONE.	6
					12.00	80.47		Grey MUDSTONE.	7
					15.20	77.27		Grey SANDSTONE.	8
					17.50	74.97		COAL (intact)	9
					18.80	73.67		Grey MUDSTONE.	10
					25.80	66.67		COAL	11
					26.30	66.17		Grey MUDSTONE.	12
					27.80	64.67		Hard grey SANDSTONE.	13

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
1.50	143	Polycarbonate drillbit & Rock Roller	1.60	123	0.00	32.00	90		0.00	24.50	Air
32.00	92								24.50	32.00	Air mist

Remarks
Damp strata at 24.30m bgl, groundwater encountered overnight at 19.10m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West	Client: Strata Sterling Barnsley West Ltd	Date: 13/03/2019 - 14/03/2019
Location: Barnsley	Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431610.58 N407719.05
Project No. : 4848	Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Comacchio 205

Borehole Number BH117	Hole Type RO	Level 92.47m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 2 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					30.10	62.37		Hard grey SANDSTONE. Brown SANDSTONE.	31
					32.00	60.47		End of Borehole at 32.00m	32
									33
									34
									35
									36
									37
									38
									39
									40
									41
									42
									43
									44
									45
									46
									47
									48
									49
									50
									51
									52
									53
									54
									55
									56
									57
									58
									59
									60

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
1.50	143	Polycarbonate drillbit & Rock Roller	1.60	123	0.00	32.00	90		0.00	24.50	Air
32.00	92								24.50	32.00	Air mist

Remarks
Damp strata at 24.30m bgl, groundwater encountered overnight at 19.10m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 14/03/2019 - 15/03/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431698.86 N407619.74
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Comacchio 205

Borehole Number BH118	Hole Type RO	Level 93.25m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
					0.20	93.05		Grass with brown clay TOPSOIL.	1	
									Grey brown MUDSTONE.	2
										3
										4
										5
										6
						7.20	86.05		COAL.	7
						7.80	85.45		Grey MUDSTONE.	8
										9
										10
						10.70	82.55		Hard grey SANDSTONE.	11
						12.00	81.25		Grey MUDSTONE.	12
						13.00	80.25		Grey SANDSTONE.	13
										14
										15
				17.00	76.25		Grey MUDSTONE.	17		
								18		
								19		
								20		
				21.00	72.25		Grey SANDSTONE.	21		
				21.80	71.45		COAL.	22		
				22.80	70.45		Grey MUDSTONE.	23		
				24.00	69.25		Grey SANDSTONE.	24		
								25		
								26		
								27		
								28		
								29		
				29.70	63.55			30		

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
3.00	143	Polycarbonate drillbit & Rock roller	3.00	123	0.00	40.00	90		1.20	3.00	Air
40.00	92								3.00	40.00	Air mist

Remarks
Damp strata at 16.80m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West	Client: Strata Sterling Barnsley West Ltd	Date: 14/03/2019 - 15/03/2019
Location: Barnsley	Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431698.86 N407619.74
Project No. : 4848	Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Comacchio 205

Borehole Number BH118	Hole Type RO	Level 93.25m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 2 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
					30.30	62.95		Grey MUDSTONE.	31	
					30.90	62.35				COAL
					31.70	61.55				Grey MUDSTONE.
										Grey SANDSTONE with weaker bands.
					40.00	53.25		End of Borehole at 40.00m	40	
									41	
									42	
									43	
									44	
									45	
									46	
									47	
									48	
									49	
									50	
									51	
									52	
									53	
									54	
									55	
									56	
									57	
									58	
									59	
									60	

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
3.00	143	Polycarbonate drillbit & Rock roller	3.00	123	0.00	40.00	90		1.20	3.00	Air
40.00	92								3.00	40.00	Air mist

Remarks
Damp strata at 16.80m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 15/03/2019 - 18/03/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E432011.45 N407605.30
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Comacchio 205

Borehole Number BH119	Hole Type RO	Level 86.97m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
[Well ID]					0.20	86.77	[Pattern]	Grass over TOPSOIL Brown weathered MUDSTONE.	1
					3.70	83.27	[Pattern]	Grey MUDSTONE.	4
					6.00	80.97	[Pattern]	COAL.	6
					6.30	80.67	[Pattern]	Grey MUDSTONE.	7
					6.80	80.17	[Pattern]	COAL.	7
					6.90	80.07	[Pattern]	Grey MUDSTONE.	8
					7.00	79.97	[Pattern]	Grey SANDSTONE.	8
					9.10	77.87	[Pattern]	Grey MUDSTONE.	9
					13.20	73.77	[Pattern]	Grey SANDSTONE.	13
					15.70	71.27	[Pattern]	Grey MUDSTONE.	16
			20.00	66.97			End of Borehole at 20.00m	20	

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
5.00	143	Rock roller	3.00	123	0.00	20.00	90		1.20	20.00	Water
20.00	120										

Remarks
Groundwater not encountered. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 29/03/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431784.13 N407083.90
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Boart Longyear DB520

Borehole Number BH120	Hole Type RO	Level 106.72m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
[Well ID]					0.25	106.47	[Cross-hatched]	TOPSOIL	1	
								[Dashed]	Firm brown mottled CLAY.	2
					3.50	103.22		[Horizontal lines]	Brown grey MUDSTONE.	3
					3.90	102.82		[Dotted]	Grey SANDSTONE.	4
					5.20	101.52		[Horizontal lines]	Grey MUDSTONE.	5
								[Horizontal lines]		6
								[Horizontal lines]		7
								[Horizontal lines]		8
								[Horizontal lines]		9
								[Horizontal lines]		10
					11.70	95.02		[Solid black]	COAL	11
					12.20	94.52		[Horizontal lines]	Grey MUDSTONE.	12
					13.20	93.52		[Dotted]	Grey SANDSTONE.	13
					13.80	92.92		[Horizontal lines]	Grey MUDSTONE.	14
					14.00	92.72		[Solid black]	COAL.	14
			14.15	92.57		[Horizontal lines]	Grey MUDSTONE.	15		
			16.10	90.62		[Dotted]	Hard grey SANDSTONE.	16		
			18.20	88.52		[Horizontal lines]	Grey MUDSTONE.	18		
			22.30	84.42		[Solid black]	COAL.	22		
			23.90	82.82		[Dotted]	Hard grey SANDSTONE.	24		
			26.95	79.77		[Horizontal lines]	Grey MUDSTONE.	27		
			28.00	78.72		[Dotted]	Grey SANDSTONE.	28		
						[Dotted]		29		
						[Dotted]		30		

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
5.00	120	Rock roller	5.00	123	0.00	40.00	90		0.00	40.00	Air
40.00	92										

Remarks
Groundwater not encountered. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West	Client: Strata Sterling Barnsley West Ltd	Date: 29/03/2019
Location: Barnsley	Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431784.13 N407083.90
Project No. : 4848	Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Boart Longyear DB520

Borehole Number BH120	Hole Type RO	Level 106.72m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 2 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					30.30	76.42		Grey SANDSTONE.	31
					31.40	75.32		Grey MUDSTONE.	
					32.40	74.32		COAL.	32
								Grey MUDSTONE.	33
									34
									35
									36
									37
									38
									39
					40.00	66.72		End of Borehole at 40.00m	40
									41
									42
									43
									44
									45
									46
									47
									48
									49
									50
									51
									52
									53
									54
									55
									56
									57
									58
									59
									60

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
5.00	120	Rock roller	5.00	123	0.00	40.00	90		0.00	40.00	Air
40.00	92										

Remarks
Groundwater not encountered. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 05/04/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431417.07 N406718.02
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Boart Longyear DB520

Borehole Number BH121	Hole Type RO	Level 144.67m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	144.47		Grass over TOPSOIL.	
					0.50	144.17		Brown clay FILL. Grey MUDSTONE.	1
									2
									3
					3.40	141.27		Brown grey MUDSTONE.	4
									5
					6.30	138.37		COAL with interbedded mudstone.	6
									7
					8.00	136.67		Grey MUDSTONE.	8
									9
									10
									11
									12
									13
									14
					14.60	130.07		COAL.	15
					15.00	129.67		Grey MUDSTONE.	16
									17
					16.00	128.67		COAL.	18
					16.50	128.17		MUDSTONE.	19
									20
					17.40	127.27		Grey SANDSTONE.	21
									22
									23
					21.00	123.67		Grey MUDSTONE.	24
									25
					24.40	120.27		Grey SANDSTONE.	26
									27
					26.40	118.27		Grey MUDSTONE.	28
									29
				29.20	115.47		COAL.	30	
				29.50	115.17				

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
3.00	120	Rock roller	1.50	123	0.00	40.00	90		1.20	40.00	Air
40.00	92										

Remarks
Groundwater not encountered. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West	Client: Strata Sterling Barnsley West Ltd	Date: 05/04/2019
Location: Barnsley	Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431417.07 N406718.02
Project No. : 4848	Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Boart Longyear DB520

Borehole Number BH121	Hole Type RO	Level 144.67m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 2 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
[Pattern]					30.30	114.37	[Pattern]	Grey MUDSTONE. Grey brown SANDSTONE.	31
					33.50	111.17	[Pattern]	Grey MUDSTONE.	32 33 34
					37.50	107.17	[Pattern]	Grey SANDSTONE.	35 36 37 38
					40.00	104.67	[Pattern]	End of Borehole at 40.00m	39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
3.00 40.00	120 92	Rock roller	1.50	123	0.00	40.00	90		1.20	40.00	Air

Remarks
Groundwater not encountered. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West	Client: Strata Sterling Barnsley West Ltd	Date: 01/04/2019 - 02/04/2019
Location: Barnsley	Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E431949.67 N406830.54
Project No. : 4848	Crew Name: P. Dixon & L. Kitson	Drilling Equipment: Comacchio 305

Borehole Number BH122	Hole Type RO	Level 126.80m AoD	Logged By P. Dixon	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.50	126.30		Stiff brown CLAY.	
					0.80	126.00		Weathered grey MUDSTONE.	1
					1.10	125.70		Firm orange/brown CLAY.	2
								Weathered grey sandy MUDSTONE.	3
									4
					4.80	122.00		Dark grey SHALE	5
									6
					7.30	119.50		Grey MUDSTONE.	7
					7.60	119.20		Grey SANDSTONE.	8
					8.10	118.70		COAL.	9
					8.20	118.60		Grey SANDSTONE.	9
					9.10	117.70		Weak grey MUDSTONE.	10
									11
									12
					15.40	111.40		COAL.	16
							17		
			17.70	109.10		Weak grey MUDSTONE.	18		
							19		
							20		
			21.00	105.80			End of Borehole at 21.00m	21	
								22	
								23	
								24	
								25	
								26	
								27	
								28	
								29	
								30	

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
1.00	146	Rockbit	1.00	150	0.00	21.00	90		1.00	6.00	Air
6.00	120		6.00	123					6.00	21.00	

Remarks
Fast groundwater flow encountered at 5.20m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 02/04/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E432256.93 N406832.83
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Boart Longyear DB520

Borehole Number BH123	Hole Type RO	Level 131.78m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
[Well ID]					0.20	131.58	[Cross-hatch pattern]	Grass over TOPSOIL. Reworked brown sandy CLAY.	1
					2.60	129.18	[Dotted pattern]	Brown SANDSTONE.	2
					7.20	124.58	[Horizontal lines]	Grey MUDSTONE.	3
					9.20	122.58	[Dotted pattern]	Hard grey SANDSTONE.	4
					9.45	122.33	[Horizontal lines]	Grey MUDSTONE.	5
					11.90	119.88	[Dotted pattern]	Hard grey SANDSTONE.	6
					13.10	118.68	[Horizontal lines]	Grey MUDSTONE.	7
					16.40	115.38	[Solid black]	Intact COAL.	8
					17.10	114.68	[Horizontal lines]	Grey MUDSTONE.	9
					21.35	110.43	[Solid black]	COAL (Shale)	10
					22.20	109.58	[Horizontal lines]	Grey MUDSTONE.	11
					23.60	108.18	[Dotted pattern]	Hard grey SANDSTONE.	12
					28.00	103.78	[Solid black]	COAL (shale)	13
					28.40	103.38	[Horizontal lines]	Grey MUDSTONE.	14

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
36.00	120	Rock roller	3.00	123	0.00	36.00	90		0.00	3.00	Air
									3.00	36.00	Air mist

Remarks
Damp strata at 13.10m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 02/04/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E432256.93 N406832.83
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Boart Longyear DB520

Borehole Number BH123	Hole Type RO	Level 131.78m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 2 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
[Pattern]					30.90	100.88	[Pattern]	Grey MUDSTONE.	31
					31.60	100.18	[Pattern]	Hard grey SANDSTONE with brown bands.	32
							[Pattern]	Grey MUDSTONE.	33
							[Pattern]		34
					34.80	96.98	[Pattern]	COAL (shale)	35
					35.20	96.58	[Pattern]	Grey MUDSTONE.	36
				36.00	95.78	[Pattern]	End of Borehole at 36.00m	37	
								38	
								39	
								40	
								41	
								42	
								43	
								44	
								45	
								46	
								47	
								48	
								49	
								50	
								51	
								52	
								53	
								54	
								55	
								56	
								57	
								58	
								59	
								60	

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
36.00	120	Rock roller	3.00	123	0.00	36.00	90		0.00 3.00	3.00 36.00	Air Air mist

Remarks
Damp strata at 13.10m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 04/04/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E432463.19 N406819.74
Project No. : 4848		Crew Name: L. Hayes & K. Fullard	Drilling Equipment: Boart Longyear DB520

Borehole Number BH124	Hole Type RO	Level 137.64m AoD	Logged By L. Hayes	Scale 1:150	Page Number Sheet 1 of 1
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	137.44		Grass over TOPSOIL. Burnt ash, clay & mudstone FILL.	1
					2.00	135.64		Grey MUDSTONE.	2
					3.80	133.84		Grey SANDSTONE.	4
					8.00	129.64		Grey MUDSTONE.	8
					9.00	128.64		Brown MUDSTONE.	9
					16.50	121.14		Intact COAL.	17
					19.50	118.14		Grey MUDSTONE.	20
					21.60	116.04		Grey SANDSTONE.	22
					24.20	113.44		Dark grey MUDSTONE.	24
					30.00	107.64		End of Borehole at 30.00m	30

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
10.00	143	Rock roller	3.00	150	0.00	30.00	90		0.00	3.00	Air
30.00	92								10.00	30.00	Air mist Water

Remarks
Groundwater encountered at 24.20m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd		Date: 03/04/2019 - 04/04/2019	
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd		Co-ords: E432176.63 N406680.48	
Project No. : 4848		Crew Name: P. Dixon & L. Kitson		Drilling Equipment: Comacchio 305	
Borehole Number BH125	Hole Type RO	Level 131.60m AoD	Logged By P. Dixon	Scale 1:150	Page Number Sheet 1 of 2

Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.25	131.35	Stiff brown CLAY.		
					1.10	130.50	Grey MUDSTONE.	1	
					1.70	129.90	Grey SANDSTONE.		
							Weathered brown SANDSTONE.	2	
					3.30	128.30	COAL.	3	
					4.30	127.30	Grey MUDSTONE.	4	
					6.40	125.20	Brown SANDSTONE.	5	
					8.60	123.00	Grey MUDSTONE.	6	
					10.50	121.10	Grey SANDSTONE with white sandstone and quartz bands.	7	
					12.20	119.40	Grey MUDSTONE.	8	
					15.00	116.60	Grey MUDSTONE.	9	
					15.50	116.10	COAL.	10	
					15.80	115.80	Grey MUDSTONE.	11	
					23.90	107.70	COAL.	12	
					24.00	107.60	Grey MUDSTONE.	13	
					25.10	106.50	COAL.	14	
				25.50	106.10	Grey MUDSTONE.	15		
							16		
							17		
							18		
							19		
							20		
							21		
							22		
							23		
							24		
							25		
							26		
							27		
							28		
							29		
							30		

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
6.00	146	Rockbit	1.00	150	0.00	40.00	90		1.00	40.00	Air
40.00	120		6.00	123							

Remarks
Fast groundwater flow encountered at 4.80m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Rotary Open Hole Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 03/04/2019 - 04/04/2019
Location: Barnsley		Contractor: Allied Exploration & Geotechnics Ltd	Co-ords: E432176.63 N406680.48
Project No. : 4848		Crew Name: P. Dixon & L. Kitson	Drilling Equipment: Comacchio 305

Borehole Number BH125	Hole Type RO	Level 131.60m AoD	Logged By P. Dixon	Scale 1:150	Page Number Sheet 2 of 2
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Well	Water Strikes	In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
[Pattern]								Grey MUDSTONE.	31
									32
									33
									34
					36.60	95.00			36
					36.90	94.70		COAL.	37
								Grey MUDSTONE.	38
					38.10	93.50		Grey SANDSTONE.	39
					40.00	91.60		End of Borehole at 40.00m	40
									41
									42
									43
									44
									45
									46
									47
									48
									49
									50
									51
									52
									53
									54
									55
									56
									57
									58
									59
									60

Hole Diameter		Drill Bit Type	Casing Diameter		Inclination & Orientation				Drilling Flush		
Depth Base (m)	Diameter (mm)	Bit Type	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Inclination	Orientation	Depth Top (m)	Depth Base (m)	Flush Type
6.00	146	Rockbit	1.00	150	0.00	40.00	90		1.00	40.00	Air
40.00	120		6.00	123							

Remarks
Fast groundwater flow encountered at 4.80m bgl. Inspection pit dug prior to drilling. All descriptions derived from drillers daily record.





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Trial Pit Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 05/04/2019
Location: Barnsley		Contractor: Hather Plant Hire Ltd	Co-ords: E431465.29 N407779.61
Project No. : 4848		Crew Name: C. Ruston	Equipment: 13 tonne 360 tracked excavator with 2ft bucket
Location Number TP101	Location Type TP	Level 95.94m AoD	Logged By JAM
		Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.20	ES		0.20	95.74		<p>MADE GROUND: Soft to firm light orangish brown slightly gravelly silty CLAY with rootlets. Gravel is angular to subrounded fine of brick and mudstone. (Reworked Topsoil)</p> <p>MADE GROUND: Firm light orangish brown and light brown gravelly silty CLAY. Gravel is angular to rounded fine to medium of brick, mudstone and coal. (Reworked Ground)</p> <p>MADE GROUND: Firm to stiff light grey and occasionally brown slightly sandy gravelly CLAY with low cobble content. Gravel is angular to subrounded fine to coarse of mudstone, sandstone and coal. Cobbles are tabular of mudstone, siltstone and sandstone. (Colliery Spoil)</p>
		0.50 - 1.00	ES		0.50	95.44		
		1.50 - 2.00	B					
		1.90 - 2.00	D					
					3.00	92.94		End of Trial Pit at 3.00m

Dimensions		Trench Support and Comment			Pumping Data			
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
2.70	0.60	Sides stable	None					

Remarks
Groundwater not encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





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Trial Pit Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd		Date: 05/04/2019	
Location: Barnsley		Contractor: Hather Plant Hire Ltd		Co-ords: E431559.02 N407680.35	
Project No. : 4848		Crew Name: C. Ruston		Equipment: 13 tonne 360 tracked excavator with 2ft bucket	
Location Number TP102	Location Type TP	Level 96.48m AoD	Logged By JAM	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.25	ES		0.20	96.28		<p>MADE GROUND: Firm dark brown and light grey slightly gravelly silty CLAY with rootlets. Gravel is angular to subrounded fine to coarse of mudstone, coal, brick, sandstone and burnt red shale. (Reworked Topsoil)</p> <p>MADE GROUND: Firm light orangish brown and light grey slightly gravelly silty CLAY with rootlets. Gravel is angular fine to medium of mudstone. (Reworked natural)</p>	
		0.80	D B ES		0.80	95.68			
		0.80 - 1.00 0.90 - 1.00							
					3.00	93.48		End of Trial Pit at 3.00m	3
									4
									5

Dimensions		Trench Support and Comment			Pumping Data			
Pit Length 3.00	Pit Width 0.60	Pit Stability Sides stable	Shoring Used None	Remarks		Date	Rate	Remarks

Remarks
Groundwater not encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





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Trial Pit Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 05/04/2019
Location: Barnsley		Contractor: Hather Plant Hire Ltd	Co-ords: E431601.47 N407721.69
Project No. : 4848		Crew Name: C. Ruston	Equipment: 13 tonne 360 tracked excavator with 2ft bucket
Location Number TP102A	Location Type TP	Level 92.66m AoD	Logged By JAM
		Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.25	ES		0.25	92.42		MADE GROUND: Firm dark brown and light grey slightly gravelly silty CLAY with rootlets. Gravel is angular to subrounded fine to coarse of mudstone, coal, brick and sandstone. (Reworked Topsoil)
					0.70	91.96		MADE GROUND: Firm light orangish brown and grey slightly gravelly silty CLAY. Gravel is angular fine to coarse of mudstone and sandstone. (Reworked natural)
								MADE GROUND. Stiff dark and light grey and brown slightly sandy gravelly CLAY with low cobble content. Gravel is angular to rounded fine to coarse of mudstone, sandstone and coal. Cobbles are tabular of mudstone, siltstone and sandstone. (Colliery Spoil)
		2.00 - 2.10	D		2.75	89.92		Stiff light orangish brown mottled grey slightly gravelly silty CLAY. Gravel is angular fine to medium of mudstone and coal. (Possible reworked natural)
		2.00 - 2.20	B		3.60	89.06		at 3.00m BGL ... 100mm thick coal band. (reworked)
2.00 - 2.20	ES		3.75	88.92		Very stiff high strength light grey and brown slightly gravelly silty CLAY. Gravel is angular fine to coarse of mudstone. (Residual soil - Pennine Lower Coal Measures)		
at 3.60m BGL ... ex-situ HSV test: 122 kPa. at 3.70m BGL ... becoming slightly gravelly sandy silty clay. Gravels are angular fine to coarse of sandstone. End of Trial Pit at 3.75m								

Dimensions		Trench Support and Comment			Pumping Data			
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
3.50	0.60	Sides stable	None					

Remarks
Groundwater not encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





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Trial Pit Log

Project Name: Barnsley West		Client: Strata Sterling Barnsley West Ltd	Date: 05/04/2019
Location: Barnsley		Contractor: Hather Plant Hire Ltd	Co-ords: E431435.80 N407415.84
Project No. : 4848		Crew Name: C. Ruston	Equipment: 13 tonne 360 tracked excavator with 2ft bucket
Location Number TP103	Location Type TP	Level 116.10m AoD	Logged By JAM
		Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.25	ES		0.25	115.85	MADE GROUND: Soft to firm dark brown slightly gravelly silty CLAY with rootlets. Gravel is angular fine to medium of mixed lithology (Reworked topsoil)	
		0.75		HSV=136	0.70	115.40	Soft to firm dark orangish brown and grey slightly gravelly sandy CLAY. Gravel is angular fine of sandstone and ironstone. (Possible reworked natural)	
		2.00 - 2.50	B		2.00	114.10	Very stiff high strength light grey and orangish brown slightly gravelly slightly sandy silty CLAY. Gravel is angular fine to medium of mudstone, siltstone and sandstone. (Residual soil - Pennine Lower Coal Measures)	
		2.00 - 2.50	D		2.00	114.10	Extremely weak thinly laminated light grey destructured clayey MUDSTONE. (Pennine Lower Coal Measures)	
					2.50	113.60	at 1.80m BGL ... becoming less orangish brown with occasional ironstone cobbles. at 2.40m BGL ... recovered as subrounded cobbles of ironstone.	
End of Trial Pit at 2.50m								

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length 2.50	Pit Width 0.60	Pit Stability Sides stable	Shoring Used None	Remarks	Date	Rate	Remarks

Remarks
Groundwater not encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





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Trial Pit Log

Project Name: Barnsley West	Client: Strata Sterling Barnsley West Ltd	Date: 05/04/2019
Location: Barnsley	Contractor: Hather Plant Hire Ltd	Co-ords: E431865.88 N407616.97
Project No. : 4848	Crew Name: C. Ruston	Equipment: 13 tonne 360 tracked excavator with 2ft bucket

Location Number TP104	Location Type TP	Level 89.36m AoD	Logged By JAM	Scale 1:25	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.25	ES					<p>MADE GROUND: Firm dark brown and light grey slightly gravelly silty CLAY with rootlets. Gravel is angular to subrounded fine to coarse of mudstone, coal, brick and sandstone. (Reworked Topsoil)</p> <p>MADE GROUND: Firm light orangish brown and light grey slightly gravelly silty CLAY with rootlets. Gravel is angular fine to medium of mudstone. (Reworked natural)</p> <p>MADE GROUND: Firm light grey and brown slightly sandy gravelly CLAY with medium cobble content and low boulder content. Gravel is angular to rounded fine to coarse of mudstone and coal. Cobbles and boulders are tabular angular to subrounded up to 500mm across of ironstone, mudstone and sandstone. (Colliery Spoil)</p>	
		0.25 - 0.60	ES		0.25	89.10			
					0.60	88.76			
		2.50 - 3.00	B						
		3.00	D		3.00	86.36		End of Trial Pit at 3.00m	

Dimensions		Trench Support and Comment			Pumping Data			
Pit Length 3.90	Pit Width 0.60	Pit Stability Sides Stable	Shoring Used None	Remarks		Date	Rate	Remarks

Remarks
Groundwater not encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





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Trial Pit Log

Project Name: Barnsley West	Client: Strata Sterling Barnsley West Ltd	Date: 05/04/2019
Location: Barnsley	Contractor: Hather Plant Hire Ltd	Co-ords: E431615.37 N407332.25
Project No. : 4848	Crew Name: C. Ruston	Equipment: 13 tonne 360 tracked excavator with 2ft bucket

Location Number TP105	Location Type TP	Level 116.91m AoD	Logged By JAM	Scale 1:25	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.50	ES		0.50	116.41		MADE GROUND: Soft to firm dark brown slightly gravelly silty CLAY with rootlets. Gravel is subrounded fine to medium of mudstone, coal and brick. (Reworked topsoil)	1
					0.80	116.11		MADE GROUND: Firm light orangish brown and grey slightly sandy gravelly silty CLAY. Gravel is angular fine to coarse of sandstone, mudstone, coal. (Reworked natural)	
					2.00	114.91		MADE GROUND: Firm to stiff dark brownish grey slightly sandy gravelly CLAY with high cobble and low boulder content. Gravel is angular to rounded fine to coarse of mudstone and coal. Cobbles and boulders are tabular angular to subrounded up to 350mm across of mudstone, siltstone and sandstone. (Colliery Spoil)	2
		2.00 - 2.40 2.00 - 2.40	B D		2.40	114.51		MADE GROUND: Dark brownish grey clayey sandy GRAVEL with high cobble content. Gravel is angular to rounded fine to coarse of mudstone and coal. Cobbles are tabular angular to subrounded of mudstone, siltstone and sandstone. (Colliery Spoil)	
		2.40	ES				End of Trial Pit at 2.40m		3
									4
									5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length 3.10	Pit Width 0.60	Pit Stability Sides Stable	Shoring Used None	Remarks	Date	Rate	Remarks

Remarks
Groundwater not encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





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Trial Pit Log

Project Name: Barnsley West	Client: Strata Sterling Barnsley West Ltd	Date: 05/04/2019
Location: Barnsley	Contractor: Hather Plant Hire Ltd	Co-ords: E431442.45 N407122.76
Project No. : 4848	Crew Name: C. Ruston	Equipment: 13 tonne 360 tracked excavator with 2ft bucket

Location Number TP106	Location Type TP	Level 132.50m AoD	Logged By JAM	Scale 1:25	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
[Pattern]		0.00 - 0.40	ES				[Pattern]	MADE GROUND: Soft to firm dark brown slightly gravelly silty CLAY with rootlets. Gravel is angular fine to coarse of mixed lithology. (Reworked topsoil)	
		0.40 - 0.80	ES		0.40	132.10		MADE GROUND: Firm light orangish brown and grey slightly sandy gravelly silty CLAY. Gravel is angular fine to coarse of sandstone, mudstone, coal. (Reworked natural)	
		1.50 - 2.00	B D		0.80	131.70		MADE GROUND: Firm light grey and occasionally brown slightly sandy gravelly CLAY with medium cobble content and low boulder content. Gravel is angular to rounded fine to coarse of mudstone and coal. Cobbles and boulders are tabular angular to subrounded up to 450mm across of ironstone, mudstone, siltstone and sandstone. (Colliery Spoil)	1
		1.50 - 2.00			2.00	130.50		<i>at 1.00m BGL ... Occasional lenses of dark grey clayey sandy gravel. Gravel is angular fine to coarse of sandstone, mudstone and siltstone.</i>	2
End of Trial Pit at 2.00m								5	

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length 2.50	Pit Width 0.60	Pit Stability Sides Stable	Shoring Used None	Remarks	Date	Rate	Remarks

Remarks
Groundwater not encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





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Trial Pit Log

Project Name: Barnsley West	Client: Strata Sterling Barnsley West Ltd	Date: 16/05/2019
Location: Barnsley	Contractor: Hather Plant Hire Ltd	Co-ords: E431410.64 N406707.87
Project No. : 4848	Crew Name: M. Simons	Equipment: 3CX with a 2ft bucket

Location Number TP108	Location Type TP	Level 144.79m AoD	Logged By JAM	Scale 1:25	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
TP108		0.00 - 0.10	ES		0.10	144.69	TP108	MADE GROUND: Soft dark brown slightly sandy slightly gravelly CLAY with rootlets. Gravel is angular to rounded fine to coarse of mudstone, sandstone and coal (Reworked topsoil)	1
					0.40	144.39		MADE GROUND: Stiff dark greyish brown slightly gravelly sandy CLAY. Gravel is angular to rounded fine to medium of mudstone, coal and sandstone. (Reworked natural)	
					0.55	144.24		MADE GROUND: Firm light orangish brown slightly gravelly sandy CLAY. Gravel is angular to rounded, fine of mudstone and coal. (Reworked natural)	
								MADE GROUND: Soft to firm light grey slightly sandy gravelly CLAY with high cobble and low boulder content. Gravel is angular fine to coarse of mudstone, siltstone, sandstone and coal. Cobbles and boulders are angular up to 300mm across of mudstone/ siltstone, sandstone and rare brick. (Reworked natural)	
		2.50 - 2.80	B						
		2.60 - 2.70	ES						
		2.70 - 2.80	D						
					2.80	141.99			
					3.40	141.39		Firm medium strength thinly laminated light orangish brown and grey slightly sandy slightly gravelly CLAY. Gravel is subrounded fine to medium of mudstone and coal. (Residual soil - Pennine Lower Coal Measures) <i>At 2.90m BGL ... land drain encountered - Dry</i> <i>At 3.10m BGL ... ex-situ HSV test: 71kPa.</i> <i>At 3.40m BGL ... many ironstone cobbles.</i> End of Trial Pit at 3.40m	3
									4
									5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length 3.50	Pit Width 0.60	Pit Stability Sides Stable	Shoring Used None	Remarks	Date	Rate	Remarks

Remarks
Groundwater not encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





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Trial Pit Log

Project Name: Barnsley West	Client: Strata Sterling Barnsley West Ltd	Date: 16/05/2019
Location: Barnsley	Contractor: Hather Plant Hire Ltd	Co-ords: E431937.80 N406836.93
Project No. : 4848	Crew Name: M. Simons	Equipment: 3CX with a 2ft bucket

Location Number TP109	Location Type TP	Level 126.60m AoD	Logged By JAM	Scale 1:25	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.15	ES		0.15	126.45		MADE GROUND: Stiff friable dark brown slightly gravelly slightly sandy CLAY with rootlets. Gravel is angular fine to medium of mixed lithology, including brick, coal and mudstone. (Reworked topsoil)	
		0.60 - 1.00	ES		0.55	126.05		MADE GROUND: Firm light orangish brown slightly gravelly sandy CLAY. Gravel is angular to subrounded fine to coarse of sandstone. (Reworked natural)	
		1.50 - 1.60 1.50 - 1.90	D B		1.50	125.10		MADE GROUND: Soft dark grey slightly sandy gravelly CLAY. Gravel is angular fine to coarse of coal, mudstone and sandstone. (Colliery spoil)	1
					2.90	123.70		Firm light grey and orangish brown slightly gravelly CLAY. Gravel is angular of mudstone, coal and ironstone. (Residual soil - Pennine Lower Coal Measures)	2
					3.30	123.30		Extremely weak occasionally thinly laminated light grey occasionally brown destructured MUDSTONE. Recovered as clayey gravel. (Pennine Lower Coal Measures)	3
End of Trial Pit at 3.30m									4
								5	

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length 2.50	Pit Width 0.60	Pit Stability Sides Stable	Shoring Used None	Remarks	Date	Rate	Remarks

Remarks
Perched groundwater encountered at 1.00m bgl, 1.50m bgl & 3.00m bgl. No visual or olfactory evidence of potential hydrocarbon contamination.





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Trial Pit Log

Project Name: Barnsley West	Client: Strata Sterling Barnsley West Ltd	Date: 16/05/2019
Location: Barnsley	Contractor: Hather Plant Hire Ltd	Co-ords: E432010.71 N406478.38
Project No. : 4848	Crew Name: M. Simons	Equipment: 3CX with a 2ft bucket

Location Number TP110	Location Type TP	Level 149.71m AoD	Logged By JAM	Scale 1:25	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.20	ES		0.20	149.51		MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY with rootlets. Gravel is angular to subrounded fine to coarse of brick, coal and mudstone. (Reworked topsoil)	1
		2.00 - 2.10 2.00 - 2.50	D B					MADE GROUND: Soft dark greyish brown slightly sandy gravelly CLAY with low boulder content. Gravel is angular to rounded fine to coarse of mudstone, sandstone and coal. Boulders are angular up to 400mm across of sandstone. (Colliery spoil)	
						2.60	147.11		Stiff dark orangish brown and dark grey slightly sandy gravelly CLAY. Gravel is angular fine to coarse of coal, sandstone and mudstone. (Possible reworked natural)
				2.90	146.81		End of Trial Pit at 2.90m		
									4
									5

Dimensions		Trench Support and Comment			Pumping Data			
Pit Length 2.50	Pit Width 0.60	Pit Stability Sides Stable	Shoring Used None	Remarks		Date	Rate	Remarks

Remarks
Perched groundwater encountered at 2.50m bgl. No visual or olfactory evidence of potential hydrocarbon contamination.





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Trial Pit Log

Project Name: Barnsley West	Client: Strata Sterling Barnsley West Ltd	Date: 16/05/2019
Location: Barnsley	Contractor: Hather Plant Hire Ltd	Co-ords: E432352.07 N406671.12
Project No. : 4848	Crew Name: M. Simons	Equipment: 3CX with a 2ft bucket

Location Number TP111	Location Type TP	Level 138.29m AoD	Logged By JAM	Scale 1:25	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
[Pattern]		0.00 - 0.20	ES		0.20	138.09	[Pattern]	MADE GROUND: Soft dark brown slightly sandy gravelly CLAY with rootlets and pieces of timber. Gravel is angular to rounded fine to coarse of mudstone, sandstone, coal and brick. (Reworked topsoil)	1
		0.80 - 1.00	ES		0.80	137.49		MADE GROUND: Firm light grey mottled orangish brown slightly sandy gravelly CLAY with low cobble content. Gravel is angular to subrounded fine to coarse of mudstone, coal, sandstone and brick. Cobbles are angular of brick. (Reworked natural)	
					1.05	137.24		MADE GROUND: Stiff friable light orangish brown and brownish grey slightly gravelly sandy CLAY with low cobble content. Gravel is subangular to rounded fine to medium of sandstone, mudstone and coal. Cobbles are tabular of sandstone. (Reworked natural)	
					1.50	136.79		MADE GROUND: Stiff dark grey gravelly CLAY. Gravel is angular fine to coarse of mudstone and coal. (Colliery spoil)	
		2.00 - 2.20	ES		2.90	135.39		[Pattern]	
2.20 - 2.50	B								
							End of Trial Pit at 2.90m	3	
								4	
								5	

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length 3.00	Pit Width 0.60	Pit Stability Sides unstable from 1.50m bgl.	Shoring Used None	Remarks	Date	Rate	Remarks

Remarks
Groundwater not encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





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Trial Pit Log

Project Name: Barnsley West	Client: Strata Sterling Barnsley West Ltd	Date: 16/05/2019
Location: Barnsley	Contractor: Hather Plant Hire Ltd	Co-ords: E431827.39 N406528.21
Project No. : 4848	Crew Name: M. Simons	Equipment: JCB 3CX with a 2ft bucket

Location Number TP112	Location Type TP	Level 148.37m AoD	Logged By JAM	Scale 1:25	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.20	ES		0.20	148.17		MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY with rootlets. Gravel is angular to subrounded fine to coarse of brick, coal and mudstone. (Reworked topsoil)
		2.20 - 2.40	ES					MADE GROUND: Firm dark brown and grey slightly sandy gravelly CLAY with low cobble content. Gravel is angular fine to coarse of mudstone, sandstone and coal. Cobbles are angular to subrounded of mudstone and sandstone. (Colliery spoil)
		2.50 - 2.80	B		2.50	145.87		MADE GROUND: Dark brownish grey slightly clayey sandy GRAVEL with high cobble and medium boulder content. Gravel is angular fine to coarse of mudstone, siltstone, sandstone and coal. Cobbles and boulders are angular up to 300mm across of sandstone and mudstone. (Colliery spoil)
					2.80	145.57		End of Trial Pit at 2.80m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length 3.00	Pit Width 0.60	Pit Stability Sides Stable	Shoring Used None	Remarks	Date	Rate	Remarks

Remarks
Groundwater not encountered. No visual or olfactory evidence of potential hydrocarbon contamination. Half inch plastic water pipe encountered at 0.3m bgl with a slow continuous flow from the east (NGR 431826.761; 406526.534)





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Trial Pit Log

Project Name: Barnsley West	Client: Strata Sterling Barnsley West Ltd	Date: 05/04/2019
Location: Barnsley	Contractor: Hather Plant Hire Ltd	Co-ords: E431807.78 N407113.20
Project No. : 4848	Crew Name: C. Ruston	Equipment: 13 tonne 360 tracked excavator with 2ft bucket

Location Number TP113	Location Type TP	Level 105.25m AoD	Logged By JAM	Scale 1:25	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
[Pattern]		0.00 - 0.40	ES		0.40	104.85	[Pattern]	MADE GROUND: Soft to firm dark brown slightly gravelly silty CLAY with rootlets. Gravel is subrounded fine to medium of mudstone, coal and brick. (Reworked topsoil)	
					1.00	104.25		MADE GROUND: Firm light orangish brown and grey slightly sandy gravelly silty CLAY with low cobble content. Gravel is angular to rounded fine to coarse of mudstone, coal, sandstone and brick. Cobbles are angular of brick. (Reworked natural)	
								MADE GROUND: Firm light grey and occasionally brown slightly sandy gravelly CLAY with medium cobble content and low boulder content. Gravel is angular to rounded fine to coarse of mudstone and coal. Cobbles and boulders are tabular angular to subrounded up to 450mm across of ironstone, mudstone and sandstone. (Colliery Spoil) <i>At 1.30m BGL ... locally dark grey clayey sandy gravel. Gravel is angular fine to coarse of sandstone, mudstone and siltstone.</i> <i>At 1.90m BGL ... becoming high boulder content.</i>	1
		2.00 - 2.20	B						2
		2.20	D						
					3.00	102.25		End of Trial Pit at 3.00m	3
									4
									5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks
3.30	0.60	Sides Stable	None				

Remarks
Groundwater not encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





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Trial Pit Log

Project Name: Barnsley West	Client: Strata Sterling Barnsley West Ltd	Date: 16/05/2019
Location: Barnsley	Contractor: Hather Plant Hire Ltd	Co-ords: E432392.30 N406935.94
Project No. : 4848	Crew Name: M. Simons	Equipment: 3CX with a 2ft bucket

Location Number TP115	Location Type TP	Level 132.60m AoD	Logged By JAM	Scale 1:25	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.25	ES		0.25	132.34		MADE GROUND: Firm to stiff dark brown slightly gravelly CLAY with rootlets. Gravel is angular fine to medium of brick, sandstone, mudstone and coal. (Reworked topsoil)
		2.50 - 2.60 2.50 - 3.00	D B		3.00	129.60		MADE GROUND: Firm friable dark brown slightly sandy gravelly CLAY with medium cobble and low boulder content. Gravel is angular to rounded fine to coarse of mudstone, siltstone, sandstone and coal. Cobbles and boulders are angular up to 500mm across of sandstone, mudstone and siltstone. (Colliery spoil) <i>at 0.40m BGL ... abundant angular gravels of brick.</i> <i>at 0.60m BGL ... occasional lenses of dark brown clayey sandy gravel.</i>
								End of Trial Pit at 3.00m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length 3.00	Pit Width 0.60	Pit Stability Sides Stable	Shoring Used None	Remarks	Date	Rate	Remarks

Remarks
Groundwater not encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





Appendix C Chemical Analysis Certificates and HazWasteOnline Waste Classification



STATISTICAL ASSESSMENT OF CHEMICAL ANALYSIS

The results of the chemical analysis have been assessed in accordance with CL:AIRE (Contaminated Land: Applications in Real Environments) 'Guidance on Comparing Soil Contamination Data with a Critical Concentration' published by the CIEH, May 2008.

This guidance provides a statistical approach to objectively evaluate the evidence for and against particular propositions/hypothesis and has the useful attribute of enabling decision makers to reach conclusions about the available evidence, with at least some understanding of the validity of the results.

The guidance approaches this in the context of assessing the results from two different perspectives, the Planning Scenario and Part 2A.

When assessing in terms of the Planning Scenario, the key question would be 'can we confidently say that the level of contamination on this land is low relative to some appropriate measure of risk?' Under Part 2A, the question would be 'can we confidently say that the level of contamination is high relative to some appropriate measure of risk?'

These questions are addressed through the use of formal hypothesis – the "Null Hypothesis" and the "Alternative Hypothesis".

This assessment will be carried out in accordance with the Planning Scenario, where the aim is to demonstrate 'suitability for use'. The Null Hypothesis is that the level of contamination is the same as, or higher than the critical concentration/GAC. The Alternative Hypothesis is that the level of contamination is lower than the critical concentration/GAC. Under Part 2A the opposite set of propositions are applicable.

By convention, the Null Hypothesis is the starting proposition against which the key question, as expressed by the Alternative Hypothesis, can be tested.

The assessment of the results relies on there being a normal distribution of results for a particular contaminant and that the data set under consideration is representative of the particular material which is being assessed. If more than one dataset is present, then the hypothesis should be applied individually for each data set.

Under the Planning Scenario, the statistical test is used to demonstrate that there is a 95% probability that the true population mean falls below the critical concentration/GAC.

Appropriate data sets must be created to enable the statistical testing to be carried out and three key elements must be considered prior to statistical analysis. These are as follows:

- Dealing with non-detects;
- Understanding the statistical distribution of data; and
- Dealing with outliers.

The results can then be assessed, and the results will be compared against the following:

- Sample Mean – if the sample mean of the data set is in excess of the GAC then the Upper Confidence Limit of the true population mean will be higher than the critical concentration.
- 95% of the Upper Confidence Limit.
- One Sample T Test (parametric test) carried out at the 95% confidence level.

On the basis of these tests, the validity of the Null Hypothesis can be assessed.



DETS

Certificate of Analysis

Certificate Number 19-06657

17-Apr-19

Client JPG (Leeds) LTD
Civil & Structural Engineers
5 John Charles Way
Leeds
LS12 6QA

Our Reference 19-06657

Client Reference 4848

Order No (not supplied)

Contract Title Barnsley West, 4848

Description 10 Soil samples, 3 Leachate samples.

Date Received 10-Apr-19

Date Started 10-Apr-19

Date Completed 17-Apr-19

Test Procedures Identified by prefix DETSn (details on request).

Notes 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.

Approved By



Adam Fenwick
Contracts Manager



2139

Summary of Chemical Analysis

Soil Samples

Our Ref 19-06657

Client Ref 4848

Contract Title Barnsley West, 4848

Lab No	1486218	1486219	1486220	1486221	1486222	1486223
Sample ID	TP101	TP101	TP102	TP102A	TP103	TP104
Depth	0.00-0.20	0.50-1.00	0.00-0.20	2.00-2.20	0.00-0.25	0.25-0.60
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	05/04/19	05/04/19	05/04/19	05/04/19	05/04/19	05/04/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units	1486218	1486219	1486220	1486221	1486222	1486223
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	11	5.8	10	5.3	13	5.8
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	< 0.1	0.2	< 0.1	0.2	< 0.1
Chromium	DETSC 2301#	0.15	mg/kg	24	19	22	18	21	19
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0				< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	26	33	26	31	63	23
Lead	DETSC 2301#	0.3	mg/kg	41	20	26	17	37	14
Mercury	DETSC 2325#	0.05	mg/kg	0.09	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Nickel	DETSC 2301#	1	mg/kg	18	37	21	38	18	19
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	97	100	86	95	80	67
Inorganics									
pH	DETSC 2008#			6.7	8.2	6.8	7.6	6.8	7.4
Cyanide, Free	DETSC 2130#	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	5.0	2.4	2.8	1.2	4.3	0.9
Ammoniacal Nitrogen as N	DETSC 2119#	0.5	mg/kg	13				7.0	3.5
Chloride	DETSC 2055	1	mg/kg	104				34.3	22.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	630	200	67	140	28	56
Sulphide	DETSC 2024*	10	mg/kg	< 10				12	< 10
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.26				0.08	0.03
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	0.3	0.2	0.1	0.1	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	0.1	< 0.1	0.3	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	0.1	0.2	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	0.1	< 0.1	0.2
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	0.4	< 0.1	< 0.1	0.5	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	0.3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PAH Total	DETSC 3301	1.6	mg/kg	2.1	< 1.6	< 1.6	6.3	< 1.6	10
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	1.0	< 0.3	0.5	< 0.3	< 0.3	< 0.3
OCPs									
alpha-BHC	DETSC 3441*	0.1	mg/kg					< 0.1	

Summary of Chemical Analysis

Soil Samples

Our Ref 19-06657

Client Ref 4848

Contract Title Barnsley West, 4848

Lab No	1486218	1486219	1486220	1486221	1486222	1486223
Sample ID	TP101	TP101	TP102	TP102A	TP103	TP104
Depth	0.00-0.20	0.50-1.00	0.00-0.20	2.00-2.20	0.00-0.25	0.25-0.60
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	05/04/19	05/04/19	05/04/19	05/04/19	05/04/19	05/04/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
gamma-BHC (Lindane)	DETSC 3441*	0.1	mg/kg						< 0.1
beta-BHC	DETSC 3441*	0.1	mg/kg						< 0.1
delta-BHC	DETSC 3441*	0.1	mg/kg						< 0.1
Heptachlor	DETSC 3441*	0.1	mg/kg						< 0.1
Aldrin	DETSC 3441*	0.1	mg/kg						< 0.1
Heptachlor epoxide	DETSC 3441*	0.1	mg/kg						< 0.1
gamma-Chlordane	DETSC 3441*	0.1	mg/kg						< 0.1
Endosulphan I & Alpha-chlorodane	DETSC 3441*	0.1	mg/kg						< 0.1
4,4-DDE	DETSC 3441*	0.1	mg/kg						< 0.1
Dieldrin	DETSC 3441*	0.1	mg/kg						< 0.1
Endrin	DETSC 3441*	0.1	mg/kg						< 0.1
Endosulphan II & 4,4-DDD	DETSC 3441*	0.1	mg/kg						< 0.1
Endrin aldehyde	DETSC 3441*	0.1	mg/kg						< 0.1
4,4-DDT	DETSC 3441*	0.1	mg/kg						< 0.1
Endosulphan sulphate	DETSC 3441*	0.1	mg/kg						< 0.1
Methoxychlor	DETSC 3441*	0.1	mg/kg						< 0.1
Endrin ketone	DETSC 3441*	0.1	mg/kg						< 0.1
OPPs									
Dichlorvos	DETSC 3443*	0.1	mg/kg						< 0.1
Mevinphos	DETSC 3443*	0.1	mg/kg						< 0.1
Demeton-O	DETSC 3443*	0.1	mg/kg						< 0.1
Ethoprop	DETSC 3443*	0.1	mg/kg						< 0.1
Naled	DETSC 3443*	0.1	mg/kg						< 0.1
Phorate	DETSC 3443*	0.1	mg/kg						< 0.1
Demeton-S	DETSC 3443*	0.1	mg/kg						< 0.1
Diazinon	DETSC 3443*	0.1	mg/kg						< 0.1
Disulfoton	DETSC 3443*	0.1	mg/kg						< 0.1
Methylparathion	DETSC 3443*	0.1	mg/kg						< 0.1
Ronnel	DETSC 3443*	0.1	mg/kg						< 0.1
Fenthion	DETSC 3443*	0.1	mg/kg						< 0.1
Chlopyrifos	DETSC 3443*	0.1	mg/kg						< 0.1
Trichlorinate	DETSC 3443*	0.1	mg/kg						< 0.1
Merphos	DETSC 3443*	0.1	mg/kg						< 0.1
Stirofos	DETSC 3443*	0.1	mg/kg						< 0.1
Tokuthion	DETSC 3443*	0.1	mg/kg						< 0.1
Fensulfothion	DETSC 3443*	0.1	mg/kg						< 0.1
Bolstar	DETSC 3443*	0.1	mg/kg						< 0.1
Azinphos methyl	DETSC 3443*	0.1	mg/kg						< 0.1
Coumaphos	DETSC 3443*	0.1	mg/kg						< 0.1
Triazines									
Atraton	DETSC 3445*	0.1	mg/kg						< 0.1
Prometon	DETSC 3445*	0.1	mg/kg						< 0.1



Summary of Chemical Analysis Soil Samples

Our Ref 19-06657

Client Ref 4848

Contract Title Barnsley West, 4848

Lab No	1486218	1486219	1486220	1486221	1486222	1486223
Sample ID	TP101	TP101	TP102	TP102A	TP103	TP104
Depth	0.00-0.20	0.50-1.00	0.00-0.20	2.00-2.20	0.00-0.25	0.25-0.60
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	05/04/19	05/04/19	05/04/19	05/04/19	05/04/19	05/04/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Simazine	DETSC 3445*	0.1	mg/kg						< 0.1
Atrazine	DETSC 3445*	0.1	mg/kg						< 0.1
Propazine	DETSC 3445*	0.1	mg/kg						< 0.1
Terbutylazine	DETSC 3445*	0.1	mg/kg						< 0.1
Secbumeton	DETSC 3445*	0.1	mg/kg						< 0.1
Symetryn	DETSC 3445*	0.1	mg/kg						< 0.1
Ametryn	DETSC 3445*	0.1	mg/kg						< 0.1
Prometryne	DETSC 3445*	0.1	mg/kg						< 0.1
Terbutryn	DETSC 3445*	0.1	mg/kg						< 0.1

Summary of Chemical Analysis Soil Samples

Our Ref 19-06657

Client Ref 4848

Contract Title Barnsley West, 4848

Lab No	1486224	1486225	1486226	1486227
Sample ID	TP105	TP105	TP106	TP113
Depth	0.00-0.50	2.00-2.40	0.00-0.40	0.00-0.40
Other ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sampling Date	05/04/19	05/04/19	05/04/19	05/04/19
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	19	6.8	23	21
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	0.1	0.3	0.3
Chromium	DETSC 2301#	0.15	mg/kg	26	18	21	22
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0			< 1.0
Copper	DETSC 2301#	0.2	mg/kg	30	32	31	34
Lead	DETSC 2301#	0.3	mg/kg	50	18	47	59
Mercury	DETSC 2325#	0.05	mg/kg	0.11	< 0.05	0.11	0.12
Nickel	DETSC 2301#	1	mg/kg	18	39	19	20
Selenium	DETSC 2301#	0.5	mg/kg	0.7	< 0.5	< 0.5	0.5
Zinc	DETSC 2301#	1	mg/kg	93	96	110	100
Inorganics							
pH	DETSC 2008#			7.5	8.1	7.2	7.3
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	4.1	1.8	4.5	4.8
Ammoniacal Nitrogen as N	DETSC 2119#	0.5	mg/kg	6.5			5.8
Chloride	DETSC 2055	1	mg/kg	29.4		37.4	14.5
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	24	260	22	19
Sulphide	DETSC 2024*	10	mg/kg	< 10			24
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.09			0.08
PAHs							
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.2
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	0.3
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	0.4	< 0.1	< 0.1	0.5
Pyrene	DETSC 3301	0.1	mg/kg	0.3	< 0.1	< 0.1	0.4
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	0.2
Chrysene	DETSC 3301	0.1	mg/kg	0.2	0.1	< 0.1	0.2
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.3
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	0.3
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
PAH Total	DETSC 3301	1.6	mg/kg	1.7	< 1.6	< 1.6	2.7
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	0.4	< 0.3
OCPs							
alpha-BHC	DETSC 3441*	0.1	mg/kg	< 0.1		< 0.1	< 0.1

Summary of Chemical Analysis

Soil Samples

Our Ref 19-06657

Client Ref 4848

Contract Title Barnsley West, 4848

Lab No	1486224	1486225	1486226	1486227
Sample ID	TP105	TP105	TP106	TP113
Depth	0.00-0.50	2.00-2.40	0.00-0.40	0.00-0.40
Other ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sampling Date	05/04/19	05/04/19	05/04/19	05/04/19
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units			
gamma-BHC (Lindane)	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
beta-BHC	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
delta-BHC	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Heptachlor	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Aldrin	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Heptachlor epoxide	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
gamma-Chlordane	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Endosulphan I & Alpha-chlorodane	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
4,4-DDE	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Dieldrin	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Endrin	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Endosulphan II & 4,4-DDD	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Endrin aldehyde	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
4,4-DDT	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Endosulphan sulphate	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Methoxychlor	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Endrin ketone	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
OPPs						
Dichlorvos	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Mevinphos	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Demeton-O	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Ethoprop	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Naled	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Phorate	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Demeton-S	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Diazinon	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Disulfoton	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Methylparathion	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Ronnel	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Fenthion	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Chlopyrifos	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Trichlorinate	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Merphos	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Stirofos	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Tokuthion	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Fensulfothion	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Bolstar	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Azinphos methyl	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Coumaphos	DETSC 3443*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Triazines						
Atraton	DETSC 3445*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Prometon	DETSC 3445*	0.1	mg/kg	< 0.1	< 0.1	< 0.1

Summary of Chemical Analysis Soil Samples

Our Ref 19-06657

Client Ref 4848

Contract Title Barnsley West, 4848

Lab No	1486224	1486225	1486226	1486227
Sample ID	TP105	TP105	TP106	TP113
Depth	0.00-0.50	2.00-2.40	0.00-0.40	0.00-0.40
Other ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sampling Date	05/04/19	05/04/19	05/04/19	05/04/19
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Simazine	DETSC 3445*	0.1	mg/kg	< 0.1		< 0.1	< 0.1
Atrazine	DETSC 3445*	0.1	mg/kg	< 0.1		< 0.1	< 0.1
Propazine	DETSC 3445*	0.1	mg/kg	< 0.1		< 0.1	< 0.1
Terbutylazine	DETSC 3445*	0.1	mg/kg	< 0.1		< 0.1	< 0.1
Secbumeton	DETSC 3445*	0.1	mg/kg	< 0.1		< 0.1	< 0.1
Symetryn	DETSC 3445*	0.1	mg/kg	< 0.1		< 0.1	< 0.1
Ametryn	DETSC 3445*	0.1	mg/kg	< 0.1		< 0.1	< 0.1
Prometryne	DETSC 3445*	0.1	mg/kg	< 0.1		< 0.1	< 0.1
Terbutryn	DETSC 3445*	0.1	mg/kg	< 0.1		< 0.1	< 0.1

Summary of Chemical Analysis

Leachate Samples

Our Ref 19-06657

Client Ref 4848

Contract Title Barnsley West, 4848

Lab No	1486228	1486229	1486230
Sample ID	TP101	TP103	TP113
Depth	0.00-0.20	0.00-0.25	0.00-0.40
Other ID			
Sample Type	LEACHATE	LEACHATE	LEACHATE
Sampling Date	05/04/19	05/04/19	05/04/19
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Preparation						
NRA Leachate Preparation	DETSC 1009*			Y	Y	Y
Metals						
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.27	< 0.16	0.21
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.33	2.7	1.9
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.8	3.1	1.5
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.26	0.27	0.20
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.30	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.3	ug/l	2.8	1.6	13
Inorganics						
pH	DETSC 2008			6.7	6.5	6.3
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20	< 20
Sulphate as SO4	DETSC 2055	0.1	mg/l	4.0	1.8	2.2
PAHs						
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	< 0.20	< 0.20
Phenols						
Phenol	DETSC 3451*	0.5	ug/l	< 0.50	< 0.50	< 0.50

Summary of Asbestos Analysis

Soil Samples

Our Ref 19-06657

Client Ref 4848

Contract Title Barnsley West, 4848

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1486218	TP101 0.00-0.20	SOIL	NAD	none	Luke Donaghy
1486220	TP102 0.00-0.20	SOIL	NAD	none	Luke Donaghy
1486222	TP103 0.00-0.25	SOIL	NAD	none	Luke Donaghy
1486223	TP104 0.25-0.60	SOIL	NAD	none	Luke Donaghy
1486225	TP105 2.00-2.40	SOIL	NAD	none	Luke Donaghy

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 19-06657
 Client Ref 4848
 Contract Barnsley West, 4848

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1486218	TP101 0.00-0.20 SOIL	05/04/19	GJ 250ml, GJ 60ml, PT 1L		
1486219	TP101 0.50-1.00 SOIL	05/04/19	GJ 250ml, GJ 60ml, PT 1L		
1486220	TP102 0.00-0.20 SOIL	05/04/19	GJ 250ml, GJ 60ml, PT 1L		
1486221	TP102A 2.00-2.20 SOIL	05/04/19	GJ 250ml, GJ 60ml, PT 1L		
1486222	TP103 0.00-0.25 SOIL	05/04/19	GJ 250ml, GJ 60ml, PT 1L		
1486223	TP104 0.25-0.60 SOIL	05/04/19	GJ 250ml, GJ 60ml, PT 1L		
1486224	TP105 0.00-0.50 SOIL	05/04/19	GJ 250ml, GJ 60ml, PT 1L		
1486225	TP105 2.00-2.40 SOIL	05/04/19	GJ 250ml, GJ 60ml, PT 1L		
1486226	TP106 0.00-0.40 SOIL	05/04/19	GJ 250ml, GJ 60ml, PT 1L		
1486227	TP113 0.00-0.40 SOIL	05/04/19	GJ 250ml, GJ 60ml, PT 1L		
1486228	TP101 0.00-0.20 LEACHATE	05/04/19	GJ 250ml, GJ 60ml, PT 1L		
1486229	TP103 0.00-0.25 LEACHATE	05/04/19	GJ 250ml, GJ 60ml, PT 1L		
1486230	TP113 0.00-0.40 LEACHATE	05/04/19	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



DETS

Certificate of Analysis

Certificate Number 19-09384

28-May-19

Client JPG (Leeds) LTD
Civil & Structural Engineers
5 John Charles Way
Leeds
LS12 6QA

Our Reference 19-09384

Client Reference 4848

Order No (not supplied)

Contract Title Barnsley West, 4848

Description 11 Soil samples, 3 Leachate samples.

Date Received 20-May-19

Date Started 20-May-19

Date Completed 28-May-19

Test Procedures Identified by prefix DETSn (details on request).

Notes 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.

Approved By



Adam Fenwick
Contracts Manager



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Summary of Chemical Analysis

Soil Samples

Our Ref 19-09384

Client Ref 4848

Contract Title Barnsley West, 4848

Lab No	1503794	1503795	1503796	1503797	1503798	1503799	1503800
Sample ID	TP108	TP108	TP109	TP109	TP110	TP111	TP111
Depth	0.00-0.10	2.60-2.70	0.00-0.15	0.60-1.00	0.00-0.20	0.00-0.20	0.80-1.00
Other ID							
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	16/05/19	16/05/19	16/05/19	16/05/19	16/05/19	16/05/19	16/05/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg	17	7.9	8.5	2.7	12	17	11
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	< 0.1	< 0.1	0.2	0.1	0.2	< 0.1
Chromium	DETSC 2301#	0.15	mg/kg	19	19	15	15	18	15	16
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0			< 1.0			< 1.0
Copper	DETSC 2301#	0.2	mg/kg	35	36	23	28	25	37	28
Lead	DETSC 2301#	0.3	mg/kg	51	23	25	22	34	68	30
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	0.13	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	21	34	21	33	22	16	19
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	100	91	81	150	95	84	67
Inorganics										
pH	DETSC 2008#			7.0	7.3	7.8	8.4	7.1	7.3	7.7
Cyanide, Free	DETSC 2130#	0.1	mg/kg	0.3	< 0.1	< 0.1	< 0.1	0.2	0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	7.2	3.3	3.2	1.8	3.4	4.7	1.7
Ammoniacal Nitrogen as N	DETSC 2119#	0.5	mg/kg	7.2			4.6			3.6
Chloride Aqueous Extract	DETSC 2055	1	mg/l	14			7.4			9.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	75	160	38	28	21	< 10	22
Sulphide	DETSC 2024*	10	mg/kg	52			40			< 10
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.10			0.02			0.03
PAHs										
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.4
Fluoranthene	DETSC 3301	0.1	mg/kg	0.3	0.1	< 0.1	< 0.1	< 0.1	0.2	2.5
Pyrene	DETSC 3301	0.1	mg/kg	0.3	0.2	< 0.1	< 0.1	< 0.1	0.3	2.3
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1.3
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1.5
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.9
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.7
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.7
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.7
PAH Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	14
Phenols										
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
OCPs										
alpha-BHC	DETSC 3441*	0.1	mg/kg						< 0.1	

Summary of Chemical Analysis

Soil Samples

Our Ref 19-09384

Client Ref 4848

Contract Title Barnsley West, 4848

Lab No	1503794	1503795	1503796	1503797	1503798	1503799	1503800
Sample ID	TP108	TP108	TP109	TP109	TP110	TP111	TP111
Depth	0.00-0.10	2.60-2.70	0.00-0.15	0.60-1.00	0.00-0.20	0.00-0.20	0.80-1.00
Other ID							
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	16/05/19	16/05/19	16/05/19	16/05/19	16/05/19	16/05/19	16/05/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
gamma-BHC (Lindane)	DETSC 3441*	0.1	mg/kg						< 0.1
beta-BHC	DETSC 3441*	0.1	mg/kg						< 0.1
delta-BHC	DETSC 3441*	0.1	mg/kg						< 0.1
Heptachlor	DETSC 3441*	0.1	mg/kg						< 0.1
Aldrin	DETSC 3441*	0.1	mg/kg						< 0.1
Heptachlor epoxide	DETSC 3441*	0.1	mg/kg						< 0.1
gamma-Chlordane	DETSC 3441*	0.1	mg/kg						< 0.1
Endosulphan I & Alpha-chlorodane	DETSC 3441*	0.1	mg/kg						< 0.1
4,4-DDE	DETSC 3441*	0.1	mg/kg						< 0.1
Dieldrin	DETSC 3441*	0.1	mg/kg						< 0.1
Endrin	DETSC 3441*	0.1	mg/kg						< 0.1
Endosulphan II & 4,4-DDD	DETSC 3441*	0.1	mg/kg						< 0.1
Endrin aldehyde	DETSC 3441*	0.1	mg/kg						< 0.1
4,4-DDT	DETSC 3441*	0.1	mg/kg						< 0.1
Endosulphan sulphate	DETSC 3441*	0.1	mg/kg						< 0.1
Methoxychlor	DETSC 3441*	0.1	mg/kg						< 0.1
Endrin ketone	DETSC 3441*	0.1	mg/kg						< 0.1
OPPs									
Dichlorvos	DETSC 3443*	0.1	mg/kg						< 0.1
Mevinphos	DETSC 3443*	0.1	mg/kg						< 0.1
Demeton-O	DETSC 3443*	0.1	mg/kg						< 0.1
Ethoprop	DETSC 3443*	0.1	mg/kg						< 0.1
Naled	DETSC 3443*	0.1	mg/kg						< 0.1
Phorate	DETSC 3443*	0.1	mg/kg						< 0.1
Demeton-S	DETSC 3443*	0.1	mg/kg						< 0.1
Diazinon	DETSC 3443*	0.1	mg/kg						< 0.1
Disulfoton	DETSC 3443*	0.1	mg/kg						< 0.1
Methylparathion	DETSC 3443*	0.1	mg/kg						< 0.1
Ronnel	DETSC 3443*	0.1	mg/kg						< 0.1
Fenthion	DETSC 3443*	0.1	mg/kg						< 0.1
Chlopyrifos	DETSC 3443*	0.1	mg/kg						< 0.1
Trichlorinate	DETSC 3443*	0.1	mg/kg						< 0.1
Merphos	DETSC 3443*	0.1	mg/kg						< 0.1
Stirofos	DETSC 3443*	0.1	mg/kg						< 0.1
Tokuthion	DETSC 3443*	0.1	mg/kg						< 0.1
Fensulfothion	DETSC 3443*	0.1	mg/kg						< 0.1
Bolstar	DETSC 3443*	0.1	mg/kg						< 0.1
Azinphos methyl	DETSC 3443*	0.1	mg/kg						< 0.1
Coumaphos	DETSC 3443*	0.1	mg/kg						< 0.1
Triazines									
Atraton	DETSC 3445*	0.1	mg/kg						< 0.1
Prometon	DETSC 3445*	0.1	mg/kg						< 0.1

Summary of Chemical Analysis Soil Samples

Our Ref 19-09384

Client Ref 4848

Contract Title Barnsley West, 4848

Lab No	1503794	1503795	1503796	1503797	1503798	1503799	1503800
Sample ID	TP108	TP108	TP109	TP109	TP110	TP111	TP111
Depth	0.00-0.10	2.60-2.70	0.00-0.15	0.60-1.00	0.00-0.20	0.00-0.20	0.80-1.00
Other ID							
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	16/05/19	16/05/19	16/05/19	16/05/19	16/05/19	16/05/19	16/05/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Simazine	DETSC 3445*	0.1	mg/kg						< 0.1
Atrazine	DETSC 3445*	0.1	mg/kg						< 0.1
Propazine	DETSC 3445*	0.1	mg/kg						< 0.1
Terbutylazine	DETSC 3445*	0.1	mg/kg						< 0.1
Secbumeton	DETSC 3445*	0.1	mg/kg						< 0.1
Symetryn	DETSC 3445*	0.1	mg/kg						< 0.1
Ametryn	DETSC 3445*	0.1	mg/kg						< 0.1
Prometryne	DETSC 3445*	0.1	mg/kg						< 0.1
Terbutryn	DETSC 3445*	0.1	mg/kg						< 0.1

Summary of Chemical Analysis

Soil Samples

Our Ref 19-09384

Client Ref 4848

Contract Title Barnsley West, 4848

Lab No	1503801	1503802	1503803	1503804
Sample ID	TP111	TP112	TP112	TP115
Depth	2.00-2.20	0.00-0.20	2.20-2.40	0.00-0.25
Other ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sampling Date	16/05/19	16/05/19	16/05/19	16/05/19
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	9.9	8.6	6.5	11
Cadmium	DETSC 2301#	0.1	mg/kg	0.1	0.1	< 0.1	0.1
Chromium	DETSC 2301#	0.15	mg/kg	8.2	15	16	17
Chromium, Hexavalent	DETSC 2204*	1	mg/kg		< 1.0		
Copper	DETSC 2301#	0.2	mg/kg	20	21	33	29
Lead	DETSC 2301#	0.3	mg/kg	53	33	17	34
Mercury	DETSC 2325#	0.05	mg/kg	0.08	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	11	13	35	22
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	40	87	84	87
Inorganics							
pH	DETSC 2008#			9.2	6.7	8.2	7.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	0.5	< 0.1	0.2
Organic matter	DETSC 2002#	0.1	%	2.4	14	1.3	5.5
Ammoniacal Nitrogen as N	DETSC 2119#	0.5	mg/kg		25		
Chloride Aqueous Extract	DETSC 2055	1	mg/l		48		
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	49	68	24	24
Sulphide	DETSC 2024*	10	mg/kg		12		
Sulphate as SO4, Total	DETSC 2321#	0.01	%		0.12		
PAHs							
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	0.5	< 0.1	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	0.4	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	0.3	< 0.1	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
PAH Total	DETSC 3301	1.6	mg/kg	2.4	< 1.6	< 1.6	< 1.6
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	0.9	< 0.3	0.4
OCPs							
alpha-BHC	DETSC 3441*	0.1	mg/kg				< 0.1

Summary of Chemical Analysis

Soil Samples

Our Ref 19-09384

Client Ref 4848

Contract Title Barnsley West, 4848

Lab No	1503801	1503802	1503803	1503804
Sample ID	TP111	TP112	TP112	TP115
Depth	2.00-2.20	0.00-0.20	2.20-2.40	0.00-0.25
Other ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sampling Date	16/05/19	16/05/19	16/05/19	16/05/19
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
gamma-BHC (Lindane)	DETSC 3441*	0.1	mg/kg				< 0.1
beta-BHC	DETSC 3441*	0.1	mg/kg				< 0.1
delta-BHC	DETSC 3441*	0.1	mg/kg				< 0.1
Heptachlor	DETSC 3441*	0.1	mg/kg				< 0.1
Aldrin	DETSC 3441*	0.1	mg/kg				< 0.1
Heptachlor epoxide	DETSC 3441*	0.1	mg/kg				< 0.1
gamma-Chlordane	DETSC 3441*	0.1	mg/kg				< 0.1
Endosulphan I & Alpha-chlorodane	DETSC 3441*	0.1	mg/kg				< 0.1
4,4-DDE	DETSC 3441*	0.1	mg/kg				< 0.1
Dieldrin	DETSC 3441*	0.1	mg/kg				< 0.1
Endrin	DETSC 3441*	0.1	mg/kg				< 0.1
Endosulphan II & 4,4-DDD	DETSC 3441*	0.1	mg/kg				< 0.1
Endrin aldehyde	DETSC 3441*	0.1	mg/kg				< 0.1
4,4-DDT	DETSC 3441*	0.1	mg/kg				< 0.1
Endosulphan sulphate	DETSC 3441*	0.1	mg/kg				< 0.1
Methoxychlor	DETSC 3441*	0.1	mg/kg				< 0.1
Endrin ketone	DETSC 3441*	0.1	mg/kg				< 0.1
OPPs							
Dichlorvos	DETSC 3443*	0.1	mg/kg				< 0.1
Mevinphos	DETSC 3443*	0.1	mg/kg				< 0.1
Demeton-O	DETSC 3443*	0.1	mg/kg				< 0.1
Ethoprop	DETSC 3443*	0.1	mg/kg				< 0.1
Naled	DETSC 3443*	0.1	mg/kg				< 0.1
Phorate	DETSC 3443*	0.1	mg/kg				< 0.1
Demeton-S	DETSC 3443*	0.1	mg/kg				< 0.1
Diazinon	DETSC 3443*	0.1	mg/kg				< 0.1
Disulfoton	DETSC 3443*	0.1	mg/kg				< 0.1
Methylparathion	DETSC 3443*	0.1	mg/kg				< 0.1
Ronnel	DETSC 3443*	0.1	mg/kg				< 0.1
Fenthion	DETSC 3443*	0.1	mg/kg				< 0.1
Chlopyrifos	DETSC 3443*	0.1	mg/kg				< 0.1
Trichlorinate	DETSC 3443*	0.1	mg/kg				< 0.1
Merphos	DETSC 3443*	0.1	mg/kg				< 0.1
Stirofos	DETSC 3443*	0.1	mg/kg				< 0.1
Tokuthion	DETSC 3443*	0.1	mg/kg				< 0.1
Fensulfothion	DETSC 3443*	0.1	mg/kg				< 0.1
Bolstar	DETSC 3443*	0.1	mg/kg				< 0.1
Azinphos methyl	DETSC 3443*	0.1	mg/kg				< 0.1
Coumaphos	DETSC 3443*	0.1	mg/kg				< 0.1
Triazines							
Atraton	DETSC 3445*	0.1	mg/kg				< 0.1
Prometon	DETSC 3445*	0.1	mg/kg				< 0.1

Summary of Chemical Analysis

Soil Samples

Our Ref 19-09384

Client Ref 4848

Contract Title Barnsley West, 4848

Lab No	1503801	1503802	1503803	1503804
Sample ID	TP111	TP112	TP112	TP115
Depth	2.00-2.20	0.00-0.20	2.20-2.40	0.00-0.25
Other ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sampling Date	16/05/19	16/05/19	16/05/19	16/05/19
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Simazine	DETSC 3445*	0.1	mg/kg				< 0.1
Atrazine	DETSC 3445*	0.1	mg/kg				< 0.1
Propazine	DETSC 3445*	0.1	mg/kg				< 0.1
Terbutylazine	DETSC 3445*	0.1	mg/kg				< 0.1
Secbumeton	DETSC 3445*	0.1	mg/kg				< 0.1
Symetryn	DETSC 3445*	0.1	mg/kg				< 0.1
Ametryn	DETSC 3445*	0.1	mg/kg				< 0.1
Prometryne	DETSC 3445*	0.1	mg/kg				< 0.1
Terbutryn	DETSC 3445*	0.1	mg/kg				< 0.1

Summary of Chemical Analysis

Leachate Samples

Our Ref 19-09384

Client Ref 4848

Contract Title Barnsley West, 4848

Lab No	1503805	1503806	1503807
Sample ID	TP108	TP111	TP112
Depth	2.60-2.70	2.00-2.20	2.20-2.40
Other ID			
Sample Type	LEACHATE	LEACHATE	LEACHATE
Sampling Date	16/05/19	16/05/19	16/05/19
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Preparation						
NRA Leachate Preparation	DETSC 1009*			Y	Y	Y
Metals						
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.19	1.2	0.28
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	3.2	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4	1.5	< 0.4
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	0.16	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.3	ug/l	4.2	2.5	2.8
Inorganics						
pH	DETSC 2008			7.6	8.8	8.7
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20	< 20
Sulphate as SO4	DETSC 2055	0.1	mg/l	24	6.8	3.6
PAHs						
Naphthalene	DETSC 3304	0.05	ug/l	0.06	< 0.05	0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	0.01	< 0.01	0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.02	0.02	0.02
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.02	0.01
Pyrene	DETSC 3304	0.01	ug/l	< 0.01	0.02	0.01
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	0.02	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	0.20	< 0.20
Phenols						
Phenol	DETSC 3451*	0.5	ug/l	< 0.50	< 0.50	< 0.50

Summary of Asbestos Analysis

Soil Samples

Our Ref 19-09384

Client Ref 4848

Contract Title Barnsley West, 4848

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1503794	TP108 0.00-0.10	SOIL	NAD	none	Luke Donaghy
1503796	TP109 0.00-0.15	SOIL	NAD	none	Luke Donaghy
1503798	TP110 0.00-0.20	SOIL	NAD	none	Luke Donaghy
1503801	TP111 2.00-2.20	SOIL	NAD	none	Luke Donaghy

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 19-09384
 Client Ref 4848
 Contract Barnsley West, 4848

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1503794	TP108 0.00-0.10 SOIL	16/05/19	GJ 250ml, GJ 60ml, PT 1L		
1503795	TP108 2.60-2.70 SOIL	16/05/19	GJ 250ml, GJ 60ml, PT 1L		
1503796	TP109 0.00-0.15 SOIL	16/05/19	GJ 250ml, GJ 60ml, PT 1L		
1503797	TP109 0.60-1.00 SOIL	16/05/19	GJ 250ml, GJ 60ml, PT 1L		
1503798	TP110 0.00-0.20 SOIL	16/05/19	GJ 250ml, GJ 60ml, PT 1L		
1503799	TP111 0.00-0.20 SOIL	16/05/19	GJ 250ml, GJ 60ml, PT 1L		
1503800	TP111 0.80-1.00 SOIL	16/05/19	GJ 250ml, GJ 60ml, PT 1L		
1503801	TP111 2.00-2.20 SOIL	16/05/19	GJ 250ml, GJ 60ml, PT 1L		
1503802	TP112 0.00-0.20 SOIL	16/05/19	GJ 250ml, GJ 60ml, PT 1L		
1503803	TP112 2.20-2.40 SOIL	16/05/19	GJ 250ml, GJ 60ml, PT 1L		
1503804	TP115 0.00-0.25 SOIL	16/05/19	GJ 250ml, GJ 60ml, PT 1L		
1503805	TP108 2.60-2.70 LEACHATE	16/05/19	GJ 250ml, GJ 60ml, PT 1L		
1503806	TP111 2.00-2.20 LEACHATE	16/05/19	GJ 250ml, GJ 60ml, PT 1L		
1503807	TP112 2.20-2.40 LEACHATE	16/05/19	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Waste Classification Report



3UUF9-RWFED-FXQXL

Job name

Barnsley West

Description/Comments

Project

4848

Site

Related Documents

#	Name	Description
None		

Waste Stream Template

JPG WASTE STREAM V20

Classified by

Name: Dominic Horne	Company: JPG Leeds
Date: 20 Jun 2019 12:41 GMT	5 John Charles Way
Telephone: 07814008742	Leeds
	LS12 6QA

Report

Created by: Dominic Horne
Created date: 20 Jun 2019 12:41 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	TP101	0.00-0.20	Non Hazardous		3
2	TP101[2]	0.50-1.00	Non Hazardous		5
3	TP102	0.00-0.20	Non Hazardous		7
4	TP102A	2.00-2.20	Non Hazardous		9
5	TP103	0.00-0.25	Non Hazardous		11
6	TP104	0.25-0.60	Non Hazardous		13
7	TP105	0.00-0.50	Non Hazardous		15
8	TP105[2]	2.00-2.40	Non Hazardous		17
9	TP106	0.00-0.40	Non Hazardous		19
10	TP108	0.00-0.10	Non Hazardous		21
11	TP108[2]	2.60-2.70	Non Hazardous		23

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
12	TP109	0.00-0.15	Non Hazardous		25
13	TP109[2]	0.60-1.00	Non Hazardous		27
14	TP110	0.00-0.20	Non Hazardous		29
15	TP111	0.00-0.20	Non Hazardous		31
16	TP111[2]	0.80-1.00	Non Hazardous		33
17	TP111[3]	2.00-2.20	Non Hazardous		35
18	TP112	0.00-0.20	Non Hazardous		37
19	TP112[2]	2.20-2.40	Non Hazardous		39
20	TP113	0.00-0.40	Non Hazardous		41
21	TP115	0.00-0.25	Non Hazardous		43

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	45
Appendix B: Rationale for selection of metal species	46
Appendix C: Version	47

Classification of sample: TP101

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

Sample details

Sample Name: TP101	LoW Code: Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth: 0.00-0.20 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified


Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	11 mg/kg	1.32	14.524 mg/kg	0.00145 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	0.3 mg/kg	1.142	0.343 mg/kg	0.0000343 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9	24 mg/kg	1.462	35.077 mg/kg	0.00351 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	26 mg/kg	1.126	29.273 mg/kg	0.00293 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	41 mg/kg	1.56	63.952 mg/kg	0.0041 %		
7	mercury { mercury(II) sulphide }		215-696-3	1344-48-5	0.09 mg/kg	1.16	0.104 mg/kg	0.0000104 %		
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	18 mg/kg	2.976	53.573 mg/kg	0.00536 %		
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
10	zinc { zinc chromate }	024-007-00-3			97 mg/kg	2.774	269.092 mg/kg	0.0269 %		
11	pH			PH	6.7 pH		6.7 pH	6.7 pH		
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			0.2 mg/kg	1.884	0.377 mg/kg	0.0000377 %		
13	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	• acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	• acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	• fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	• phenanthrene	201-581-5	85-01-8		0.1 mg/kg		0.1 mg/kg	0.00001 %		
18	• anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	• fluoranthene	205-912-4	206-44-0		0.3 mg/kg		0.3 mg/kg	0.00003 %		
20	• pyrene	204-927-3	129-00-0		0.2 mg/kg		0.2 mg/kg	0.00002 %		
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.2 mg/kg		0.2 mg/kg	0.00002 %		
22	chrysene	601-048-00-0	205-923-4	218-01-9	0.2 mg/kg		0.2 mg/kg	0.00002 %		
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.4 mg/kg		0.4 mg/kg	0.00004 %		
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.2 mg/kg		0.2 mg/kg	0.00002 %		
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.3 mg/kg		0.3 mg/kg	0.00003 %		
26	• indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	• benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29	phenol	604-001-00-2	203-632-7	108-95-2	1 mg/kg		1 mg/kg	0.0001 %		
Total:								0.045 %		

Key

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

Classification of sample: TP101[2]

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

Sample details

Sample Name:	LoW Code:	
TP101[2]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.50-1.00 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				5.8 mg/kg	1.32	7.658 mg/kg	0.000766 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide }				19 mg/kg	1.462	27.77 mg/kg	0.00278 %		
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				33 mg/kg	1.126	37.154 mg/kg	0.00372 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	20 mg/kg	1.56	31.196 mg/kg	0.002 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury(II) sulphide }				<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %		<LOD
		215-696-3	1344-48-5							
7	nickel { nickel chromate }				37 mg/kg	2.976	110.122 mg/kg	0.011 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
	034-002-00-8									
9	zinc { zinc chromate }				100 mg/kg	2.774	277.415 mg/kg	0.0277 %		
	024-007-00-3									
10	pH				8.2 pH		8.2 pH	8.2 pH		
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
	006-007-00-5									
12	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
15	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
16	phenanthrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-581-5	85-01-8							
17	anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-371-1	120-12-7							
18	fluoranthene				0.2 mg/kg		0.2 mg/kg	0.00002 %		
		205-912-4	206-44-0							
19	pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-927-3	129-00-0							
20	benzo[a]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-033-00-9	200-280-6							
21	chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-048-00-0	205-923-4							
22	benzo[b]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-034-00-4	205-911-9							
23	benzo[k]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-036-00-5	205-916-6							
24	benzo[a]pyrene; benzo[def]chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-032-00-3	200-028-5							
25	indeno[123-cd]pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-893-2	193-39-5							
26	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-041-00-2	200-181-8							
27	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-883-8	191-24-2							
28	phenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
		604-001-00-2	203-632-7							
Total:								0.0484 %		

Key

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

Classification of sample: TP102

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

Sample details

Sample Name:	LoW Code:	
TP102	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.00-0.20 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				10	mg/kg	1.32	13.203	mg/kg	0.00132 %		
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.2	mg/kg	1.142	0.228	mg/kg	0.0000228 %		
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide }				22	mg/kg	1.462	32.154	mg/kg	0.00322 %		
		215-160-9	1308-38-9									
4	copper { dicopper oxide; copper (I) oxide }				26	mg/kg	1.126	29.273	mg/kg	0.00293 %		
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead chromate }			1	26	mg/kg	1.56	40.555	mg/kg	0.0026 %		
	082-004-00-2	231-846-0	7758-97-6									
6	mercury { mercury(II) sulphide }				<0.05	mg/kg	1.16	<0.058	mg/kg	<0.0000058 %		<LOD
		215-696-3	1344-48-5									
7	nickel { nickel chromate }				21	mg/kg	2.976	62.502	mg/kg	0.00625 %		
	028-035-00-7	238-766-5	14721-18-7									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
	034-002-00-8											
9	zinc { zinc chromate }				86	mg/kg	2.774	238.577	mg/kg	0.0239 %		
	024-007-00-3											
10	pH				6.8	pH		6.8	pH	6.8 pH		
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
	006-007-00-5											
12	naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
13	acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8									
14	acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	fluoranthene	205-912-4	206-44-0		0.1 mg/kg		0.1 mg/kg	0.00001 %		
19	pyrene	204-927-3	129-00-0		0.1 mg/kg		0.1 mg/kg	0.00001 %		
20	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	chrysene	601-048-00-0	205-923-4		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	phenol	604-001-00-2	203-632-7		0.5 mg/kg		0.5 mg/kg	0.00005 %		
Total:								0.0406 %		

Key

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

Classification of sample: TP102A

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

Sample details

Sample Name:	LoW Code:	
TP102A	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
2.00-2.20 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				5.3 mg/kg	1.32	6.998 mg/kg	0.0007 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide }				18 mg/kg	1.462	26.308 mg/kg	0.00263 %		
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				31 mg/kg	1.126	34.903 mg/kg	0.00349 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	17 mg/kg	1.56	26.517 mg/kg	0.0017 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury(II) sulphide }				<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %		<LOD
		215-696-3	1344-48-5							
7	nickel { nickel chromate }				38 mg/kg	2.976	113.098 mg/kg	0.0113 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
	034-002-00-8									
9	zinc { zinc chromate }				95 mg/kg	2.774	263.544 mg/kg	0.0264 %		
	024-007-00-3									
10	pH				7.6 pH		7.6 pH	7.6 pH		
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
	006-007-00-5									
12	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	fluoranthene	205-912-4	206-44-0		0.1 mg/kg		0.1 mg/kg	0.00001 %		
19	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6		0.1 mg/kg		0.1 mg/kg	0.00001 %		
21	chrysene	601-048-00-0	205-923-4		0.1 mg/kg		0.1 mg/kg	0.00001 %		
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.5 mg/kg		0.5 mg/kg	0.00005 %		
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.0466 %		

Key

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

Classification of sample: TP103

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

Sample details

Sample Name:	LoW Code:	
TP103	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.00-0.25 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	13 mg/kg	1.32	17.164 mg/kg	0.00172 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	0.2 mg/kg	1.142	0.228 mg/kg	0.0000228 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9	21 mg/kg	1.462	30.693 mg/kg	0.00307 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	63 mg/kg	1.126	70.931 mg/kg	0.00709 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	37 mg/kg	1.56	57.713 mg/kg	0.0037 %		
7	mercury { mercury(II) sulphide }		215-696-3	1344-48-5	<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %		<LOD
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	18 mg/kg	2.976	53.573 mg/kg	0.00536 %		
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
10	zinc { zinc chromate }	024-007-00-3			80 mg/kg	2.774	221.932 mg/kg	0.0222 %		
11	pH			PH	6.8 pH		6.8 pH	6.8 pH		
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
13	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	pyrene	204-927-3	129-00-0		0.3 mg/kg		0.3 mg/kg	0.00003 %		
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.2 mg/kg		0.2 mg/kg	0.00002 %		
22	chrysene	601-048-00-0	205-923-4	218-01-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29	phenol	604-001-00-2	203-632-7	108-95-2	<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.0437 %		

Key

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

Classification of sample: TP104

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

Sample details

Sample Name: TP104	LoW Code: Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth: 0.25-0.60 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	5.8 mg/kg	1.32	7.658 mg/kg	0.000766 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9	19 mg/kg	1.462	27.77 mg/kg	0.00278 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	23 mg/kg	1.126	25.895 mg/kg	0.00259 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	14 mg/kg	1.56	21.837 mg/kg	0.0014 %		
7	mercury { mercury(II) sulphide }		215-696-3	1344-48-5	0.05 mg/kg	1.16	0.058 mg/kg	0.0000058 %		
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	19 mg/kg	2.976	56.549 mg/kg	0.00565 %		
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
10	zinc { zinc chromate }	024-007-00-3			67 mg/kg	2.774	185.868 mg/kg	0.0186 %		
11	pH			PH	7.4 pH		7.4 pH	7.4 pH		
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
13	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4	218-01-9	0.2 mg/kg		0.2 mg/kg	0.00002 %		
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29	phenol	604-001-00-2	203-632-7	108-95-2	<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.0323 %		

Key

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

Classification of sample: TP105

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

Sample details

Sample Name:	LoW Code:	
TP105	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.00-0.50 m		

Hazard properties

None identified


Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	19 mg/kg	1.32	25.086 mg/kg	0.00251 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	0.3 mg/kg	1.142	0.343 mg/kg	0.0000343 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9	26 mg/kg	1.462	38 mg/kg	0.0038 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	30 mg/kg	1.126	33.777 mg/kg	0.00338 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	50 mg/kg	1.56	77.991 mg/kg	0.005 %		
7	mercury { mercury(II) sulphide }		215-696-3	1344-48-5	0.11 mg/kg	1.16	0.128 mg/kg	0.0000128 %		
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	18 mg/kg	2.976	53.573 mg/kg	0.00536 %		
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			0.7 mg/kg	2.554	1.788 mg/kg	0.000179 %		
10	zinc { zinc chromate }	024-007-00-3			93 mg/kg	2.774	257.996 mg/kg	0.0258 %		
11	pH			PH	7.5 pH		7.5 pH	7.5 pH		
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
13	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	• acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
15	• acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							
16	• fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
17	• phenanthrene				0.2 mg/kg		0.2 mg/kg	0.00002 %		
		201-581-5	85-01-8							
18	• anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-371-1	120-12-7							
19	• fluoranthene				0.4 mg/kg		0.4 mg/kg	0.00004 %		
		205-912-4	206-44-0							
20	• pyrene				0.3 mg/kg		0.3 mg/kg	0.00003 %		
		204-927-3	129-00-0							
21	benzo[a]anthracene				0.2 mg/kg		0.2 mg/kg	0.00002 %		
	601-033-00-9	200-280-6	56-55-3							
22	chrysene				0.2 mg/kg		0.2 mg/kg	0.00002 %		
	601-048-00-0	205-923-4	218-01-9							
23	benzo[b]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
24	benzo[k]fluoranthene				0.2 mg/kg		0.2 mg/kg	0.00002 %		
	601-036-00-5	205-916-6	207-08-9							
25	benzo[a]pyrene; benzo[def]chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
26	• indeno[123-cd]pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-893-2	193-39-5							
27	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
28	• benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-883-8	191-24-2							
29	phenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
Total:								0.0466 %		

Key

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

Classification of sample: TP105[2]

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

Sample details

Sample Name:	LoW Code:	
TP105[2]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
2.00-2.40 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				6.8 mg/kg	1.32	8.978 mg/kg	0.000898 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.1 mg/kg	1.142	0.114 mg/kg	0.0000114 %		
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide }				18 mg/kg	1.462	26.308 mg/kg	0.00263 %		
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				32 mg/kg	1.126	36.028 mg/kg	0.0036 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	18 mg/kg	1.56	28.077 mg/kg	0.0018 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury(II) sulphide }				<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %		<LOD
		215-696-3	1344-48-5							
7	nickel { nickel chromate }				39 mg/kg	2.976	116.074 mg/kg	0.0116 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
	034-002-00-8									
9	zinc { zinc chromate }				96 mg/kg	2.774	266.318 mg/kg	0.0266 %		
	024-007-00-3									
10	pH				8.1 pH		8.1 pH	8.1 pH		
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
	006-007-00-5									
12	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	chrysene	601-048-00-0	205-923-4		0.1 mg/kg		0.1 mg/kg	0.00001 %		
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.0475 %		

Key

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

Classification of sample: TP106

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

Sample details

Sample Name:	LoW Code:	
TP106	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.00-0.40 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				23	mg/kg	1.32	30.367	mg/kg	0.00304 %		
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.3	mg/kg	1.142	0.343	mg/kg	0.0000343 %		
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide }				21	mg/kg	1.462	30.693	mg/kg	0.00307 %		
		215-160-9	1308-38-9									
4	copper { dicopper oxide; copper (I) oxide }				31	mg/kg	1.126	34.903	mg/kg	0.00349 %		
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead chromate }			1	47	mg/kg	1.56	73.311	mg/kg	0.0047 %		
	082-004-00-2	231-846-0	7758-97-6									
6	mercury { mercury(II) sulphide }				0.11	mg/kg	1.16	0.128	mg/kg	0.0000128 %		
		215-696-3	1344-48-5									
7	nickel { nickel chromate }				19	mg/kg	2.976	56.549	mg/kg	0.00565 %		
	028-035-00-7	238-766-5	14721-18-7									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
	034-002-00-8											
9	zinc { zinc chromate }				110	mg/kg	2.774	305.156	mg/kg	0.0305 %		
	024-007-00-3											
10	pH				7.2	pH		7.2	pH	7.2 pH		
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
	006-007-00-5											
12	naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
13	acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8									
14	acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	chrysene	601-048-00-0	205-923-4	218-01-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	phenol	604-001-00-2	203-632-7	108-95-2	0.4 mg/kg		0.4 mg/kg	0.00004 %		
Total:								0.0509 %		

Key

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

Classification of sample: TP108

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

Sample details

Sample Name: TP108	LoW Code: Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth: 0.00-0.10 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	17 mg/kg	1.32	22.446 mg/kg	0.00224 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	0.2 mg/kg	1.142	0.228 mg/kg	0.0000228 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9	19 mg/kg	1.462	27.77 mg/kg	0.00278 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	35 mg/kg	1.126	39.406 mg/kg	0.00394 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	51 mg/kg	1.56	79.551 mg/kg	0.0051 %		
7	mercury { mercury(II) sulphide }		215-696-3	1344-48-5	<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %		<LOD
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	21 mg/kg	2.976	62.502 mg/kg	0.00625 %		
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
10	zinc { zinc chromate }	024-007-00-3			100 mg/kg	2.774	277.415 mg/kg	0.0277 %		
11	pH			PH	7 pH		7 pH	7pH		
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			0.3 mg/kg	1.884	0.565 mg/kg	0.0000565 %		
13	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	fluoranthene	205-912-4	206-44-0		0.3 mg/kg		0.3 mg/kg	0.00003 %		
20	pyrene	204-927-3	129-00-0		0.3 mg/kg		0.3 mg/kg	0.00003 %		
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4	218-01-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29	phenol	604-001-00-2	203-632-7	108-95-2	<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.0487 %		

Key

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

Classification of sample: TP108[2]

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

Sample details

Sample Name:	LoW Code:	
TP108[2]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
2.60-2.70 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				7.9 mg/kg	1.32	10.431 mg/kg	0.00104 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide }				19 mg/kg	1.462	27.77 mg/kg	0.00278 %		
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				36 mg/kg	1.126	40.532 mg/kg	0.00405 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	23 mg/kg	1.56	35.876 mg/kg	0.0023 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury(II) sulphide }				<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %		<LOD
		215-696-3	1344-48-5							
7	nickel { nickel chromate }				34 mg/kg	2.976	101.193 mg/kg	0.0101 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
	034-002-00-8									
9	zinc { zinc chromate }				91 mg/kg	2.774	252.447 mg/kg	0.0252 %		
	024-007-00-3									
10	pH				7.3 pH		7.3 pH	7.3 pH		
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
	006-007-00-5									
12	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	fluoranthene	205-912-4	206-44-0		0.1 mg/kg		0.1 mg/kg	0.00001 %		
19	pyrene	204-927-3	129-00-0		0.2 mg/kg		0.2 mg/kg	0.00002 %		
20	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	chrysene	601-048-00-0	205-923-4		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.0459 %		

Key

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

Classification of sample: TP109

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

Sample details

Sample Name:	LoW Code:	
TP109	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.00-0.15 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				8.5 mg/kg	1.32	11.223 mg/kg	0.00112 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide }				15 mg/kg	1.462	21.923 mg/kg	0.00219 %		
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				23 mg/kg	1.126	25.895 mg/kg	0.00259 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	25 mg/kg	1.56	38.995 mg/kg	0.0025 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury(II) sulphide }				<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %		<LOD
		215-696-3	1344-48-5							
7	nickel { nickel chromate }				21 mg/kg	2.976	62.502 mg/kg	0.00625 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
	034-002-00-8									
9	zinc { zinc chromate }				81 mg/kg	2.774	224.706 mg/kg	0.0225 %		
	024-007-00-3									
10	pH				7.8 pH		7.8 pH	7.8 pH		
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
	006-007-00-5									
12	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	chrysene	601-048-00-0	205-923-4	218-01-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	phenol	604-001-00-2	203-632-7	108-95-2	<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.0375 %		

Key

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

Classification of sample: TP109[2]

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

Sample details

Sample Name:	LoW Code:	
TP109[2]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.60-1.00 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	2.7 mg/kg	1.32	3.565 mg/kg	0.000356 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	0.2 mg/kg	1.142	0.228 mg/kg	0.0000228 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9	15 mg/kg	1.462	21.923 mg/kg	0.00219 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	28 mg/kg	1.126	31.525 mg/kg	0.00315 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	22 mg/kg	1.56	34.316 mg/kg	0.0022 %		
7	mercury { mercury(II) sulphide }		215-696-3	1344-48-5	<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %		<LOD
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	33 mg/kg	2.976	98.217 mg/kg	0.00982 %		
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
10	zinc { zinc chromate }	024-007-00-3			150 mg/kg	2.774	416.122 mg/kg	0.0416 %		
11	pH			PH	8.4 pH		8.4 pH	8.4 pH		
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
13	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4	218-01-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29	phenol	604-001-00-2	203-632-7	108-95-2	<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.0599 %		

Key

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

Classification of sample: TP110

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

Sample details

Sample Name:	LoW Code:	
TP110	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.00-0.20 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				12 mg/kg	1.32	15.844 mg/kg	0.00158 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.1 mg/kg	1.142	0.114 mg/kg	0.0000114 %		
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide }				18 mg/kg	1.462	26.308 mg/kg	0.00263 %		
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				25 mg/kg	1.126	28.147 mg/kg	0.00281 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	34 mg/kg	1.56	53.034 mg/kg	0.0034 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury(II) sulphide }				0.13 mg/kg	1.16	0.151 mg/kg	0.0000151 %		
		215-696-3	1344-48-5							
7	nickel { nickel chromate }				22 mg/kg	2.976	65.478 mg/kg	0.00655 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
	034-002-00-8									
9	zinc { zinc chromate }				95 mg/kg	2.774	263.544 mg/kg	0.0264 %		
	024-007-00-3									
10	pH				7.1 pH		7.1 pH	7.1 pH		
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.2 mg/kg	1.884	0.377 mg/kg	0.0000377 %		
	006-007-00-5									
12	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	chrysene	601-048-00-0	205-923-4	218-01-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	phenol	604-001-00-2	203-632-7	108-95-2	<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.0437 %		

Key

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

Classification of sample: TP111

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

Sample details

Sample Name:	LoW Code:	
TP111	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.00-0.20 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				17	mg/kg	1.32	22.446	mg/kg	0.00224 %		
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.2	mg/kg	1.142	0.228	mg/kg	0.0000228 %		
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide }				15	mg/kg	1.462	21.923	mg/kg	0.00219 %		
		215-160-9	1308-38-9									
4	copper { dicopper oxide; copper (I) oxide }				37	mg/kg	1.126	41.658	mg/kg	0.00417 %		
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead chromate }			1	68	mg/kg	1.56	106.067	mg/kg	0.0068 %		
	082-004-00-2	231-846-0	7758-97-6									
6	mercury { mercury(II) sulphide }				<0.05	mg/kg	1.16	<0.058	mg/kg	<0.0000058 %		<LOD
		215-696-3	1344-48-5									
7	nickel { nickel chromate }				16	mg/kg	2.976	47.62	mg/kg	0.00476 %		
	028-035-00-7	238-766-5	14721-18-7									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
	034-002-00-8											
9	zinc { zinc chromate }				84	mg/kg	2.774	233.028	mg/kg	0.0233 %		
	024-007-00-3											
10	pH				7.3	pH		7.3	pH	7.3 pH		
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.1	mg/kg	1.884	0.188	mg/kg	0.0000188 %		
	006-007-00-5											
12	naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
13	acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8									
14	acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
15	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
16	phenanthrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-581-5	85-01-8							
17	anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-371-1	120-12-7							
18	fluoranthene				0.2 mg/kg		0.2 mg/kg	0.00002 %		
		205-912-4	206-44-0							
19	pyrene				0.3 mg/kg		0.3 mg/kg	0.00003 %		
		204-927-3	129-00-0							
20	benzo[a]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-033-00-9	200-280-6							
21	chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-048-00-0	205-923-4							
22	benzo[b]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-034-00-4	205-911-9							
23	benzo[k]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-036-00-5	205-916-6							
24	benzo[a]pyrene; benzo[def]chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-032-00-3	200-028-5							
25	indeno[123-cd]pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-893-2	193-39-5							
26	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-041-00-2	200-181-8							
27	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-883-8	191-24-2							
28	phenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
		604-001-00-2	203-632-7							
Total:								0.0439 %		

Key

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

Classification of sample: TP111[2]

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

Sample details

Sample Name: TP111[2]	LoW Code: Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth: 0.80-1.00 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	11 mg/kg	1.32	14.524 mg/kg	0.00145 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9	16 mg/kg	1.462	23.385 mg/kg	0.00234 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	28 mg/kg	1.126	31.525 mg/kg	0.00315 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	30 mg/kg	1.56	46.794 mg/kg	0.003 %		
7	mercury { mercury(II) sulphide }		215-696-3	1344-48-5	<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %		<LOD
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	19 mg/kg	2.976	56.549 mg/kg	0.00565 %		
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
10	zinc { zinc chromate }	024-007-00-3			67 mg/kg	2.774	185.868 mg/kg	0.0186 %		
11	pH			PH	7.7 pH		7.7 pH	7.7 pH		
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
13	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	acenaphthylene	205-917-1	208-96-8		0.2 mg/kg		0.2 mg/kg	0.00002 %		
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	fluorene	201-695-5	86-73-7		0.1 mg/kg		0.1 mg/kg	0.00001 %		
17	phenanthrene	201-581-5	85-01-8		1.1 mg/kg		1.1 mg/kg	0.00011 %		
18	anthracene	204-371-1	120-12-7		0.4 mg/kg		0.4 mg/kg	0.00004 %		
19	fluoranthene	205-912-4	206-44-0		2.5 mg/kg		2.5 mg/kg	0.00025 %		
20	pyrene	204-927-3	129-00-0		2.3 mg/kg		2.3 mg/kg	0.00023 %		
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	1.3 mg/kg		1.3 mg/kg	0.00013 %		
22	chrysene	601-048-00-0	205-923-4	218-01-9	1.5 mg/kg		1.5 mg/kg	0.00015 %		
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.9 mg/kg		0.9 mg/kg	0.00009 %		
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.7 mg/kg		0.7 mg/kg	0.00007 %		
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	1.1 mg/kg		1.1 mg/kg	0.00011 %		
26	indeno[123-cd]pyrene	205-893-2	193-39-5		0.7 mg/kg		0.7 mg/kg	0.00007 %		
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.1 mg/kg		0.1 mg/kg	0.00001 %		
28	benzo[ghi]perylene	205-883-8	191-24-2		0.7 mg/kg		0.7 mg/kg	0.00007 %		
29	phenol	604-001-00-2	203-632-7	108-95-2	<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.036 %		

Key

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

Classification of sample: TP111[3]

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

Sample details

Sample Name:	LoW Code:	
TP111[3]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
2.00-2.20 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				9.9 mg/kg	1.32	13.071 mg/kg	0.00131 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.1 mg/kg	1.142	0.114 mg/kg	0.0000114 %		
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide }				8.2 mg/kg	1.462	11.985 mg/kg	0.0012 %		
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				20 mg/kg	1.126	22.518 mg/kg	0.00225 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	53 mg/kg	1.56	82.67 mg/kg	0.0053 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury(II) sulphide }				0.08 mg/kg	1.16	0.0928 mg/kg	0.00000928 %		
		215-696-3	1344-48-5							
7	nickel { nickel chromate }				11 mg/kg	2.976	32.739 mg/kg	0.00327 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
	034-002-00-8									
9	zinc { zinc chromate }				40 mg/kg	2.774	110.966 mg/kg	0.0111 %		
	024-007-00-3									
10	pH				9.2 pH		9.2 pH	9.2 pH		
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
	006-007-00-5									
12	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
15	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD	
16	phenanthrene	201-581-5	85-01-8		0.2 mg/kg		0.2 mg/kg	0.00002 %			
17	anthracene	204-371-1	120-12-7		0.1 mg/kg		0.1 mg/kg	0.00001 %			
18	fluoranthene	205-912-4	206-44-0		0.5 mg/kg		0.5 mg/kg	0.00005 %			
19	pyrene	204-927-3	129-00-0		0.4 mg/kg		0.4 mg/kg	0.00004 %			
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.3 mg/kg		0.3 mg/kg	0.00003 %			
21	chrysene	601-048-00-0	205-923-4	218-01-9	0.2 mg/kg		0.2 mg/kg	0.00002 %			
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.2 mg/kg		0.2 mg/kg	0.00002 %			
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.1 mg/kg		0.1 mg/kg	0.00001 %			
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.2 mg/kg		0.2 mg/kg	0.00002 %			
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD	
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD	
28	phenol	604-001-00-2	203-632-7	108-95-2	<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD	
Total:								0.0249 %			

Key

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

Classification of sample: TP112

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

Sample details

Sample Name:	LoW Code:	
TP112	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.00-0.20 m		

Hazard properties

None identified


Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	8.6 mg/kg	1.32	11.355 mg/kg	0.00114 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	0.1 mg/kg	1.142	0.114 mg/kg	0.0000114 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9	15 mg/kg	1.462	21.923 mg/kg	0.00219 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	21 mg/kg	1.126	23.644 mg/kg	0.00236 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	33 mg/kg	1.56	51.474 mg/kg	0.0033 %		
7	mercury { mercury(II) sulphide }		215-696-3	1344-48-5	<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %		<LOD
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	13 mg/kg	2.976	38.691 mg/kg	0.00387 %		
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
10	zinc { zinc chromate }	024-007-00-3			87 mg/kg	2.774	241.351 mg/kg	0.0241 %		
11	pH			PH	6.7 pH		6.7 pH	6.7 pH		
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			0.5 mg/kg	1.884	0.942 mg/kg	0.0000942 %		
13	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4	218-01-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29	phenol	604-001-00-2	203-632-7	108-95-2	0.9 mg/kg		0.9 mg/kg	0.00009 %		
Total:								0.0377 %		

Key

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

Classification of sample: TP112[2]

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

Sample details

Sample Name:	LoW Code:	
TP112[2]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
2.20-2.40 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				6.5 mg/kg	1.32	8.582 mg/kg	0.000858 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide }				16 mg/kg	1.462	23.385 mg/kg	0.00234 %		
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				33 mg/kg	1.126	37.154 mg/kg	0.00372 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	17 mg/kg	1.56	26.517 mg/kg	0.0017 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury(II) sulphide }				<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %		<LOD
		215-696-3	1344-48-5							
7	nickel { nickel chromate }				35 mg/kg	2.976	104.169 mg/kg	0.0104 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
	034-002-00-8									
9	zinc { zinc chromate }				84 mg/kg	2.774	233.028 mg/kg	0.0233 %		
	024-007-00-3									
10	pH				8.2 pH		8.2 pH	8.2 pH		
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
	006-007-00-5									
12	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	chrysene	601-048-00-0	205-923-4		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.0427 %		

Key

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

Classification of sample: TP113

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

Sample details

Sample Name:	LoW Code:	
TP113	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.00-0.40 m		

Hazard properties

None identified


Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	21 mg/kg	1.32	27.727 mg/kg	0.00277 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	0.3 mg/kg	1.142	0.343 mg/kg	0.0000343 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9	22 mg/kg	1.462	32.154 mg/kg	0.00322 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	34 mg/kg	1.126	38.28 mg/kg	0.00383 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	59 mg/kg	1.56	92.029 mg/kg	0.0059 %		
7	mercury { mercury(II) sulphide }		215-696-3	1344-48-5	0.12 mg/kg	1.16	0.139 mg/kg	0.0000139 %		
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	20 mg/kg	2.976	59.525 mg/kg	0.00595 %		
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			0.5 mg/kg	2.554	1.277 mg/kg	0.000128 %		
10	zinc { zinc chromate }	024-007-00-3			100 mg/kg	2.774	277.415 mg/kg	0.0277 %		
11	pH			PH	7.3 pH		7.3 pH	7.3 pH		
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
13	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	acenaphthylene	205-917-1	208-96-8		0.2 mg/kg		0.2 mg/kg	0.00002 %		
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	phenanthrene	201-581-5	85-01-8		0.3 mg/kg		0.3 mg/kg	0.00003 %		
18	anthracene	204-371-1	120-12-7		0.1 mg/kg		0.1 mg/kg	0.00001 %		
19	fluoranthene	205-912-4	206-44-0		0.5 mg/kg		0.5 mg/kg	0.00005 %		
20	pyrene	204-927-3	129-00-0		0.4 mg/kg		0.4 mg/kg	0.00004 %		
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.2 mg/kg		0.2 mg/kg	0.00002 %		
22	chrysene	601-048-00-0	205-923-4	218-01-9	0.2 mg/kg		0.2 mg/kg	0.00002 %		
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.3 mg/kg		0.3 mg/kg	0.00003 %		
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.3 mg/kg		0.3 mg/kg	0.00003 %		
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.1 mg/kg		0.1 mg/kg	0.00001 %		
26	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29	phenol	604-001-00-2	203-632-7	108-95-2	<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.0501 %		

Key

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

Classification of sample: TP115

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

Sample details

Sample Name:	LoW Code:	
TP115	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.00-0.25 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				11	mg/kg	1.32	14.524	mg/kg	0.00145 %		
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.1	mg/kg	1.142	0.114	mg/kg	0.0000114 %		
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide }				17	mg/kg	1.462	24.846	mg/kg	0.00248 %		
		215-160-9	1308-38-9									
4	copper { dicopper oxide; copper (I) oxide }				29	mg/kg	1.126	32.651	mg/kg	0.00327 %		
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead chromate }			1	34	mg/kg	1.56	53.034	mg/kg	0.0034 %		
	082-004-00-2	231-846-0	7758-97-6									
6	mercury { mercury(II) sulphide }				<0.05	mg/kg	1.16	<0.058	mg/kg	<0.0000058 %		<LOD
		215-696-3	1344-48-5									
7	nickel { nickel chromate }				22	mg/kg	2.976	65.478	mg/kg	0.00655 %		
	028-035-00-7	238-766-5	14721-18-7									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
	034-002-00-8											
9	zinc { zinc chromate }				87	mg/kg	2.774	241.351	mg/kg	0.0241 %		
	024-007-00-3											
10	pH				7.1	pH		7.1	pH	7.1 pH		
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.2	mg/kg	1.884	0.377	mg/kg	0.0000377 %		
	006-007-00-5											
12	naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
13	acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8									
14	acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	chrysene	601-048-00-0	205-923-4	218-01-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	phenol	604-001-00-2	203-632-7	108-95-2	0.4 mg/kg		0.4 mg/kg	0.00004 %		
Total:								0.0417 %		

Key

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

Appendix A: Classifier defined and non CLP determinands

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

Conversion factor: 1.462

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

• **mercury(II) sulphide** (EC Number: 215-696-3, CAS Number: 1344-48-5)

Conversion factor: 1.16

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT RE 2 H373 , Acute Tox. 2 H300 , Acute Tox. 1 H310 , Acute Tox. 3 H331

• **pH** (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

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

CLP index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Data source: Commission Regulation (EC) No 790/2009 - 1st Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP1)

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s)/Risk Phrase(s):

14 Dec 2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

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

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

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

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

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

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

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

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

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case CLP species based on hazard statements/molecular weight and low solubility. Industrial sources include: flame retardants in electrical apparatus, textiles and coatings.

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides.

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

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass.

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected.

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight.

mercury {mercury(II) sulphide}

Worst case CLP species based on hazard statements/molecular weight.

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight.

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

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil.

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight.

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

Harmonised group entry used as most reasonable case as complex cyanides and those specified elsewhere in the annex are not likely to be present in this soil: [Note conversion factor based on a worst case compound: sodium cyanide]

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

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.1, May 2018**
HazWasteOnline Classification Engine Version: 2019.163.3889.7904 (12 Jun 2019)
HazWasteOnline Database: 2019.163.3889.7904 (12 Jun 2019)

This classification utilises the following guidance and legislation:

WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010



Appendix D Geotechnical Testing Results



LABORATORY REPORT



4043

Contract Number: PSL19/2340

Report Date: 17 May 2019
Client's Reference: 4848
Client Name: JPG
5 John Charles Way
Leeds
West Yorkshire
LS12 6QD

For the attention of: Joseph Morley

Contract Title: Barnsley West
Date Received: 10/4/2019
Date Commenced: 10/4/2019
Date Completed: 17/5/2019

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. 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 other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:


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(Director)

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SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP101	T1	T	1.90	2.00	Brown mottled grey slightly gravelly sandy CLAY.
TP102	T2	T	0.80		Grey gravelly sandy CLAY.
TP102A	T3	T	2.00	2.20	Brown slightly gravelly sandy CLAY.
TP103	T8	T	2.00	2.50	Grey gravelly sandy CLAY.
TP104	T4	T	3.00		Grey gravelly sandy CLAY.
TP105	T6	T	2.00	2.40	Grey gravelly sandy CLAY.
TP106	T7	T	1.50	2.00	Grey gravelly sandy CLAY.
TP113	T5	T	2.20		Grey gravelly sandy CLAY.
TP101	B1	BB	1.50	2.00	Grey very gravelly sandy CLAY.
TP101	B2	BB	1.50	2.00	Grey gravelly sandy CLAY.
TP102	B3	BB	0.80	1.00	Brown very gravelly sandy very silty CLAY.
TP102	B4	BB	0.80	1.00	Brown gravelly slightly sandy CLAY.
TP102A	B5	BB	2.00	2.20	Brown very gravelly sandy CLAY
TP102A	B6	BB	2.00	2.20	Brown very gravelly sandy CLAY.
TP103	B15	BB	2.00	2.50	Brown very gravelly slightly sandy CLAY.
TP103	B16	BB	2.00	2.50	Brown very gravelly slightly sandy CLAY.
TP104	B7	BB	2.50	3.00	Grey gravelly sandy CLAY.
TP104	B8	BB	2.50	3.00	Grey gravelly sandy CLAY.
TP105	B11	BB	2.00	2.40	Grey sandy clayey silty GRAVEL.



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PSL

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Contract No:

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Client Ref:

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SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m ³ Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
TP101	T1	T	1.90	2.00	16			44	22	22	90	Intermediate plasticity CI.
TP102	T2	T	0.80		16			42	21	21	85	Intermediate plasticity CI.
TP102A	T3	T	2.00	2.20	19							
TP103	T8	T	2.00	2.50	15							
TP104	T4	T	3.00		12			45	23	22	83	Intermediate plasticity CI.
TP105	T6	T	2.00	2.40	16			43	22	21	82	Intermediate plasticity CI.
TP106	T7	T	1.50	2.00	15			46	23	23	98	Intermediate plasticity CI.
TP113	T5	T	2.20		14			39	20	19	93	Intermediate plasticity CI.
TP101	B1	BB	1.50	2.00			2.68					
TP102	B4	BB	0.80	1.00			2.68					
TP103	B15	BB	2.00	2.50			2.68					
TP104	B8	BB	2.50	3.00			2.68					
TP105	B12	BB	2.00	2.40			2.66					
TP113	B10	BB	2.00	2.50			2.67					

SYMBOLS : NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.



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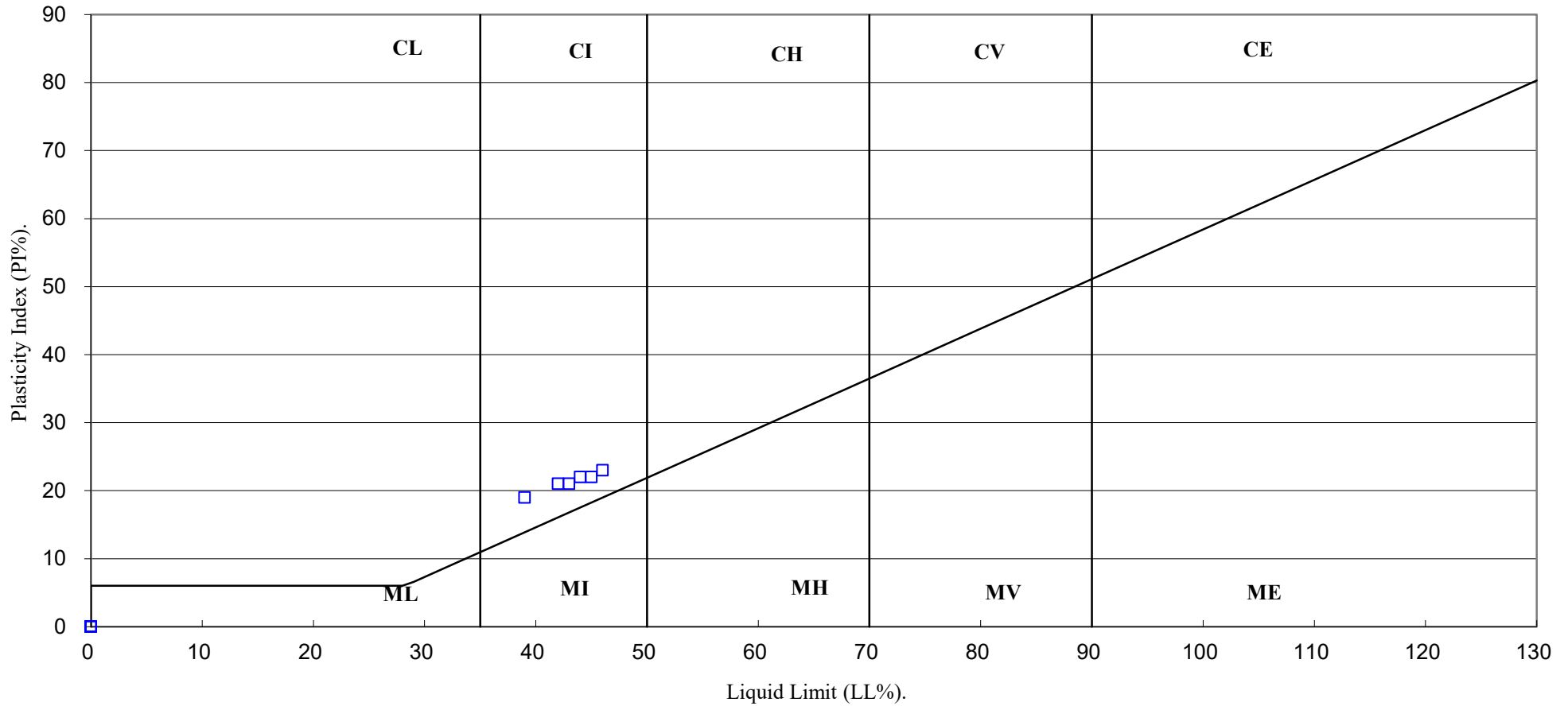
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PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



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PARTICLE SIZE DISTRIBUTION TEST

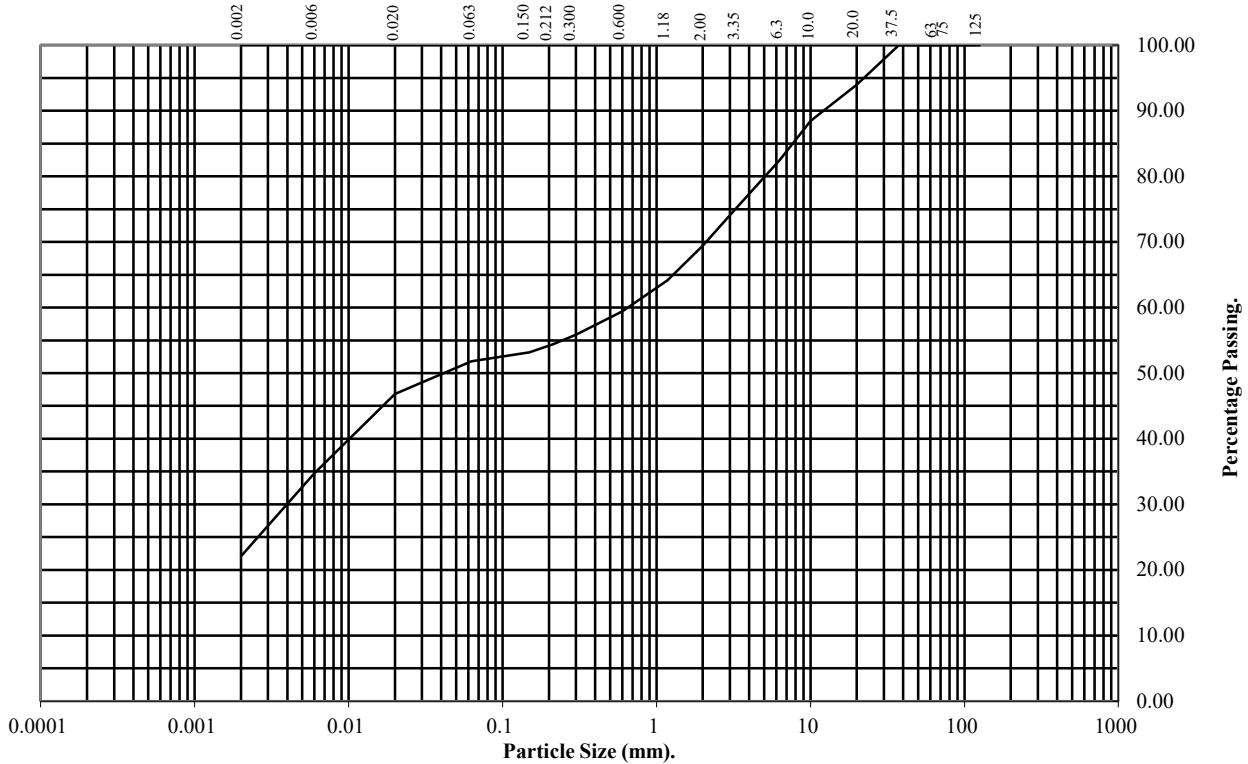
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: TP102 Top Depth (m): 0.80

Sample Number: B3 Base Depth(m): 1.00

Sample Type: BB



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	94
10	88
6.3	82
3.35	75
2	69
1.18	64
0.6	59
0.3	56
0.212	54
0.15	53
0.063	52

Particle Diameter	Percentage Passing
0.02	47
0.006	35
0.002	22

Soil Fraction	Total Percentage
Cobbles	0
Gravel	31
Sand	17
Silt	30
Clay	22

Remarks:
See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

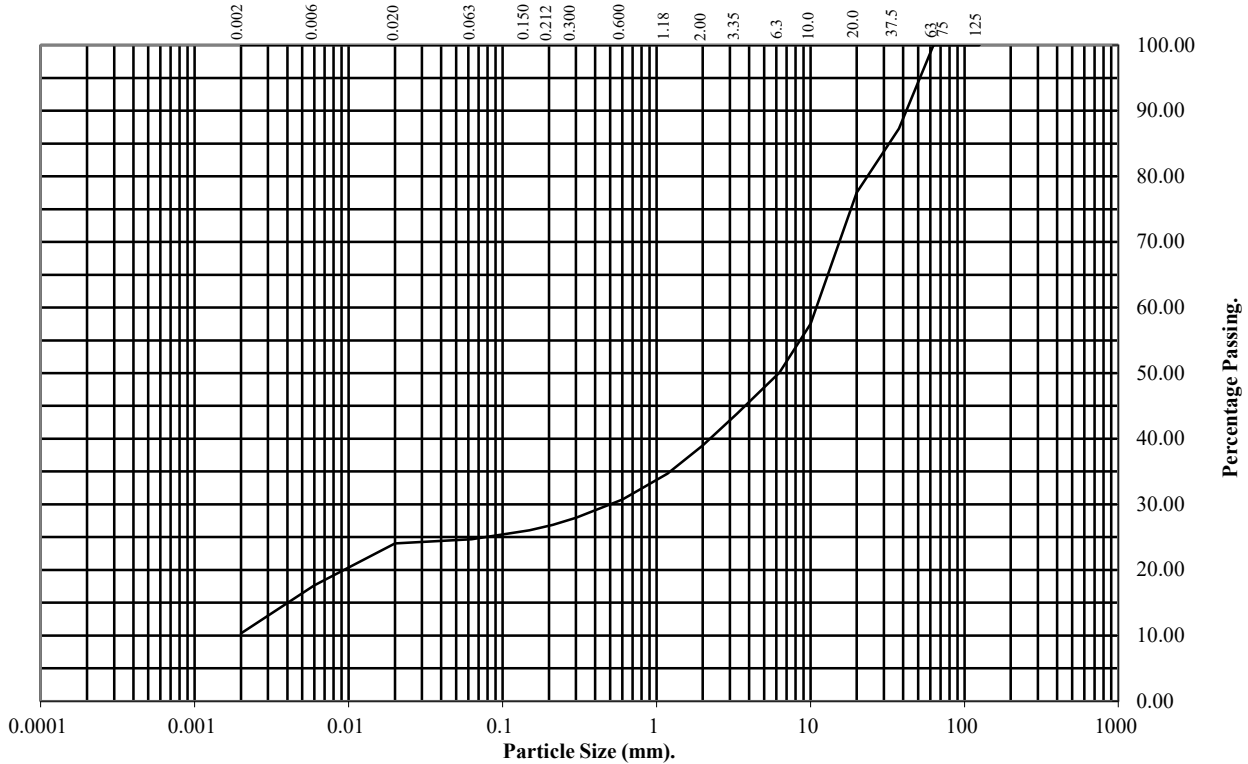
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: TP105 **Top Depth (m):** 2.00

Sample Number: B11 **Base Depth(m):** 2.40

Sample Type: BB



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	87
20	78
10	58
6.3	50
3.35	44
2	39
1.18	35
0.6	31
0.3	28
0.212	27
0.15	26
0.063	25

Particle Diameter	Percentage Passing
0.02	24
0.006	18
0.002	10

Soil Fraction	Total Percentage
Cobbles	0
Gravel	61
Sand	14
Silt	15
Clay	10

Remarks:
See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

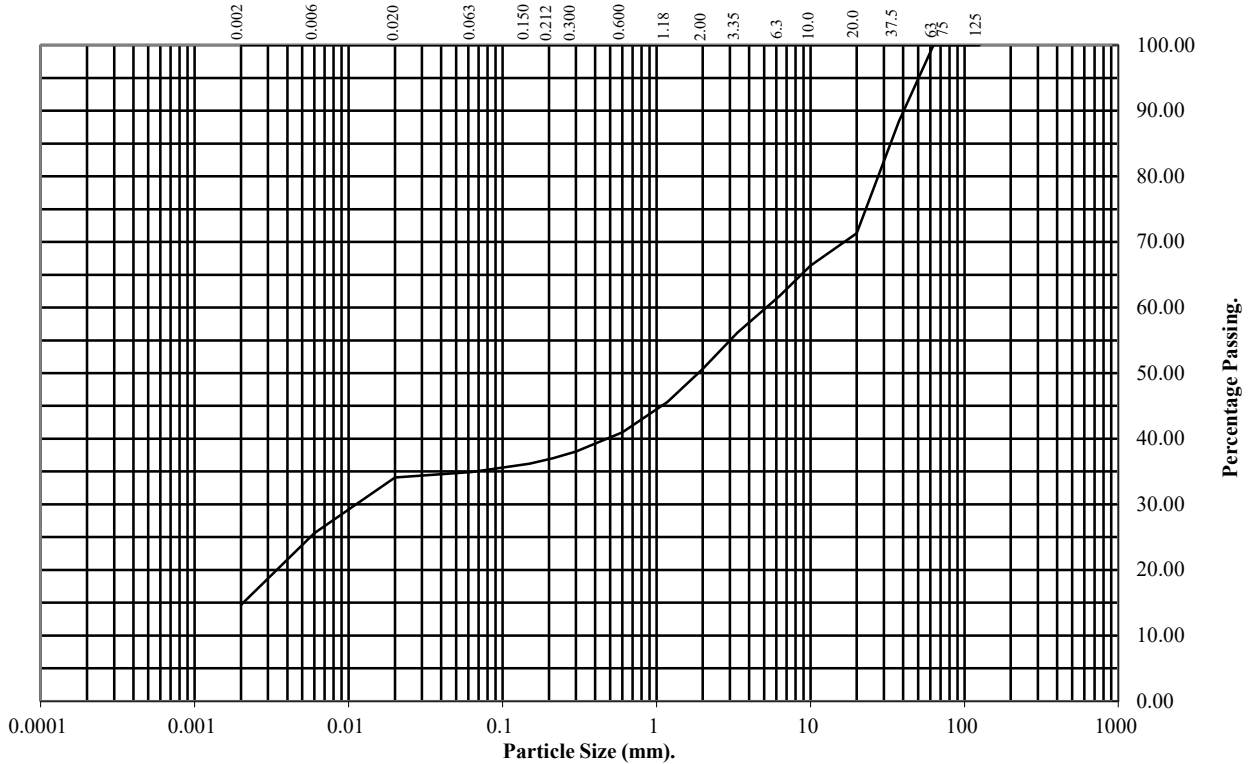
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: TP113 Top Depth (m): 2.00

Sample Number: B10 Base Depth(m): 2.40

Sample Type: BB



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	88
20	71
10	66
6.3	62
3.35	56
2	51
1.18	46
0.6	41
0.3	38
0.212	37
0.15	36
0.063	35

Particle Diameter	Percentage Passing
0.02	34
0.006	26
0.002	15

Soil Fraction	Total Percentage
Cobbles	0
Gravel	49
Sand	16
Silt	20
Clay	15

Remarks:
See Summary of Soil Descriptions



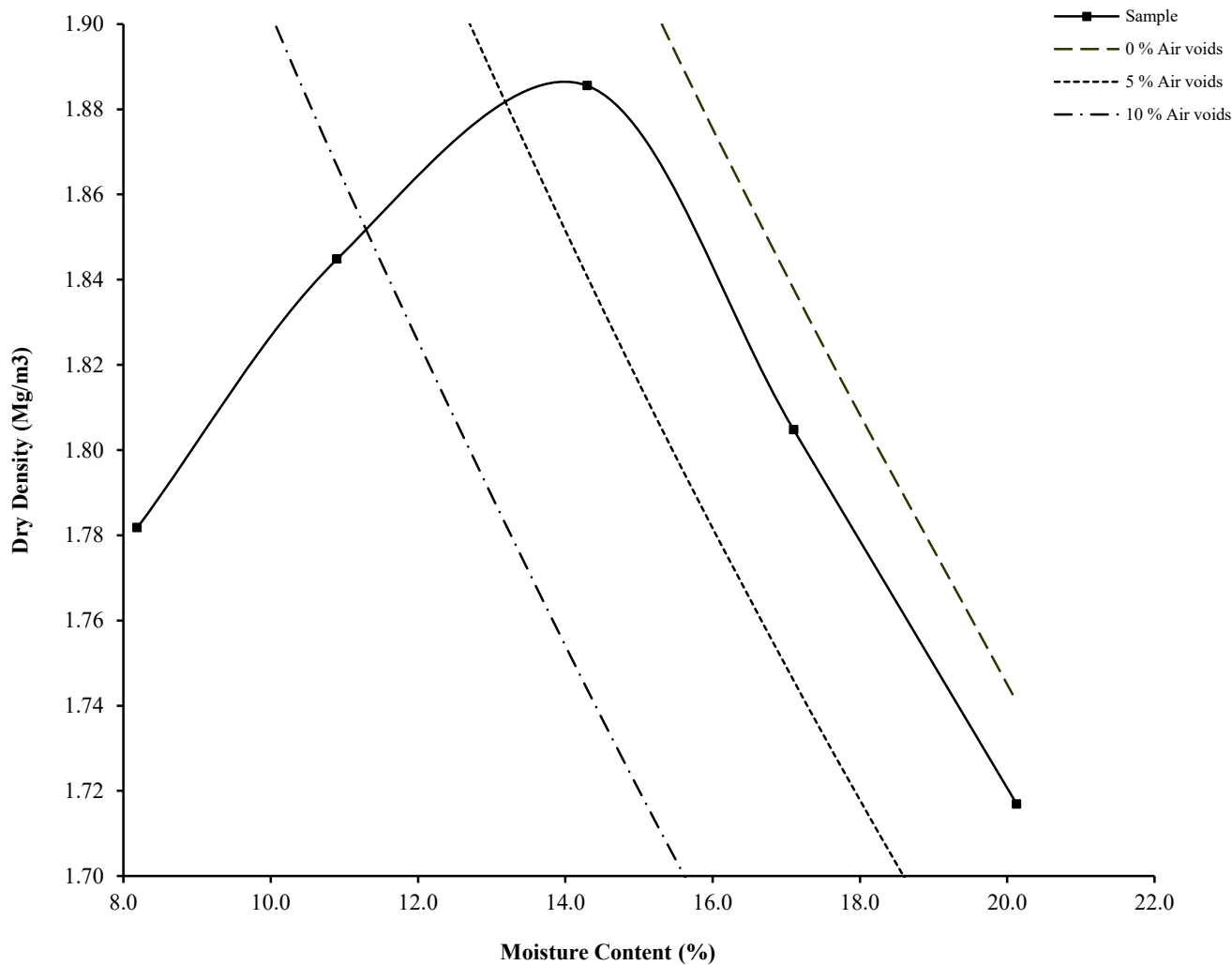
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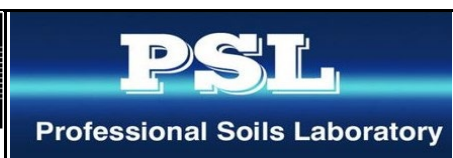
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP101 Top Depth (m) : 1.50
 Sample Number: B1 Base Depth (m) : 2.00
 Sample Type: BB



Initial Moisture Content:	14	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.68	Measured	Material Retained on 37.5 mm Test Sieve (%):	2
Maximum Dry Density (Mg/m ³):	1.89		Material Retained on 20.0 mm Test Sieve (%):	11
Optimum Moisture Content (%):	14			
Remarks				
See summary of soil descriptions.				



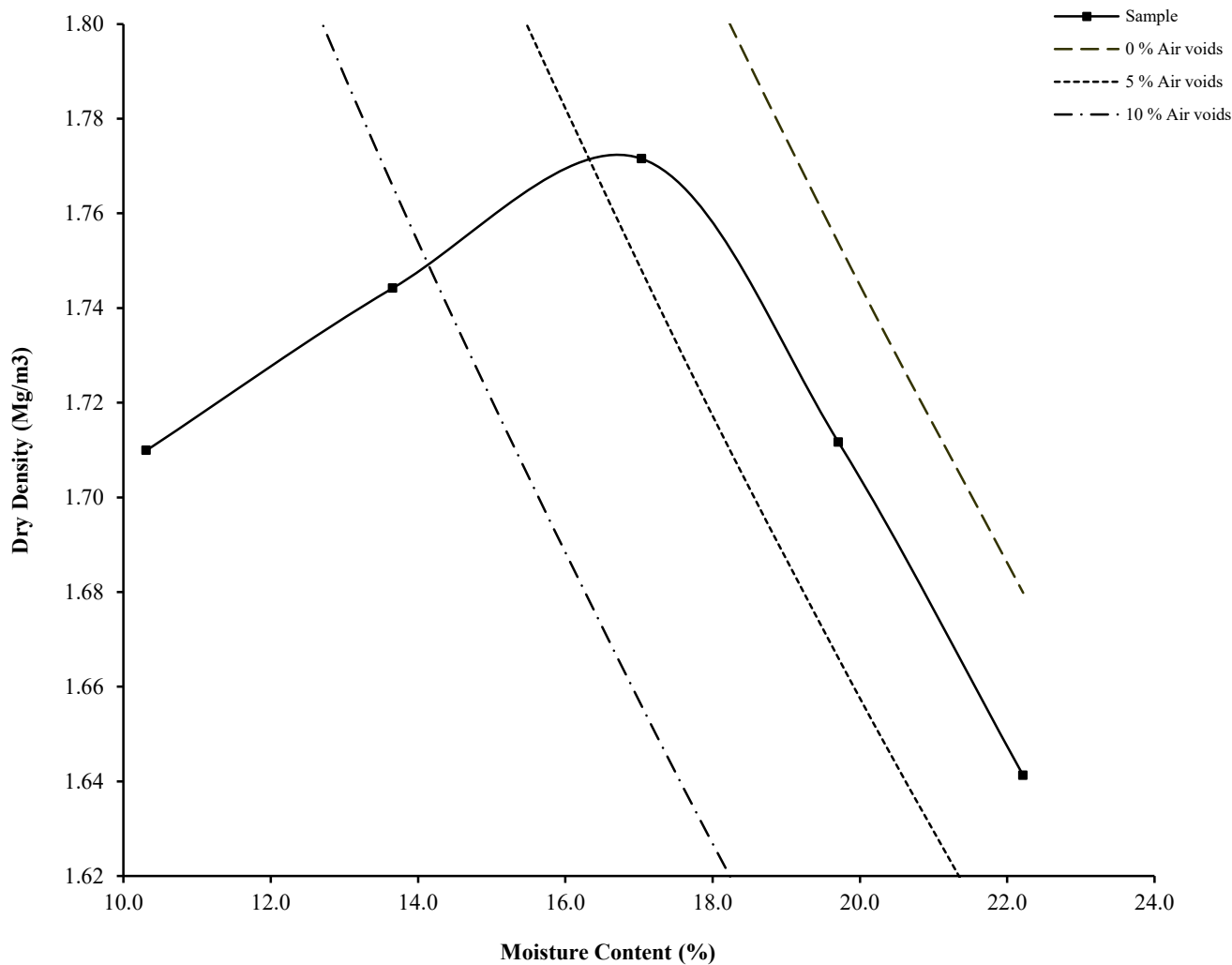
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP102A Top Depth (m) : 2.00
 Sample Number: B5 Base Depth (m) : 2.20
 Sample Type: BB



Initial Moisture Content:	17	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.68	Assumed	Material Retained on 37.5 mm Test Sieve (%):	1
Maximum Dry Density (Mg/m ³):	1.77		Material Retained on 20.0 mm Test Sieve (%):	4
Optimum Moisture Content (%):	15			
Remarks See summary of soil descriptions.				



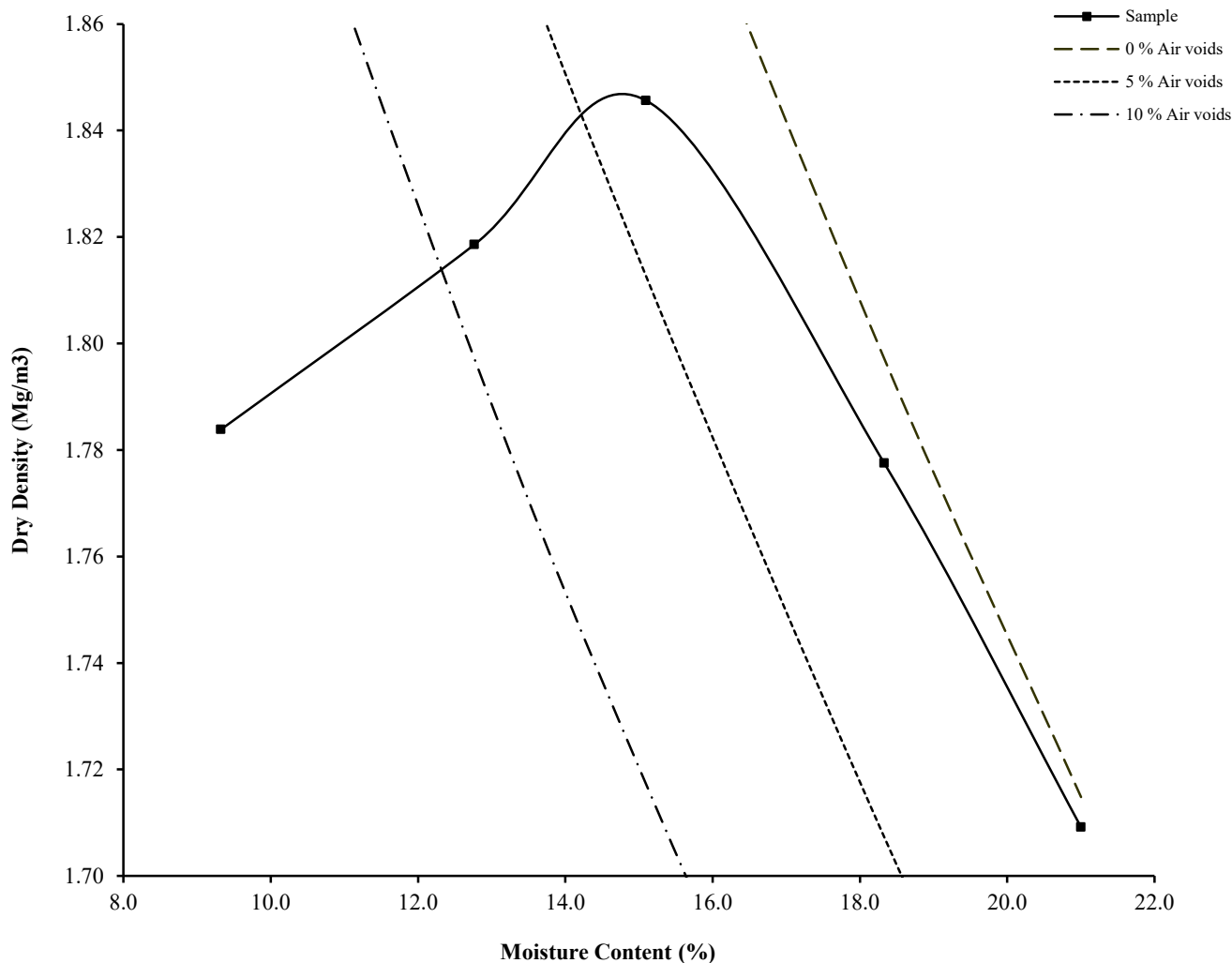
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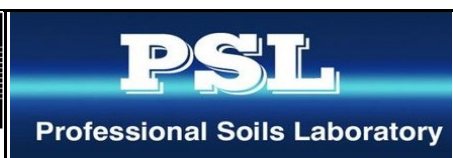
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP103 Top Depth (m) : 2.00
 Sample Number: B15 Base Depth (m) : 2.50
 Sample Type: BB



Initial Moisture Content:	15	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.68	Measured	Material Retained on 37.5 mm Test Sieve (%):	1
Maximum Dry Density (Mg/m ³):	1.85	Material Retained on 20.0 mm Test Sieve (%):	0	
Optimum Moisture Content (%):	15			
Remarks See summary of soil descriptions.				



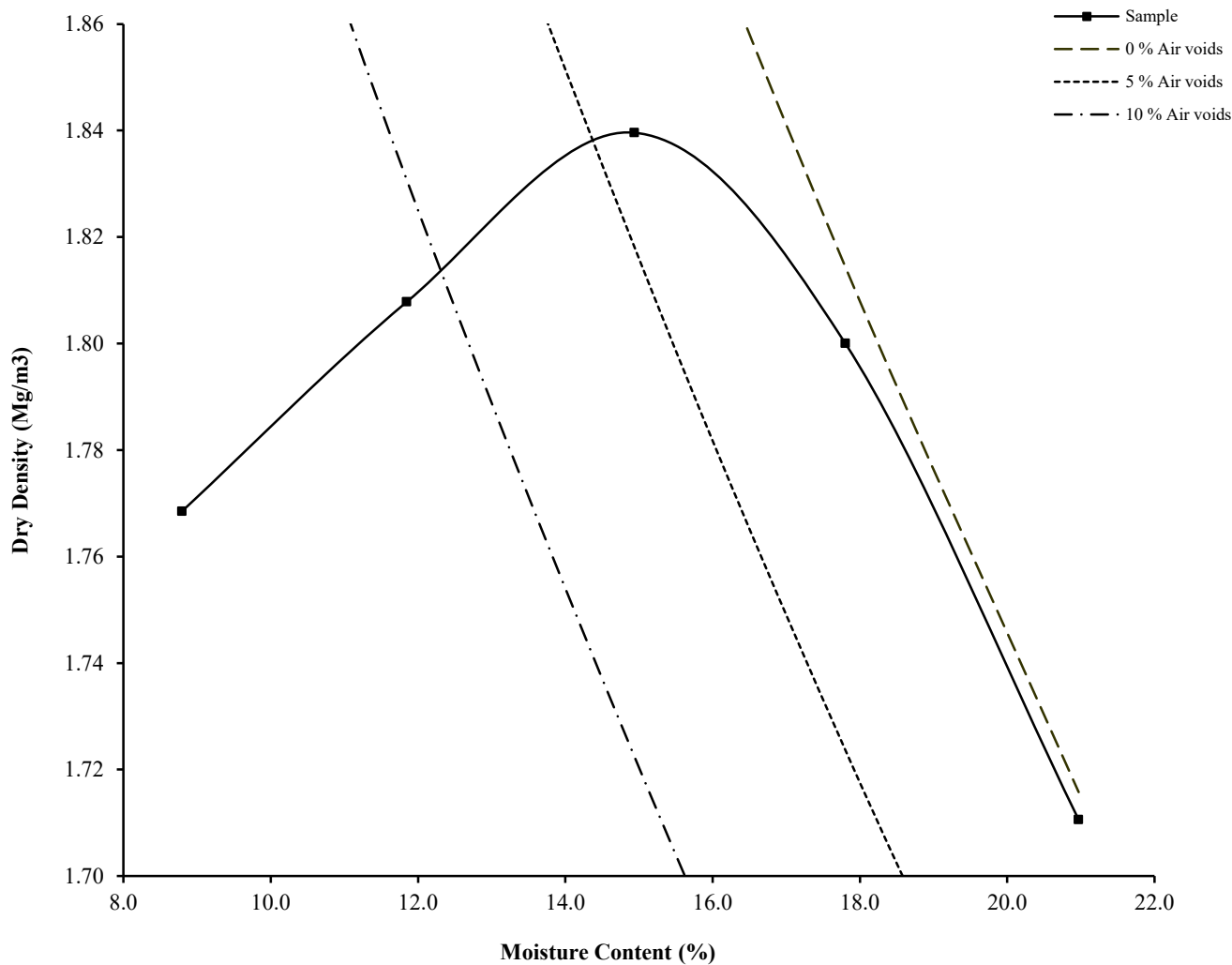
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP106 Top Depth (m) : 1.50
 Sample Number: B13 Base Depth (m) : 2.00
 Sample Type: BB



Initial Moisture Content:	15	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.68	Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.84	Material Retained on 20.0 mm Test Sieve (%):	6	
Optimum Moisture Content (%):	15			
Remarks See summary of soil descriptions.				



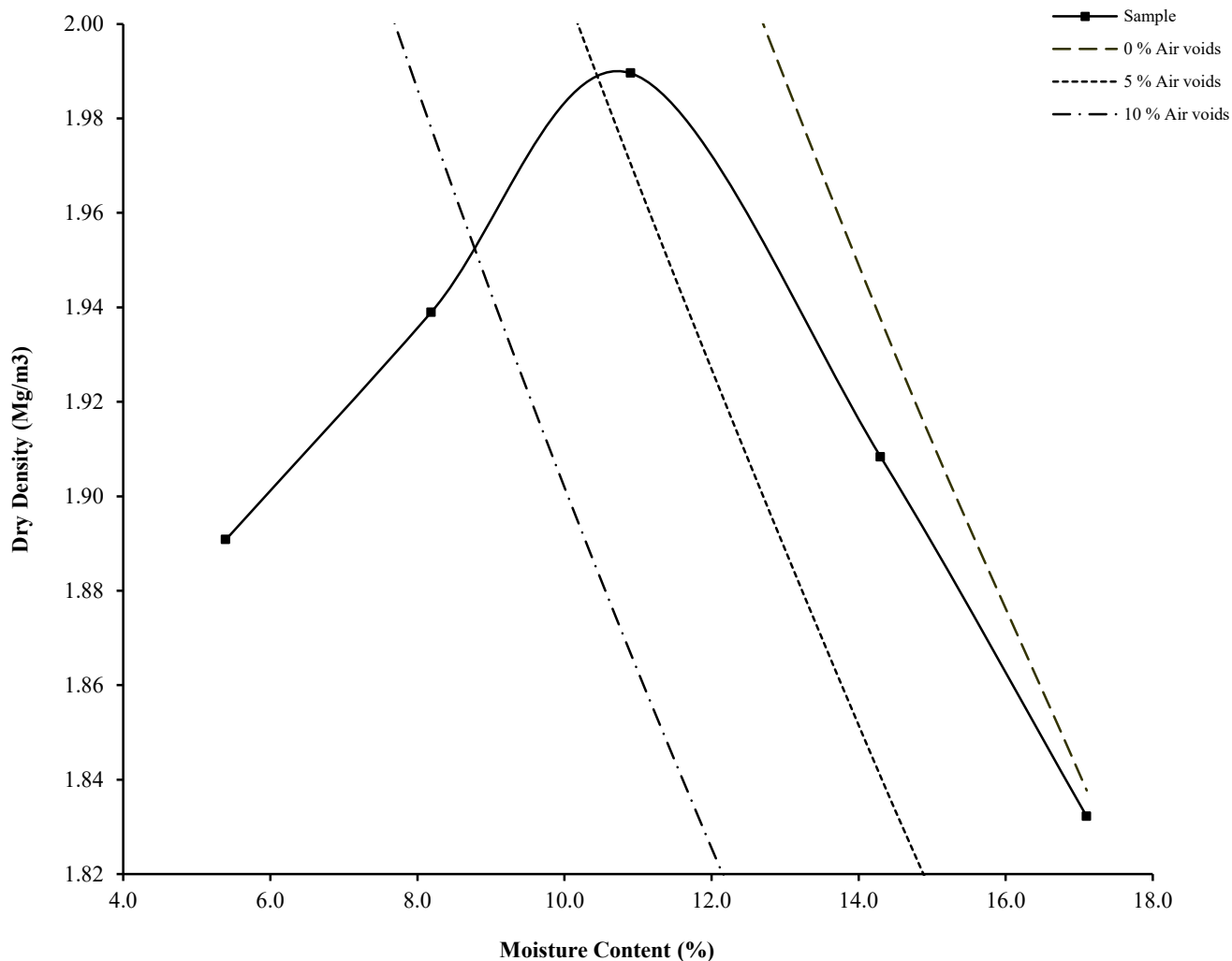
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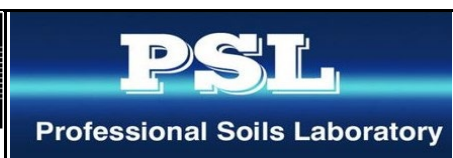
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP101 Top Depth (m) : 1.50
 Sample Number: B1 Base Depth (m) : 2.00
 Sample Type: BB



Initial Moisture Content:	14	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.68	Measured	Material Retained on 37.5 mm Test Sieve (%):	2
Maximum Dry Density (Mg/m ³):	1.99		Material Retained on 20.0 mm Test Sieve (%):	11
Optimum Moisture Content (%):	11			
Remarks See summary of soil descriptions.				



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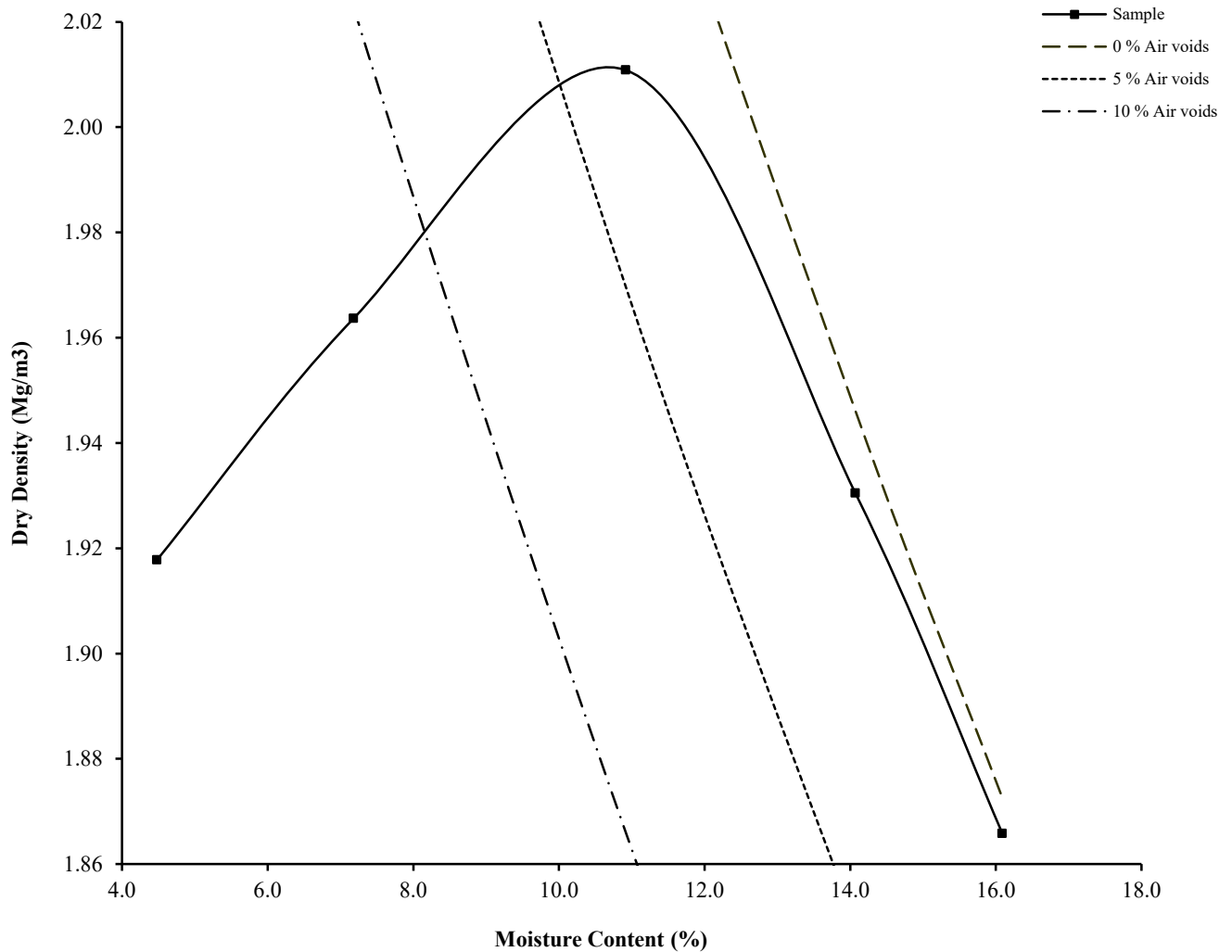
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP102 Top Depth (m) : 0.80

Sample Number: B3 Base Depth (m) : 1.00

Sample Type: BB



Initial Moisture Content:	13	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.68	Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	2.01		Material Retained on 20.0 mm Test Sieve (%):	6
Optimum Moisture Content (%):	11			
Remarks See summary of soil descriptions.				



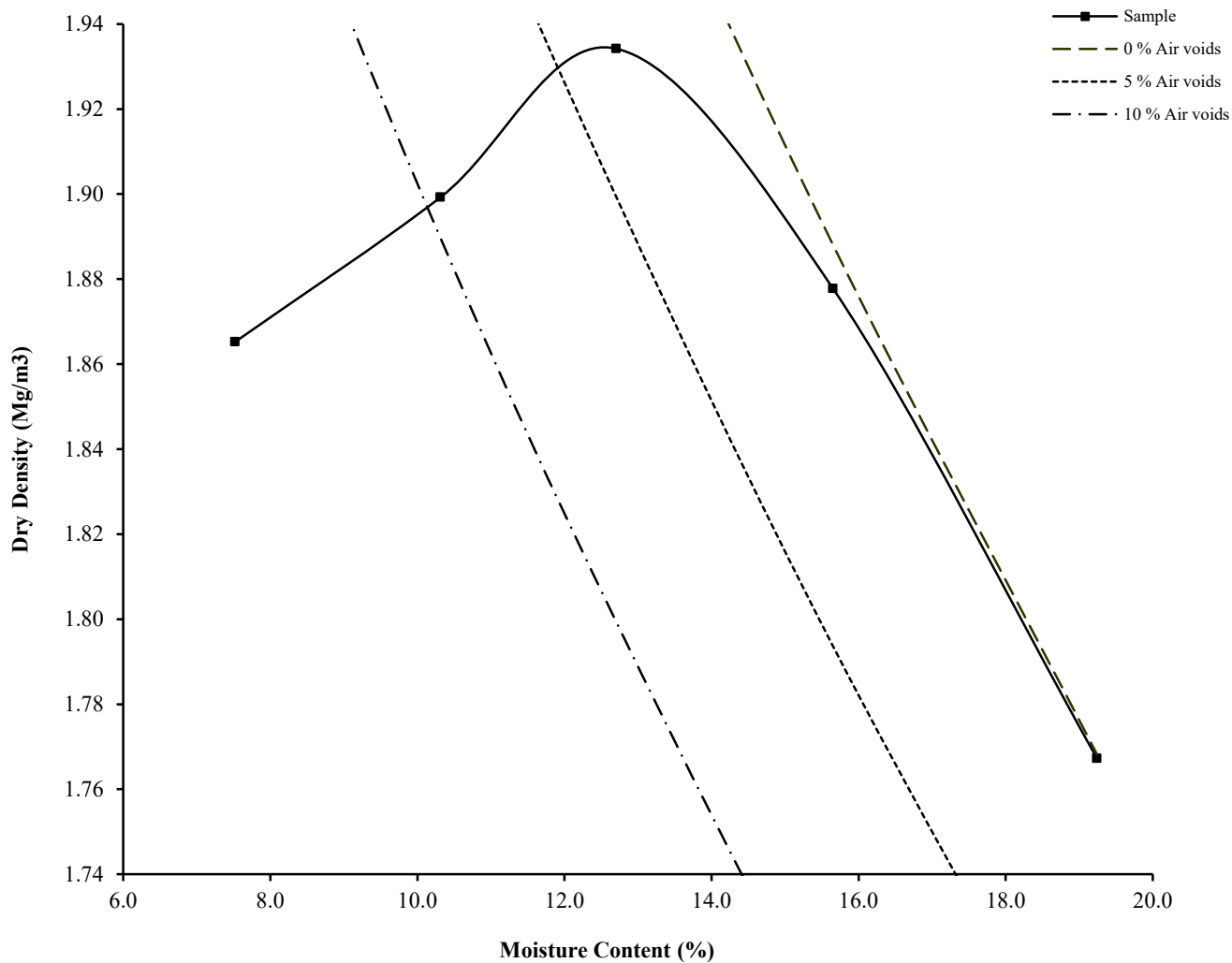
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP102A Top Depth (m) : 2.00
 Sample Number: B6 Base Depth (m) : 2.20
 Sample Type: BB



Initial Moisture Content:	17	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.68	Measured	Material Retained on 37.5 mm Test Sieve (%):	1
Maximum Dry Density (Mg/m ³):	1.93		Material Retained on 20.0 mm Test Sieve (%):	4
Optimum Moisture Content (%):	13			
Remarks See summary of soil descriptions.				



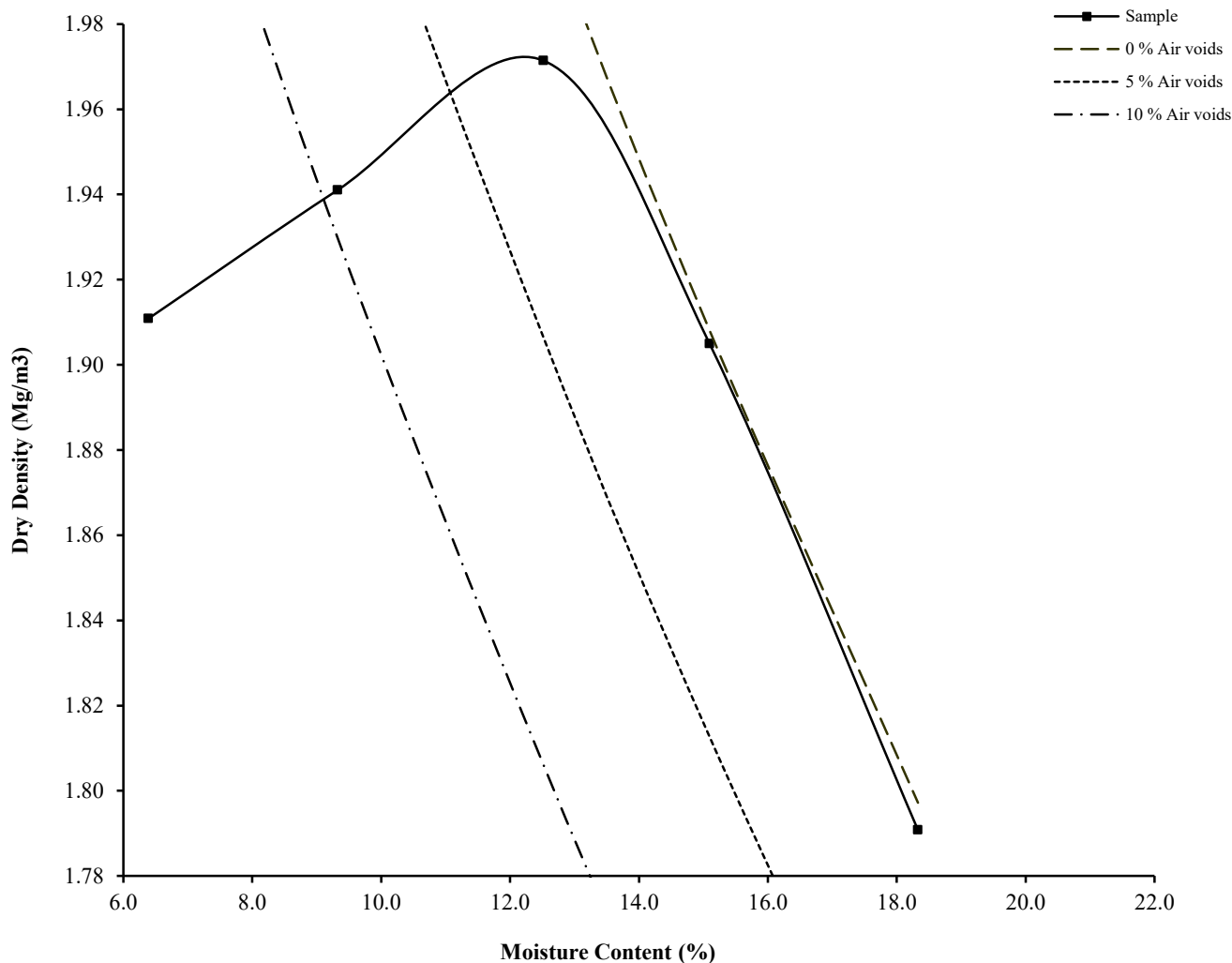
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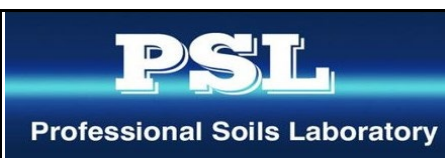
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP103 Top Depth (m) : 2.00
 Sample Number: B16 Base Depth (m) : 2.50
 Sample Type: BB



Initial Moisture Content:	15	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.68	Assumed	Material Retained on 37.5 mm Test Sieve (%):	1
Maximum Dry Density (Mg/m ³):	1.97		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	12			
Remarks See summary of soil descriptions.				



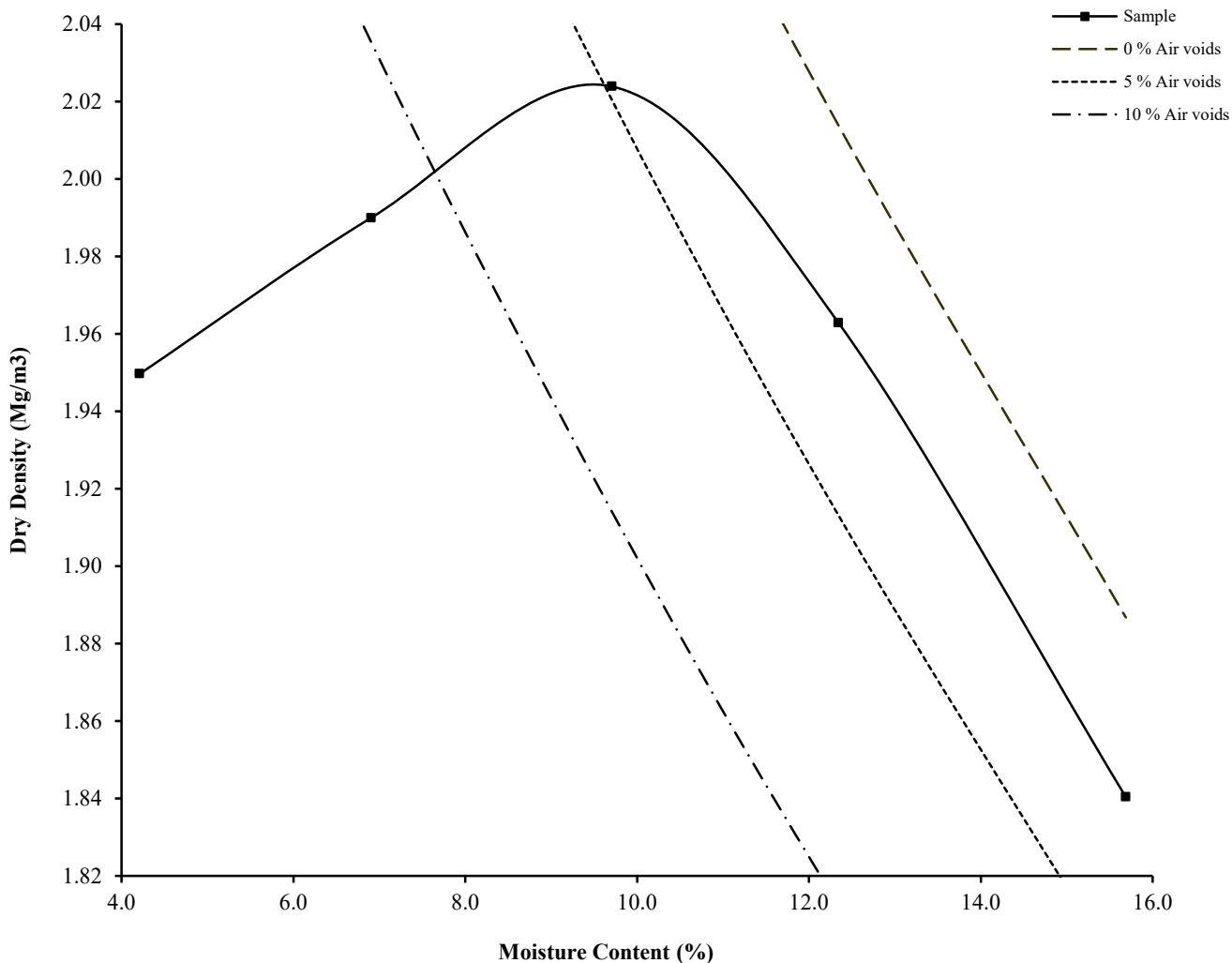
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP104 Top Depth (m) : 2.50
 Sample Number: B7 Base Depth (m) : 3.00
 Sample Type: BB



Initial Moisture Content:	12	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.68	Assumed	Material Retained on 37.5 mm Test Sieve (%):	9
Maximum Dry Density (Mg/m ³):	2.02	Material Retained on 20.0 mm Test Sieve (%):	16	
Optimum Moisture Content (%):	10			
Remarks See summary of soil descriptions.				



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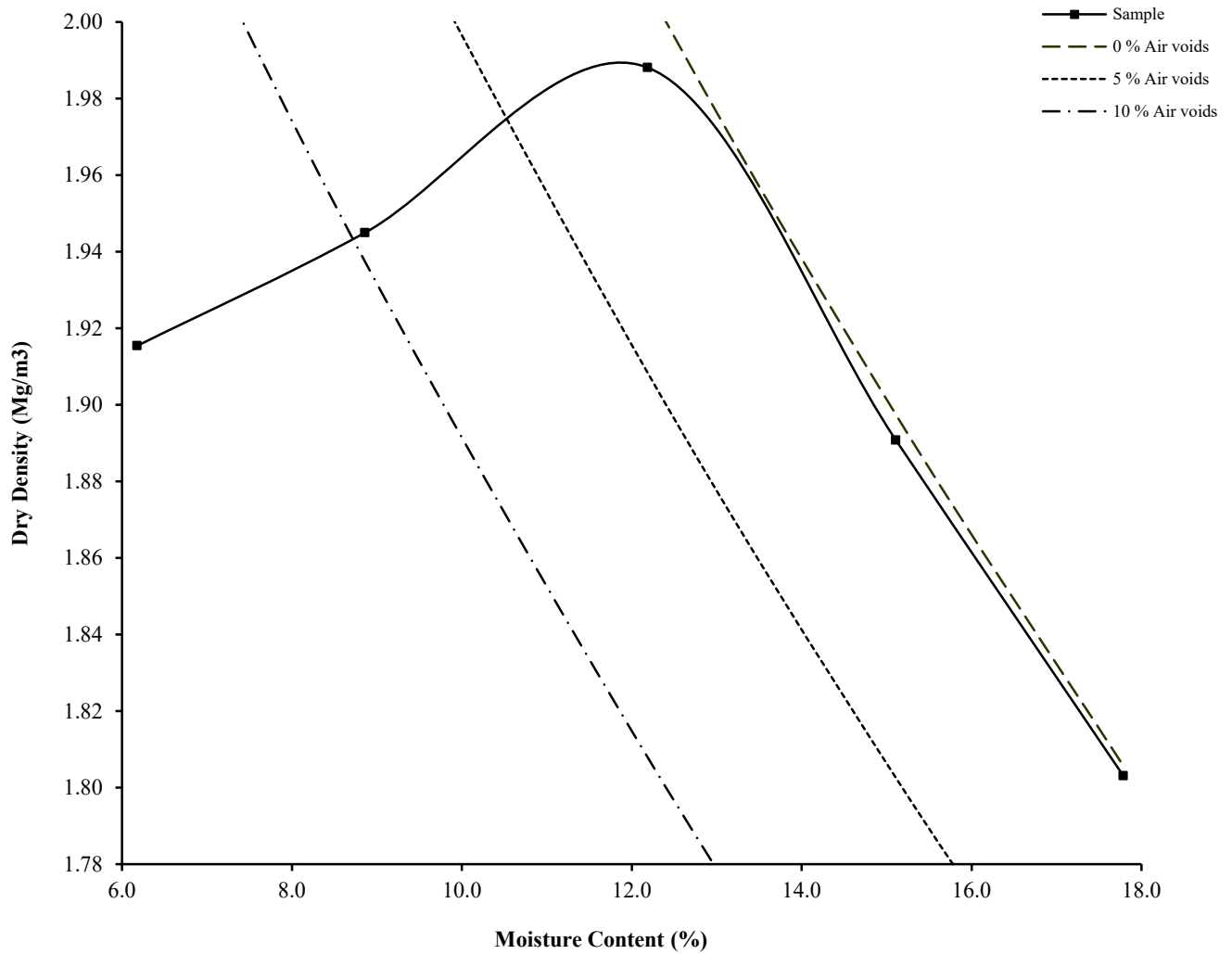
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP105 Top Depth (m) : 2.00

Sample Number: B12 Base Depth (m) : 2.40

Sample Type: BB



Initial Moisture Content:	12	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.66	Measured	Material Retained on 37.5 mm Test Sieve (%):	1
Maximum Dry Density (Mg/m ³):	1.99	Material Retained on 20.0 mm Test Sieve (%):	14	
Optimum Moisture Content (%):	12			
Remarks				
See summary of soil descriptions.				



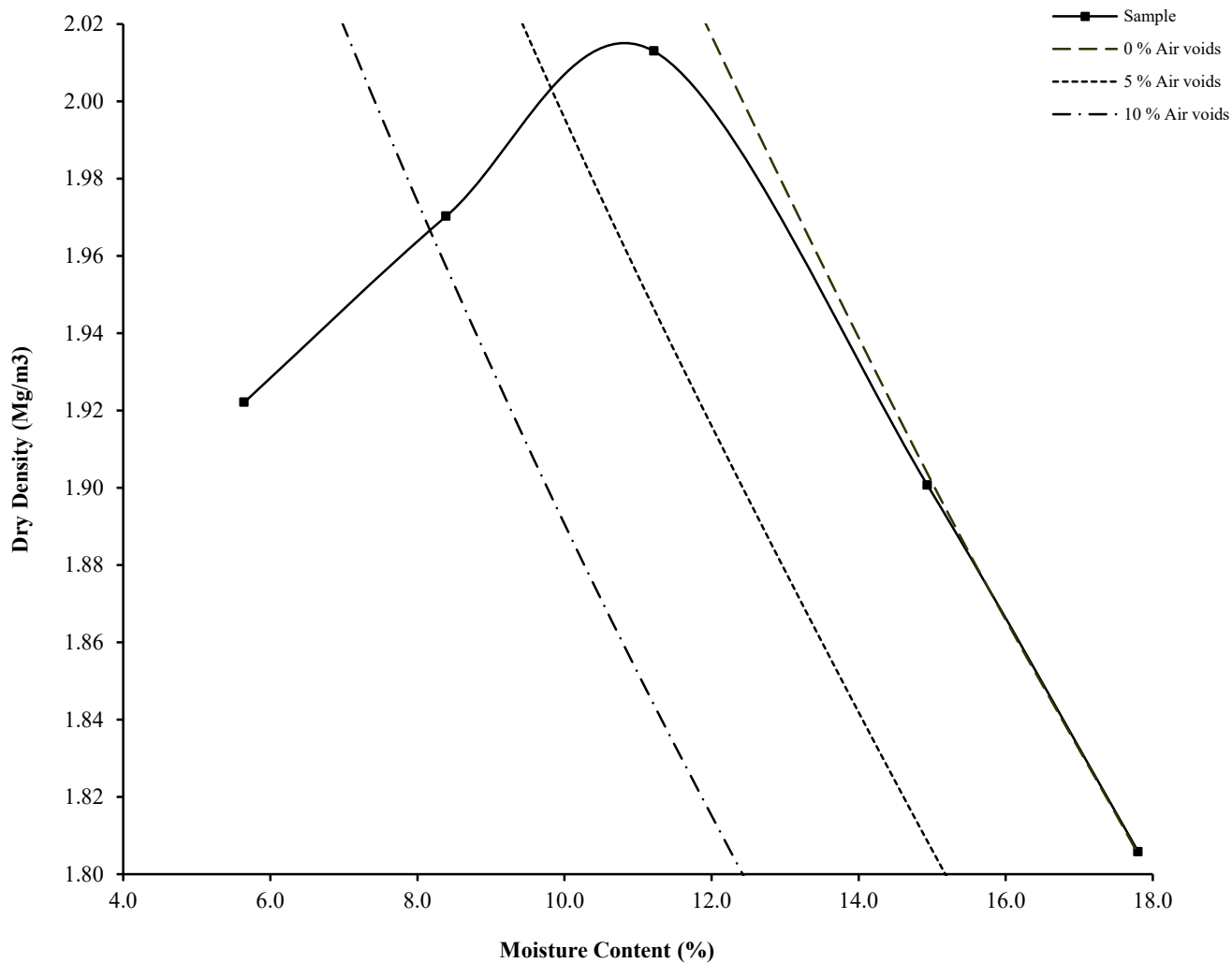
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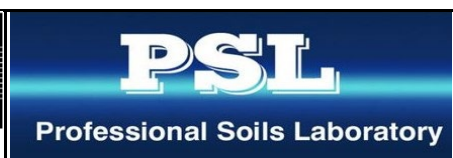
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP106 Top Depth (m) : 1.50
 Sample Number: B13 Base Depth (m) : 2.00
 Sample Type: BB



Initial Moisture Content:	15	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.66	Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	2.01		Material Retained on 20.0 mm Test Sieve (%):	6
Optimum Moisture Content (%):	11			
Remarks See summary of soil descriptions.				



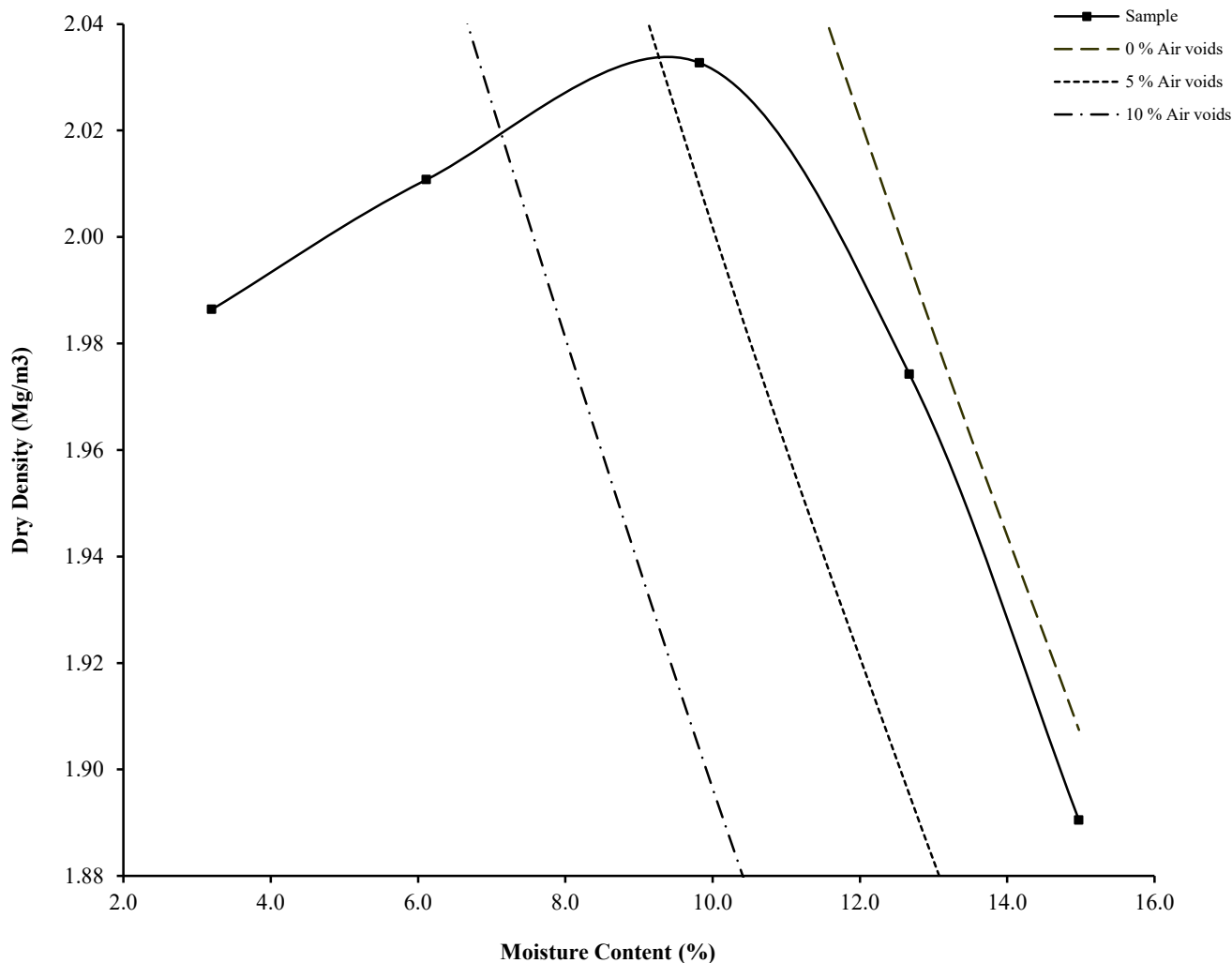
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP113 Top Depth (m) : 2.00
 Sample Number: B9 Base Depth (m) : 2.50
 Sample Type: BB



Initial Moisture Content:	15	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.67	Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	2.03		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	10			
Remarks See summary of soil descriptions.				



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CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

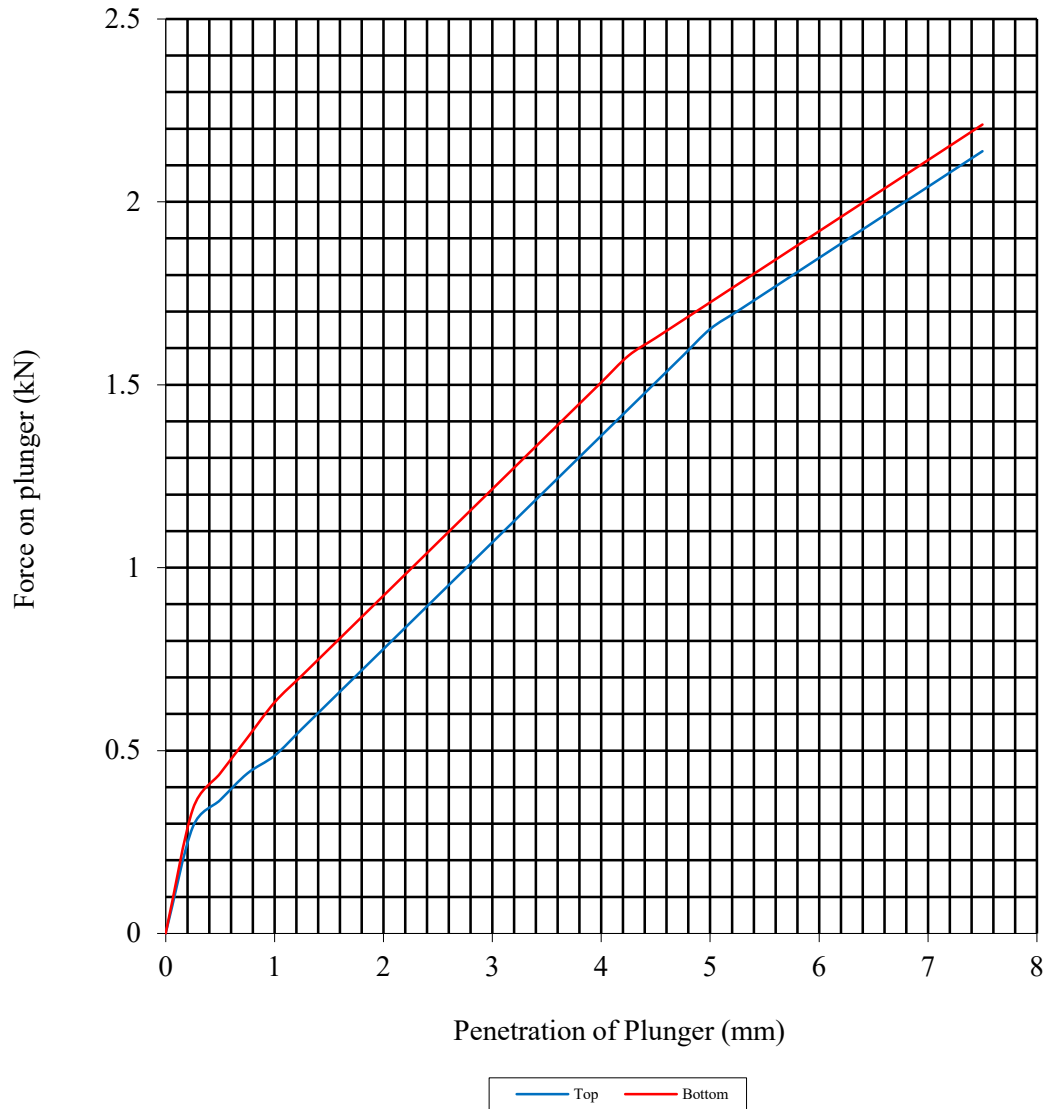
Hole Number: TP101

Top Depth (m): 1.50

Sample Number: B2

Base Depth (m): 2.00

Sample Type: BB



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	12	Surcharge Kg:	4.20	Sample Top	12	Sample Top	8.3
Bulk Density Mg/m ³ :	2.10	Soaking Time hrs	0	Sample Bottom	12	Sample Bottom	8.6
Dry Density Mg/m ³ :	1.87	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:	1						
Compaction Conditions	2.5kg						



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CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

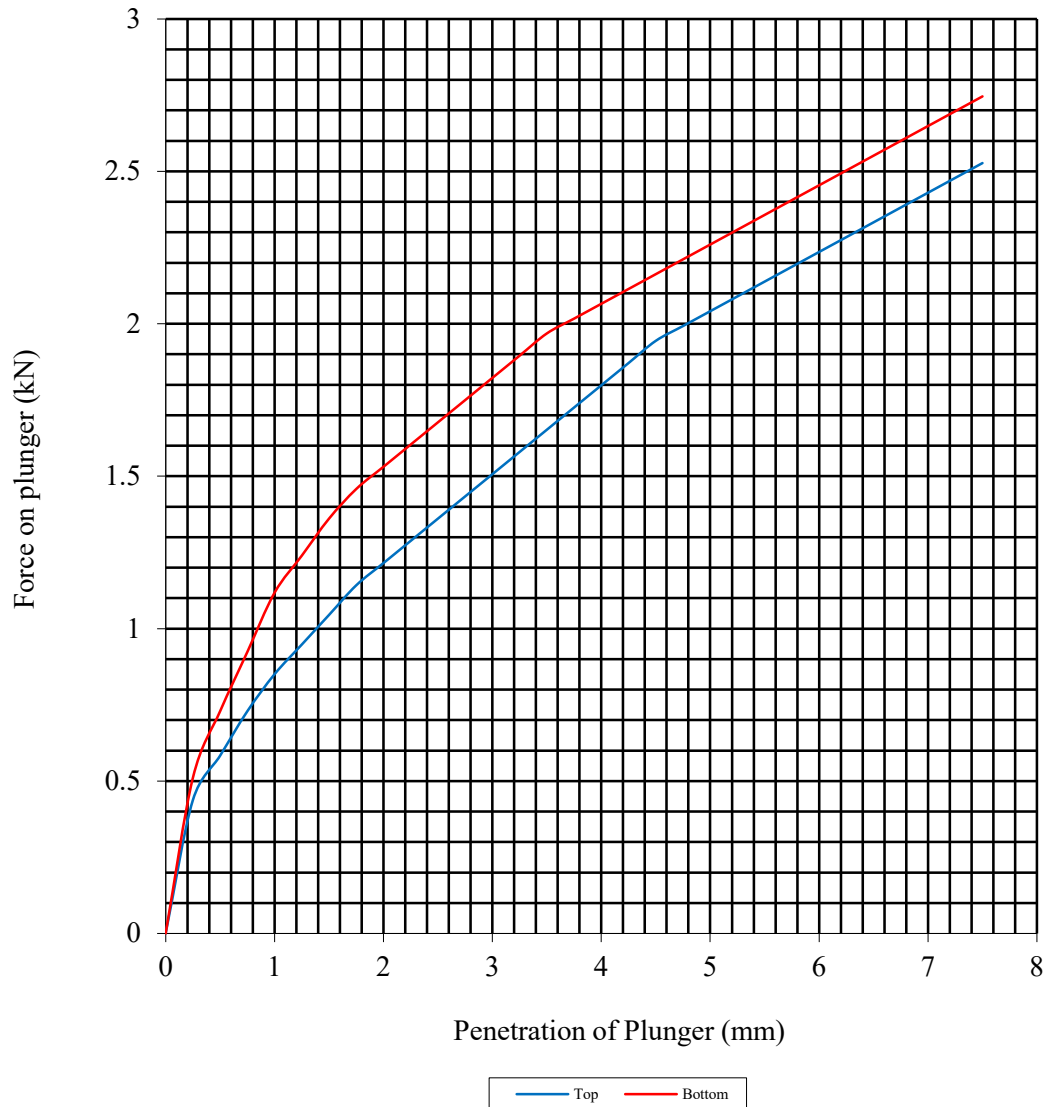
Hole Number: TP101

Top Depth (m): 1.50

Sample Number: B2

Base Depth (m): 2.00

Sample Type: BB



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	12	Surcharge Kg:	4.20	Sample Top	12	Sample Top	10.3
Bulk Density Mg/m ³ :	2.16	Soaking Time hrs	0	Sample Bottom	12	Sample Bottom	12.7
Dry Density Mg/m ³ :	1.93	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:	1						
Compaction Conditions	4.5kg						



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CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

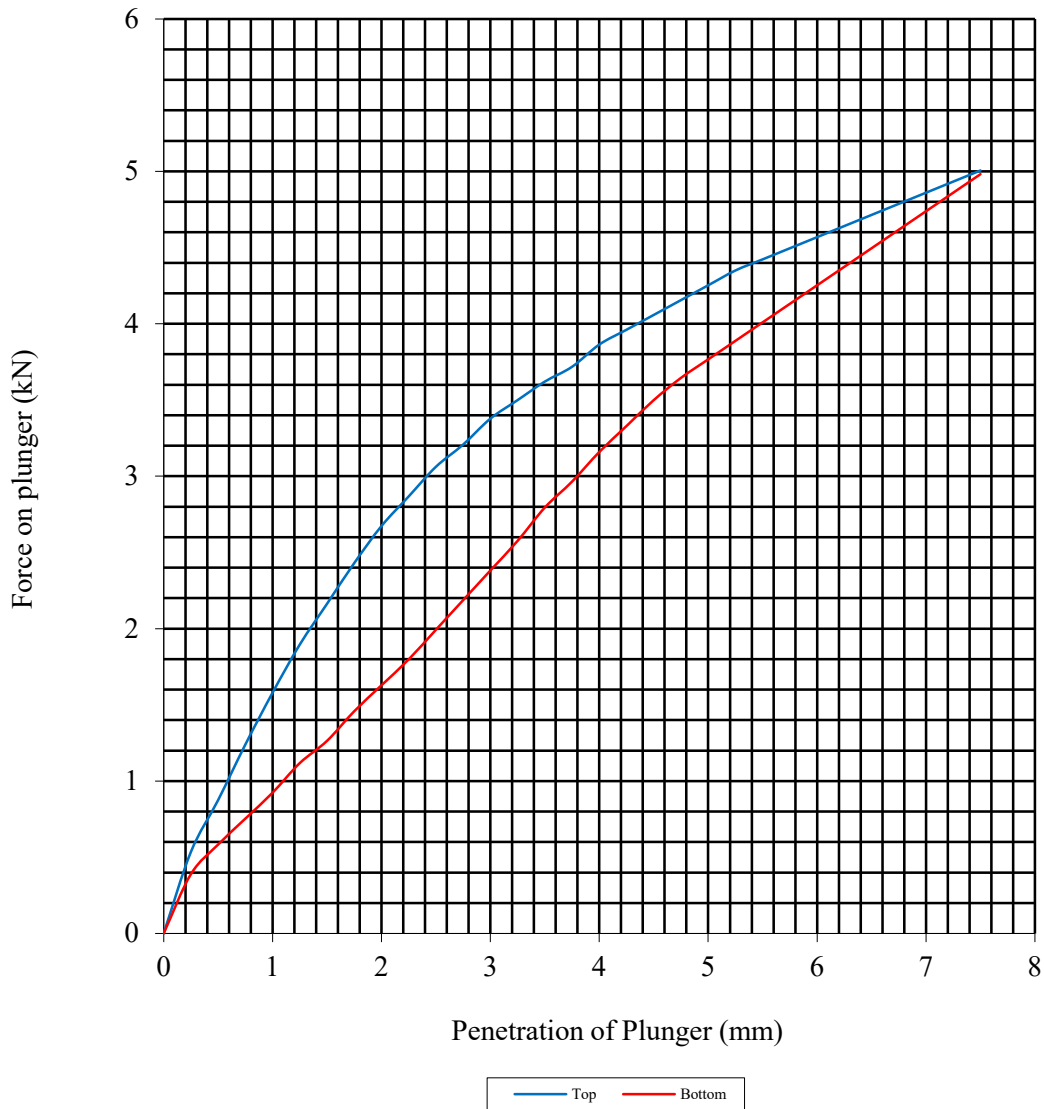
Hole Number: TP102

Top Depth (m): 0.80

Sample Number: B4

Base Depth (m): 1.00

Sample Type: BB



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	12	Surcharge Kg:	4.20	Sample Top	12	Sample Top	23.2
Bulk Density Mg/m ³ :	2.25	Soaking Time hrs	0	Sample Bottom	12	Sample Bottom	18.8
Dry Density Mg/m ³ :	2.00	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		10					
Compaction Conditions		4.5kg					



Barnsley West

Contract No:
PSL19/2340
Client Ref:
4848

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

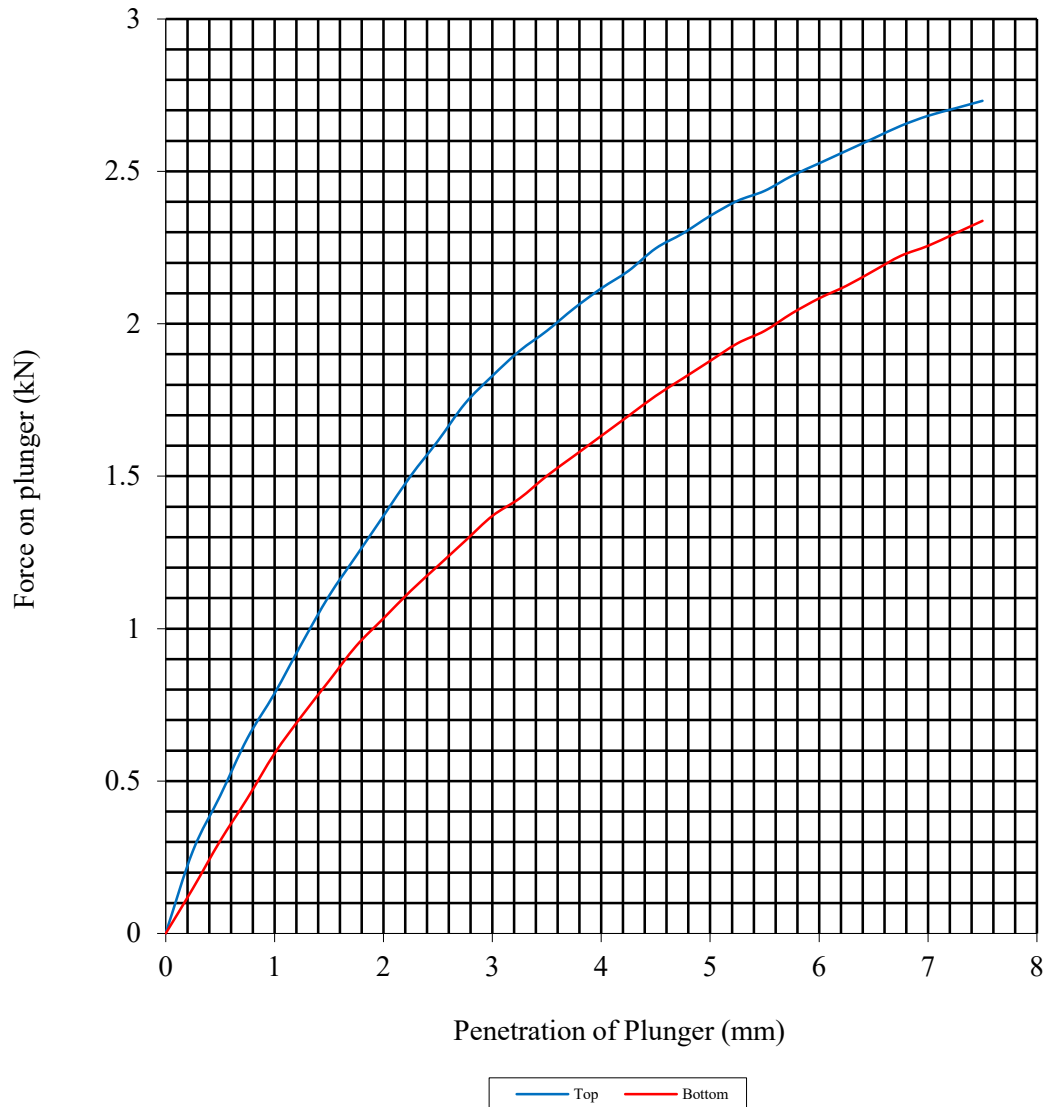
Hole Number: TP104

Top Depth (m): 2.50

Sample Number: B7

Base Depth (m): 3.00

Sample Type: BB



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	13	Surcharge Kg:	4.20	Sample Top	12	Sample Top	12.2
Bulk Density Mg/m ³ :	2.15	Soaking Time hrs	0	Sample Bottom	13	Sample Bottom	9.4
Dry Density Mg/m ³ :	1.91	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:	25						
Compaction Conditions	2.5kg						



Barnsley West

Contract No:
PSL19/2340
Client Ref:
4848

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

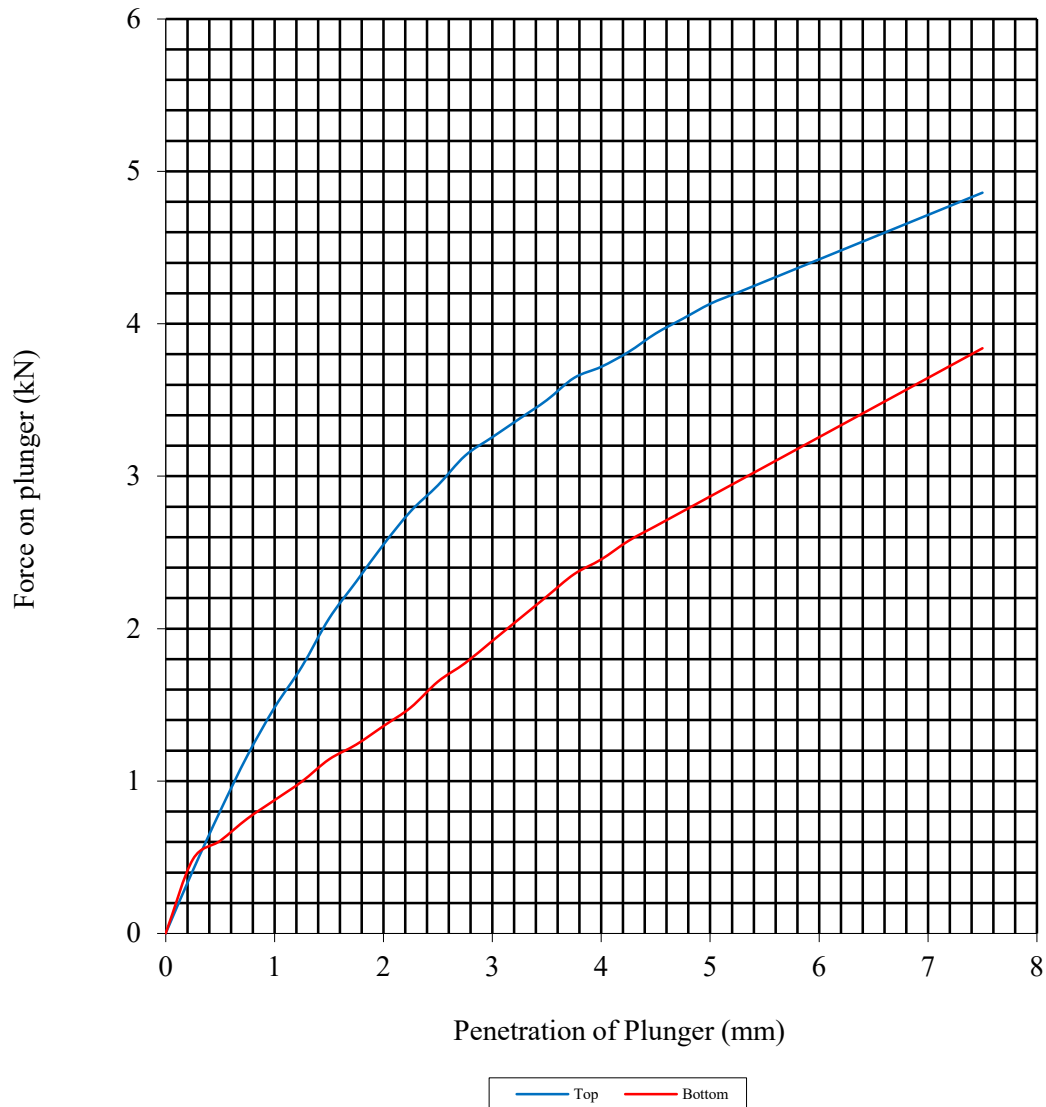
Hole Number: TP105

Top Depth (m): 2.00

Sample Number: B11

Base Depth (m): 2.40

Sample Type: BB



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	12	Surcharge Kg:	4.20	Sample Top	12	Sample Top	22.3
Bulk Density Mg/m ³ :	2.21	Soaking Time hrs	0	Sample Bottom	12	Sample Bottom	14.3
Dry Density Mg/m ³ :	1.97	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		22					
Compaction Conditions		4.5kg					



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Contract No:
PSL19/2340
Client Ref:
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CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

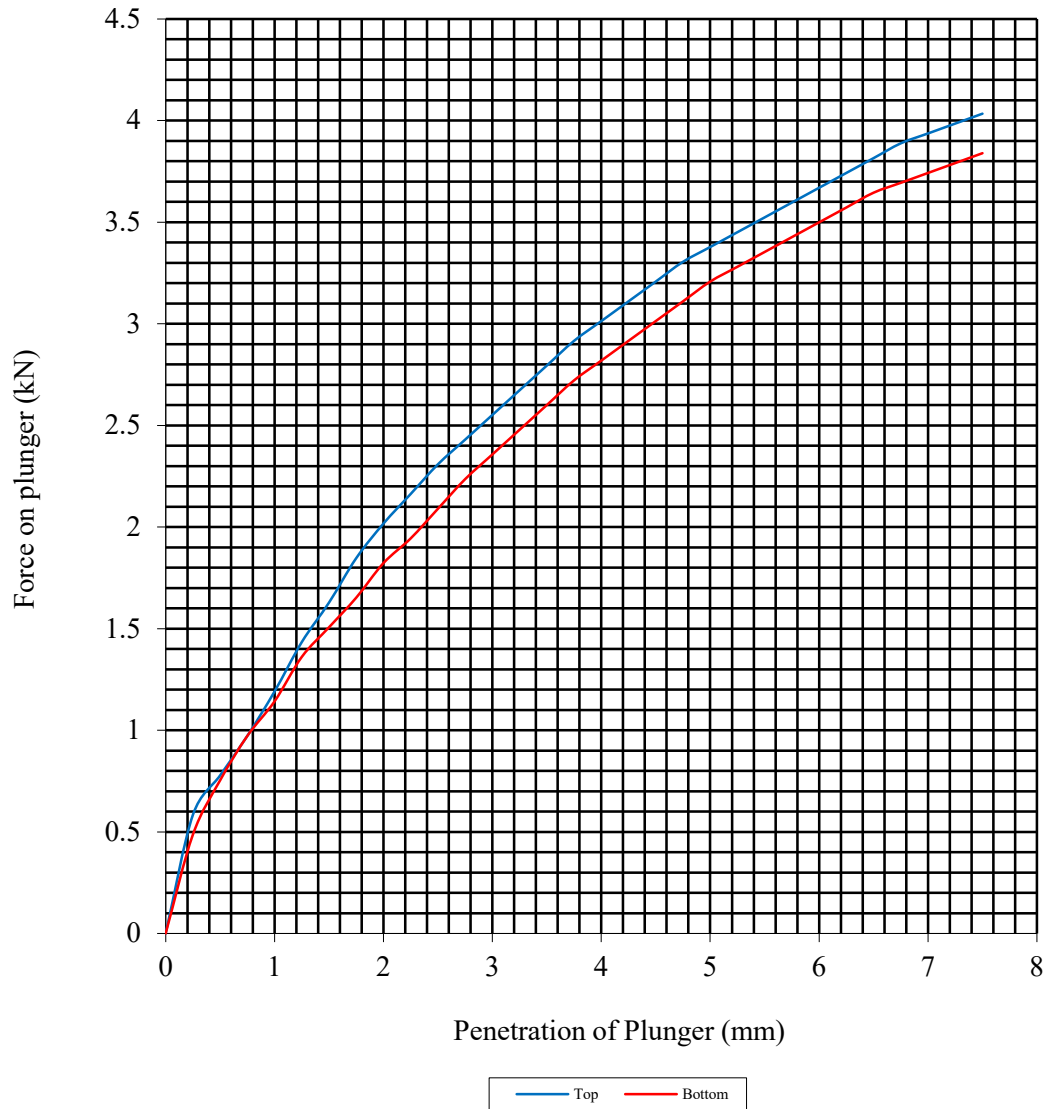
Hole Number: TP106

Top Depth (m): 1.50

Sample Number: B14

Base Depth (m): 2.00

Sample Type: BB



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	14	Surcharge Kg:	4.20	Sample Top	14	Sample Top	17.5
Bulk Density Mg/m3:	2.19	Soaking Time hrs	0	Sample Bottom	14	Sample Bottom	16.0
Dry Density Mg/m3:	1.91	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		9					
Compaction Conditions		4.5kg					



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Contract No:
PSL19/2340
Client Ref:
4848

MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

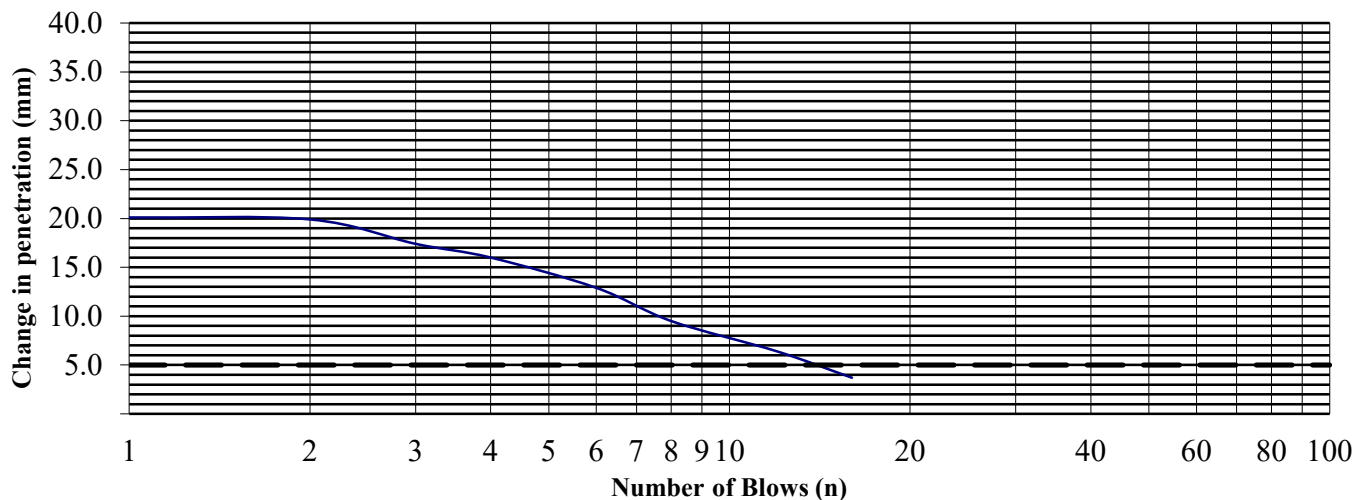
Hole Number: TP101 Top Depth (m): 1.50

Sample Number: 2B Base Depth (m): 2.00

Sample Type: B

Material Retained on the 20mm BS Test Sieve (%):	0
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	78.4	20.1
2	68.6	19.9
3	62.5	17.4
4	58.3	16.0
6	52.5	12.9
8	48.7	9.5
12	45.1	6.4
16	42.3	3.7
24	39.6	
32	39.2	
48	38.7	
64	38.6	
96		
128		
192		
256		

Test Results.

Moisture Content (%)	15
MCV	11.5



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Contract No:
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MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

Hole Number: TP102 Top Depth (m): 0.80

Sample Number: B4 Base Depth (m): 1.00

Sample Type: B

Material Retained on the 20mm BS Test Sieve (%):	6
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	88.5	16.9
2	80.6	17.4
3	75.6	16.5
4	71.6	14.8
6	66.4	12.0
8	63.2	9.4
12	59.1	5.7
16	56.8	3.9
24	54.4	
32	53.8	
48	53.4	
64	52.9	
96		
128		
192		
256		

Test Results.

Moisture Content (%)	11
MCV	11.1



Barnsley West

Contract No:
PSL19/2340
Client Ref:
4848

MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

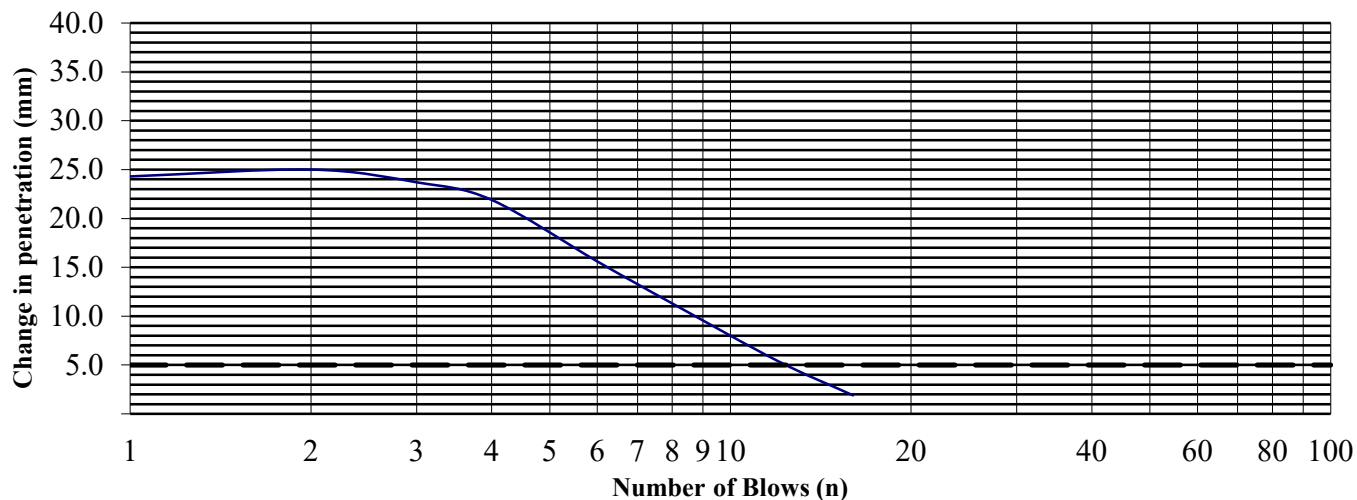
Hole Number: TP102A Top Depth (m): 2.00

Sample Number: B6 Base Depth (m): 2.20

Sample Type: B

Material Retained on the 20mm BS Test Sieve (%):	5
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	89.1	24.3
2	77.4	25.0
3	70.1	23.7
4	64.8	21.9
6	57.2	15.6
8	52.4	11.3
12	46.4	5.4
16	42.9	1.9
24	41.6	
32	41.1	
48	41.0	
64	41.0	
96		
128		
192		
256		

Test Results.

Moisture Content (%)	16
MCV	10.9



Barnsley West

Contract No:

PSL19/2340

Client Ref:

4848

MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

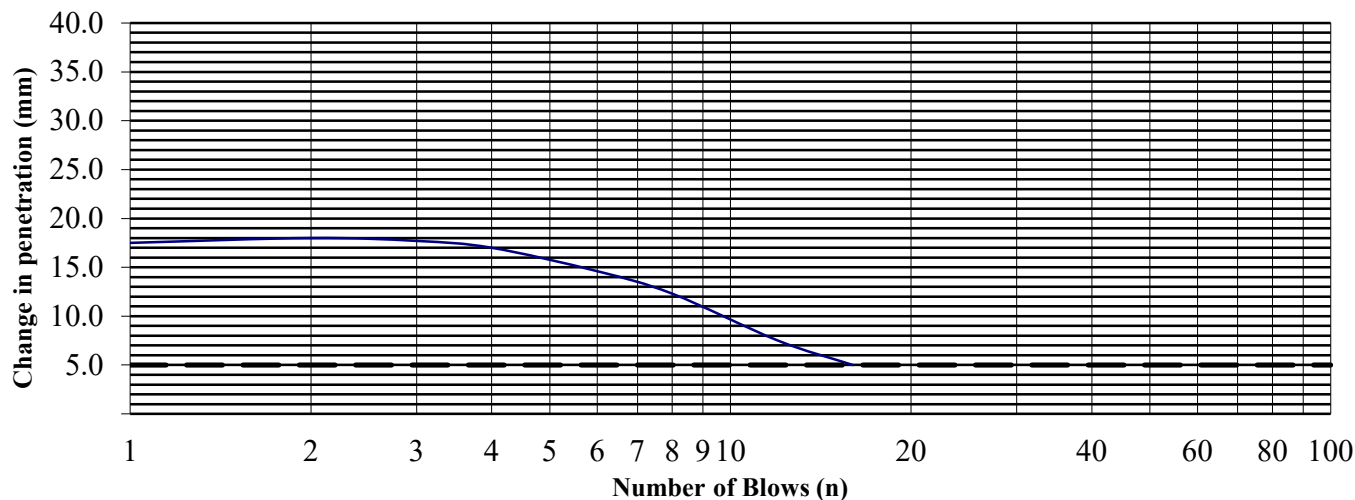
Hole Number: TP103 Top Depth (m): 2.00

Sample Number: B16 Base Depth (m): 2.50

Sample Type: B

Material Retained on the 20mm BS Test Sieve (%):	1
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	68.4	17.5
2	59.8	18.0
3	54.6	17.7
4	50.9	17.0
6	45.2	14.6
8	41.8	12.3
12	36.9	7.5
16	33.9	5.0
24	30.6	
32	29.5	
48	29.4	
64	28.9	
96		
128		
192		
256		

Test Results.

Moisture Content (%)	15
MCV	11.8



Barnsley West

Contract No:
PSL19/2340
Client Ref:
4848

MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

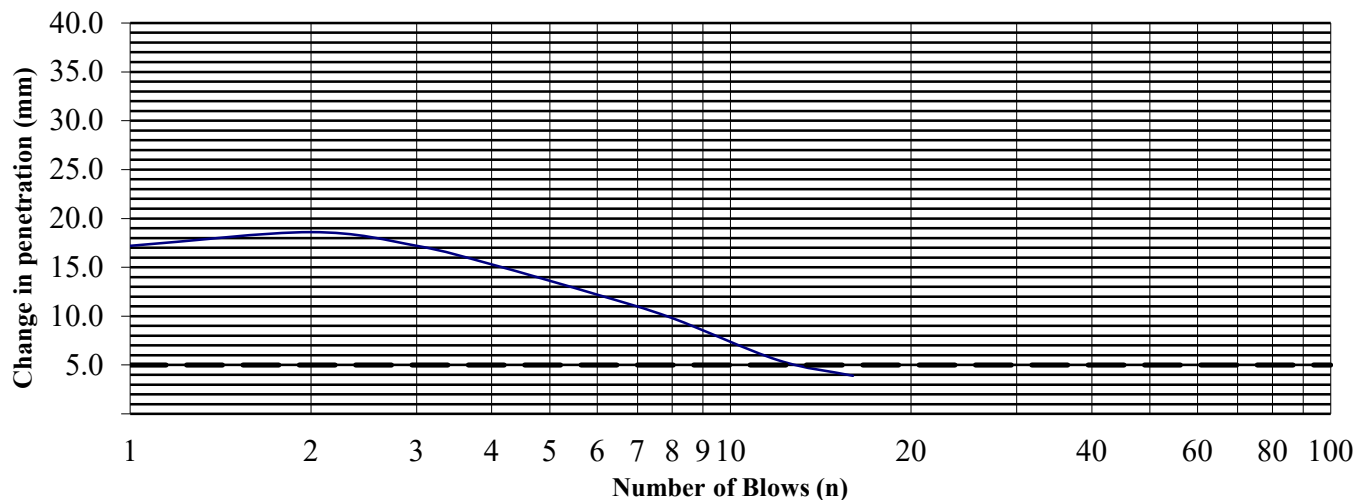
Hole Number: TP106 Top Depth (m): 1.50

Sample Number: B13 Base Depth (m): 2.00

Sample Type: B

Material Retained on the 20mm BS Test Sieve (%):	6
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	71.5	17.2
2	64.4	18.6
3	58.4	17.2
4	54.3	15.3
6	48.8	12.2
8	45.8	9.8
12	41.2	5.5
16	39.0	3.9
24	36.6	
32	36.0	
48	35.7	
64	35.1	
96		
128		
192		
256		

Test Results.

Moisture Content (%)	14
MCV	11.0



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Barnsley West

Contract No:

PSL19/2340

Client Ref:

4848

MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

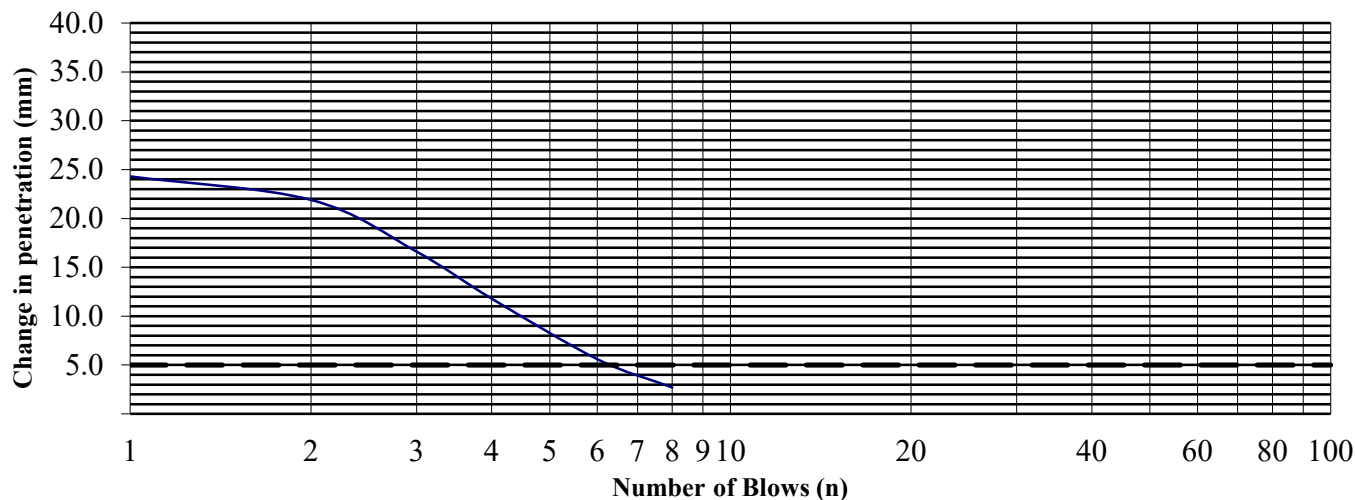
Hole Number: TP113 Top Depth (m): 2.00

Sample Number: B9 Base Depth (m): 2.50

Sample Type: B

Material Retained on the 20mm BS Test Sieve (%):	0
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	74.4	24.3
2	62.5	21.9
3	55.1	16.6
4	50.1	11.8
6	43.6	5.6
8	40.6	2.7
12	38.5	
16	38.3	
24	38.0	
32	37.9	
48		
64		
96		
128		
192		
256		

Test Results.

Moisture Content (%)	15
MCV	8.1



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Barnsley West

Contract No:
PSL19/2340
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MOISTURE CONDITION VALUE CALIBRATION

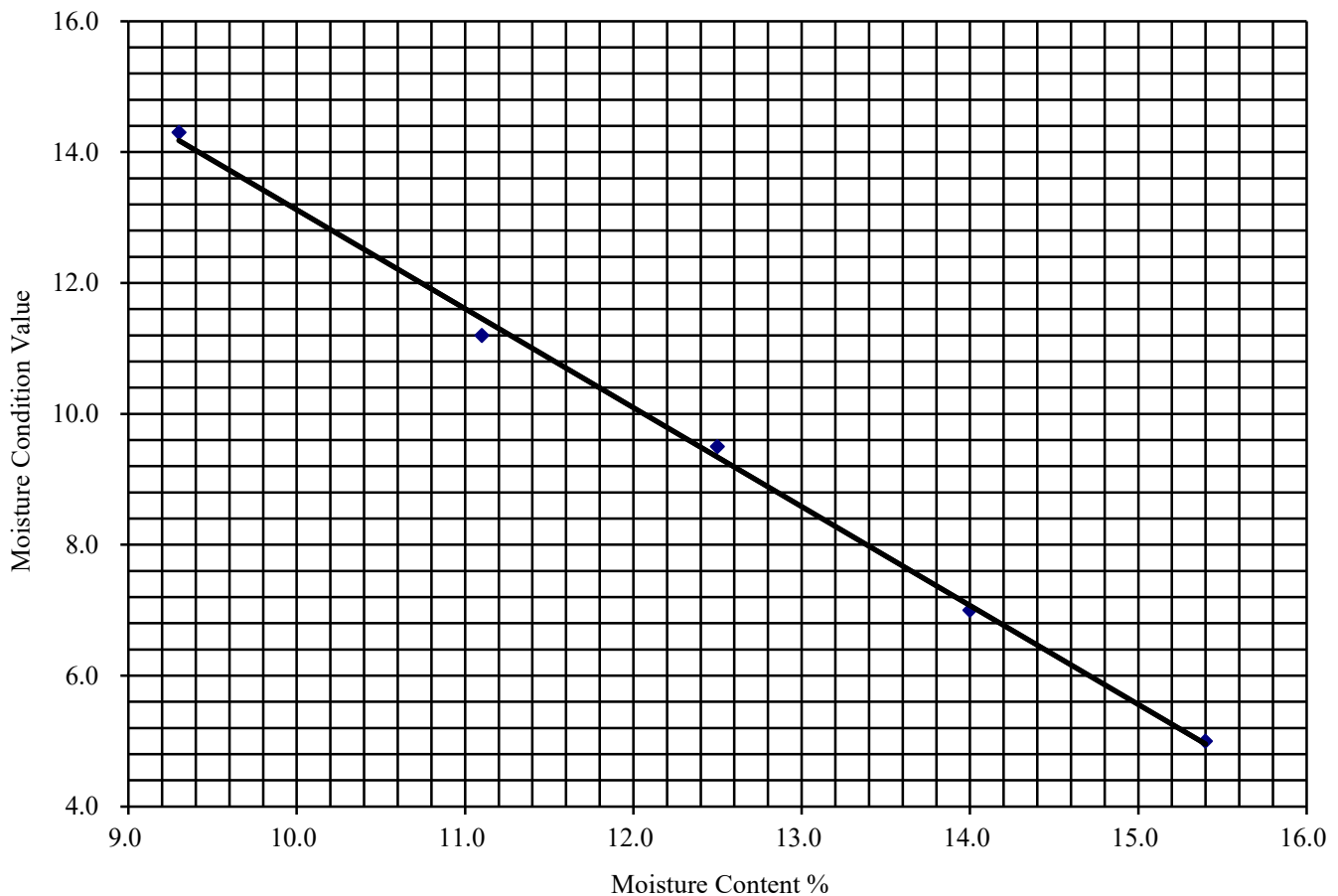
BS1377 : Part 4 : 1990 Clause 5.5

Hole Number: TP104 Top Depth (m): 2.50

Sample Number: B8 Base Depth (m): 3.00

Sample Type: BB

Initial Moisture Content (%):	13
Single/Separate Samples Tested	Separate
Material Retained on the 20mm BS Test Sieve (%):	0



Test Results.

Test Number	1	2	3	4	5
Moisture Content (%)	9.3	11.1	12.5	14.0	15.4
MCV	14.3	11.2	9.5	7.0	5.0



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Contract No:
PSL19/2340
Client Ref:
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MOISTURE CONDITION VALUE CALIBRATION

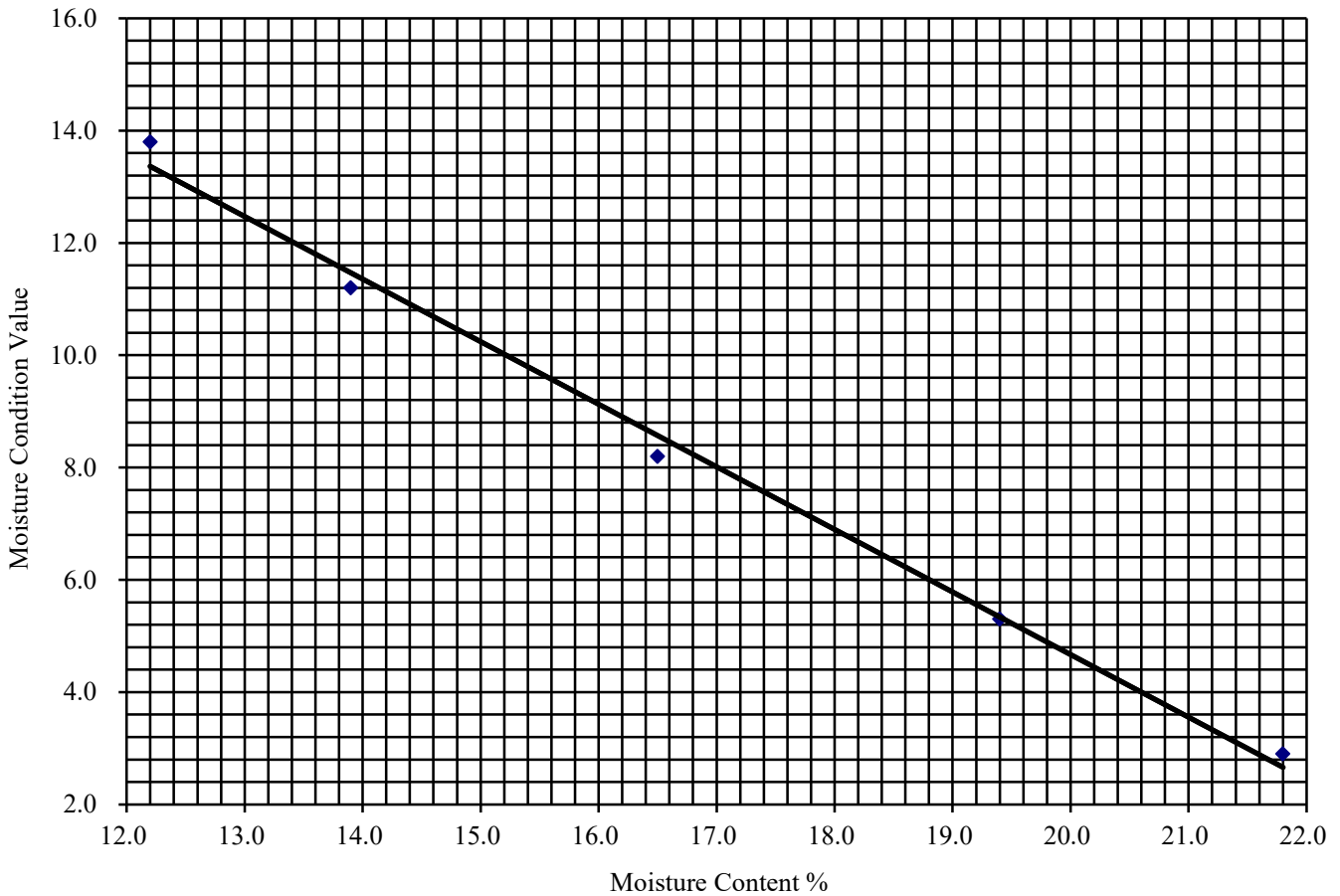
BS1377 : Part 4 : 1990 Clause 5.5

Hole Number: TP106 Top Depth (m): 1.50

Sample Number: B14 Base Depth (m): 2.00

Sample Type: BB

Initial Moisture Content (%):	14
Single/Separate Samples Tested	Separate
Material Retained on the 20mm BS Test Sieve (%):	9



Test Results.

Test Number	1	2	3	4	5
Moisture Content (%)	12.2	13.9	16.5	19.4	21.8
MCV	13.8	11.2	8.2	5.3	2.9



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Professional Soils Laboratory

Barnsley West

Contract No:	PSL19/2340
Client Ref:	4848



DETS

Certificate of Analysis

Certificate Number 19-07200

29-Apr-19

Client Professional Soils Laboratory Ltd
5/7 Hexthorpe Road
Hexthorpe
DN4 0AR

Our Reference 19-07200

Client Reference PSL19/2340

Order No (not supplied)

Contract Title Barnsley West

Description 8 Soil samples.

Date Received 17-Apr-19

Date Started 17-Apr-19

Date Completed 29-Apr-19

Test Procedures Identified by prefix DETSn (details on request).

Notes 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.

Approved By



Adam Fenwick
Contracts Manager



Summary of Chemical Analysis Soil Samples

Our Ref 19-07200

Client Ref PSL19/2340

Contract Title Barnsley West

Lab No	1489697	1489698	1489699	1489700	1489701	1489702	1489703	1489704
Sample ID	TP101	TP102	TP102A	TP103	TP104	TP105	TP106	TP113
Depth	1.90-2.00	0.80	2.00-2.20	2.00-2.50	3.00	2.00-2.40	1.50-2.00	1.50-2.00
Other ID	1	2	3	8	4	6	7	5
Sample Type	T	T	T	T	T	T	T	T
Sampling Date	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units								
Inorganics											
pH	DETSC 2008#			7.5	7.4	7.2	7.3	7.5	7.9	7.3	7.8
Calorific Value	DETSC 5008	1	MJ/kg	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0
Organic matter	DETSC 2002#	0.1	%	1.6	2.8	1.6		2.6	2.7	1.8	2.4
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	230	220	180	19	96	120	1100	290
Sulphur as S, Total	DETSC 2320	0.01	%	0.03		0.02		0.07		0.10	
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.07		0.05		0.04		0.20	

Information in Support of the Analytical Results

Our Ref 19-07200
 Client Ref PSL19/2340
 Contract Barnsley West

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1489697	TP101 1.90-2.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Calorific Value (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), Organic Matter (Manual) (28 days), pH + Conductivity (7 days)	
1489698	TP102 0.80 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Calorific Value (365 days), Organic Matter (Manual) (28 days), pH + Conductivity (7 days)	
1489699	TP102A 2.00-2.20 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Calorific Value (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), Organic Matter (Manual) (28 days), pH + Conductivity (7 days)	
1489700	TP103 2.00-2.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1489701	TP104 3.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Calorific Value (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), Organic Matter (Manual) (28 days), pH + Conductivity (7 days)	
1489702	TP105 2.00-2.40 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Calorific Value (365 days), Organic Matter (Manual) (28 days), pH + Conductivity (7 days)	
1489703	TP106 1.50-2.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Calorific Value (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), Organic Matter (Manual) (28 days), pH + Conductivity (7 days)	
1489704	TP113 1.50-2.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Calorific Value (365 days), Organic Matter (Manual) (28 days), pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Information in Support of the Analytical Results

Our Ref 19-07200
Client Ref PSL19/2340
Contract Barnsley West

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.
Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.
The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



LABORATORY REPORT



4043

Contract Number: PSL19/3110

Report Date: 17 June 2019
Client's Reference: 4848
Client Name: JPG Leeds
5 John Charles Way
Leeds
West Yorkshire
LS12 6QD

For the attention of: Joseph Morley

Contract Title: Barnsley West
Date Received: 20/5/2019
Date Commenced: 20/5/2019
Date Completed: 17/6/2019

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. 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 other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson
(Director)

L Knight
(Senior Technician)

A Watkins
(Director)

S Eyre
(Senior Technician)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
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e-mail: rgunson@prosoils.co.uk
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Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP108	T2	D	2.70	2.80	Grey slightly gravelly very sandy CLAY.
TP109	T3	D	1.50	1.60	Brown mottled grey slightly gravelly sandy CLAY.
TP110	T4	D	2.00	2.10	Brown slightly gravelly sandy CLAY.
TP115	T1	D	2.50	2.60	Brown very gravelly very sandy CLAY.
TP108	B5	BB	2.50	2.60	Grey mottled brown gravelly very sandy CLAY.
TP108	B6	BB	2.50	2.60	Grey mottled brown very gravelly sandy CLAY.
TP109	B7	BB	1.50	1.90	Grey mottled brown gravelly sandy CLAY.
TP109	B8	BB	1.50	1.90	Grey mottled brown gravelly sandy CLAY.
TP110	B9	BB	2.00	2.50	Brown mottled grey gravelly sandy CLAY.
TP111	B1	BB	2.20	2.50	MADE GROUND brown very sandy slightly clayey silty gravel.
TP111	B2	BB	2.20	2.50	MADE GROUND brown very sandy slightly clayey silty gravel.
TP112	B10	BB	2.50	2.80	Grey very sandy clayey GRAVEL.
TP115	B3	BB	2.50	3.00	Brown very gravelly sandy CLAY.
TP115	B4	BB	2.50	3.00	Brown very gravelly sandy CLAY.



Barnsley West

Contract No:

PSL19/3110

Client Ref:

4848

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m ³ Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
TP108	T2	D	2.70	2.80	11			34	18	16	94	Low plasticity CL.
TP109	T3	D	1.50	1.60	18			48	23	25	99	Intermediate plasticity CI.
TP110	T4	D	2.00	2.10	16			49	25	24	90	Intermediate plasticity CI.
TP115	T1	D	2.50	2.60	9.2			32	17	15	66	Low plasticity CL.
TP108	B5	BB	2.50	2.60	13			38	19	19	85	Intermediate plasticity CI.
TP108	B6	BB	2.50	2.60	14		2.69					
TP109	B7	BB	1.50	1.90	17		2.67					
TP110	B9	BB	2.00	2.50	18			42	20	22	92	Intermediate plasticity CI.
TP111	B1	BB	2.20	2.50			2.51					
TP111	B2	BB	2.20	2.50	18							
TP115	B4	BB	2.50	3.00	12							

SYMBOLS : NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.



4043

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Barnsley West

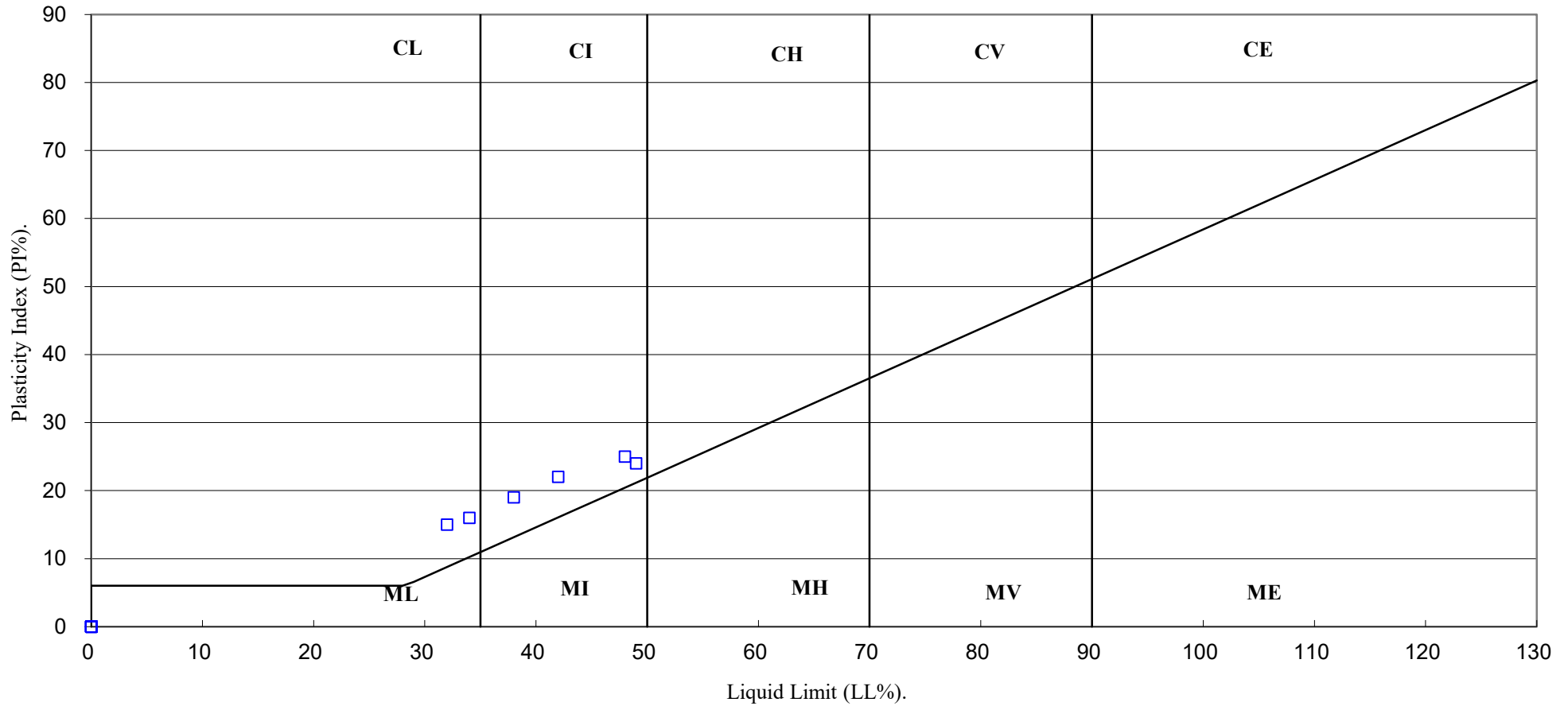
Contract No:

PSL19/3110

Client Ref:

4848

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL
Professional Soils Laboratory

Barnsley West

Contract No:

PSL19/3110

Client Ref:

4848

PARTICLE SIZE DISTRIBUTION TEST

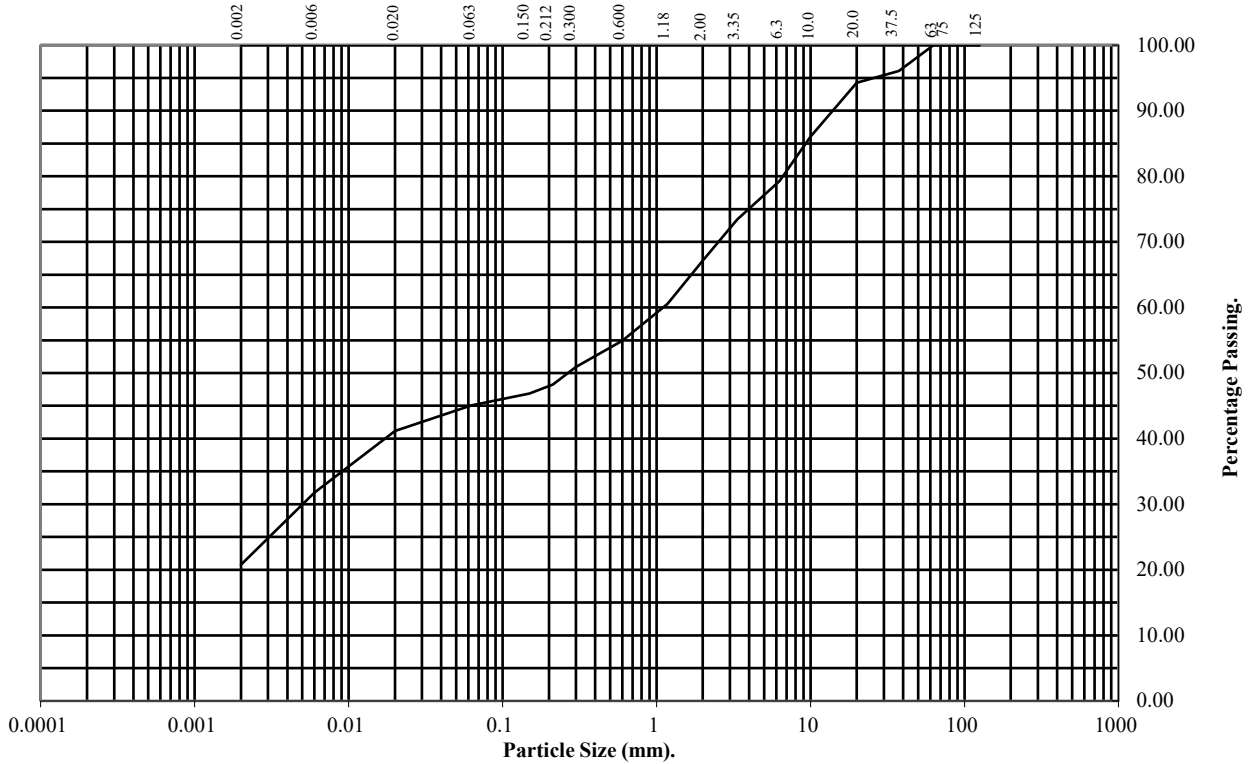
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: TP108 Top Depth (m): 2.50

Sample Number: B6 Base Depth(m): 2.60

Sample Type: BB



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	96
20	94
10	86
6.3	79
3.35	73
2	67
1.18	61
0.6	55
0.3	51
0.212	48
0.15	47
0.063	45

Particle Diameter	Percentage Passing
0.02	41
0.006	32
0.002	21

Soil Fraction	Total Percentage
Cobbles	0
Gravel	33
Sand	22
Silt	24
Clay	21

Remarks:
See Summary of Soil Descriptions



Barnsley West

Contract No:
PSL19/3110
Client Ref:
4848

PARTICLE SIZE DISTRIBUTION TEST

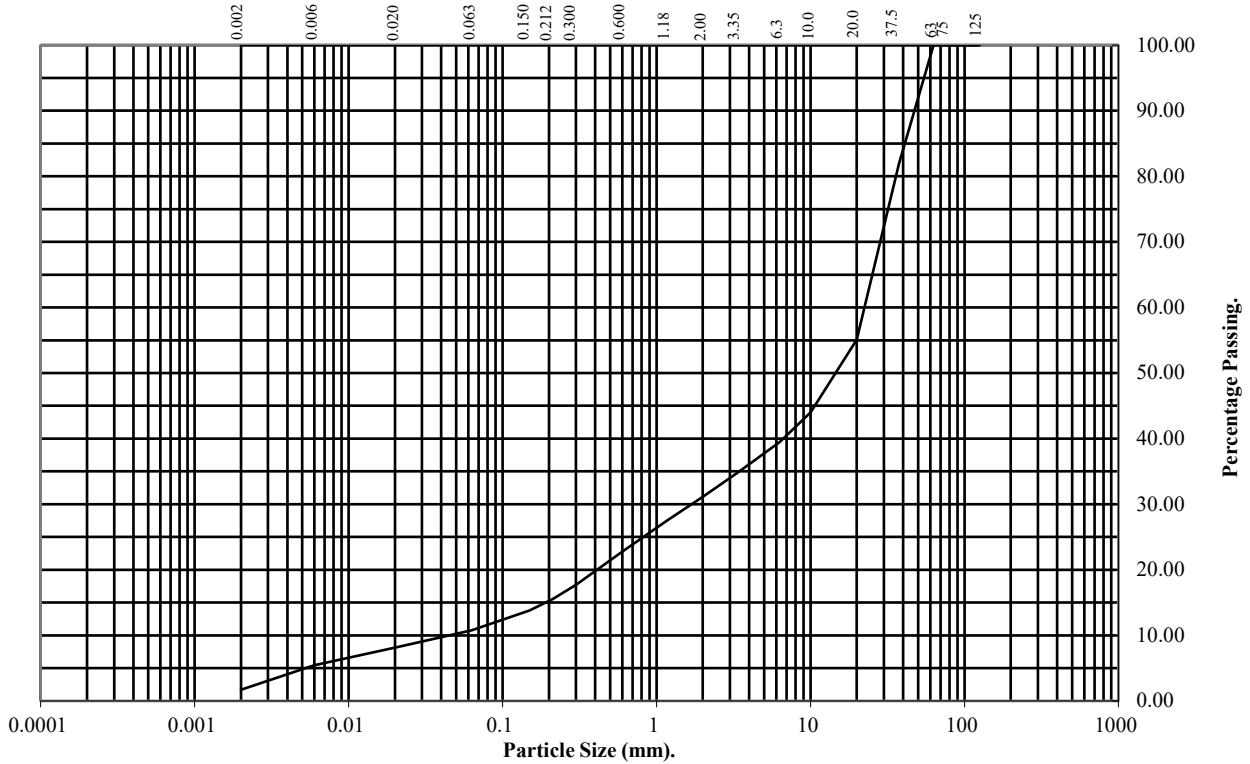
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: TP111 **Top Depth (m):** 2.20

Sample Number: B1 **Base Depth(m):** 2.50

Sample Type: BB



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	82
20	55
10	44
6.3	39
3.35	35
2	31
1.18	28
0.6	23
0.3	18
0.212	16
0.15	14
0.063	11

Particle Diameter	Percentage Passing
0.02	8
0.006	5
0.002	2

Soil Fraction	Total Percentage
Cobbles	0
Gravel	69
Sand	20
Silt	9
Clay	2

Remarks:
See Summary of Soil Descriptions



Barnsley West

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PARTICLE SIZE DISTRIBUTION TEST

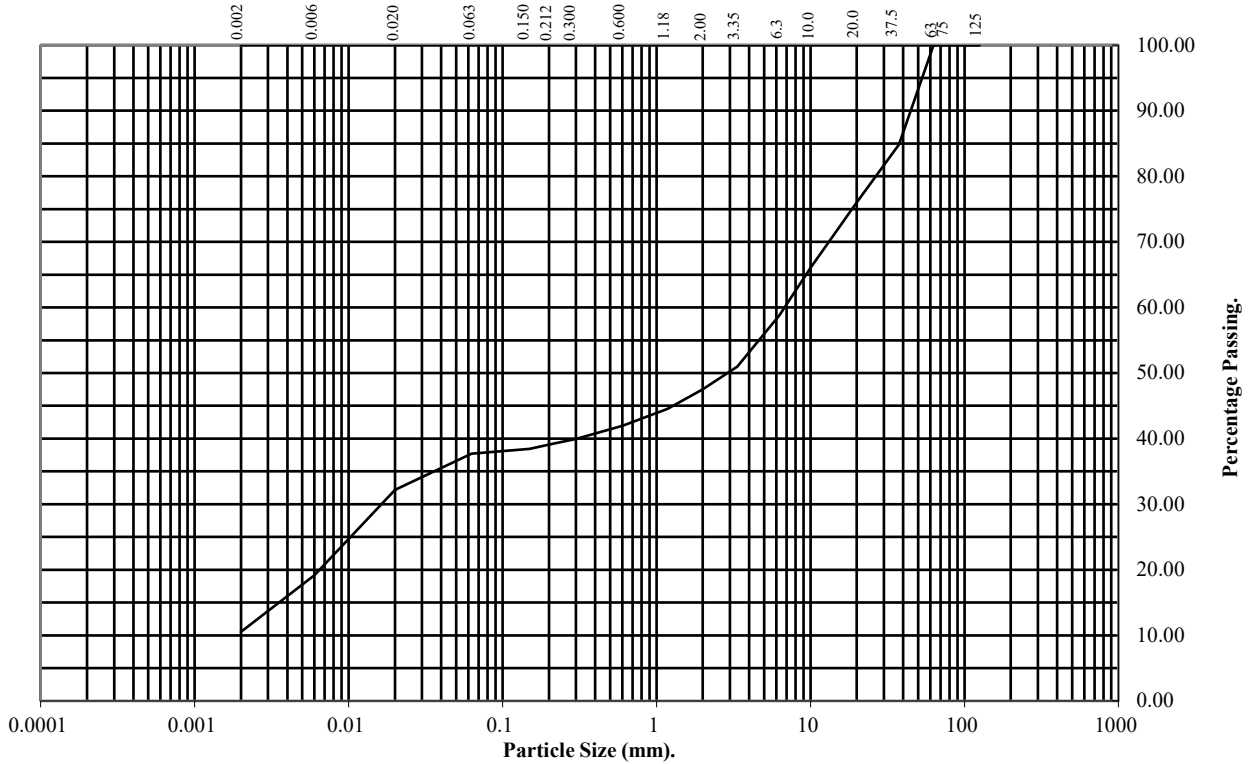
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: TP115 **Top Depth (m):** 2.50

Sample Number: B3 **Base Depth(m):** 3.00

Sample Type: BB



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	85
20	76
10	66
6.3	59
3.35	51
2	48
1.18	45
0.6	42
0.3	40
0.212	39
0.15	38
0.063	38

Particle Diameter	Percentage Passing
0.02	32
0.006	19
0.002	11

Soil Fraction	Total Percentage
Cobbles	0
Gravel	52
Sand	10
Silt	27
Clay	11

Remarks:
See Summary of Soil Descriptions



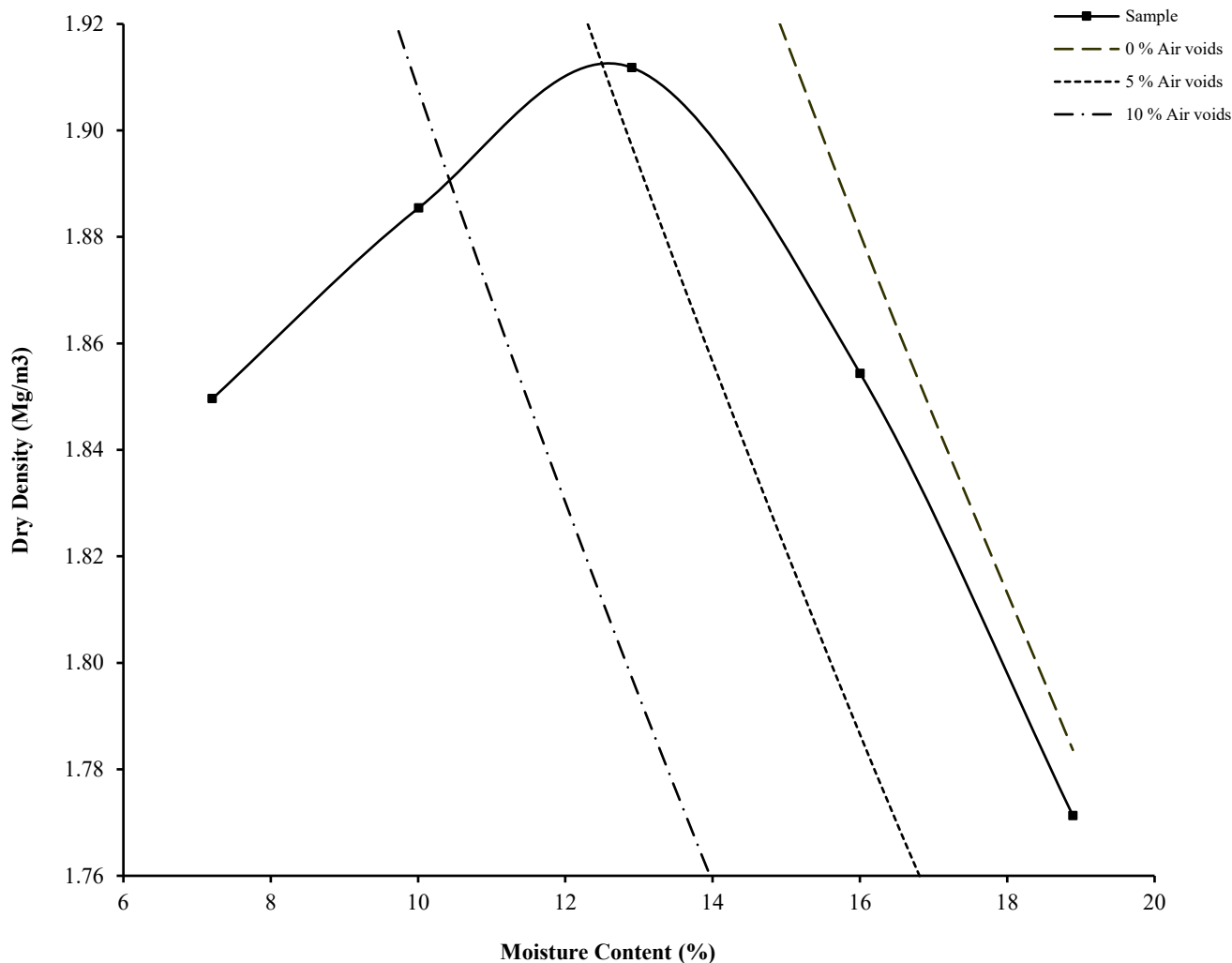
Barnsley West

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Client Ref:
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP108 Top Depth (m) : 2.50
 Sample Number: B5 Base Depth (m) : 2.60
 Sample Type: BB



Initial Moisture Content:	13	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.69	Assumed	Material Retained on 37.5 mm Test Sieve (%):	6
Maximum Dry Density (Mg/m ³):	1.91		Material Retained on 20.0 mm Test Sieve (%):	8
Optimum Moisture Content (%):	13			
Remarks See summary of soil descriptions.				



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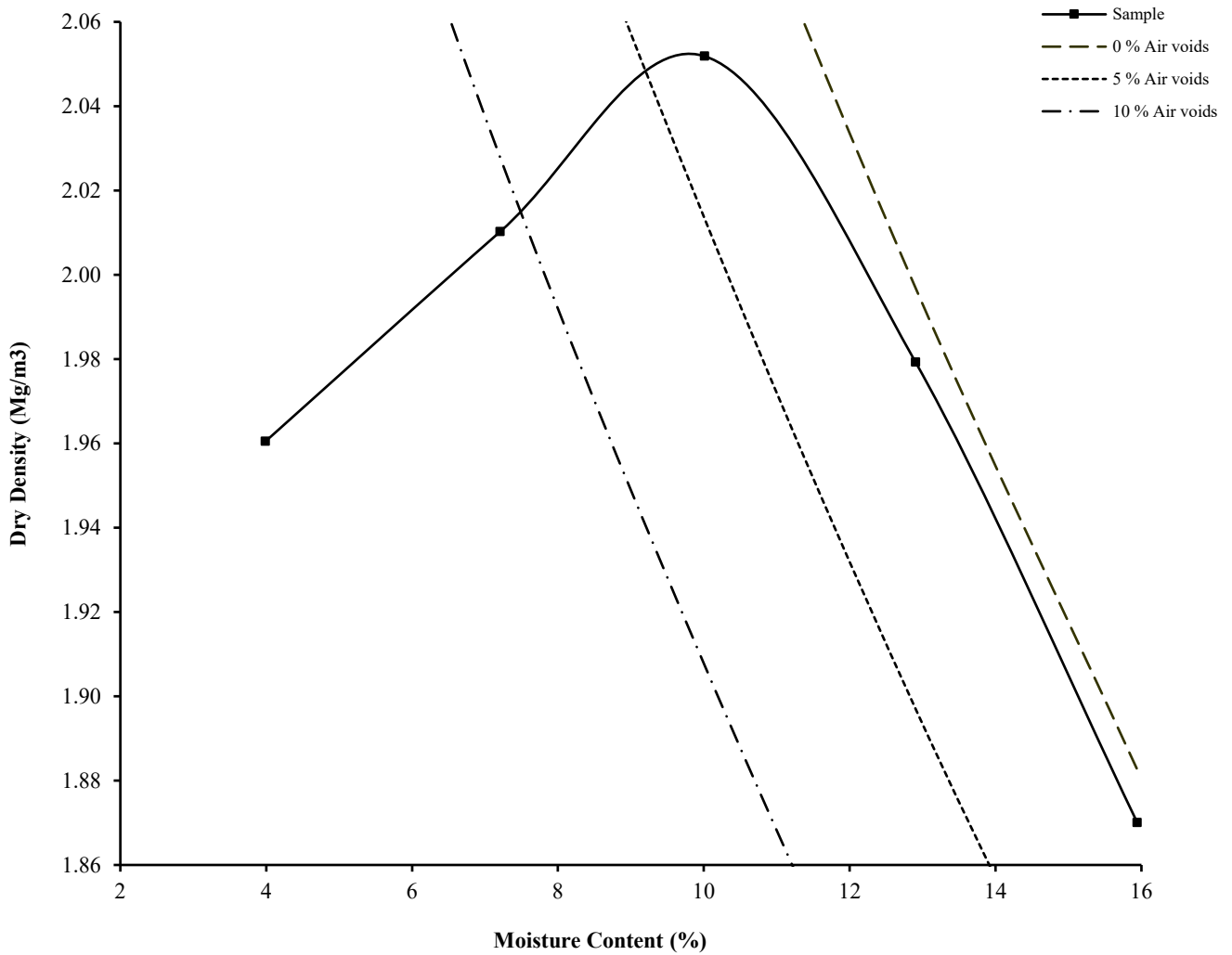
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP108 Top Depth (m) : 2.50

Sample Number: B5 Base Depth (m) : 2.60

Sample Type: BB



Initial Moisture Content:	13	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.69	Assumed	Material Retained on 37.5 mm Test Sieve (%):	6
Maximum Dry Density (Mg/m ³):	2.05		Material Retained on 20.0 mm Test Sieve (%):	8
Optimum Moisture Content (%):	10			
Remarks				
See summary of soil descriptions.				



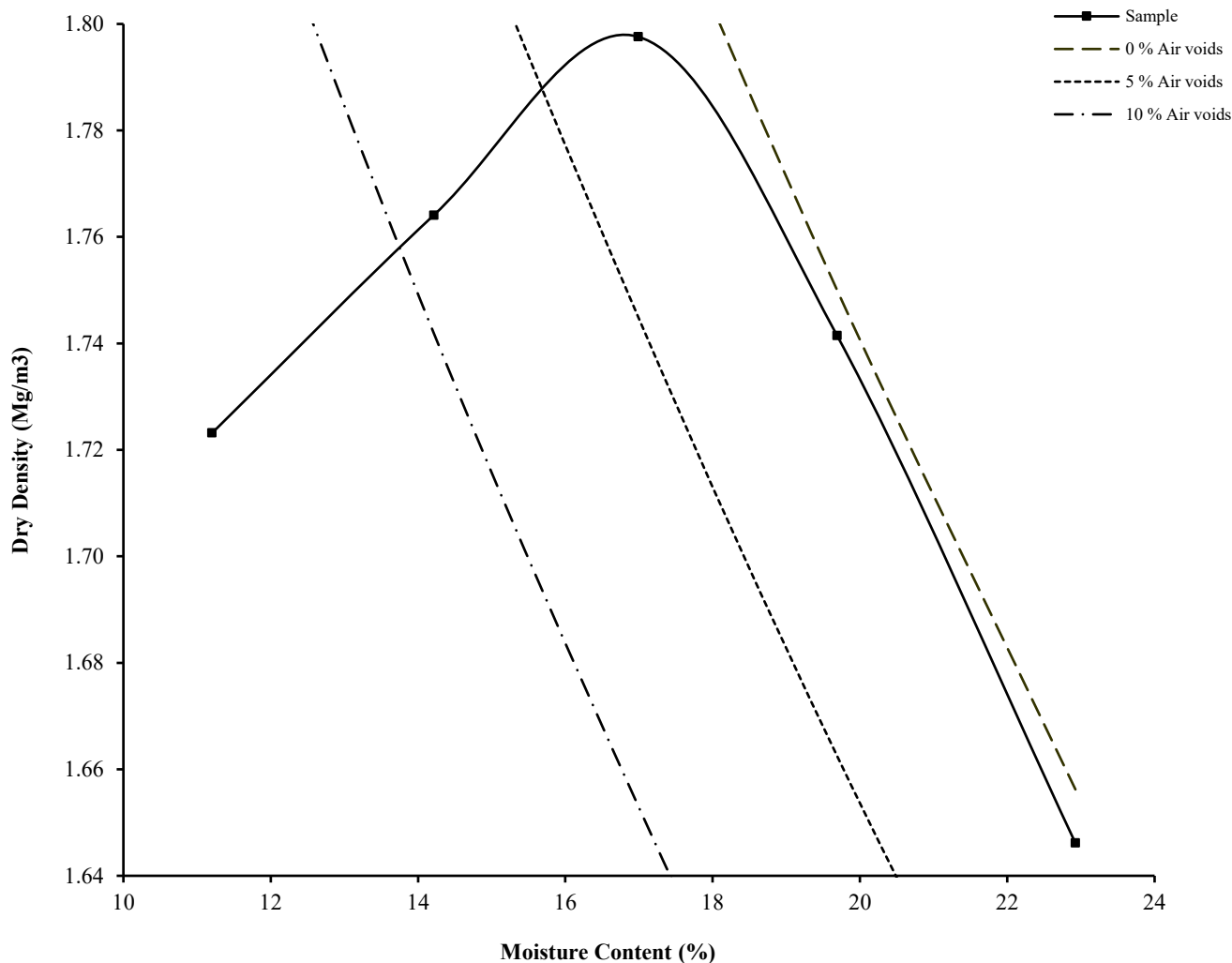
Barnsley West

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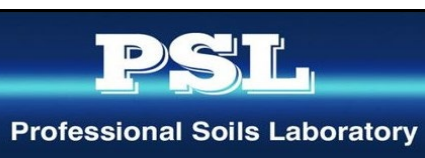
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP109 Top Depth (m) : 1.50
 Sample Number: B7 Base Depth (m) : 1.90
 Sample Type: BB



Initial Moisture Content:	17	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.67	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.80		Material Retained on 20.0 mm Test Sieve (%):	13
Optimum Moisture Content (%):	17			
Remarks See summary of soil descriptions.				



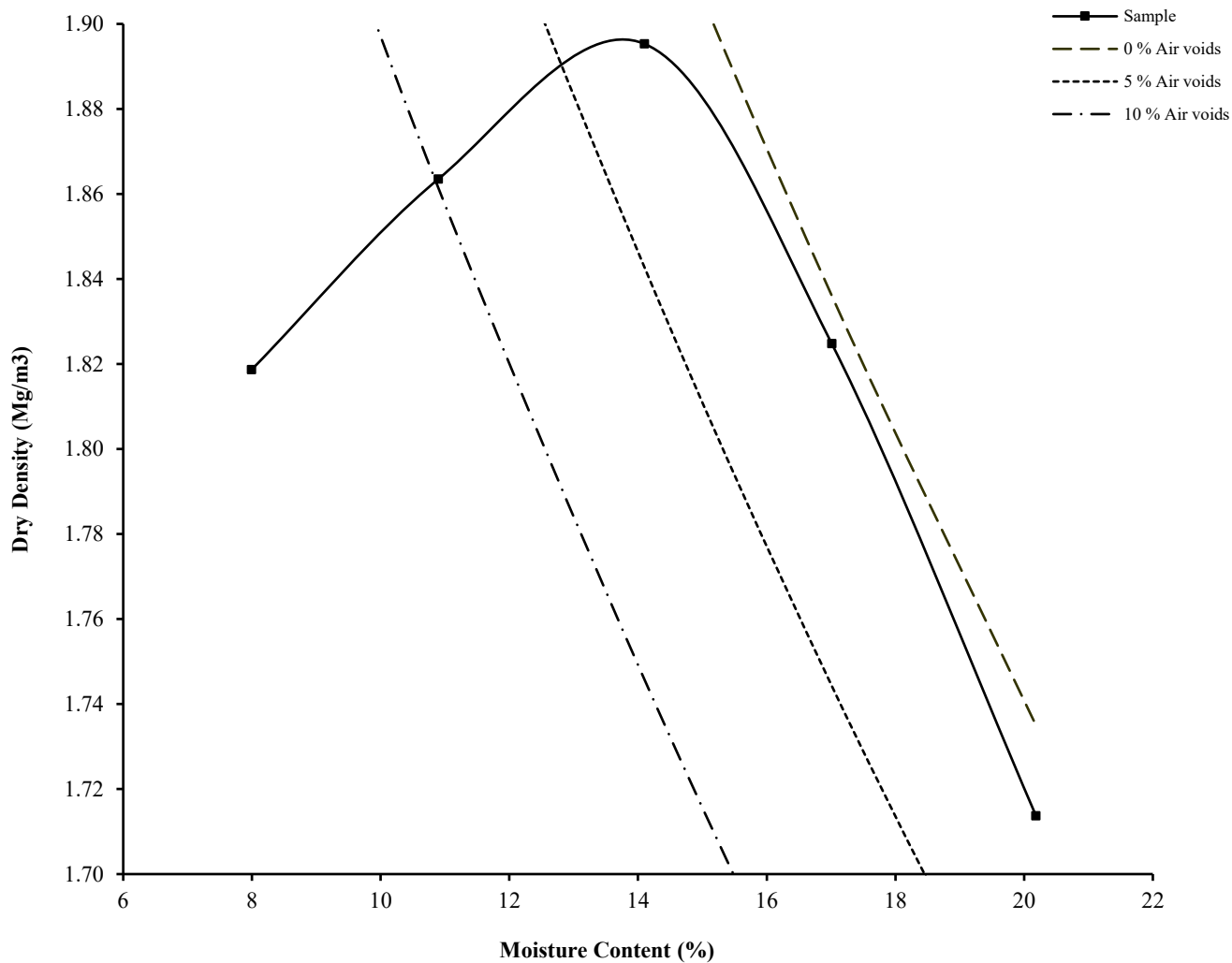
Barnsley West

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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP109 Top Depth (m) : 1.50
 Sample Number: B8 Base Depth (m) : 1.90
 Sample Type: BB



Initial Moisture Content:	17	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.67	Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.90		Material Retained on 20.0 mm Test Sieve (%):	10
Optimum Moisture Content (%):	14			
Remarks				
See summary of soil descriptions.				



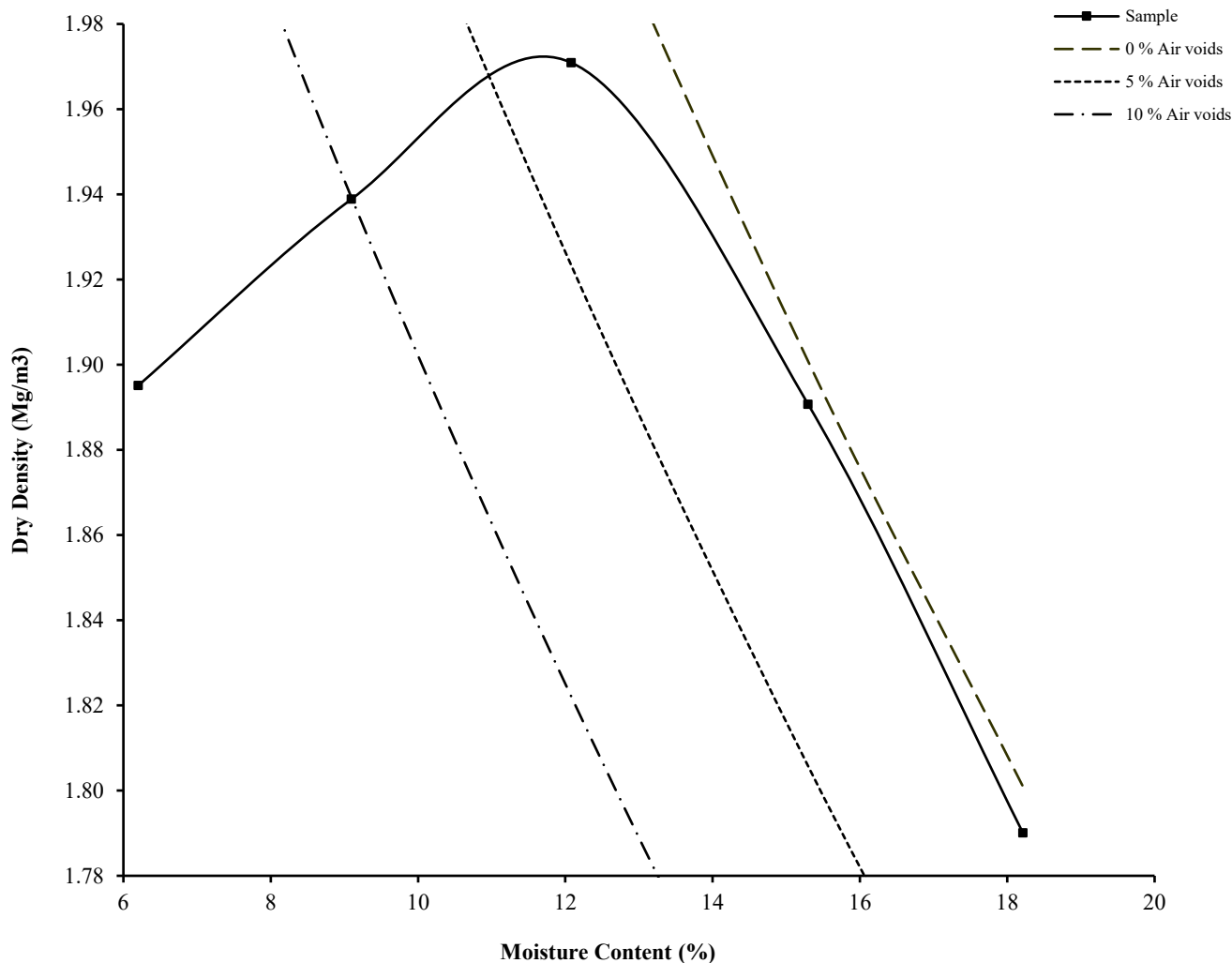
Barnsley West

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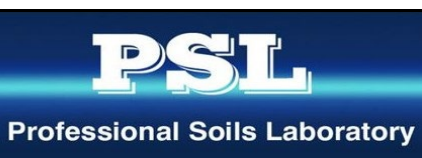
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

Hole Number: TP110 Top Depth (m) : 2.00
 Sample Number: B9 Base Depth (m) : 2.50
 Sample Type: BB



Initial Moisture Content:	18	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.68	Assumed	Material Retained on 37.5 mm Test Sieve (%):	3
Maximum Dry Density (Mg/m ³):	1.97		Material Retained on 20.0 mm Test Sieve (%):	8
Optimum Moisture Content (%):	12			
Remarks See summary of soil descriptions.				



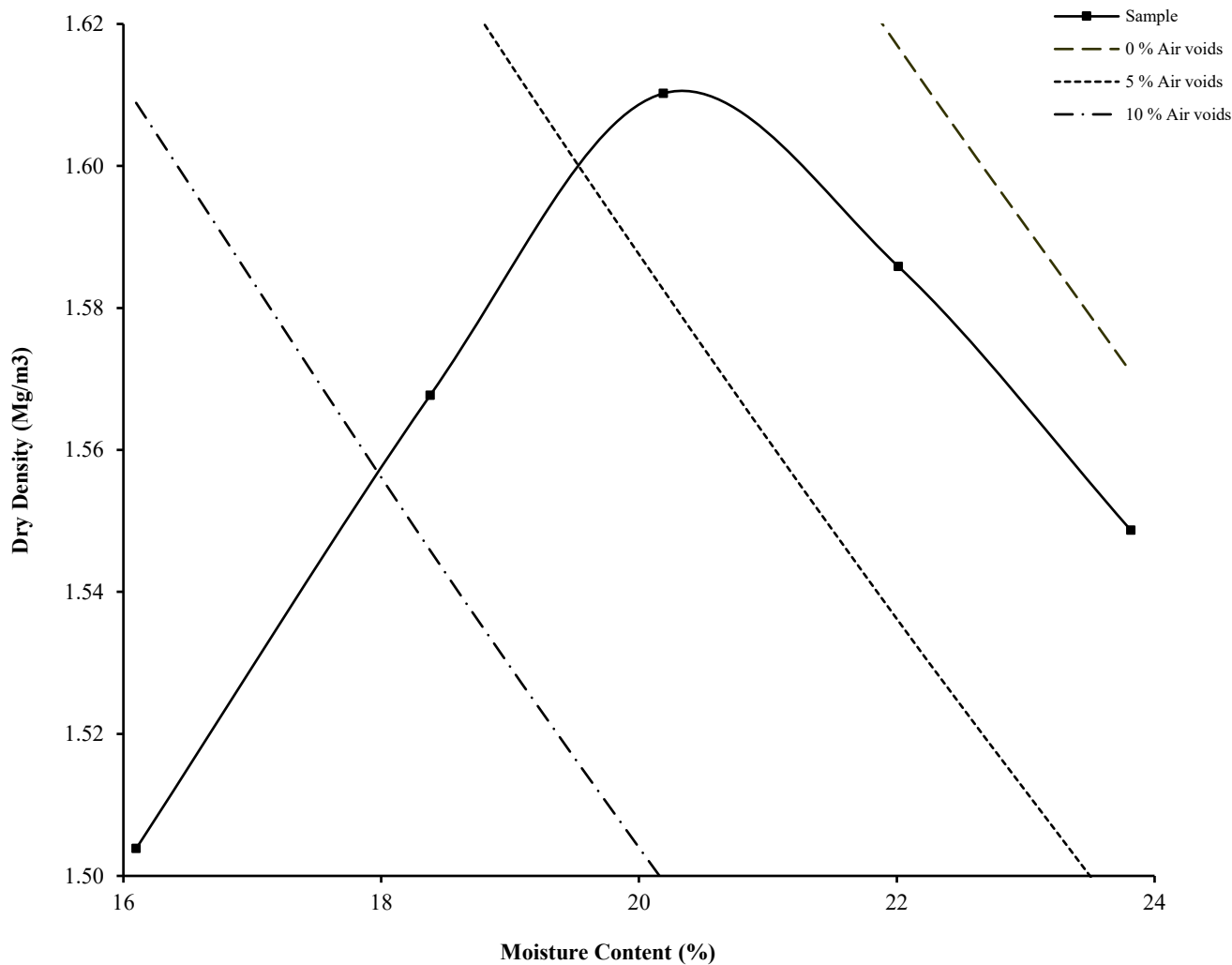
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

Non compliance with BS 1377 : Part 4 : 1990

Hole Number: TP111 Top Depth (m) : 2.20
 Sample Number: B2 Base Depth (m) : 2.50
 Sample Type: BB



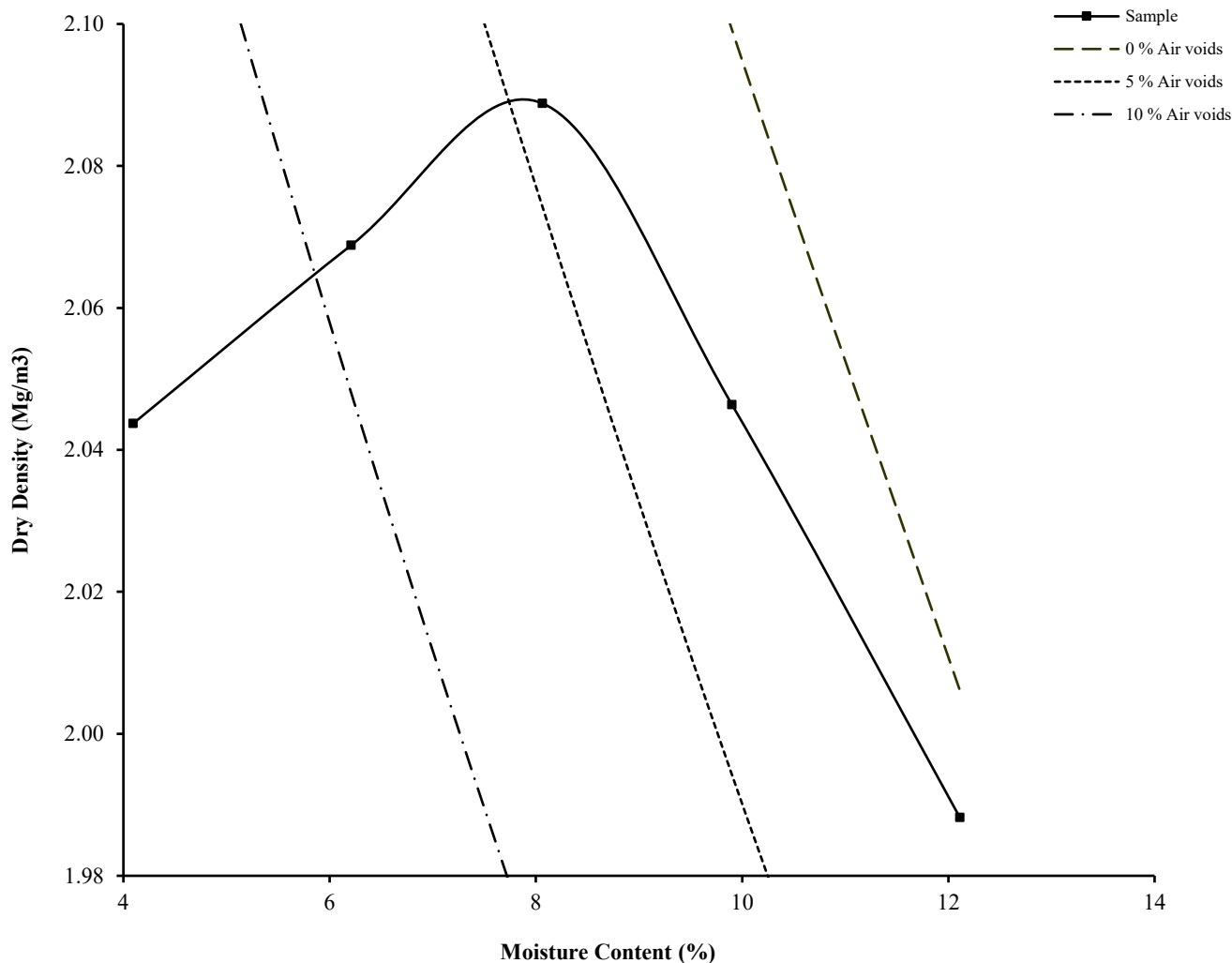
Initial Moisture Content:	18	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.51	Measured	Material Retained on 37.5 mm Test Sieve (%):	17
Maximum Dry Density (Mg/m ³):	1.61	Material Retained on 20.0 mm Test Sieve (%):	21	
Optimum Moisture Content (%):	20			
Remarks				
See summary of soil descriptions.				

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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

Non compliance with BS 1377 : Part 4 : 1990

Hole Number: TP112 Top Depth (m) : 2.50
 Sample Number: B10 Base Depth (m) : 2.80
 Sample Type: BB



Initial Moisture Content:	10	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.65	Assumed	Material Retained on 37.5 mm Test Sieve (%):	15
Maximum Dry Density (Mg/m ³):	2.09		Material Retained on 20.0 mm Test Sieve (%):	10
Optimum Moisture Content (%):	8			
Remarks See summary of soil descriptions.				



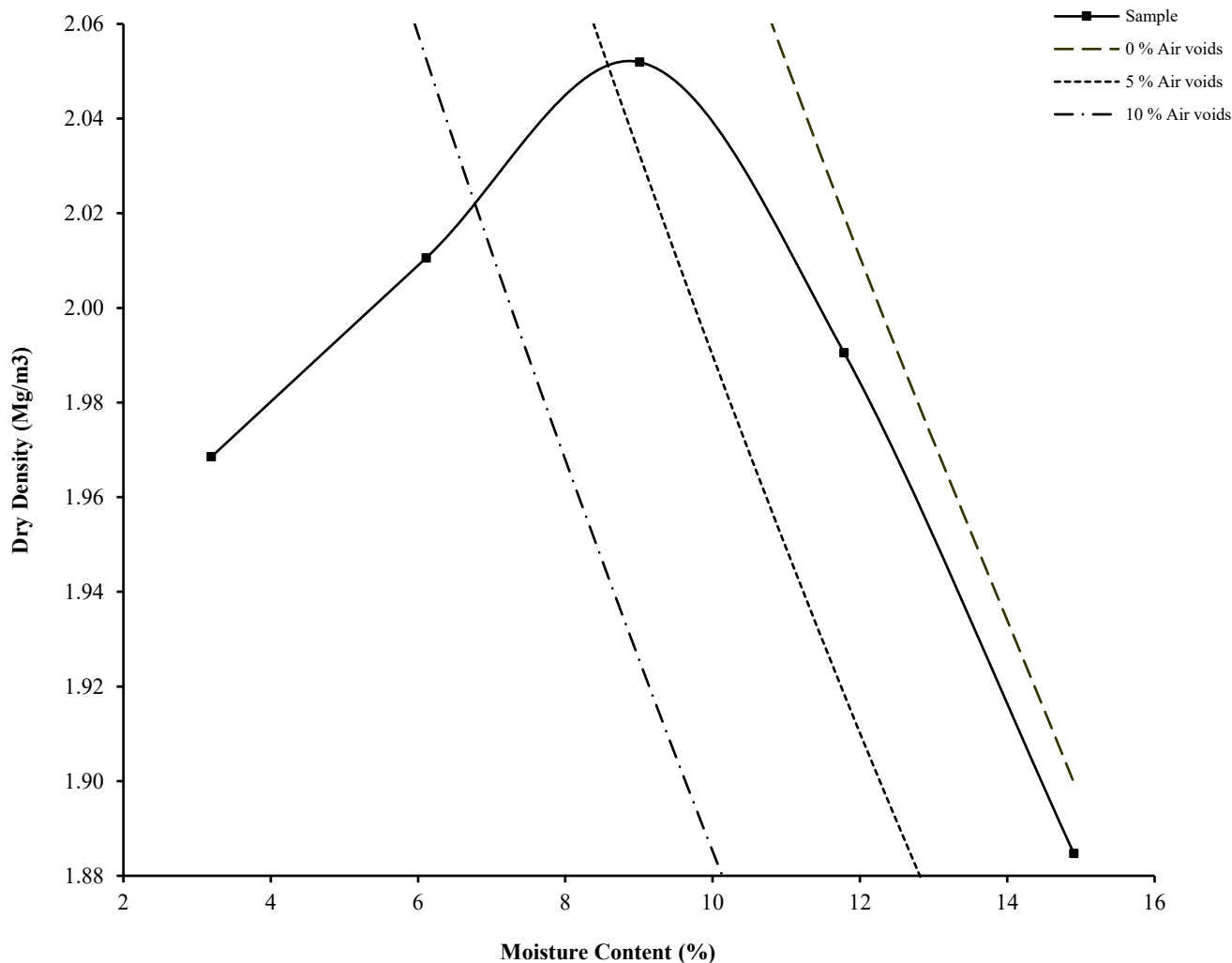
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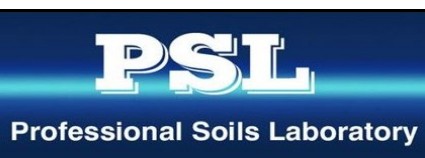
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

Non compliance with BS 1377 : Part 4 : 1990

Hole Number: TP115 Top Depth (m) : 2.50
 Sample Number: B3 Base Depth (m) : 3.00
 Sample Type: BB



Initial Moisture Content:	12	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.65	Measured	Material Retained on 37.5 mm Test Sieve (%):	15
Maximum Dry Density (Mg/m ³):	2.05	Material Retained on 20.0 mm Test Sieve (%):	9	
Optimum Moisture Content (%):	9			
Remarks				
See summary of soil descriptions.				



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CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

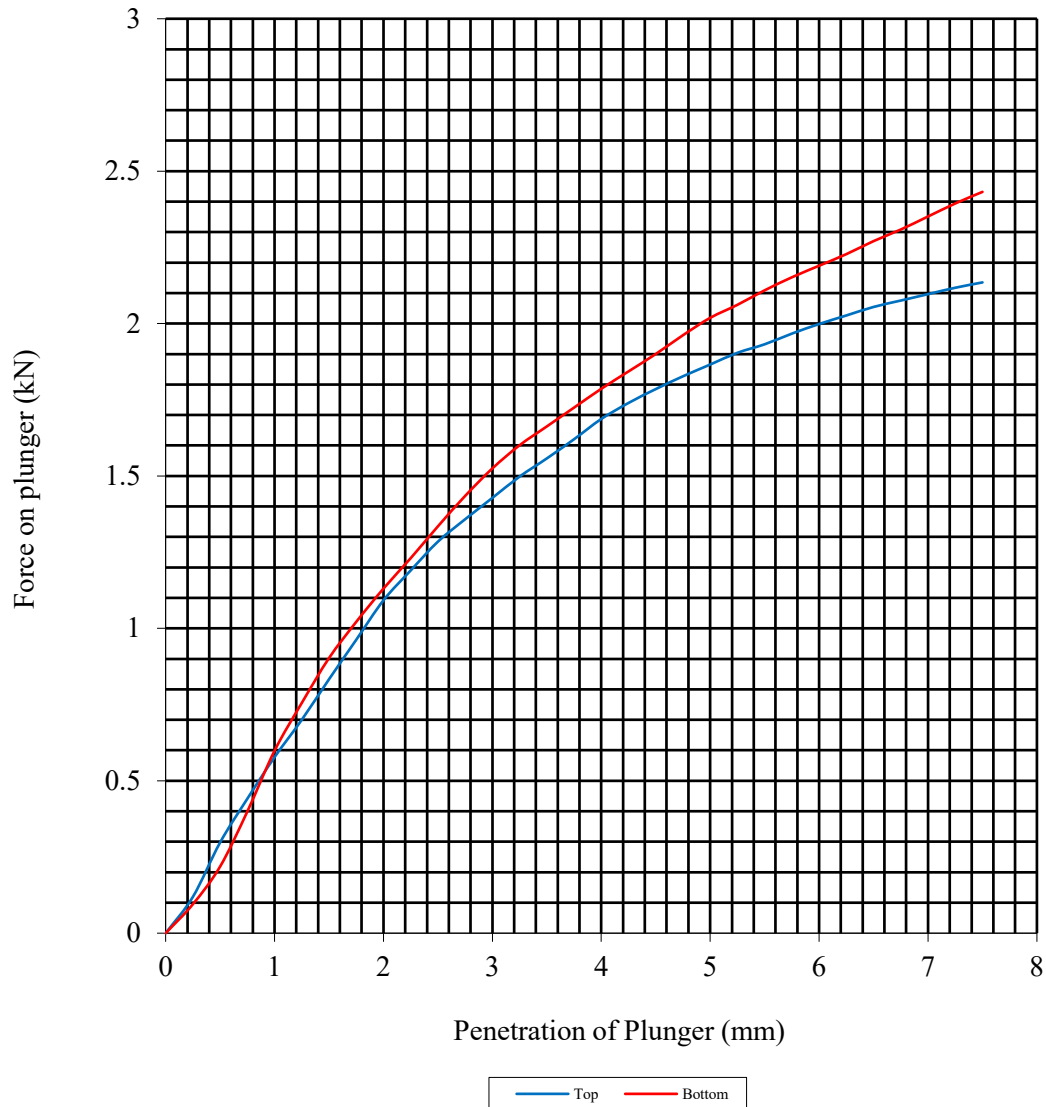
Hole Number: TP109

Top Depth (m): 1.50

Sample Number: B7

Base Depth (m): 1.90

Sample Type: BB



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	17	Surcharge Kg:	4.20	Sample Top	17	Sample Top	9.7
Bulk Density Mg/m ³ :	2.11	Soaking Time hrs	0	Sample Bottom	17	Sample Bottom	10.1
Dry Density Mg/m ³ :	1.80	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			13				
Compaction Conditions		2.5kg					



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CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

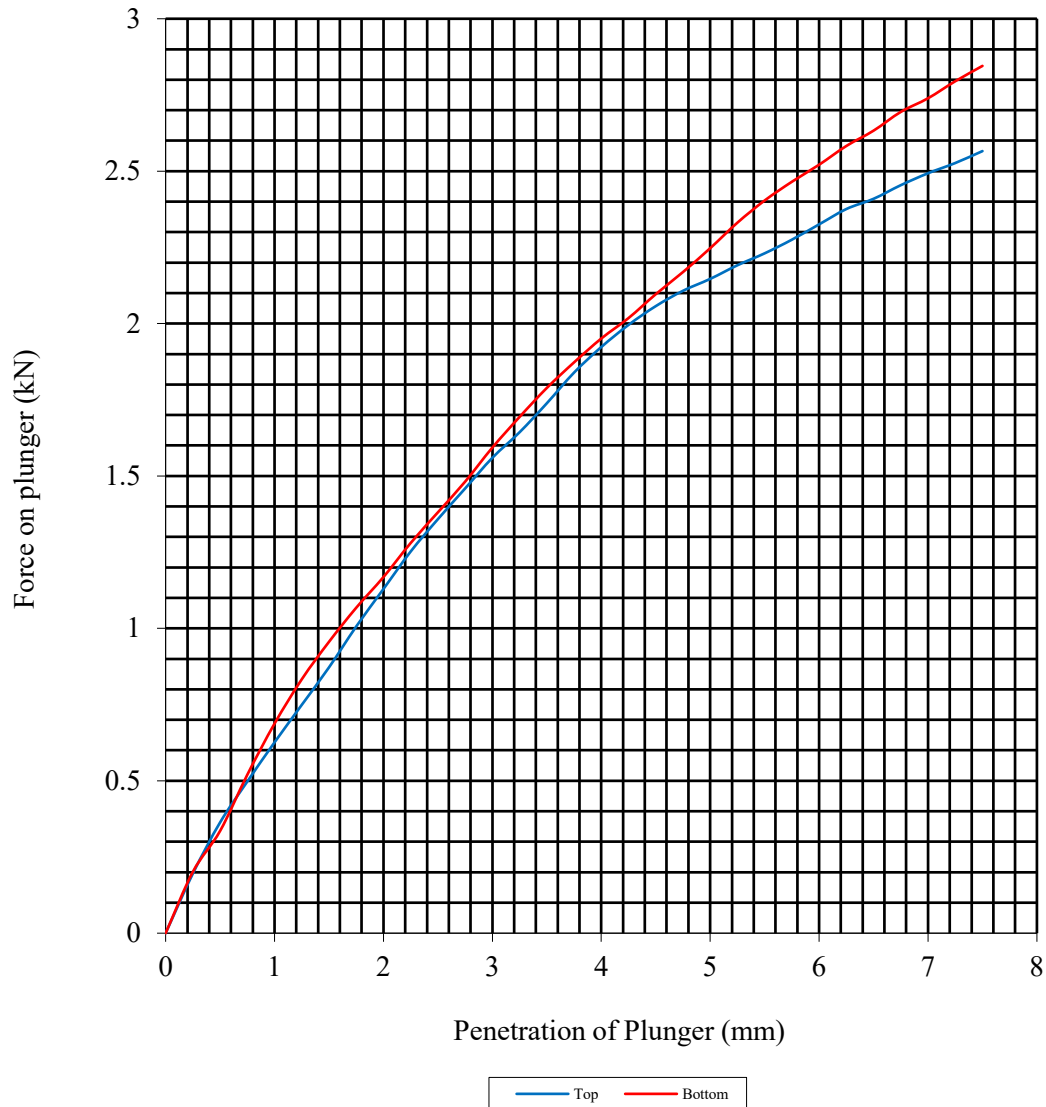
Hole Number: TP109

Top Depth (m): 1.50

Sample Number: B8

Base Depth (m): 1.90

Sample Type: BB



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	17	Surcharge Kg:	4.20	Sample Top	17	Sample Top	10.7
Bulk Density Mg/m ³ :	2.15	Soaking Time hrs	0	Sample Bottom	17	Sample Bottom	11.2
Dry Density Mg/m ³ :	1.84	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:	10						
Compaction Conditions	4.5kg						



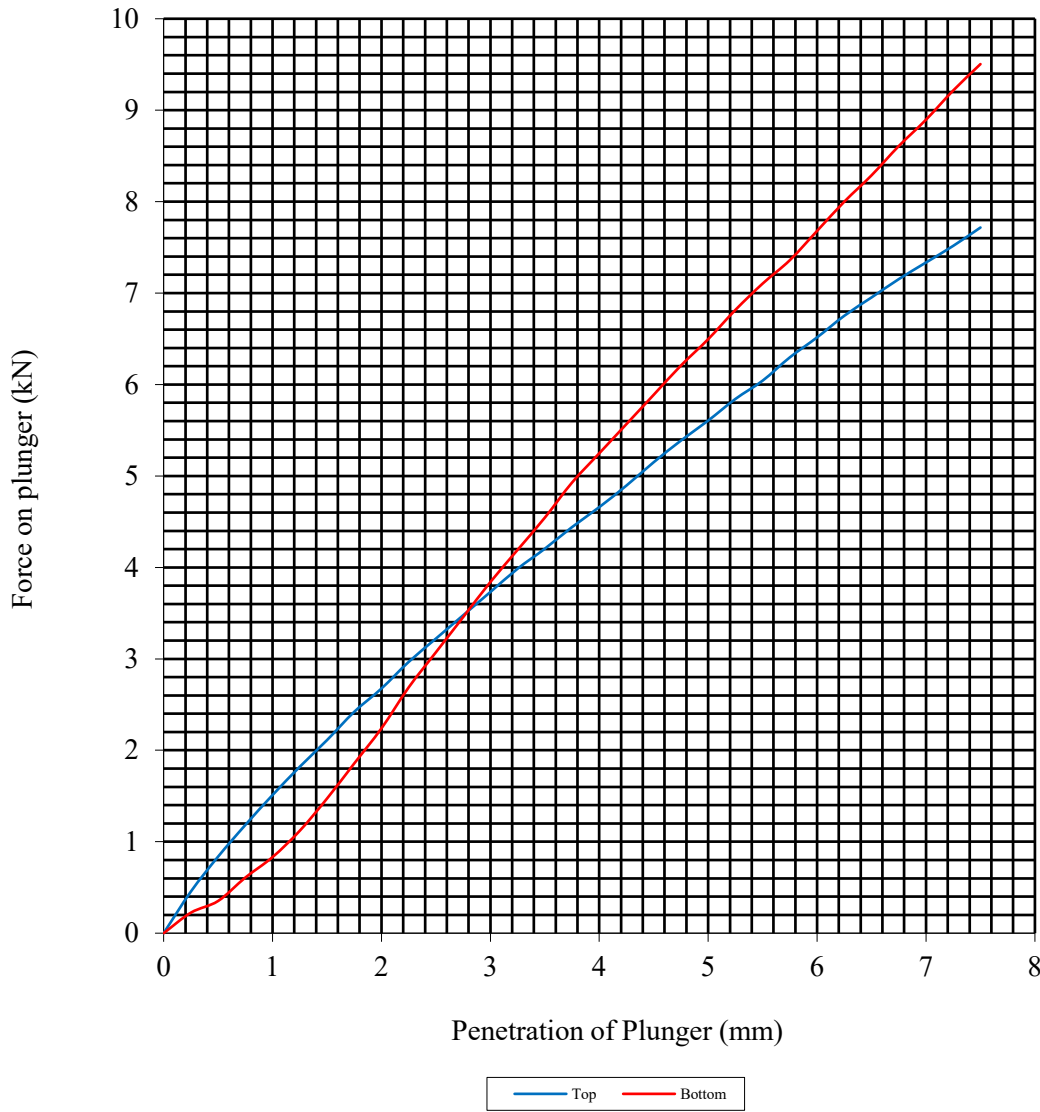
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CALIFORNIA BEARING RATIO TEST

Non compliance with BS 1377 : Part 4 : 1990

Hole Number: TP111 Top Depth (m): 2.20
 Sample Number: B2 Base Depth (m): 2.50
 Sample Type: BB



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	18	Surcharge Kg:	4.20	Sample Top	18	Sample Top	28.0
Bulk Density Mg/m3:	1.85	Soaking Time hrs	0	Sample Bottom	18	Sample Bottom	32.5
Dry Density Mg/m3:	1.56	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			38				
Compaction Conditions			2.5kg				



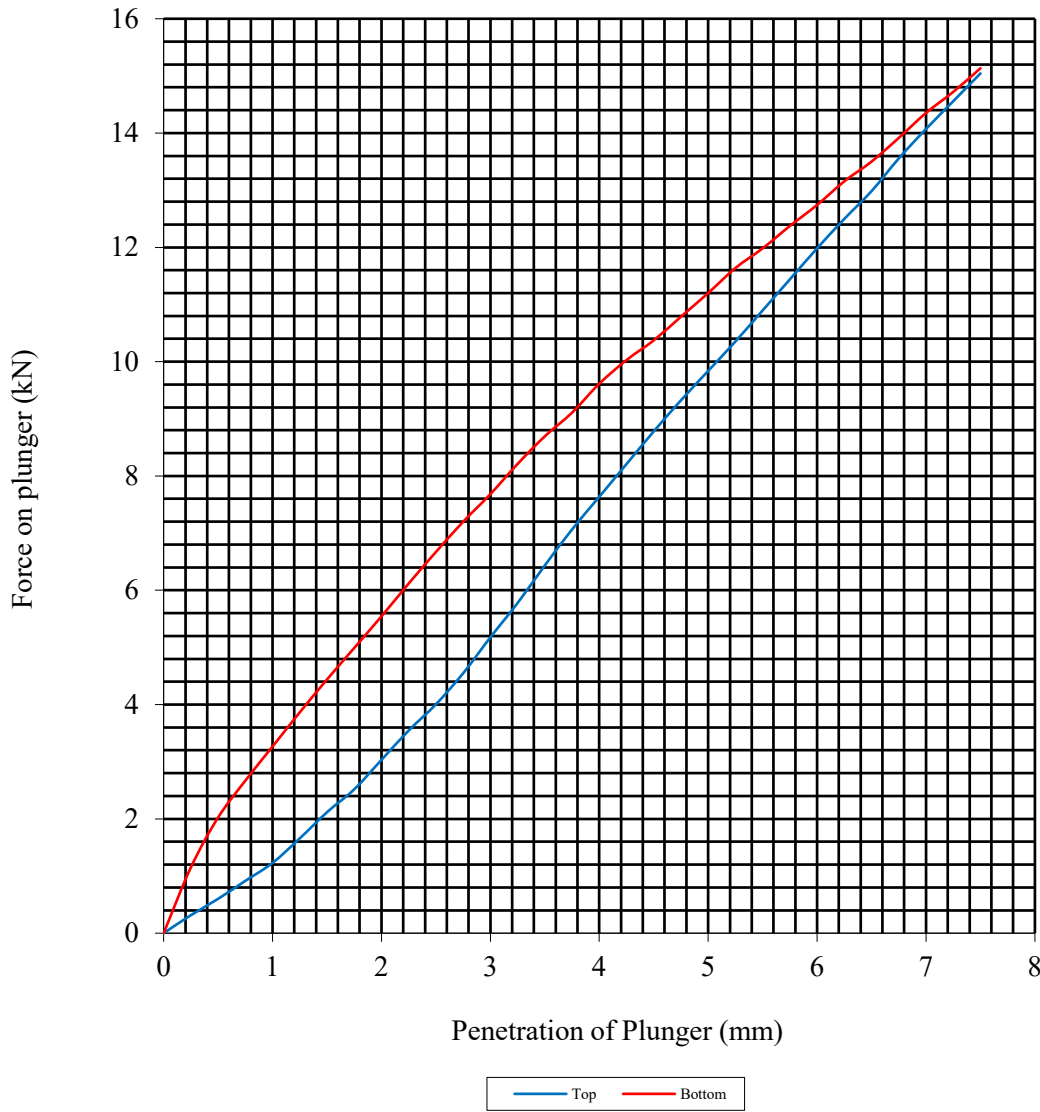
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CALIFORNIA BEARING RATIO TEST

Non compliance with BS 1377 : Part 4 : 1990

Hole Number: TP111 Top Depth (m): 2.20
 Sample Number: B2 Base Depth (m): 2.50
 Sample Type: BB



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	18	Surcharge Kg:	4.20	Sample Top	18	Sample Top	49.2
Bulk Density Mg/m ³ :	1.99	Soaking Time hrs	0	Sample Bottom	18	Sample Bottom	56.0
Dry Density Mg/m ³ :	1.68	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		38					
Compaction Conditions		4.5kg					



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CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

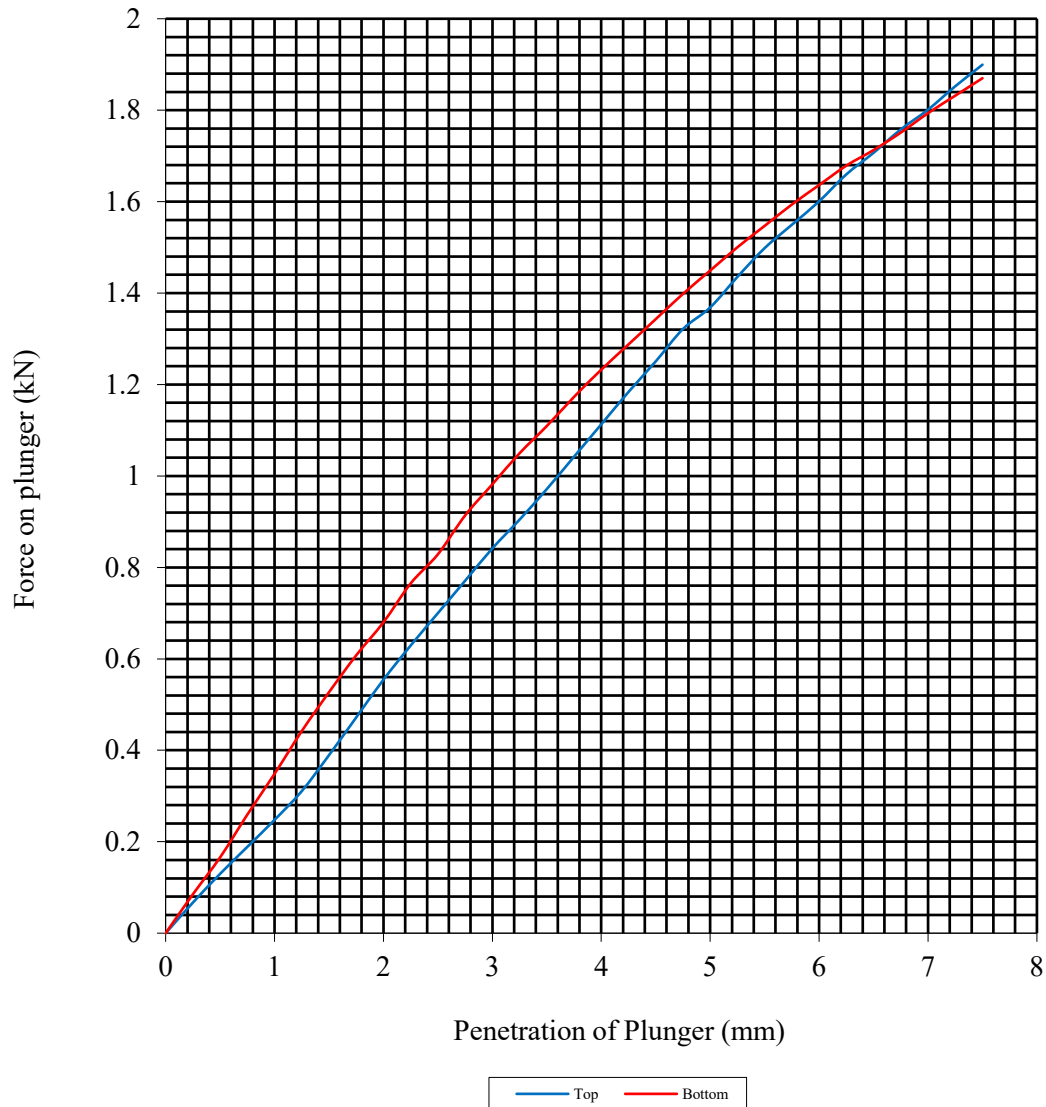
Hole Number: TP115

Top Depth (m): 2.50

Sample Number: B4

Base Depth (m): 3.00

Sample Type: BB



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	12	Surcharge Kg:	4.20	Sample Top	12	Sample Top	6.8
Bulk Density Mg/m ³ :	2.12	Soaking Time hrs	0	Sample Bottom	12	Sample Bottom	7.2
Dry Density Mg/m ³ :	1.89	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:	24						
Compaction Conditions	2.5kg						



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CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

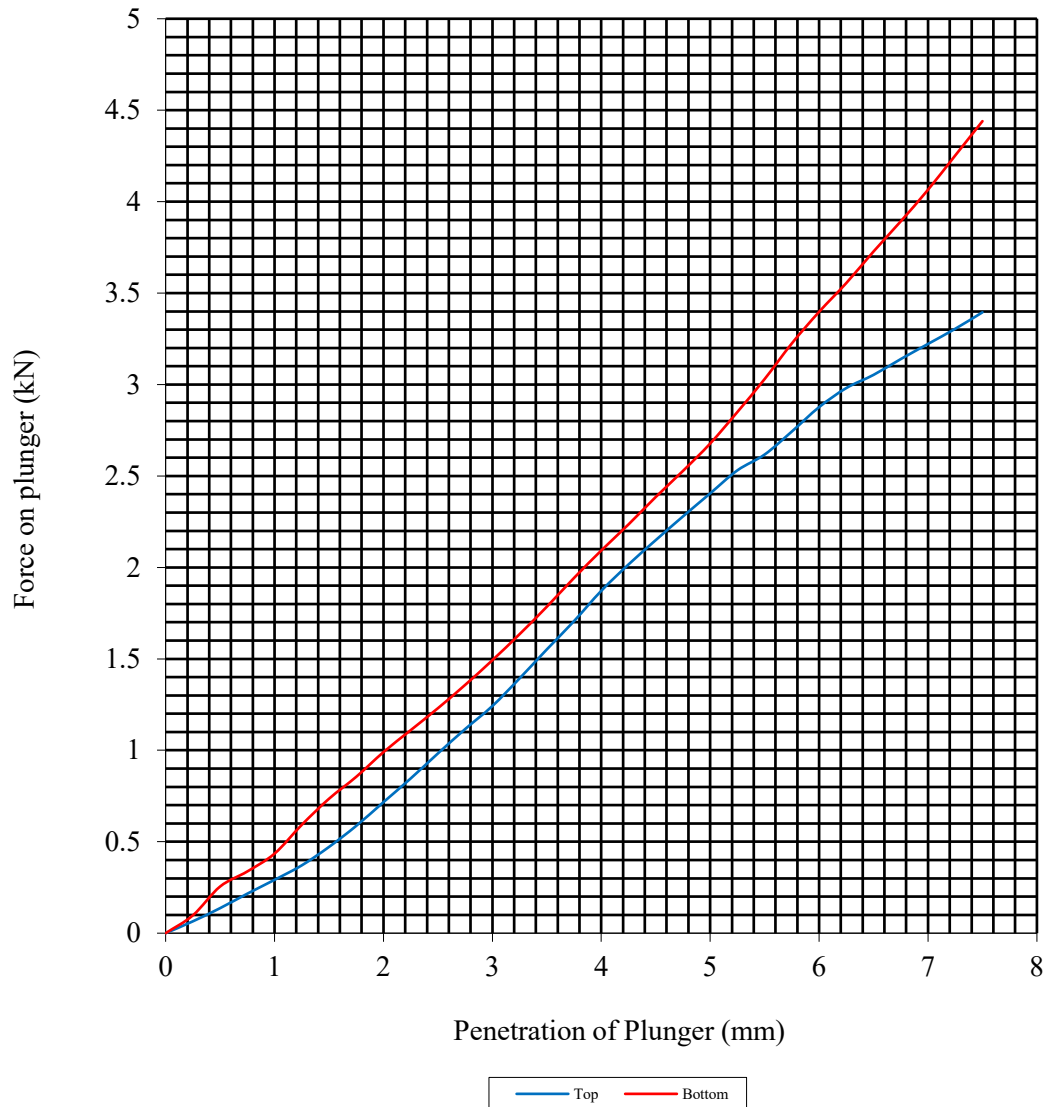
Hole Number: TP115

Top Depth (m): 2.50

Sample Number: B4

Base Depth (m): 3.00

Sample Type: BB



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	12	Surcharge Kg:	4.20	Sample Top	12	Sample Top	12.0
Bulk Density Mg/m ³ :	2.24	Soaking Time hrs	0	Sample Bottom	12	Sample Bottom	13.4
Dry Density Mg/m ³ :	2.00	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			24				
Compaction Conditions		4.5kg					



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MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

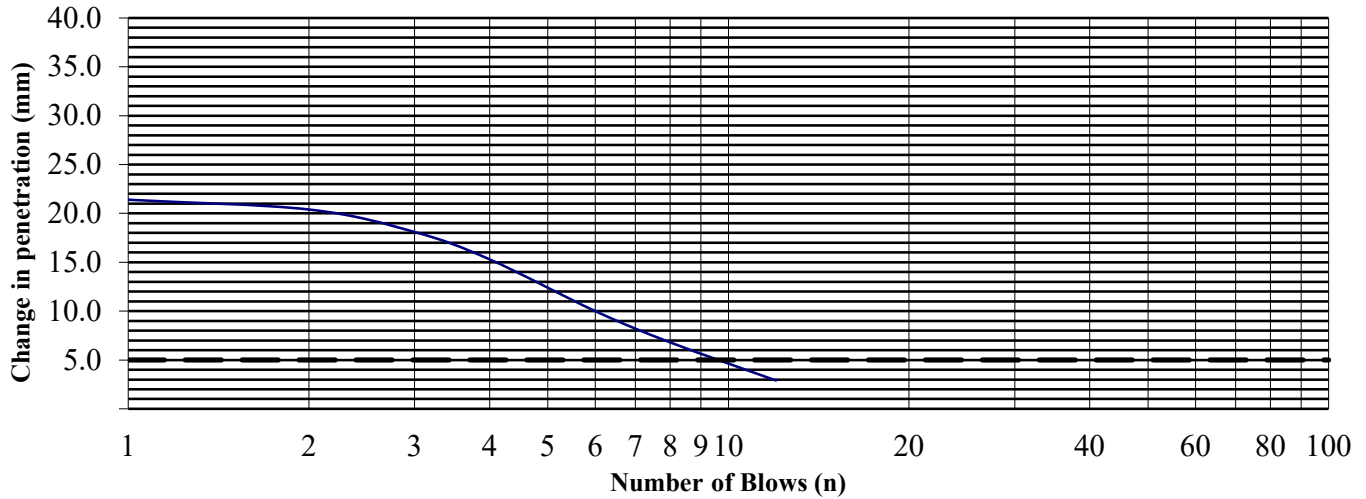
Hole Number: TP108 Top Depth (m): 2.50

Sample Number: 5 Base Depth (m): 2.60

Sample Type: B

Material Retained on the 20mm BS Test Sieve (%):	14
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	75.1	21.4
2	64.3	20.4
3	58.0	18.1
4	53.7	15.3
6	47.7	10.0
8	43.9	6.8
12	39.9	2.9
16	38.4	
24	37.7	
32	37.1	
48	37.0	
64		
96		
128		
192		
256		

Test Results.

Moisture Content (%)	13
MCV	9.9



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MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

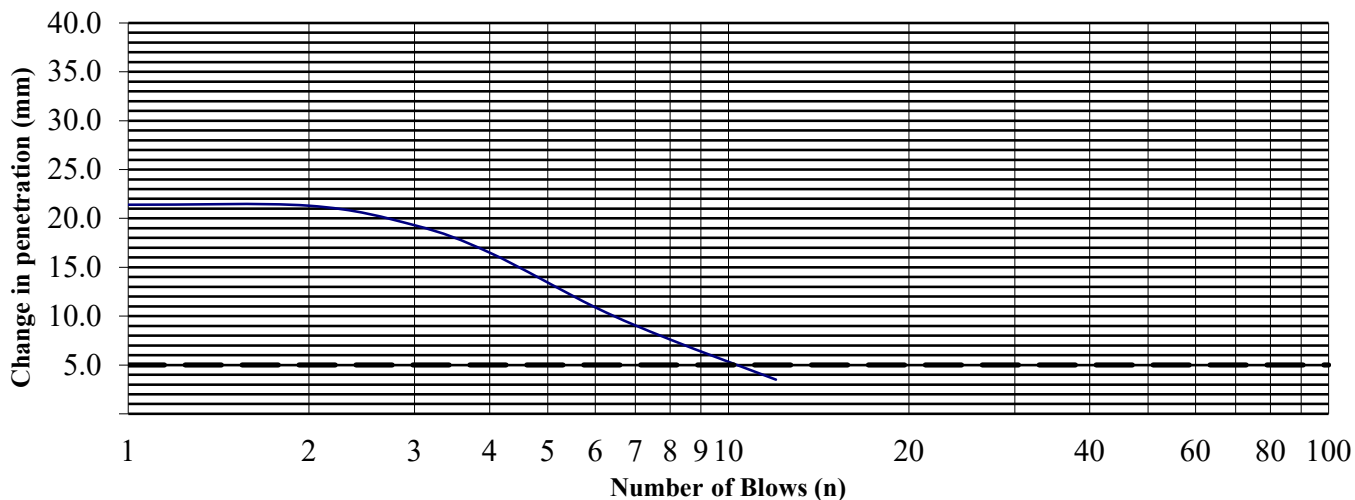
Hole Number: TP109 Top Depth (m): 1.50

Sample Number: 8 Base Depth (m): 1.90

Sample Type: B

Material Retained on the 20mm BS Test Sieve (%):	10
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	77.0	21.4
2	66.8	21.3
3	60.6	19.3
4	55.6	16.5
6	49.1	10.9
8	45.5	7.6
12	41.3	3.5
16	39.1	
24	38.2	
32	37.9	
48	37.8	
64		
96		
128		
192		
256		

Test Results.

Moisture Content (%)	17
MCV	9.5



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MOISTURE CONDITION VALUE CALIBRATION

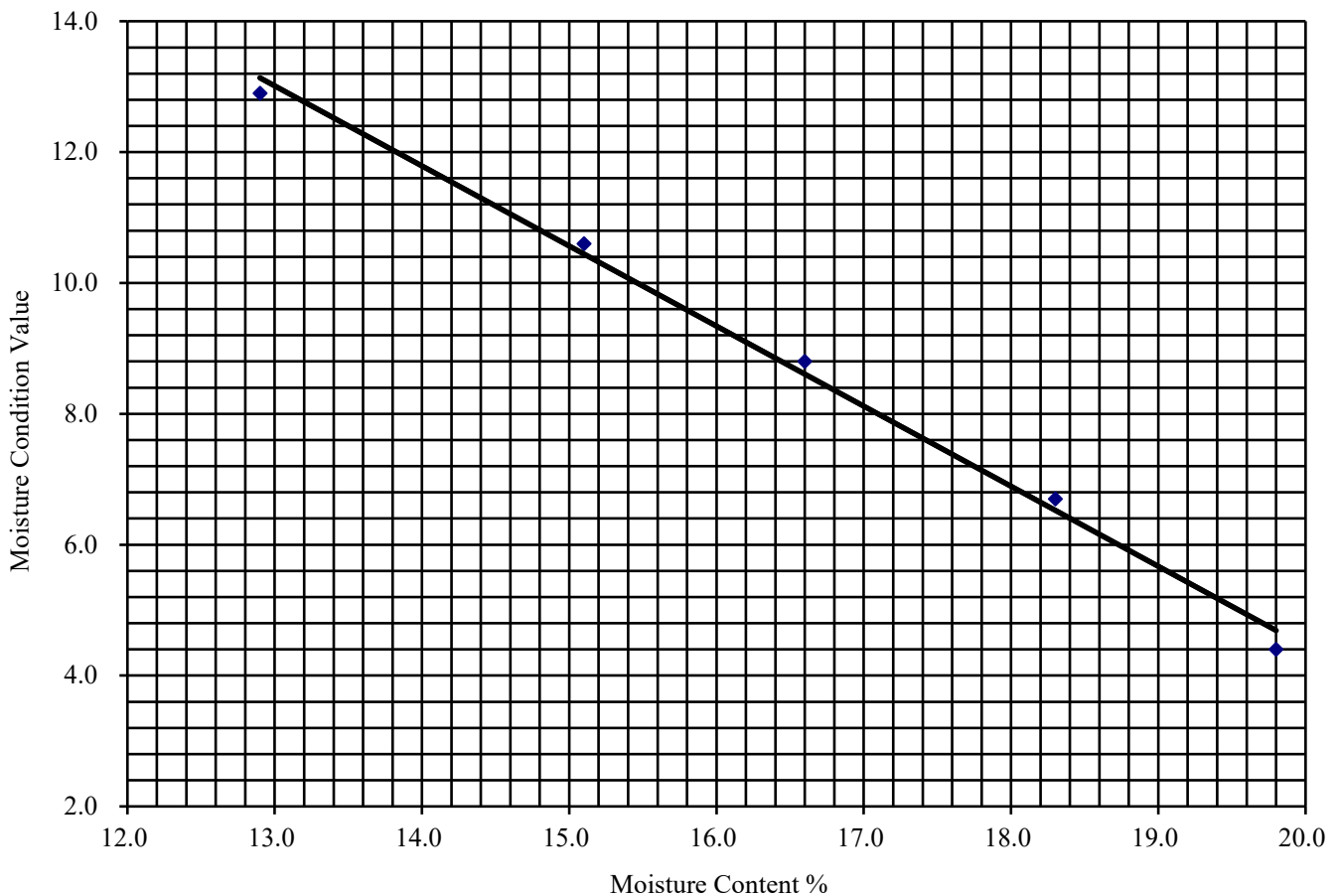
BS1377 : Part 4 : 1990 Clause 5.5

Hole Number: TP110 Top Depth (m): 2.00

Sample Number: 9 Base Depth (m): 2.50

Sample Type: B

Initial Moisture Content (%):	18
Single/Separate Samples Tested	Separate
Material Retained on the 20mm BS Test Sieve (%):	11



Test Results.

Test Number	1	2	3	4	5
Moisture Content (%)	12.9	15.1	16.6	18.3	19.8
MCV	12.9	10.6	8.8	6.7	4.4



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MOISTURE CONDITION VALUE CALIBRATION

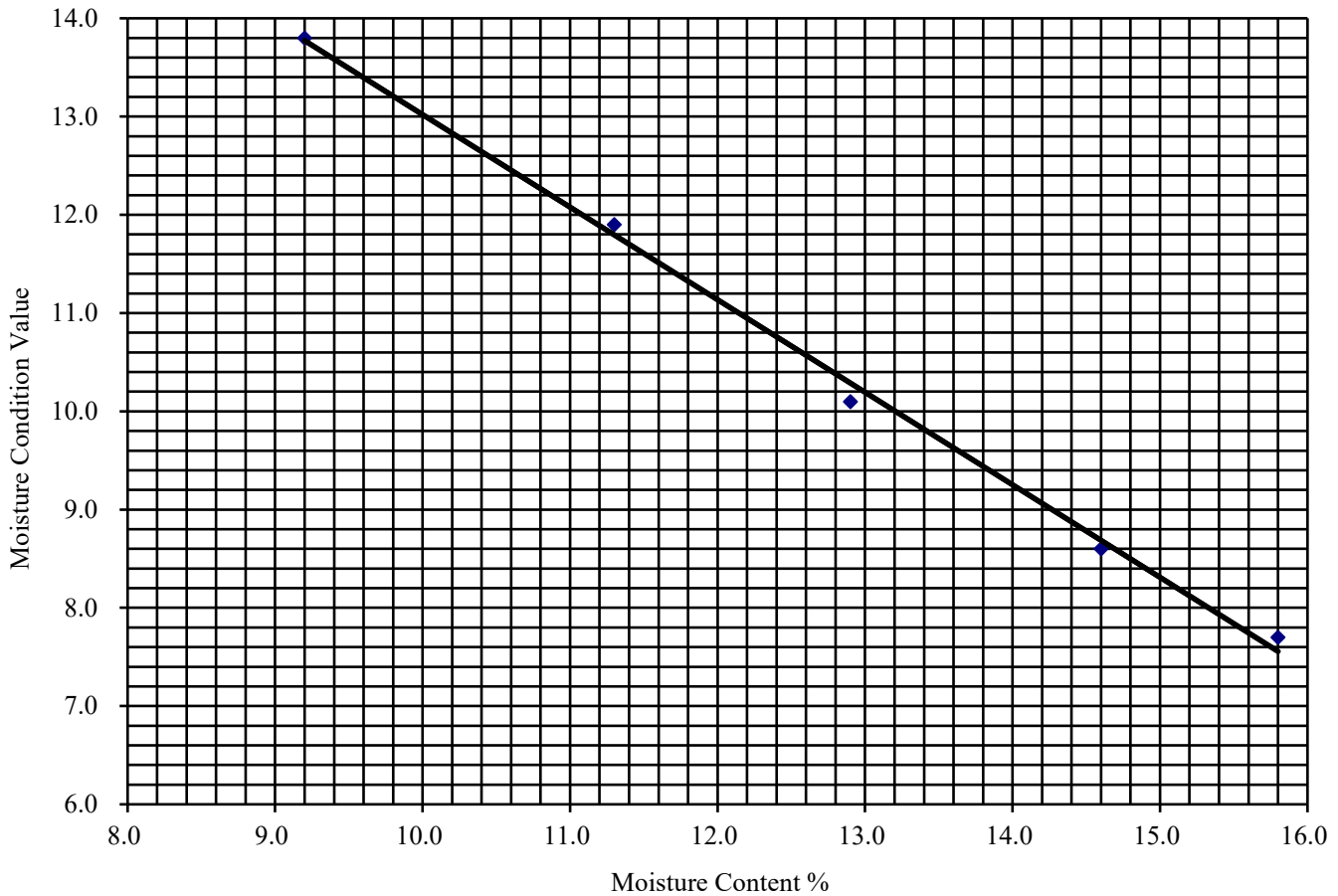
BS1377 : Part 4 : 1990 Clause 5.5

Hole Number: TP112 **Top Depth (m):** 2.50

Sample Number: 10 **Base Depth (m):** 2.80

Sample Type: B

Initial Moisture Content (%):	10
Single/Separate Samples Tested	Separate
Material Retained on the 20mm BS Test Sieve (%):	25



Test Results.

Test Number	1	2	3	4	5
Moisture Content (%)	9.2	11.3	12.9	14.6	15.8
MCV	13.8	11.9	10.1	8.6	7.7



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MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

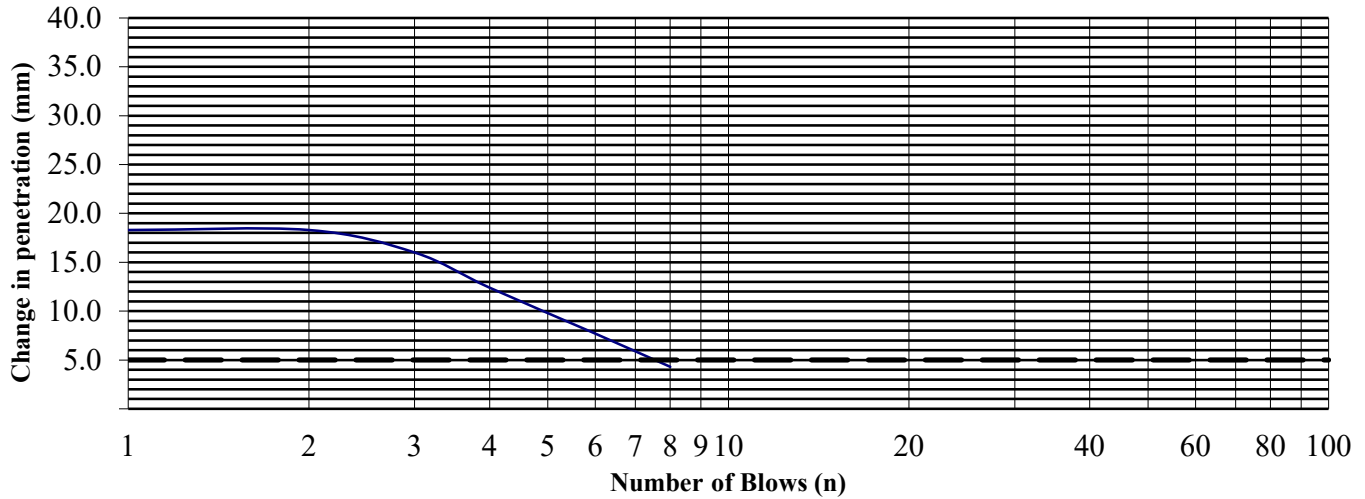
Hole Number: TP115 Top Depth (m): 2.50

Sample Number: 4 Base Depth (m): 3.00

Sample Type: B

Material Retained on the 20mm BS Test Sieve (%):	24
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	67.7	18.3
2	59.1	18.3
3	53.6	16.0
4	49.4	12.4
6	44.4	7.7
8	40.8	4.3
12	37.6	
16	37.0	
24	36.7	
32	36.5	
48		
64		
96		
128		
192		
256		

Test Results.

Moisture Content (%)	12
MCV	8.3



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DETS

Certificate of Analysis

Certificate Number 19-10180

06-Jun-19

Client Professional Soils Laboratory Ltd
5/7 Hexthorpe Road
Hexthorpe
DN4 0AR

Our Reference 19-10180

Client Reference PSL19/3110

Order No (not supplied)

Contract Title Barnsley West

Description 4 Soil samples.

Date Received 31-May-19

Date Started 31-May-19

Date Completed 06-Jun-19

Test Procedures Identified by prefix DETSn (details on request).

Notes 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.

Approved By



Adam Fenwick
Contracts Manager



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Summary of Chemical Analysis

Soil Samples

Our Ref 19-10180

Client Ref PSL19/3110

Contract Title Barnsley West

Lab No	1509073	1509074	1509075	1509076
Sample ID	TP108	TP109	TP110	TP115
Depth	2.70-2.80	1.50-1.60	2.00-2.10	2.50-2.60
Other ID	T2	T3	T4	T1
Sample Type	D	D	D	D
Sampling Date	30/05/19	30/05/19	30/05/19	30/05/19
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Inorganics							
pH	DETSC 2008#			7.6	8.1	7.3	8.2
Calorific Value	DETSC 5008	1	MJ/kg	7.1	< 1.0	< 1.0	< 1.0
Organic matter	DETSC 2002#	0.1	%	4.3	0.6	1.0	1.1
Sulphate Aqueous Extract as SO ₄	DETSC 2076#	10	mg/l	250	51	26	26
Sulphur as S, Total	DETSC 2320	0.01	%	0.41	0.01	0.02	< 0.01
Sulphate as SO ₄ , Total	DETSC 2321#	0.01	%	0.05	0.02	0.01	0.01

Information in Support of the Analytical Results

Our Ref 19-10180
 Client Ref PSL19/3110
 Contract Barnsley West

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1509073	TP108 2.70-2.80 SOIL	30/05/19	PT 500ml		
1509074	TP109 1.50-1.60 SOIL	30/05/19	PT 500ml		
1509075	TP110 2.00-2.10 SOIL	30/05/19	PT 500ml		
1509076	TP115 2.50-2.60 SOIL	30/05/19	PT 500ml		

Key: P-Plastic T-Tub
 DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

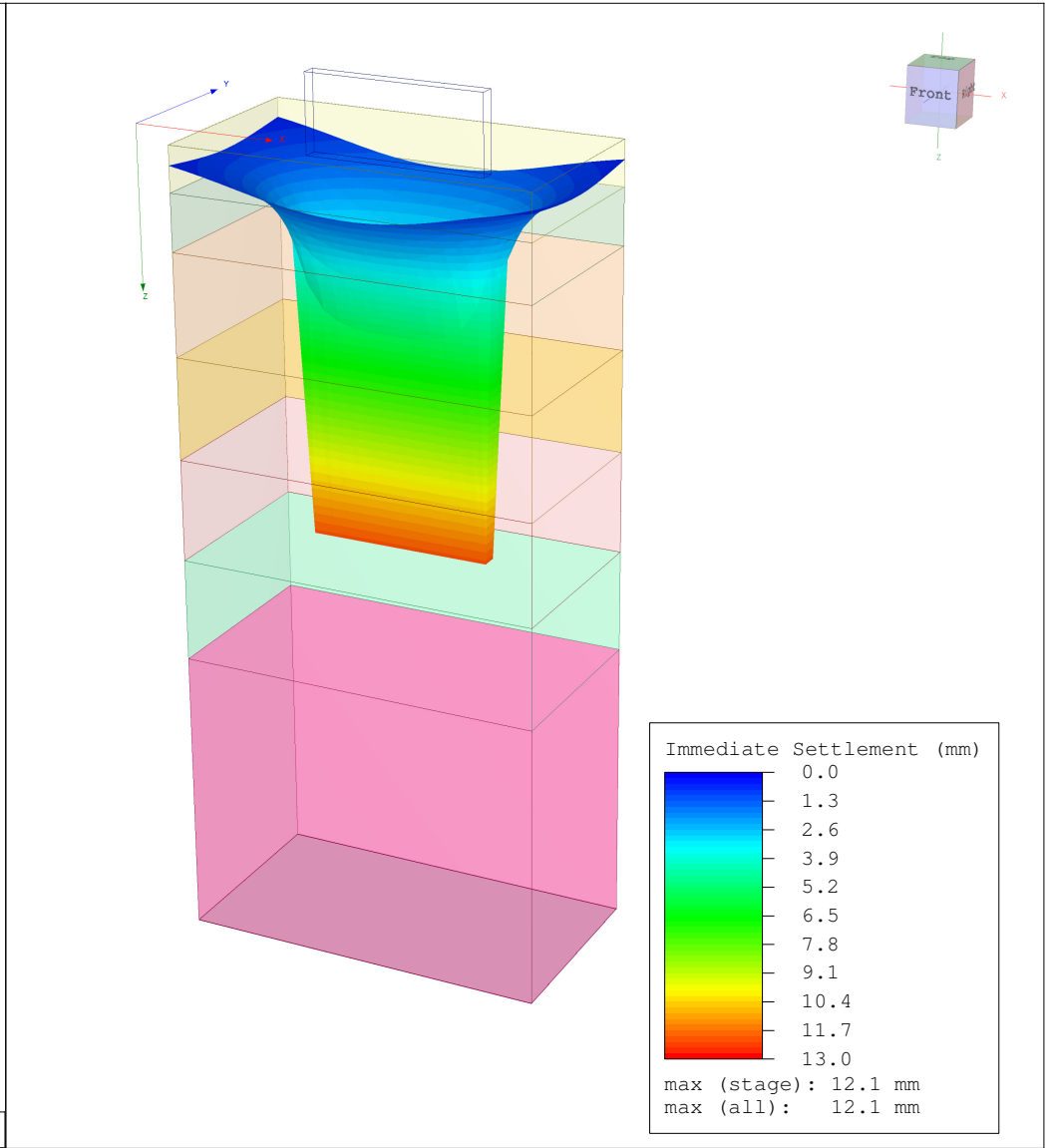
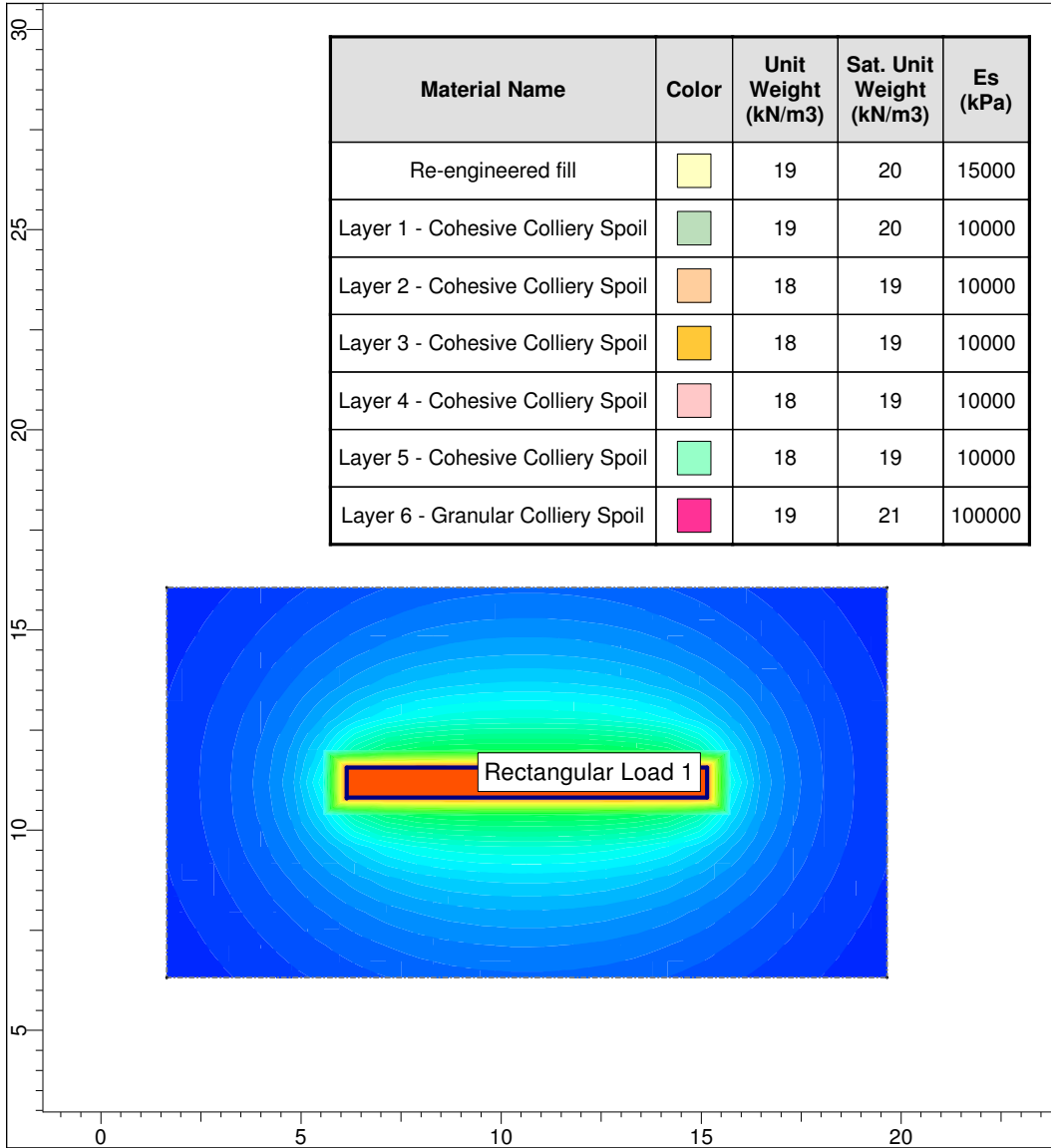
Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.
 Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.
 The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal




From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
 Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

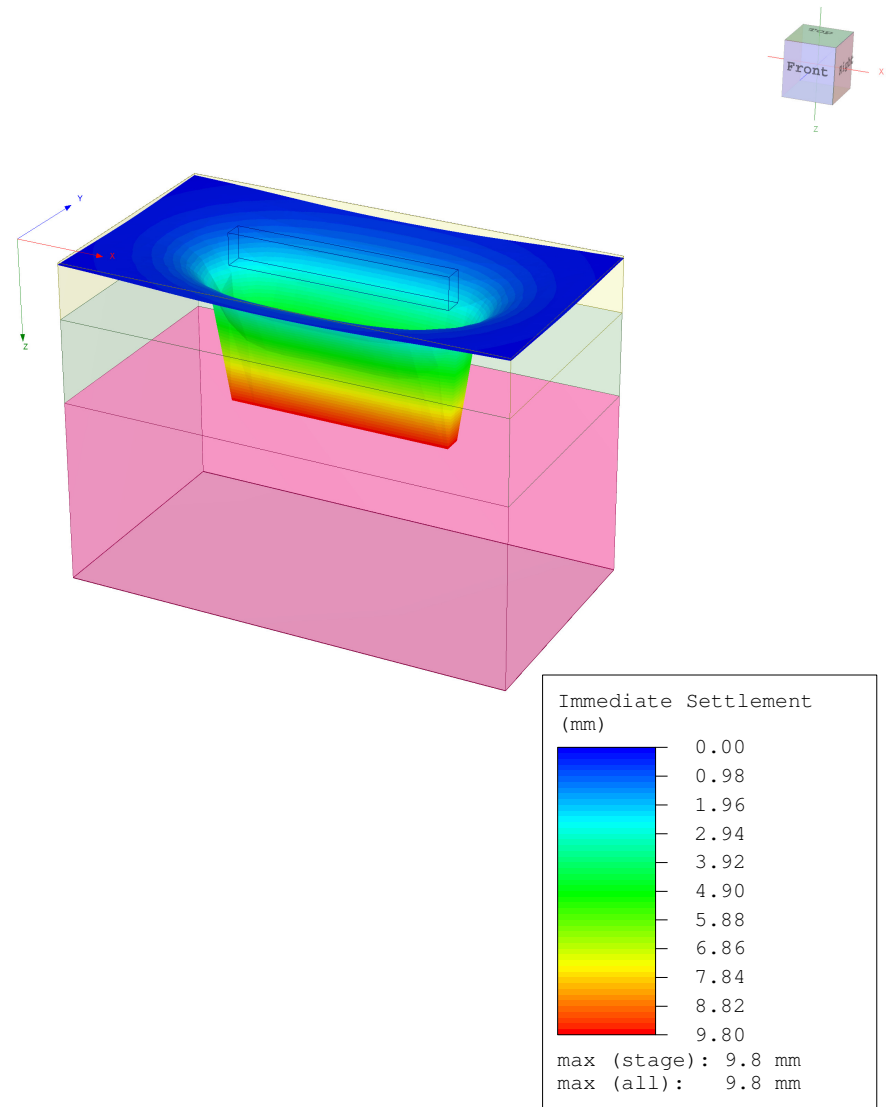
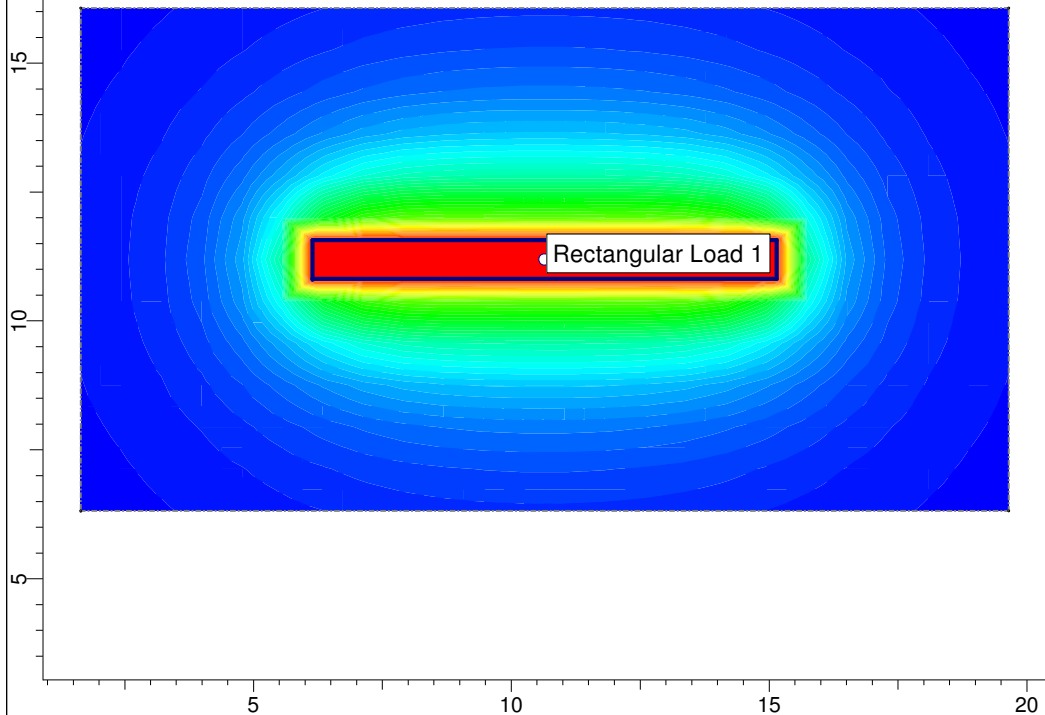



Appendix E Settlement Analysis (Settle 3D)

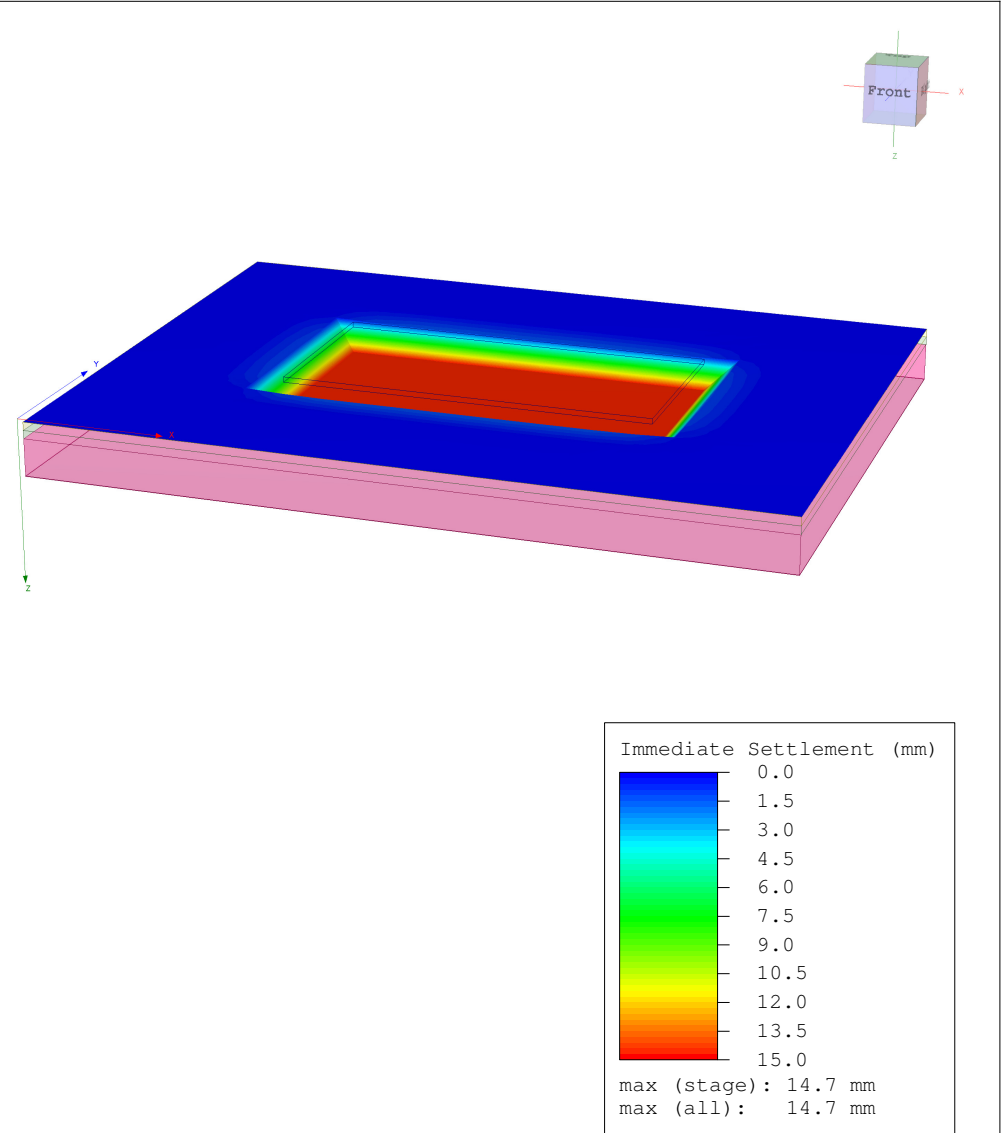
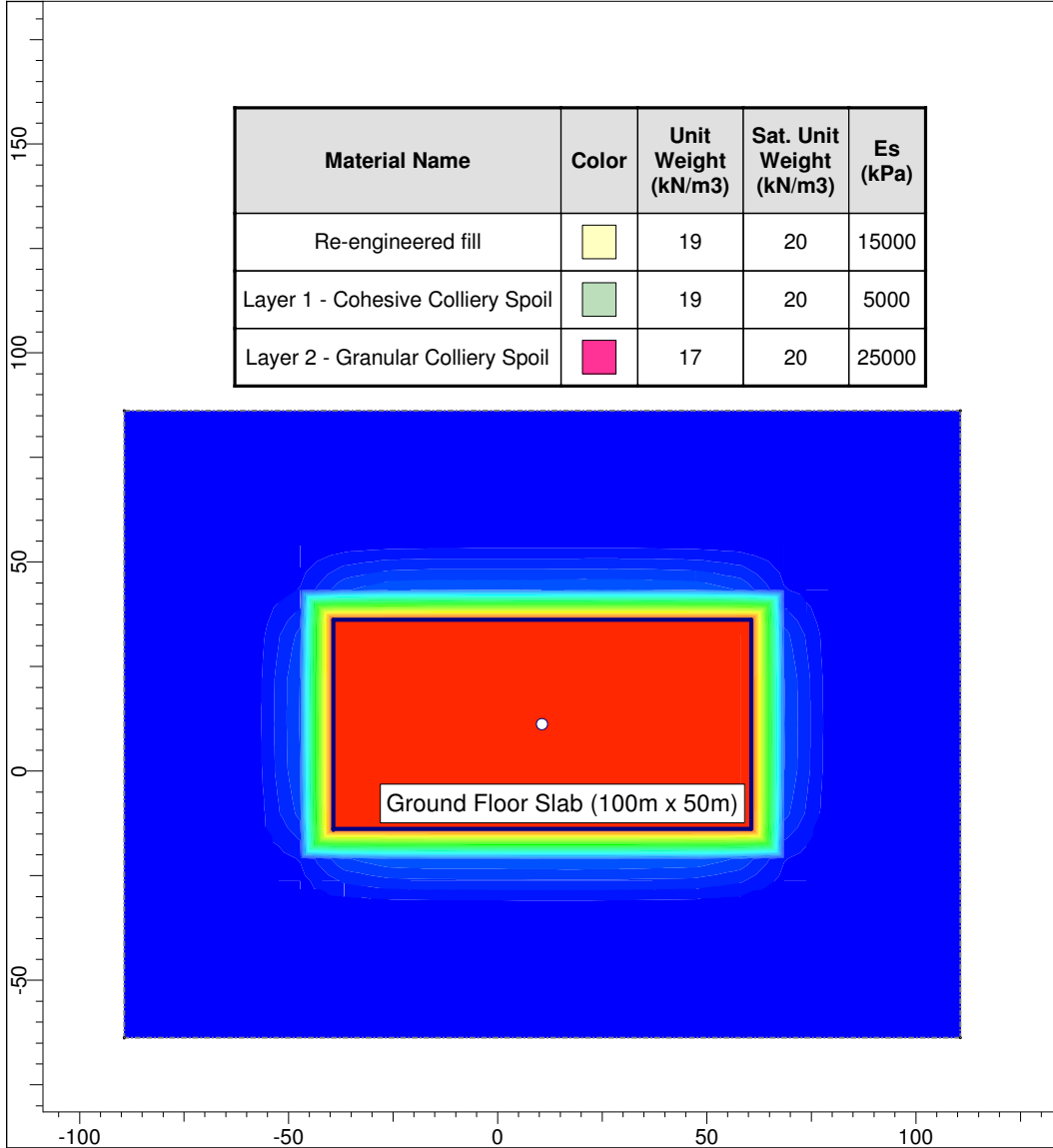


	Project	4848 - Barnsley West	
	Analysis Description	Boussinesq - Immediate Settlement Only_Craven I & II	
	Drawn By	JAM	Company JPG (Leeds) Ltd
	Date	21/06/2019, 10:24:47	File Name 4848 - Craven I & II_Reinforced strips_60kPa_Empirical parameters.s3z

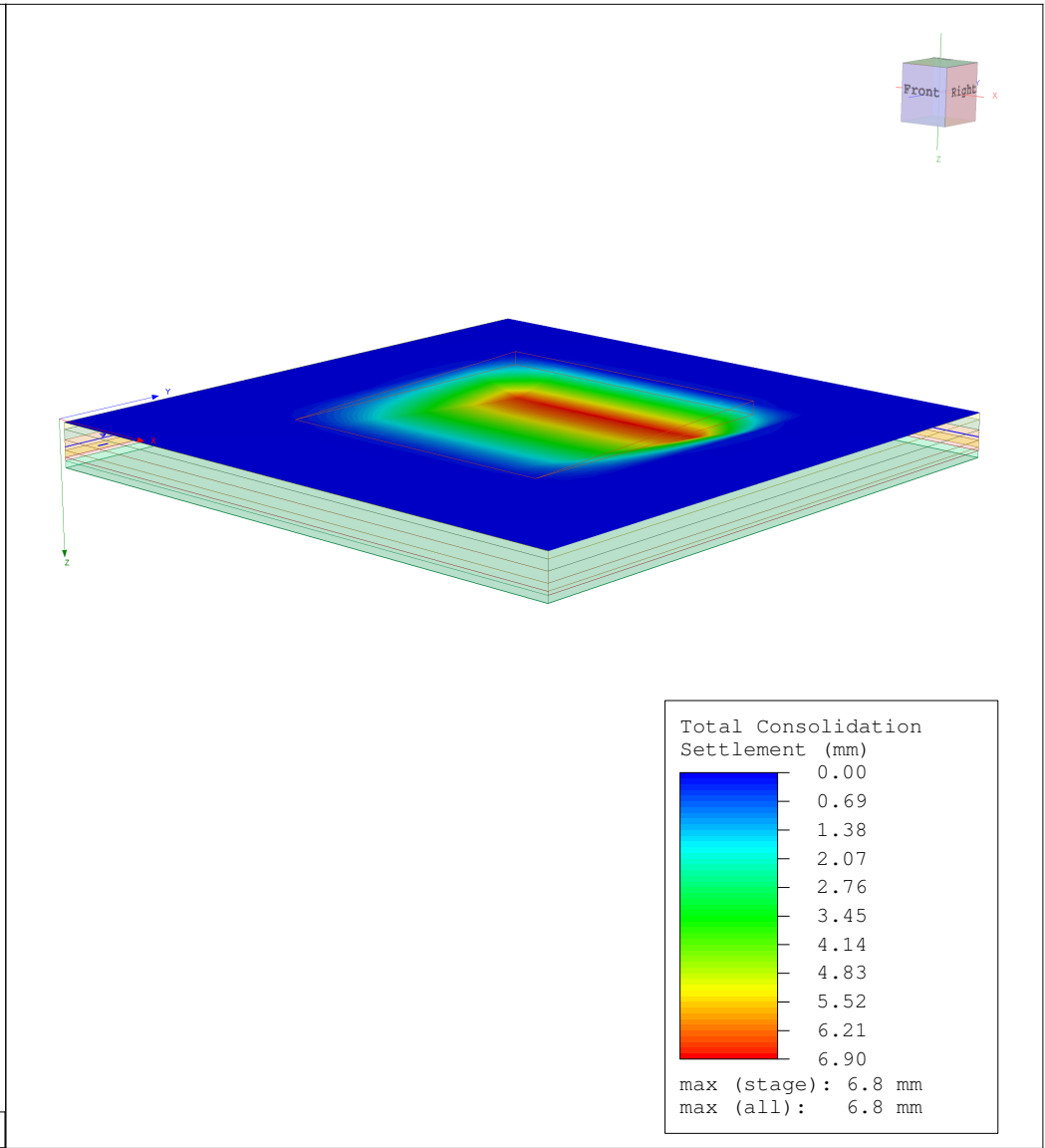
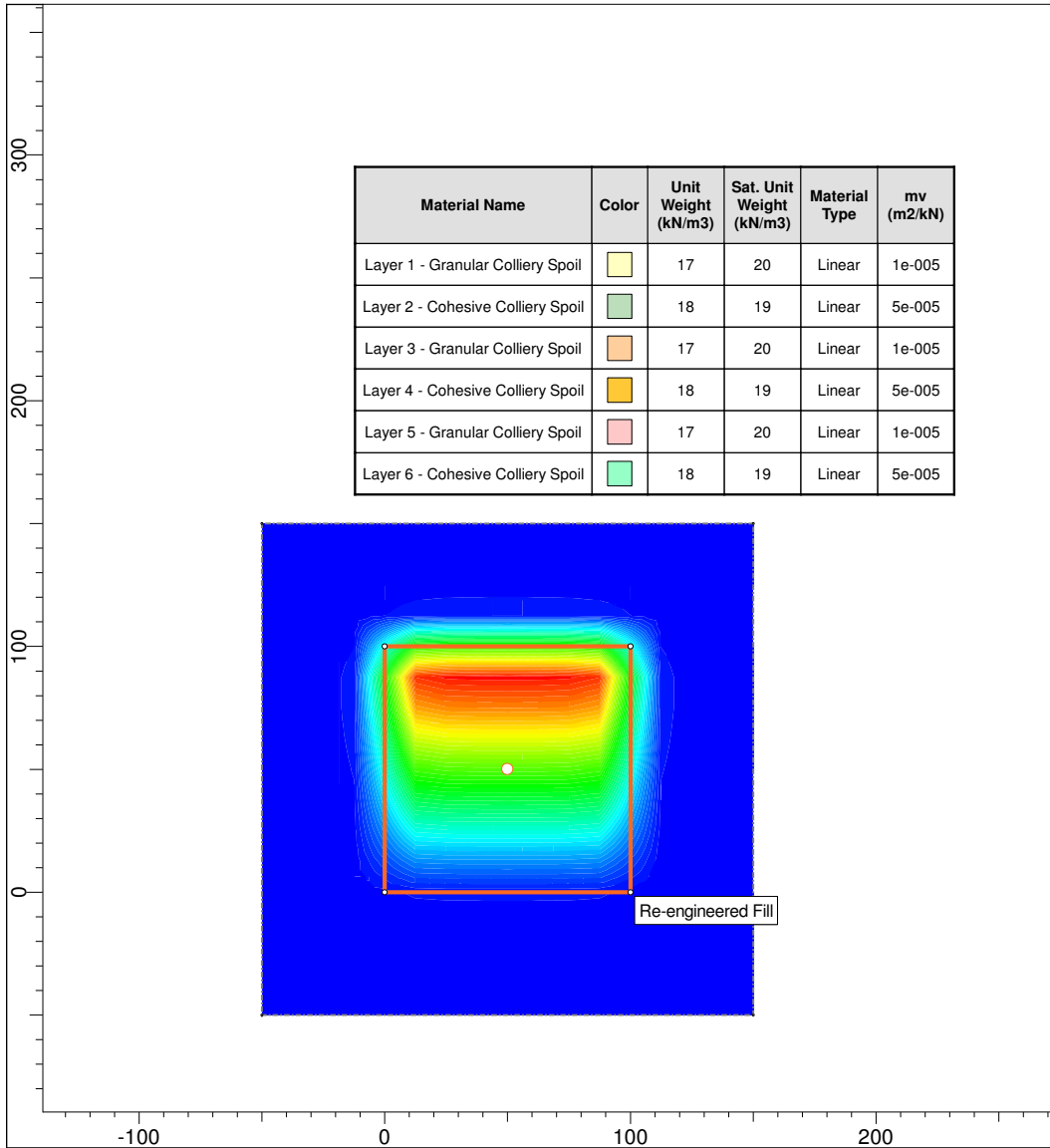
Material Name	Color	Unit Weight (kN/m ³)	Sat. Unit Weight (kN/m ³)	Es (kPa)
Re-engineered fill		19	20	15000
Layer 1 - Cohesive Colliery Spoil		19	20	5000
Layer 2 - Granular Colliery Spoil		19	21	25000



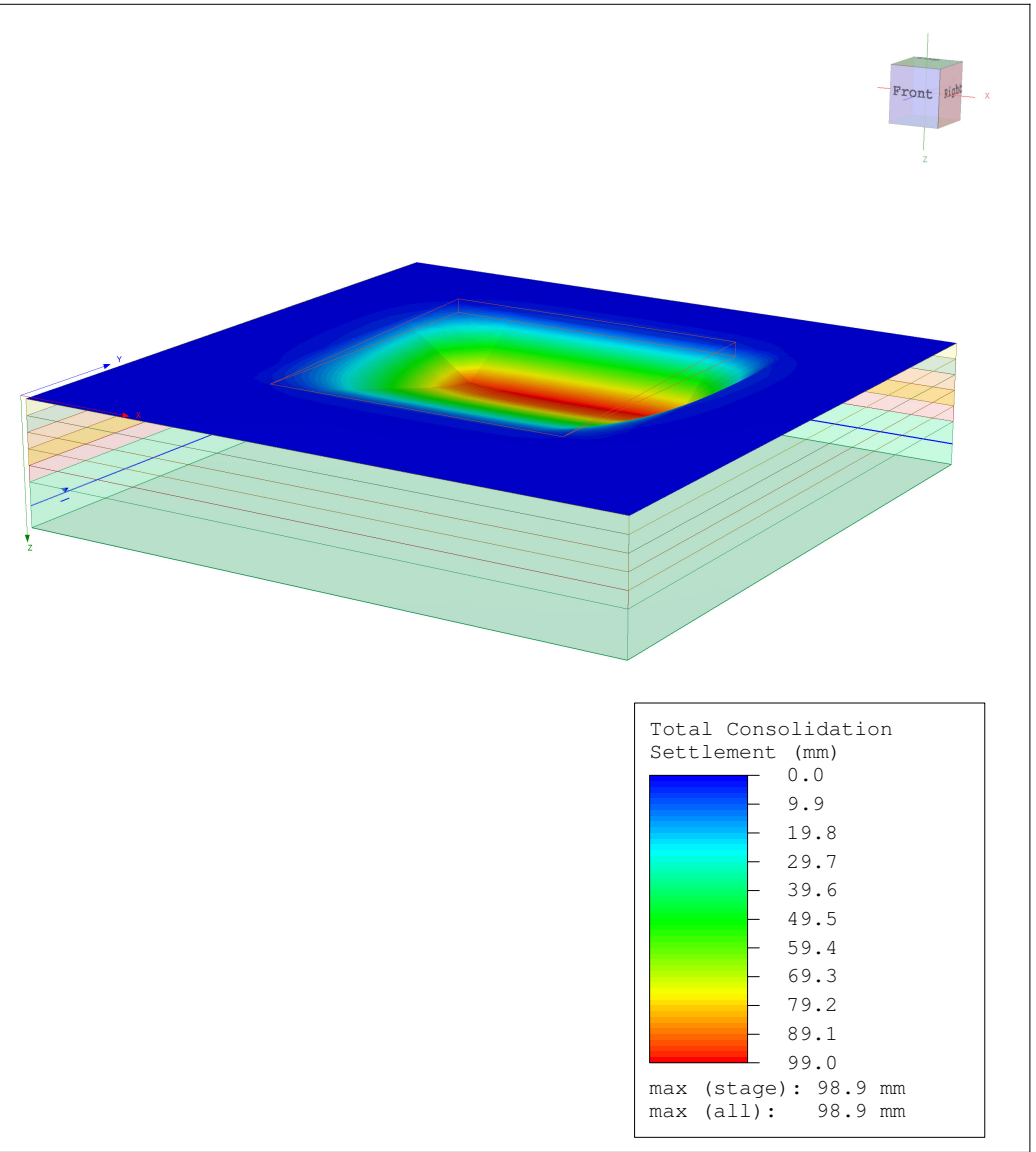
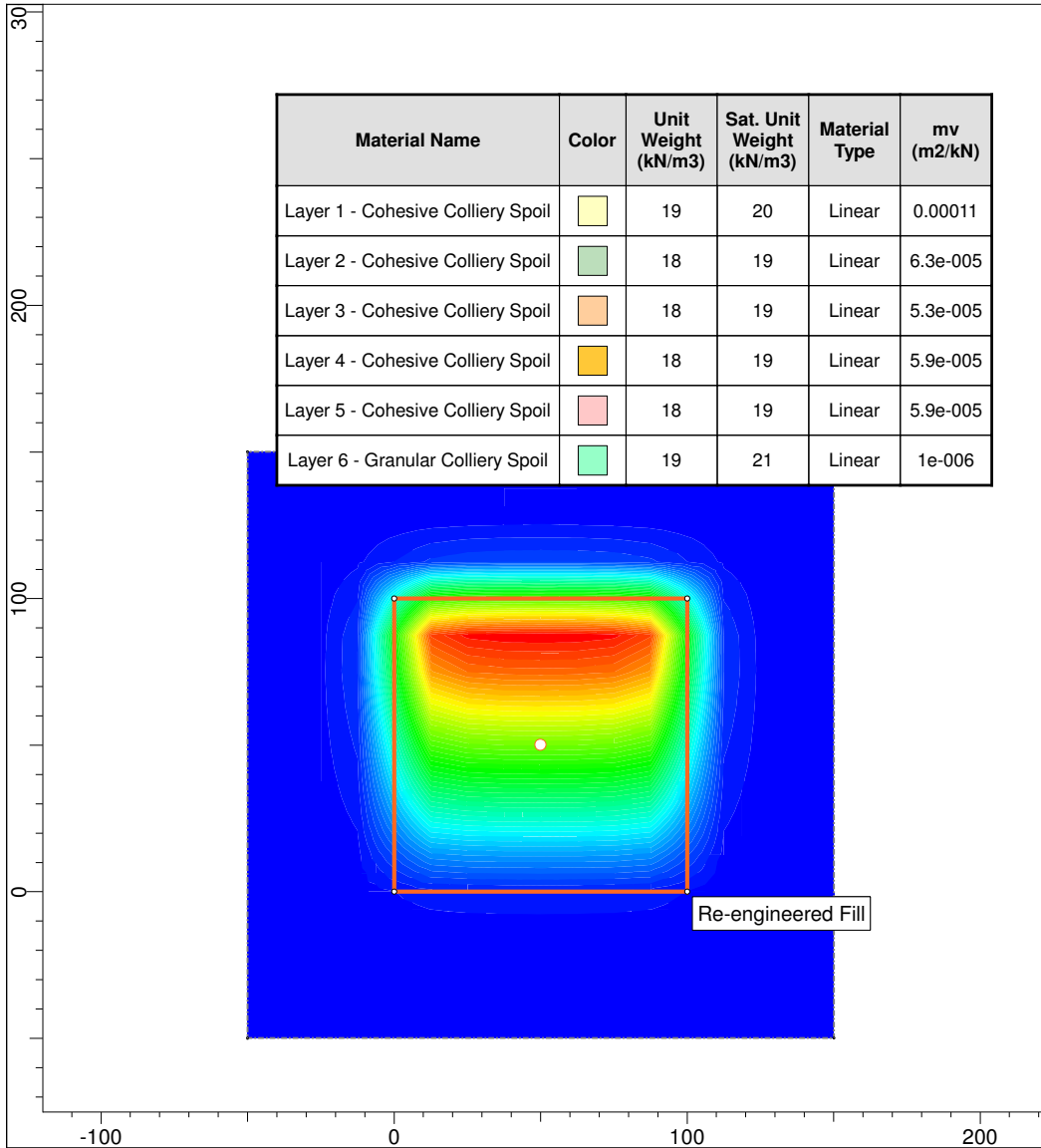
	Project	4848 - Barnsley West	
	Analysis Description	Boussinesq - Immediate Settlement Only_Farmhouse Lane OCCS	
	Drawn By	JAM	Company JPG (Leeds) Ltd
	Date	21/06/2019, 10:24:47	File Name 4848 - Farmhouse Lane_Reinforced strips_60kPa_Empirical parameters s37



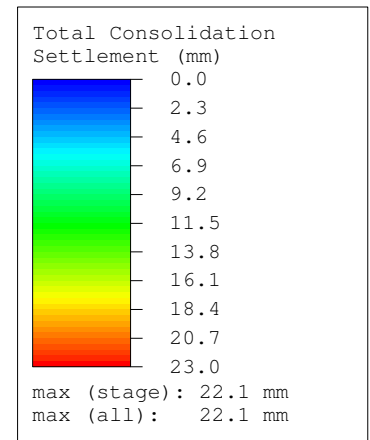
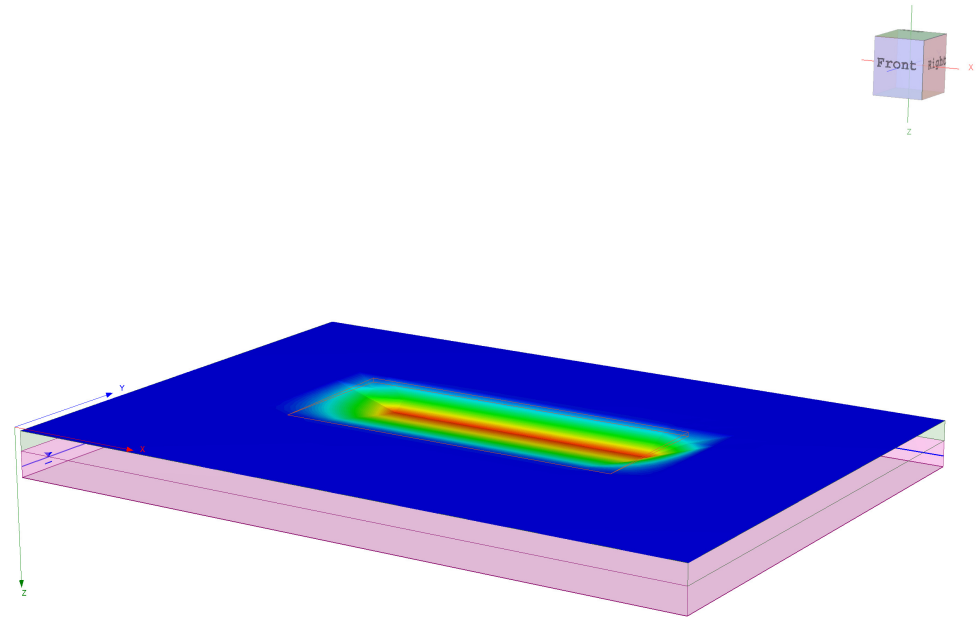
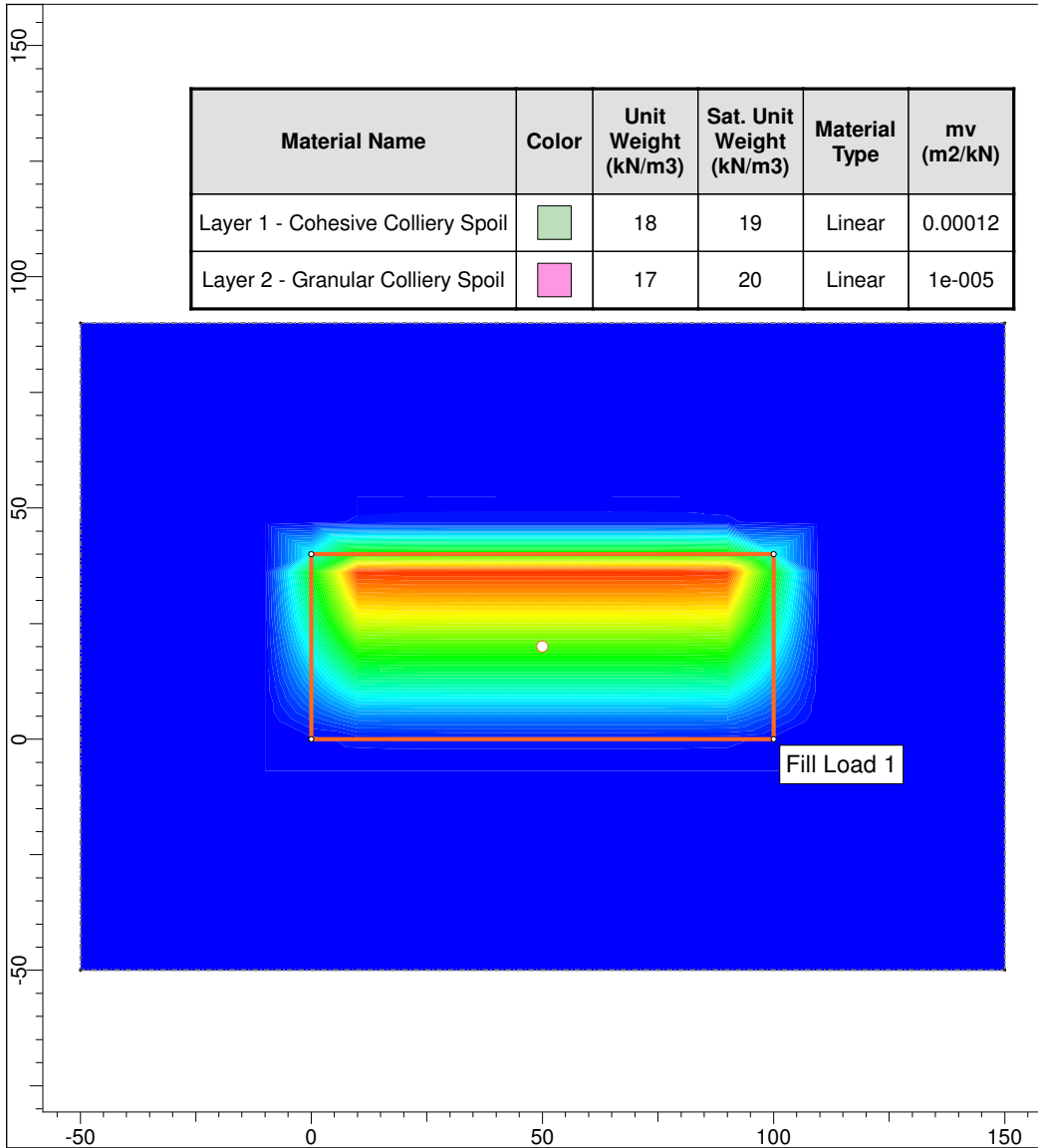
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	Analysis Description	Boussinesq - Immediate Settlement Only_Hunters Cottage	
	Drawn By	JAM	Company JPG (Leeds) Ltd
	Date	21/06/2019, 10:24:47	File Name 4848 - Hunters Cottage_GB Slab_25kPa_Empirical parameters.s3z



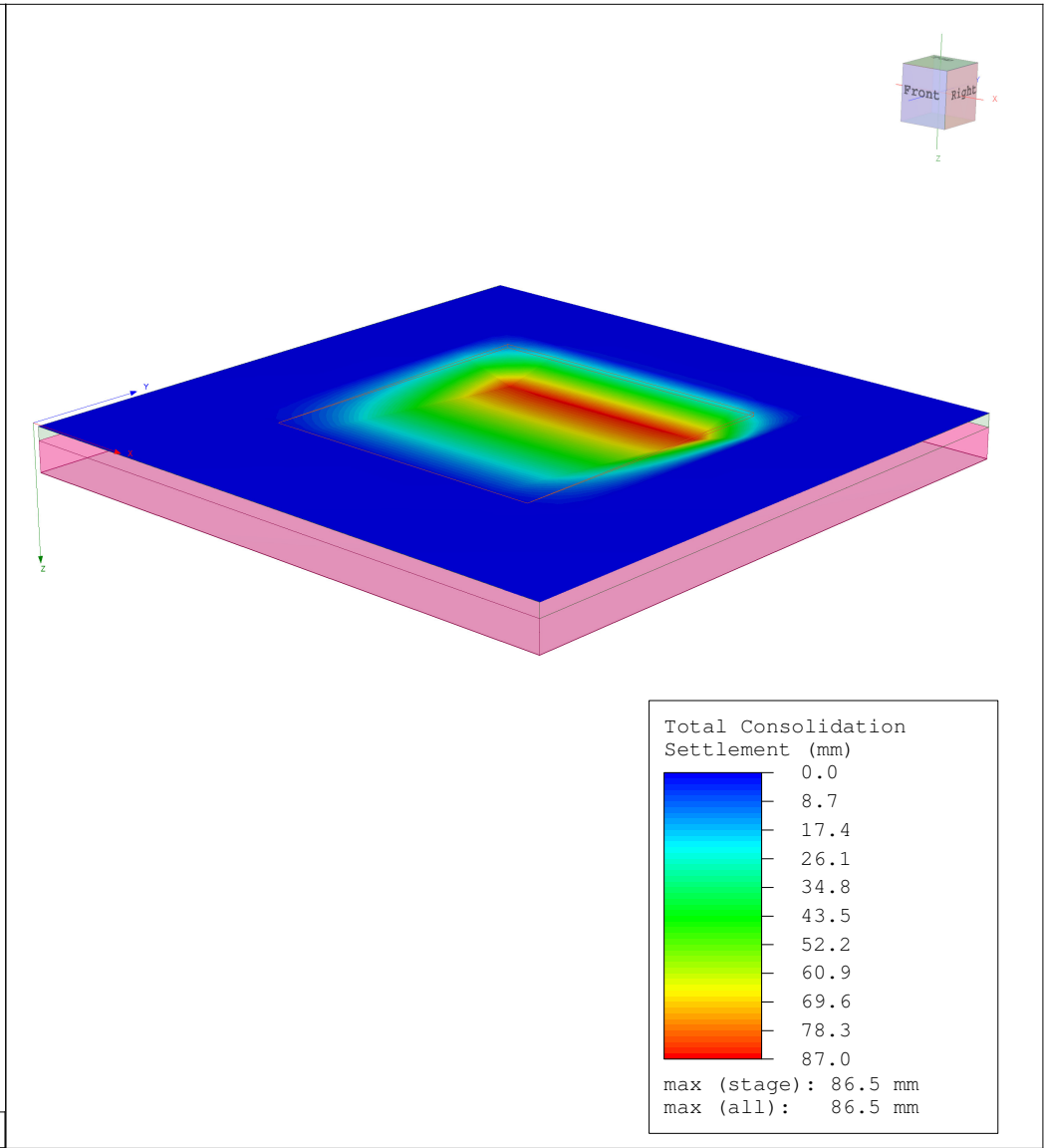
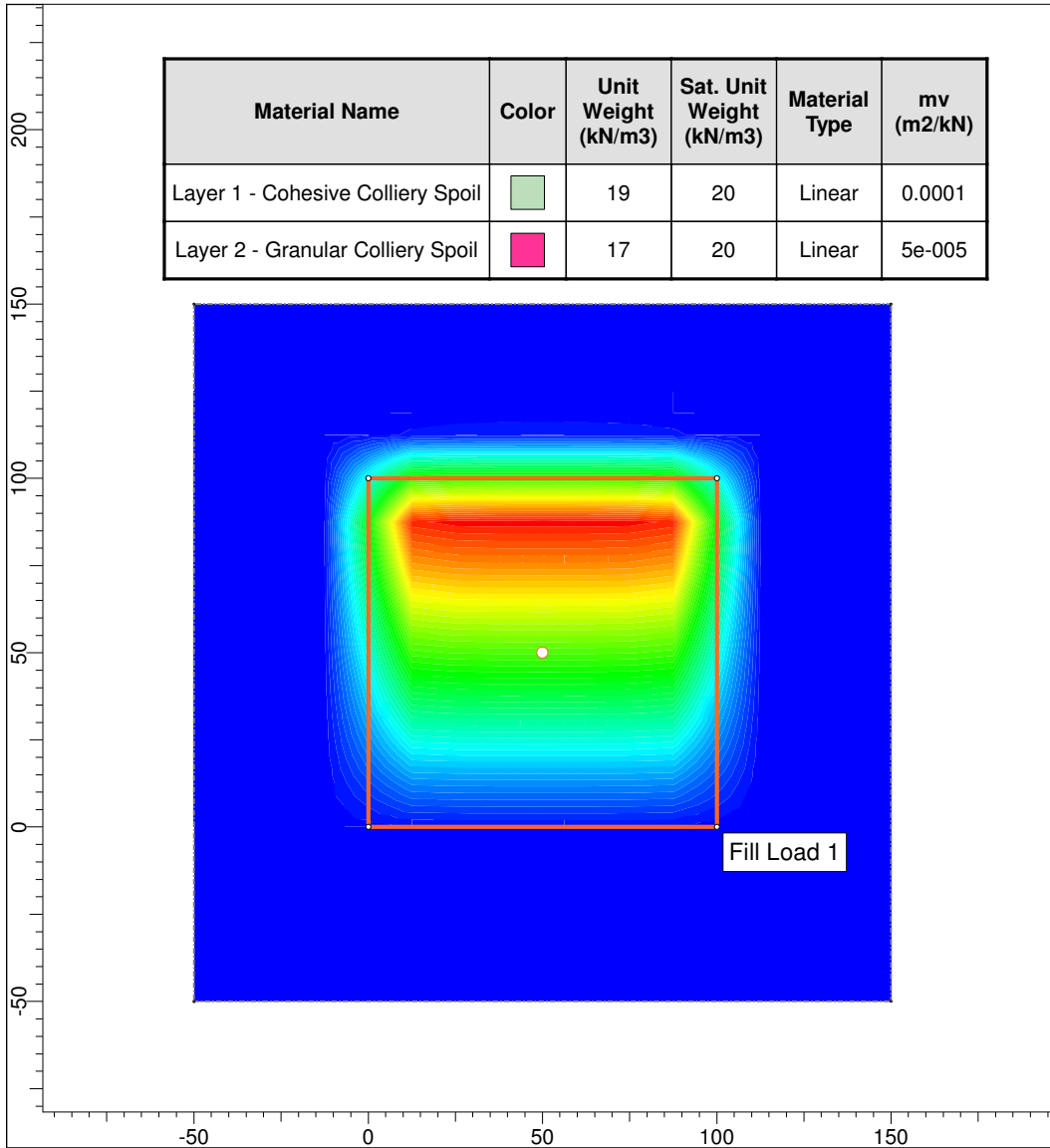
	Project	4848 - Barnsley West	
	Analysis Description	Boussinesq - Consolidation Settlement Only_Craven I	
	Drawn By	JAM	Company JPG (Leeds) Ltd
	Date	21/06/2019, 09:20:59	File Name 4848 - CI_Consolidation_re-engineered fill_Empirical Parameters - Conv s3z




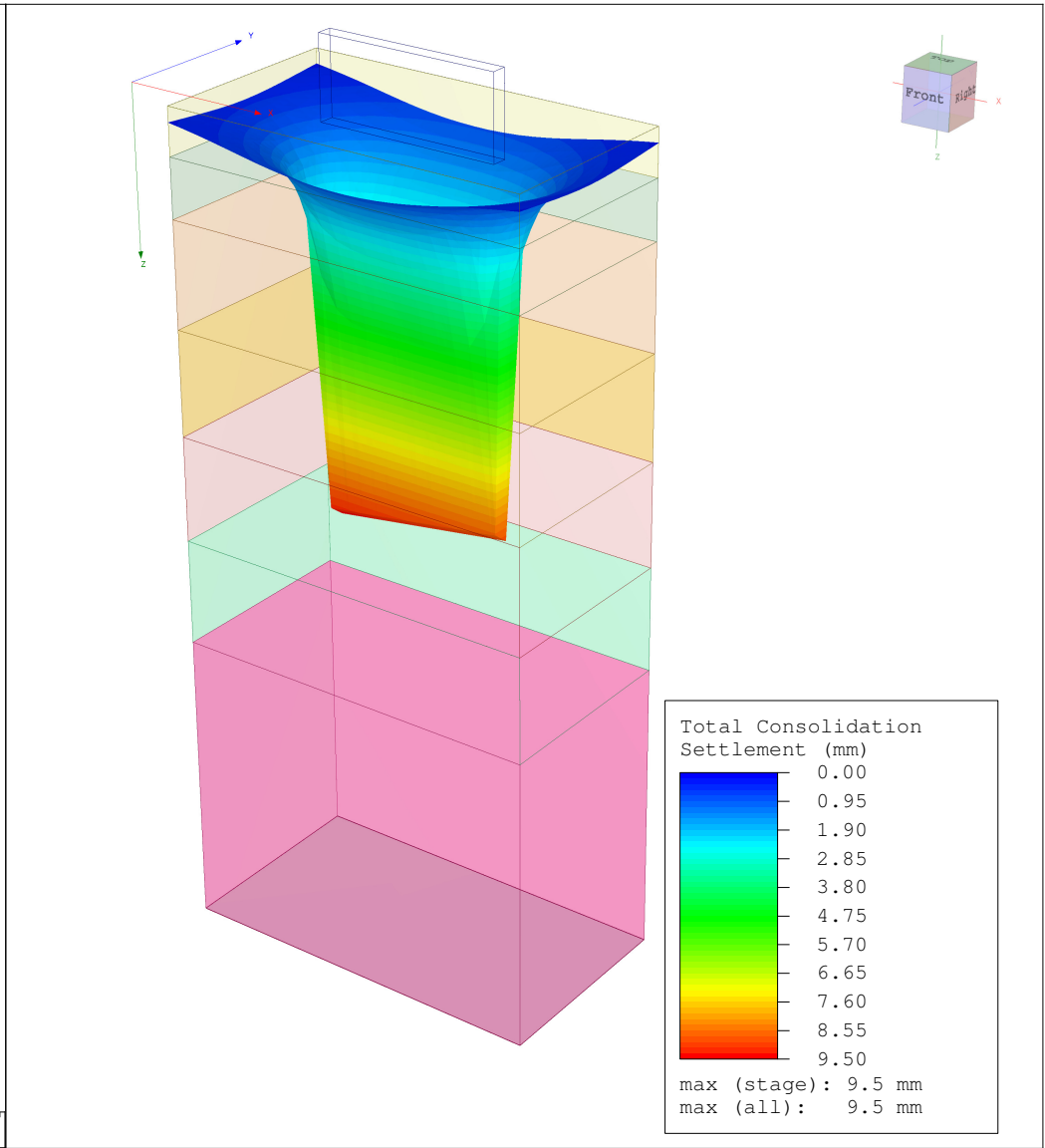
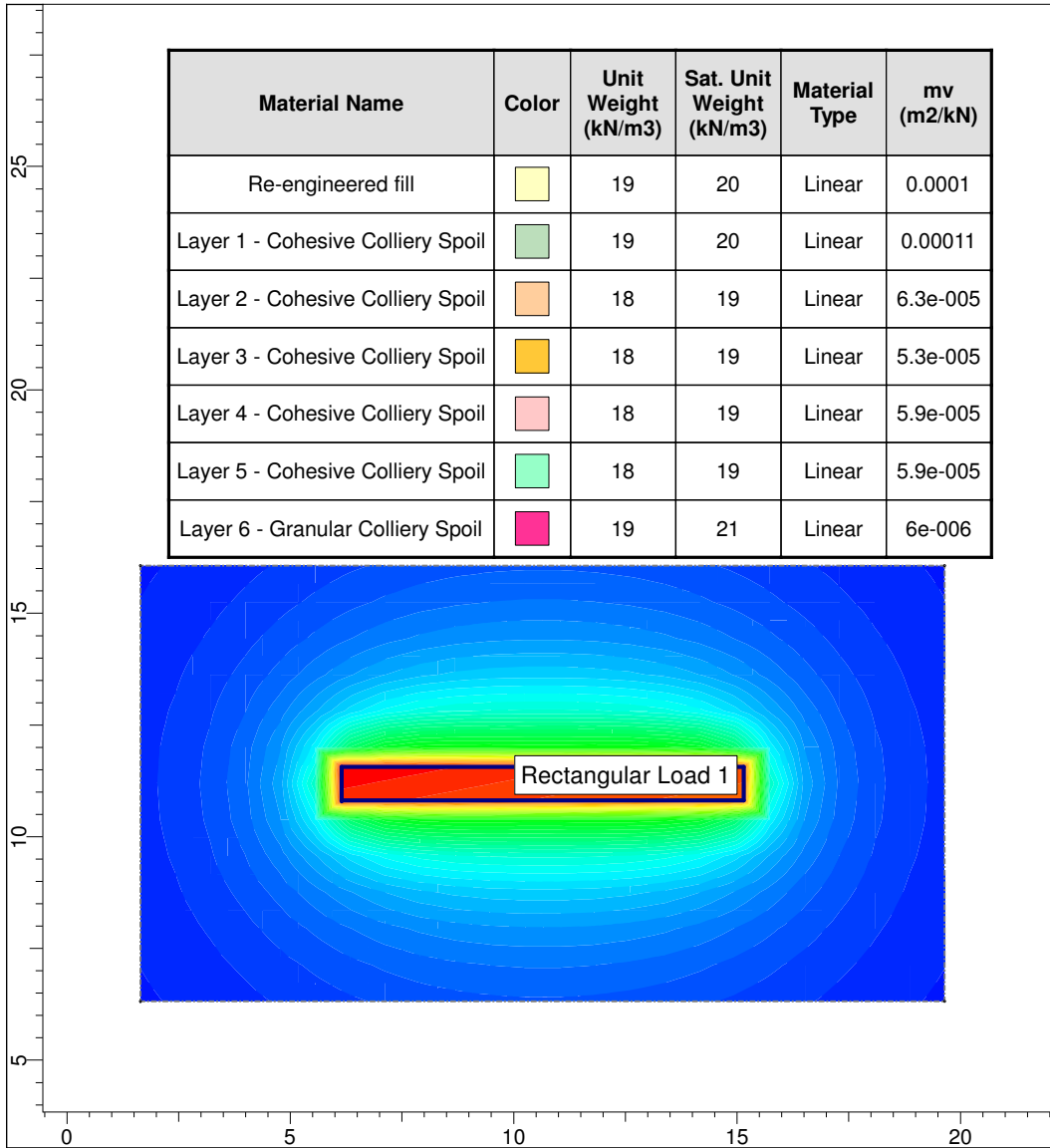
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	Analysis Description	Boussinesq - Craven II_Consolidation Settlement Only	
	Drawn By	JAM	Company JPG (Leeds) Ltd
	Date	21/06/2019, 09:20:59	File Name 4848 - CII_Consolidation_re-engineered fill_Empirical Parameters.s3z



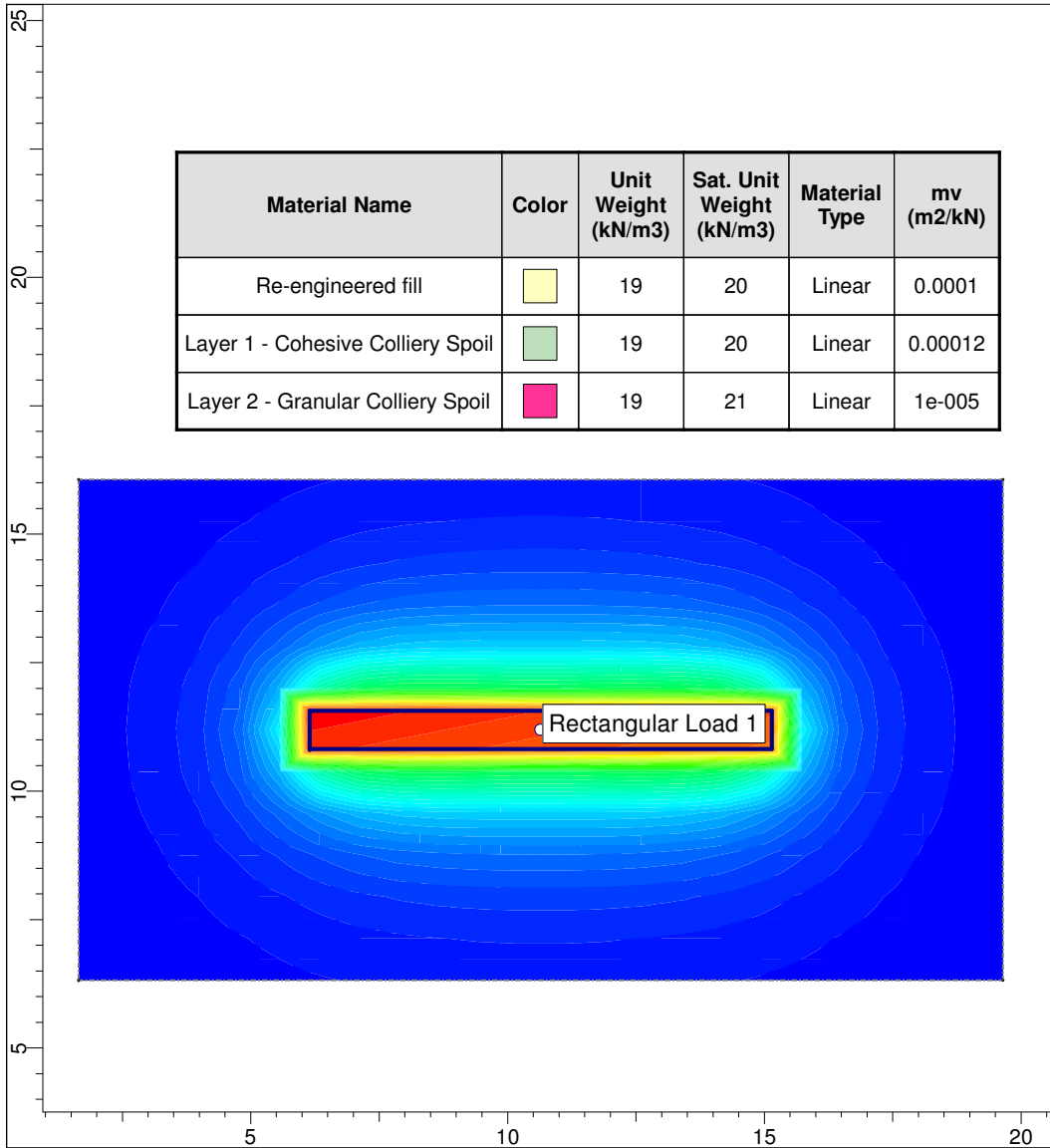
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	Analysis Description	Boussinesq - Consolidation Settlement Only_Farmhouse Lane	
	Drawn By	JAM	Company JPG (Leeds) Ltd
	Date	21/06/2019, 09:20:59	File Name 4848 - FH Lane_Consolidation_re-engineered fill_Empirical Parameters s3z



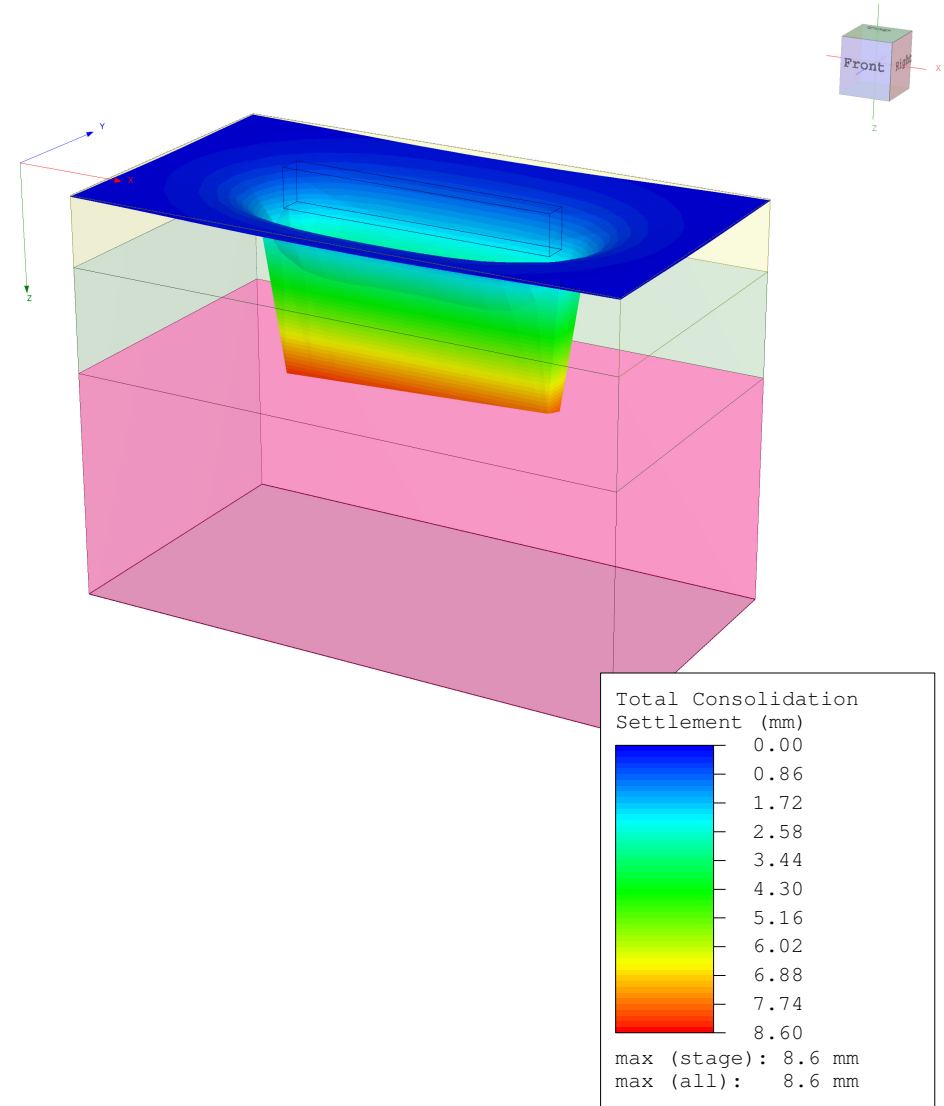
	Project		4848 - Barnsley West	
	Analysis Description		Boussinesq - Consolidation Settlement Only_Hunters Cottage	
	Drawn By	JAM	Company	JPG (Leeds) Ltd
	Date	21/06/2019, 10:24:47	File Name	4848 - Hunters Cottage_Consolidation Settlement_Empirical parameters s37



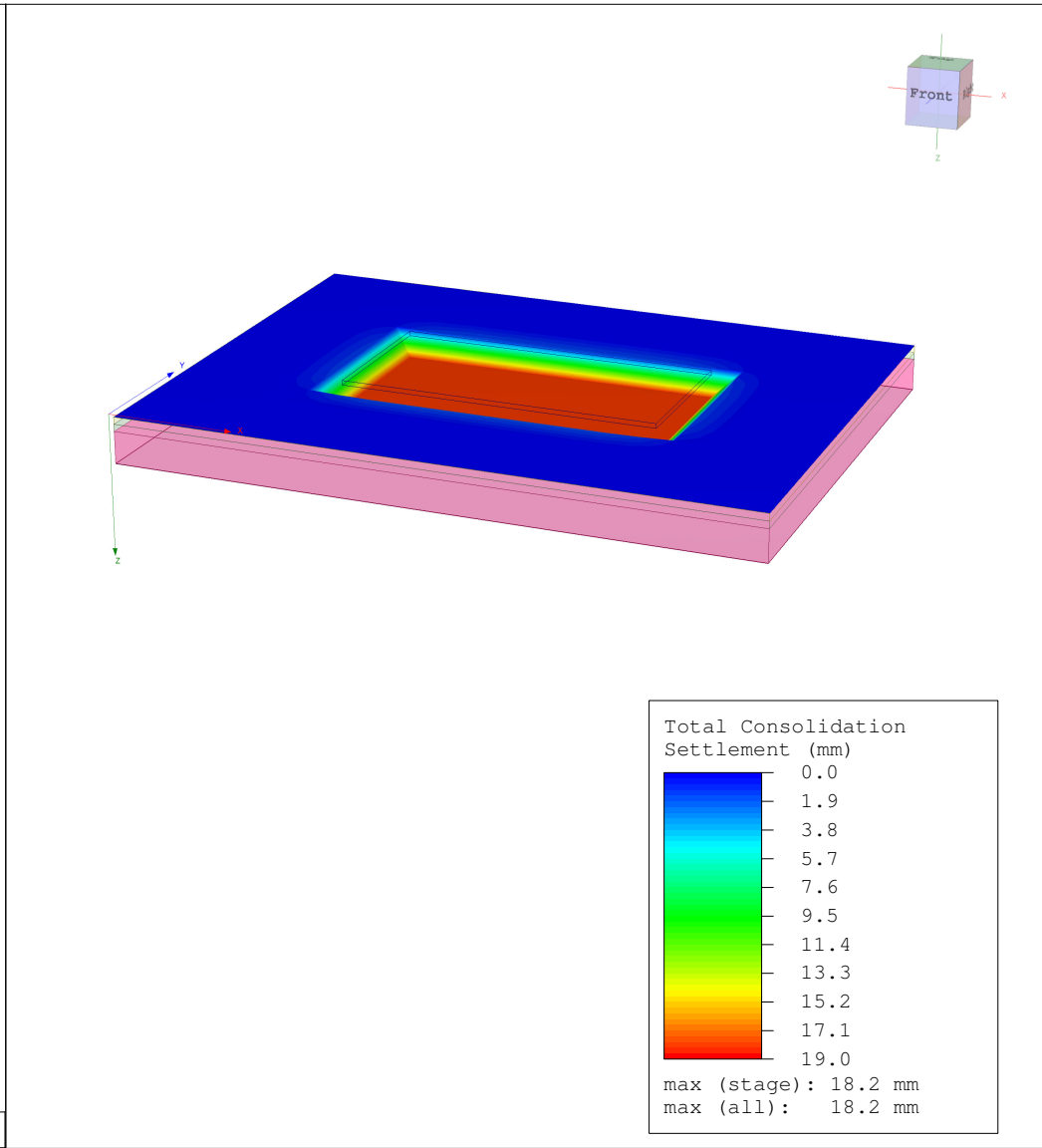
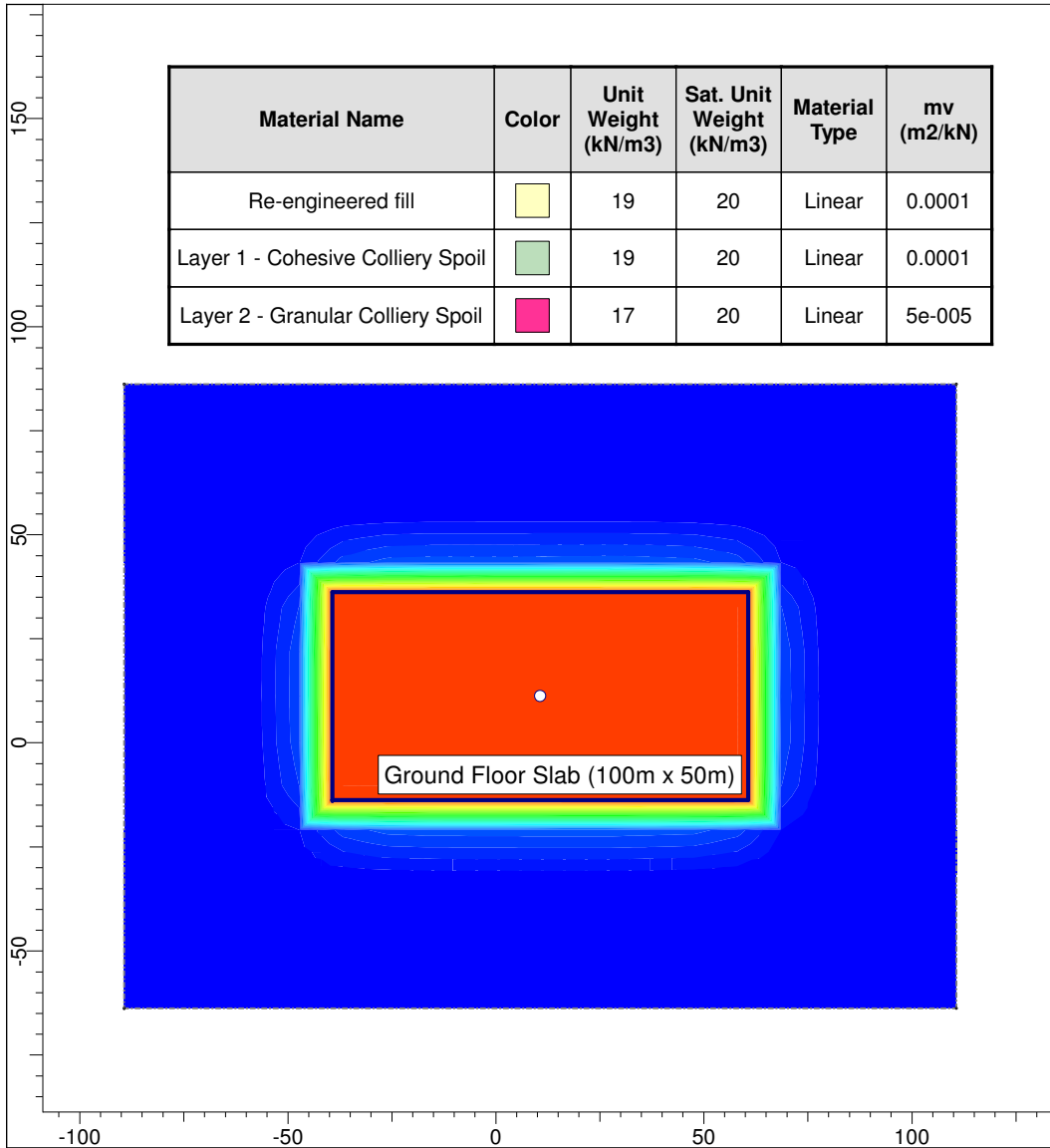
	Project	4848 - Barnsley West	
	Analysis Description	Boussinesq - Consolidation Settlement Only_Craven I & II	
	Drawn By	JAM	Company JPG (Leeds) Ltd
	Date	21/06/2019, 10:24:47	File Name 4848 - Craven I & II_Reinforced strips_60kPa_Empirical parameters.s3z




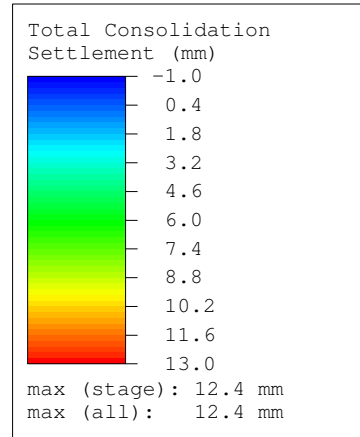
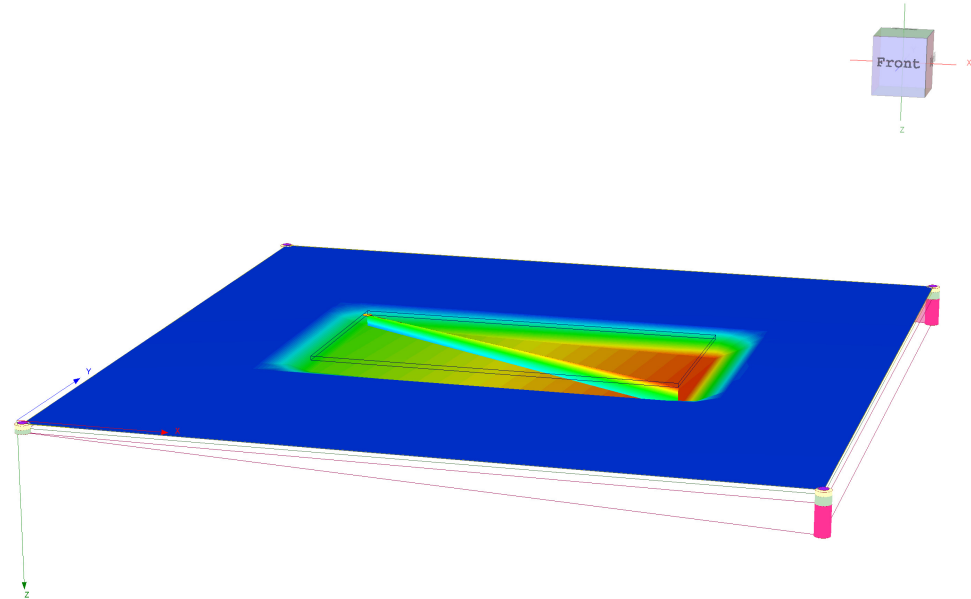
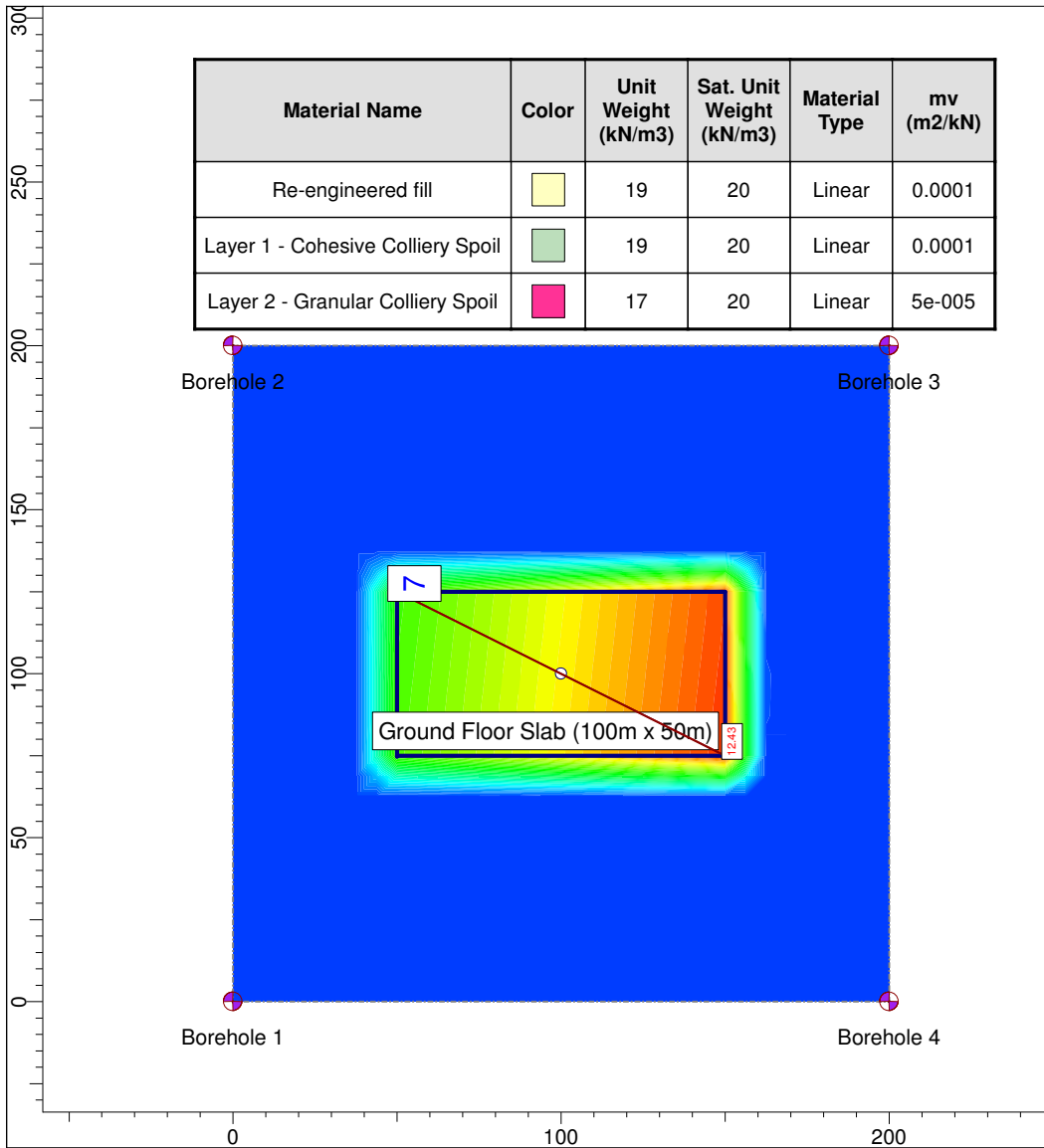
Material Name	Color	Unit Weight (kN/m3)	Sat. Unit Weight (kN/m3)	Material Type	mv (m2/kN)
Re-engineered fill		19	20	Linear	0.0001
Layer 1 - Cohesive Colliery Spoil		19	20	Linear	0.00012
Layer 2 - Granular Colliery Spoil		19	21	Linear	1e-005



	Project	4848 - Barnsley West	
	Analysis Description	Boussinesq - Consolidation Settlement Only_Farmhouse Lane OCCS	
	Drawn By	JAM	Company JPG (Leeds) Ltd
	Date	21/06/2019, 10:24:47	File Name 4848 - Farmhouse Lane_Reinforced strips_60kPa_Empirical parameters s37



	Project		4848 - Barnsley West	
	Analysis Description		Boussinesq - Consolidation Settlement Only_Hunters Cottage	
	Drawn By	JAM	Company	JPG (Leeds) Ltd
	Date	21/06/2019, 10:24:47	File Name	4848 - Hunters Cottage_GB Slab_25kPa_Empirical parameters.s3z



	Project	4848 - Barnsley West	
	Analysis Description	Boussinesq - Differential Consolidation Settlement Only_Hunters Cottage	
	Drawn By	JAM	Company JPG (Leeds) Ltd
	Date	21/06/2019, 10:24:47	File Name 4848 - Hunters Cottage_Diff Consol_GB Slab_Empirical parameters.s3z



Appendix F Gas and Groundwater Monitoring Results



Appendix G Notes on Limitations



General

JPG (Leeds) Limited have prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from JPG (Leeds) Limited; a charge may be levied against such approval.

JPG (Leeds) Limited accepts no responsibility or liability for:

- a) the consequences of this document being used for any purpose or project other than for which it was commissioned, and
- b) this document to any third party with whom an agreement has not been executed.

Phase I Desk Study Reports

The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, JPG (Leeds) Limited reserves the right to review such information and, if warranted, to modify the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase II Geo-Environmental Investigations

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, geotechnical characteristics and ground and groundwater conditions to allow a reasonable assessment of the environmental risks together with engineering and development implications. The objectives of the investigation have been limited to establishing the risks associated with potential human targets, building materials, the environment (including adjacent land), and to surface and groundwater.

The amount of exploratory work and chemical testing undertaken has necessarily been restricted by the short timescale available, and the locations of exploratory holes have been restricted to the areas unoccupied by the building(s) on the site and by buried services. A more comprehensive investigation may be required if the site is to be redeveloped as, in addition to risk assessment, a number of important engineering and environmental issues may need to be resolved.

For these reasons if costs have been included in relation to site remediation these must be considered as tentative only and must, in any event, be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken, which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site of each of the exploratory holes. There may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.

The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that groundwater levels will vary owing to seasonal, tidal and weather related effects.

The number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" of contamination where concentrations may be significantly higher than those actually encountered.

The risk assessment and opinions provided, inter alia, take into consideration currently available guidance values relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

The scope of the investigation was selected on the basis of the specific development proposed by the Client and may be inappropriate to another form of development or scheme.

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