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**NPS Property
Consultants Limited**

P18-01848

**Harborough Hill Road,
Barnsley**

**Supplementary Phase II
Geo Environmental
Site Assessment**

Report by:

T White

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Practical Solutions**



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1. REVISION RECORD

Report Ref: P18-01848 / Phase II					
Rev	Description	Date	Originator	Checked	Approved
1	Initial Issue	22/03/19	TAW	AEC	IFL

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2. INTRODUCTION

2.1. GENERAL INTRODUCTION

This Report presents the findings of a Phase II Geo-environmental assessment of a site at Land off Harborough Hill Road/Schwabisch Gmund Way, Barnsley, S71 1BP (Grid Reference: 434824, 406629) for NPS Property Consultants Limited.

The Intrusive Site Investigation (Phase II) comprised of open hole rotary boreholes and trial pits to establish the sub surface strata and remove samples for contamination and geotechnical testing. The test results combined with the findings of the intrusions will then be used to make recommendations for any remedial works which may be necessary. A site plan including positions of the boreholes and trial pits can be found in Appendix I of this report.

2.2. OBJECTIVES

An initial Phase II site investigation was carried out by BWB Consulting Limited in September 2006 for the purpose of making recommendations for a proposed commercial development. This report was subsequently assessed by Hamson Barron Smith (HBS) with a residential end use in mind, and recommendations were made as to additional intrusive site investigation works which were required. This intrusive investigation was conducted to supplement the ground conditions summary carried out by HBS, and carry out the recommended intrusive works.

The review of the original Phase II report identified that no intrusive investigation had been carried out within the footprint of an existing building. Since the original intrusive works the building has been demolished, therefore it was recommended to carry out trial pits within the former building footprint in order to validate the ground conditions present, and remove samples for contamination testing.

It was also recommended to drill 3No additional rotary boreholes in the eastern area of the site, to confirm that the shallow coal in this area is intact.

Furthermore it was recommended to carry out additional trial pitting in the north eastern area of the site, to determine the extent of the Made Ground identified within the original Phase II Site Investigation.

The original Site Investigation did not assess the viability of soakaway drainage for the proposed development, therefore infiltration testing was carried out in order to evaluate this.

The original site investigation identified elevated levels of Heavy Metals and PAH within the Made Ground identified in TP011, and no contamination testing was carried out on samples removed from TP012, therefore additional testing of the clinker Made Ground found from top depths of between 0.15m and 0.3mbgl in this area was recommended.

2.3. SCOPE OF WORKS

Based upon the recommendations of the Ground Conditions Report by HBS and a visual assessment of the sub-surface materials during the intrusive works, soil samples were taken for laboratory testing. CLEA Guidelines and recommendations given in Land Quality Management General Assessment Criteria have been applied to establish a risk based CLEA Model to assess the likely contamination issues and to comment on potential constraints for development of the site.

Judgement is based strictly on the findings of the specific boreholes, trial pits and soil samples tested and therefore may not be representative of the site as a whole. The findings of the intrusive investigation will also be used in conjunction with the findings of the Ground Conditions Report by HBS to establish parameters which may be used in formulating a foundation design.

2.4. LIMITATIONS OF THE REPORT

NPS Property Consultants Limited. (the Client) has requested that a Phase II Site Investigation, CLEA Conceptual Model and Risk Assessment be undertaken in order to assess the suitability of the site for redevelopment. The report is not a comprehensive site characterisation and should not be construed as such.

This report has been prepared for the sole internal use and reliance of NPS Property Consultants Limited. The report shall not be relied upon or transferred to any other parties without the express written authority of Met Engineers Limited. If any unauthorised third party comes into possession of the report, they rely on it at their own risk and Met Engineers Limited owes them no duty of care.

The findings and opinions conveyed via this report are based on information obtained from a variety of sources as detailed within this report and which Met Engineers Limited, believes are reliable. Nevertheless, Met Engineers Limited, cannot and does not guarantee the authenticity or reliability of the information it has relied upon. The information contained in this report is to the best of our knowledge accurate at the date of issue, however, sub-surface conditions, including ground water levels, may vary, especially with time.

In preparing this report it has been assumed that all past and present occupants and Third Parties have provided accurate information, especially relating to known or potential hazards. This report does not identify deficiencies or mistakes in the information provided by the user/owner, or from any other source, except where obvious in the light of other information.

This report is relevant at the date the report was written and should be read in the light of any subsequent changes in legislation, statutory requirement or industry practices.

The report represents the technical findings and opinions of Met Engineers Limited, and does not constitute any legal advice. As such, the advice of a Solicitor may also be required.

3. SITE HISTORY AND ENVIRONMENTAL SETTING

A detailed review of the published history, hydrological, geological and available environmental information was carried out by BWB in a Phase I Desk Study report dated September 2006, and subsequently summarised in a Ground Conditions Report by HBS in July 2018. The following is a brief summary of those findings.

The area of land referred to as 'The Site' within this document is indicated in Appendix I.

3.1. SITE DESCRIPTION

Site Name	Land off Harborough Hill Road/Schwabisch Gmund Way, Barnsley, S71 1BP
Location	Grid Reference: 434824, 406629
Setting	The site is irregular in shape and is approximately 1.6ha in size. The site is primarily covered with concrete and tarmac hardstanding, along with the reinforced concrete slab of the former building. There is a large mound of building/demolition rubble adjacent to the north of the existing concrete slab. The south eastern area of the site was previously developed with a club, and is currently covered with a large mound of building rubble following its demolition.
Site History	The site was developed with several small buildings and field/plantations until 1892, when Harborough Hill House is shown. The site remained unchanged until 1930 when the site was occupied by allotment gardens and a club. By 1961 the site had been developed with several small unidentified buildings and by 1968 the site was occupied by the electricity board depot. By 1991 several additional small buildings had been developed. In 2006 the BWB site walkover identified an above ground tank on site. By 2018 the HBS site walkover identified that all the buildings on site had been demolished, and the tanks removed, leaving the site in its current state. A full summary of the site history can be found in the Ground Conditions Report by HBS.
Development Proposal	The BWB Phase II Report was written with a commercial development in mind. The subsequent HBS review of the initial report assessed the site with a residential development in mind, and it is understood that the site is currently proposed to be developed with residential housing.

3.2. GEOLOGY & SOILS

Geology	The ground conditions expected to be encountered are summarised within the BWB Phase I Desk Study. In general it was not anticipated that significant depths of Made Ground would be present on site. The BGS 1:50,000 map sheet shows that the site is underlain by strata of the Carboniferous Lower Westphalian Coal Measures.
Radon	The HBS Ground Conditions Report states that less than 1% of homes in the area surrounding the site have recorded radon levels above the recommended action level, therefore in accordance with BRE211 no radon protection measures are required for the proposed development.
Ground workings	No ground workings noted within the Phase I Desk Study by BWB.
Mining	The Phase I Desk Study by BWB states that coal seams are likely to be present at shallow depth beneath the site. These seams may have been worked at some point.
Natural Ground Subsidence	The BWB Phase I Desk Study states that the risk from Compressible Ground is moderate, the risk from shrink/swell clays and running sands is low, and there is no risk from potential dissolution of soluble rocks.
Boreholes	The Phase I Desk Study by BWB identified that a previous intrusive investigation had taken place on site in 2001, which included 5No cable percussion boreholes, and 6No open hole rotary boreholes. These generally found <1m of Made Ground, overlying weathered coal measures mudstone, sandstone, siltstone and coal seams. The boreholes identified up to 7No coal seams present beneath the site, at depths ranging from just below the Made Ground to 60mbgl, with thicknesses ranging from 0.1m to 1.3m.

3.3. ENVIRONMENTAL OVERVIEW

The following records are as stated in the BWB Phase I Desk Study for the site:

Historical and Current Land Use	The BWB Phase I Desk Study identified the following on site potential sources of contamination; • Electricity sub-station • Fuel tanks • Building demolition The Phase I Desk Study also identified the following off site potential sources of contamination; • Colliery • Timber yard • Railway land and foundry • Bus depot
Landfill Sites	2No landfill sites have previously been recorded within 500m of the site, the nearest being 316m north west of the site.
Waste Transfer & Processing Stations	The site was registered as a waste transfer station between 1992 and 1999.
Hydrogeology	The bedrock on site is recorded as a Secondary A Aquifer.
Hydrology	The Phase I Desk Study by BWB does not identify any surface water features within 250m of the site.

Flooding	The site is not recorded to lie within a floodplain, and the chance of flooding is less than 0.1%.
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3.4. HBS RECOMMENDATIONS FOR FURTHER WORK

The Ground Conditions Report carried out by HBS recommended that several further works be carried out, this site investigation report aims to address some of these recommendations which are as follows:

- Further investigation beneath the former building footprint to validate the ground conditions present.
- Supplemental investigation around TP11 and TP12 to collate chemical data to allow a detailed quantitative risk assessment to be completed.
- Supplemental investigation in the north eastern corner of the site to investigate the extent of deeper Made Ground reported present.
- Full scale soakaway testing to BRE365 standards in the locations of proposed soakaways, if proposed.
- Drilling of an additional three holes within the eastern edge of the site to confirm the shallow coal in this location is intact.

4. INTRUSIVE INVESTIGATION

4.1. FIELDWORK

This supplementary intrusive investigation consisted of 3Nø open hole rotary boreholes and 10Nø Trial Pits excavated by JCB, 2Nø of which were utilised for soakaway testing. An additional 18Nø sampling pits were excavated by JCB and hand digging techniques. The intrusive investigations were carried out on 11th to 13th February 2019; the locations of which can be found within Appendix I. The weather during the investigation was clear.

The trial pits specifically targeted the area of the former building and the area of deeper Made Ground in the north east of the site.

The sampling pits were excavated by breaking out a 300mm x 300mm square of concrete, and hand digging until reaching the Made Ground. The pits specifically targeted the area surrounding TP011 and TP012 carried out during the site investigation by BWB in 2006, however the locations were restricted due to services, vegetation, and a large stockpile of building rubble.

The open hole rotary boreholes were carried out in the eastern area of the site, in order to fill in gaps within the shallow coal mining investigation carried out by BWB as part of the site investigation in 2006.

The trial pits found Made Ground to depths of between 0.6mbgl (TP01 and TP05) and 3.1mbgl (TP09). The Made Ground varied in composition ranging from gravelly clay to sandy gravel.

Superficial deposits comprising soft to firm clay were identified under the majority of the site with typical thicknesses ranging between 0.2m (TP05) and 1.6m (TP04). Trial pits 6 to 10 were excavated to determine the thickness of Made Ground in the north eastern area of the site, and as such were terminated once reaching natural material.

Bedrock was deepest adjacent to the northern edge of the existing concrete slab of the former building, and was encountered at between 0.6mbgl (TP01) and 2.7mbgl (TP02). Bedrock comprised mudstone, siltstone, and coal.

Logs of the Boreholes and Trial Pits can be found in Appendix II and III of this report respectively.

4.2. GROUNDWATER

Groundwater was not identified during this site investigation, aside from a small amount of perched water in TP09 at 1.5mbgl.

4.3. GAS MONITORING

Gas monitoring was carried out as part of the initial site investigation by BWB, and as such no further monitoring was required.

4.4. LABORATORY TESTING

The desk study recommended a regime of contamination testing on soil samples recovered from the intrusive investigation. Samples were obtained during the site investigation and tested at a UKAS accredited laboratory for contaminants including:

- *Heavy Metals*
- *Polycyclic Aromatic Hydrocarbons*
- *Total Petroleum Hydrocarbons*
- *Asbestos*

5. CONTAMINATION ASSESSMENT

5.1. GENERAL

Current Environmental Legislation, in particular Part IIA of the Environmental Protection Act 1990, adopts a risk-based approach to the evaluation of contaminated sites, based on the proposed end use of the site. The commonly accepted approach is to adopt a Source-Pathway-Receptor model where the Source of the contaminant is examined in relation to potential Receptors (i.e. humans, controlled waters etc.) to determine if there is a Pathway (i.e. contaminant linkage) connecting them. If any of these elements (i.e. contaminant, pathway or receptor) are absent or removed, then there is no risk.

The Department of the Environment, Food and Rural Affairs (DEFRA) have published a series of guidelines in connection with Risk Assessment. In addition The Environment Agency has produced the Contaminated Land Exposure Model (CLEA) which models guideline values for those elements which pose the greatest risk to human health.¹ Using values derived from CLEA, a site specific, conceptual model has been used to determine any significant contaminant linkages and identify suitable risk management proposals on which remediation design (if any required) can be based. The conceptual model is summarised at the end of this section in tabular form.

By considering the Source-Pathway-Receptors Model, an assessment can be made as to whether the source contamination can reach a receptor. The degree and significance of any resulting risk is then determined. The categorisation of the risk is based on consideration of both:

- The likelihood or probability of an event (taking into account both the presence of the Source and the Receptor, and the integrity of the Pathway).
- The severity of the potential consequence (taking into account both the potential severity of the Source and the sensitivity of the Receptor).

The following categorisation of risk has been adopted in this report:

Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without appropriate remedial action.
High	Harm is likely to arise to a designated receptor from an identified hazard without appropriate remedial action.
Moderate	It is possible that, without appropriate remedial action, harm could arise to a designated receptor, but it is relatively unlikely that any such harm would be severe and, if harm were to occur, it is more likely that such harm would be relatively mild.
Low	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that, at worst, this harm, if realised, would normally be mild.
Negligible	The presence of an identified hazard does not give rise to the potential to cause any significant harm to a designated receptor on this site.

¹ Updated technical background to the CLEA model, Science Report SC050021/SR3, The Environment Agency, 2009

5.2. PRELIMINARY CONCEPTUAL SITE MODEL

The following table provides a list of the potential Sources, Pathways and Receptors that have potential to exist on this site as defined in the Phase I desk study by BWB dated May 2006.

Source	Pathway	Receptor
Contaminants contained within the Made Ground	Vertical migration through site soils	Underlying Minor Aquifer
	Direct contact	Existing site users
	Direct contact	Ground workers
	Surface run-off	On and off site drainage system
	Lateral migration through site soils	Existing buildings on site

Based on the above conceptual site model and the gaps in previous works requiring investigation, the following sources of contamination have been investigated;

- Soils
 - Heavy Metals
 - Poly Aromatic Hydrocarbons
 - Total Petroleum Hydrocarbons
 - Asbestos

5.3. CONTAMINATION CRITERIA FOR SOIL TESTING

Suitable 4 Use Levels (S4ULs) published by Land Quality Management, have been used to assess risk.² Where there are no S4ULs, Defra Category 4 Screening Levels (C4SLs) have been used as intervention values to assess risk.³

It is proposed that the site will be developed with residential housing and private gardens. Therefore the proposed land use can be classified as 'residential with home produce' in accordance with the CLEA Guidelines.

Soils were taken from site and tested for % Soil Organic Matter (SOM).

Location	TP01	TP02	TP03	TP04
Depth (m)	0.5	0.3	0.4	0.25
Strata	Made Ground	Made Ground	Made Ground	Made Ground
SOM (%)	0.6	0.2	0.3	<0.1

Taking the lowest SOM recorded as the worst case scenario, the results of the chemical analysis on the soil samples are compared against the S4ULs for residential developments with home grown produce with 1% SOM (where there are published S4ULs) and C4SLs where there are no published S4ULs. These values are then used as Intervention Values (IV) to assess the risk.

² The LQM/CIEH S4ULs for Human Health Risk Assessment, Land Quality Press, Nathanail et. al, 2015.

³ SP1010, Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, DEFRA 2014

5.4. RESULTS OF CONTAMINATION TESTING

The following tables are summaries of the laboratory test results. Please see the key below for the origin of each intervention value.

Intervention Value Key

Author	Type	Land Use
Land Quality Management	S4UL	Residential with home produce
DEFRA	C4SL	Residential with home produce

Results of Contamination Testing Beneath Former Building Slab

Heavy Metals

Location	TP01	TP02	TP03	TP04		
Depth (m)	0.5	0.3	0.4	0.25		
Strata	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)					IV	Number Exceeding
Arsenic	<1	<1	<1	<1	37	0
Cadmium	<0.5	<0.5	0.5	<0.5	11	0
Copper	13	3	5	4	2400	0
Chromium	10	5	10	8	910	0
Chromium (V)	<1	<1	<1	<1	6	0
Lead	21	7	8	8	200	0
Mercury	<0.17	<0.17	<0.17	<0.17	40	0
Nickel	12	9	17	10	130	0
Selenium	<1	<1	<1	<1	250	0
Zinc	40	13	22	40	3700	0

Polycyclic Aromatic Hydrocarbons

Location	TP01	TP02	TP03	TP04		
Depth (m)	0.5	0.3	0.4	0.25		
Strata	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)					IV	Number Exceeding
Acenaphthene	<0.01	0.04	<0.01	<0.01	210	0
Acenaphthylene	<0.01	<0.01	<0.01	<0.01	170	0
Anthracene	<0.02	<0.02	<0.02	<0.02	2400	0
Benzo(a)anthracene	0.04	<0.04	<0.04	<0.04	7.2	0
Benzo(a)pyrene	<0.04	<0.04	<0.04	<0.04	2.2	0
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	2.6	0
Benzo(ghi)perylene	<0.05	<0.05	<0.05	<0.05	320	0
Benzo(k)fluoranthene	<0.07	<0.07	<0.07	<0.07	77	0
Chrysene	<0.06	<0.06	<0.06	<0.06	15	0
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04	0.24	0

Location	TP01	TP02	TP03	TP04		
Depth (m)	0.5	0.3	0.4	0.25		
Strata	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)					IV	Number Exceeding
Fluoranthene	0.09	<0.08	<0.08	<0.08	280	0
Fluorene	<0.01	<0.01	<0.01	<0.01	170	0
Indeno(123-cd)pyrene	0.04	<0.03	<0.03	<0.03	27	0
Naphthalene	<0.03	<0.03	<0.03	<0.03	2.3	0
Phenanthrene	0.08	0.05	<0.03	<0.03	95	0
Pyrene	0.08	<0.07	<0.07	<0.07	620	0
Total PAH	0.33	0.09	<0.08	<0.08		0

Total Petroleum Hydrocarbons

Location	TP01	TP02	TP03	TP04		
Depth (m)	0.5	0.3	0.4	0.25		
Strata	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)					IV	Number Exceeding
Ali >C5-C6	<0.01	<0.01	<0.01	<0.01	42	0
Ali >C6-C8	<0.01	<0.01	<0.01	<0.01	100	0
Ali >C8-C10	<0.01	<0.01	<0.01	<0.01	27	0
Ali >C10-C12	<0.1	<0.1	<0.1	<0.1	130	0
Ali >C12-C16	<0.1	<0.1	<0.1	<0.1	1100	0
Ali >C16-C21	<0.1	<0.1	<0.1	<0.1	65000	0
Ali >C21-C35	<0.1	<0.1	<0.1	<0.1	65000	0
Total Aliphatics	<0.1	<0.1	<0.1	<0.1	-	-
Aro >C5-C7	<0.01	<0.01	<0.01	<0.01	70	0
Aro >C7-C8	<0.01	<0.01	<0.01	<0.01	130	0
Aro >C8-C9	0.05	<0.01	<0.01	<0.01	34	0
Aro >C9-C10	<0.01	<0.01	<0.01	<0.01	34	0
Aro >C10-C12	<0.1	<0.1	<0.1	<0.1	74	0
Aro >C12-C16	<0.1	<0.1	<0.1	<0.1	140	0
Aro >C16-C21	<0.1	<0.1	<0.1	<0.1	260	0
Aro >C21-C35	<0.1	<0.1	<0.1	<0.1	1100	0

Location	TP01	TP02	TP03	TP04		
Depth (m)	0.5	0.3	0.4	0.25		
Strata	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)					IV	Number Exceeding
Total Aromatics	<0.1	<0.1	<0.1	<0.1	-	-
TPH (Ali & Aro)	<0.1	<0.1	<0.1	<0.1	-	-
BTEX - Benzene	<0.01	<0.01	<0.01	<0.01	0.087	0
BTEX - Toluene	<0.01	<0.01	<0.01	<0.01	130	0
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01	<0.01	47	0
BTEX - m & p Xylene	0.05	<0.01	<0.01	<0.01	56	0
BTEX - o Xylene	<0.01	<0.01	<0.01	<0.01	60	0
MTBE	<0.01	<0.01	<0.01	<0.01	-	-

Asbestos

Location	TP01	TP02	TP03	TP04	
Depth (m)	0.5	0.3	0.4	0.25	
Strata	Made Ground	Made Ground	Made Ground	Made Ground	
Contaminant					Number Exceeding
Asbestos in Soil	NAD	NAD	NAD	NAD	0

Results of Contamination Testing in Northern Area of the Site (Area Surrounding TP011 and TP012 carried out by BWB)

Heavy Metals

Location	TP05	TP07	TP08	TP09	TP09	TP10	TP10	SP01	SP02	SP03	SP03	SP04	SP05		
Depth (m)	0.25	0.6	0.4	0.2	0.4	0.2	0.4	0.2	0.3	0.3	0.8	0.3	0.3		
Strata	Made Ground	Made Ground	Made Ground	Fill	Made Ground	Fill	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)														IV	Number Exceeding
Arsenic	<1	6	<1	<1	<1	<1	<1	<1	1	2	2	<1	<1	37	0
Cadmium	<0.5	0.7	0.6	<0.5	<0.5	0.7	<0.5	<0.5	0.7	0.5	0.7	1	0.6	11	0
Copper	3	23	10	3	3	9	7	6	13	26	33	14	7	2400	0
Chromium	6	16	9	3	4	6	7	4	5	14	15	10	5	910	0
Lead	5	42	28	9	5	29	23	21	25	331	309	63	26	200	2

Location	TP05	TP07	TP08	TP09	TP09	TP10	TP10	SP01	SP02	SP03	SP03	SP04	SP05		
Depth (m)	0.25	0.6	0.4	0.2	0.4	0.2	0.4	0.2	0.3	0.3	0.8	0.3	0.3		
Strata	Made Ground	Made Ground	Made Ground	Fill	Made Ground	Fill	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)														IV	Number Exceeding
Mercury	<0.17	0.23	<0.17	<0.17	<0.17	0.37	0.45	0.48	0.36	<0.17	<0.17	0.43	0.53	40	0
Nickel	9	25	12	5	7	5	5	3	3	16	10	5	5	130	0
Selenium	<1	1	<1	<1	<1	1	<1	<1	<1	<1	<1	1	<1	250	0
Zinc	18	77	44	28	11	67	60	53	92	260	354	110	66	3700	0

Location	SP06	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP16	SP17	SP18		
Depth (m)	0.3	0.4	0.4	0.3	0.2	0.3	0.4	0.3	0.3	0.4	0.3	0.4	0.5		
Strata	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)														IV	Number Exceeding
Arsenic	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	37	0
Cadmium	<0.5	<0.5	<0.5	<0.5	0.6	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	11	0
Copper	9	5	4	4	3	7	5	4	5	4	4	4	4	2400	0
Chromium	6	5	5	4	3	5	3	6	5	3	6	3	4	910	0
Lead	24	15	12	11	13	20	18	20	17	13	15	20	8	200	0
Mercury	0.61	<0.17	0.21	<0.17	0.35	0.34	0.4	0.48	0.49	0.26	0.38	0.28	<0.17	40	0
Nickel	3	5	5	6	4	3	3	3	2	4	3	3	5	130	0
Selenium	1	<1	<1	<1	<1	1	<1	<1	<1	1	1	2	<1	250	0
Zinc	68	31	26	26	39	58	45	58	45	45	40	53	21	3700	0

Polycyclic Aromatic Hydrocarbons

Location	TP05	TP07	TP08	TP09	TP09	TP10	TP10	SP01	SP02	SP03	SP03	SP04	SP05		
Depth (m)	0.25	0.6	0.4	0.2	0.4	0.2	0.4	0.2	0.3	0.3	0.8	0.3	0.3		
Strata	Made Ground	Made Ground	Made Ground	Fill	Made Ground	Fill	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)														IV	Number Exceeding
Acenaphthene	<0.01	0.01	0.08	0.02	<0.01	<0.01	0.02	0.02	<0.01	<0.01	<0.01	0.4	<0.01	210	0
Acenaphthylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	170	0
Anthracene	<0.02	0.03	0.08	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	0.55	<0.02	2400	0
Benzo(a)anthracene	<0.04	0.1	0.16	<0.04	<0.04	<0.04	0.14	<0.04	<0.04	<0.04	<0.04	1.32	<0.04	7.2	0
Benzo(a)pyrene	<0.04	0.07	0.13	<0.04	<0.04	<0.04	0.1	<0.04	<0.04	<0.04	0.37	0.85	<0.04	2.2	0
Benzo(b)fluoranthene	<0.05	0.08	0.16	<0.05	<0.05	<0.05	0.14	0.06	<0.05	0.34	0.49	1.2	<0.05	2.6	0
Benzo(ghi)perylene	<0.05	<0.05	0.13	<0.05	<0.05	<0.05	0.06	0.08	<0.05	0.46	0.62	0.66	0.08	320	0
Benzo(k)fluoranthene	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	0.39	<0.07	77	0
Chrysene	<0.06	0.1	0.2	<0.06	<0.06	<0.06	0.15	0.09	<0.06	<0.06	<0.06	1.33	<0.06	15	0
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.17	<0.04	0.24	0
Fluoranthene	<0.08	0.18	0.31	<0.08	<0.08	<0.08	0.28	0.09	<0.08	<0.08	<0.08	2.71	<0.08	280	0
Fluorene	<0.01	0.02	0.05	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	0.29	<0.01	170	0
Indeno(123-cd)pyrene	<0.03	0.05	0.13	<0.03	<0.03	<0.03	0.07	0.06	<0.03	0.37	0.53	0.76	0.04	27	0
Naphthalene	<0.03	<0.03	0.08	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	0.56	<0.03	2.3	0
Phenanthrene	<0.03	0.17	0.34	0.05	<0.03	0.06	0.17	0.08	<0.03	<0.03	<0.03	1.84	<0.03	95	0
Pyrene	<0.07	0.15	0.29	0.08	<0.07	<0.07	0.22	0.12	<0.07	<0.07	<0.07	2.81	<0.07	620	0
Total PAH	<0.08	0.96	2.14	0.15	<0.08	0.1	1.41	0.6	<0.08	1.17	2.01	15.8	0.12	-	-

Location	SP06	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP16	SP17	SP18		
Depth (m)	0.3	0.4	0.4	0.3	0.2	0.3	0.4	0.3	0.3	0.4	0.3	0.4	0.5		
Strata	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)														IV	Number Exceeding
Acenaphthene	1	0.01	<0.01	0.02	0.07	<0.01	<0.01	0.02	<0.01	<0.01	0.06	0.02	<0.01	210	0
Acenaphthylene	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	170	0
Anthracene	1.59	<0.02	<0.02	0.03	0.09	<0.02	<0.02	0.03	<0.02	<0.02	0.06	0.03	<0.02	2400	0
Benzo(a)anthracene	3.26	<0.04	<0.04	0.12	0.19	<0.04	<0.04	<0.04	<0.04	<0.04	0.15	0.08	<0.04	7.2	0
Benzo(a)pyrene	2.09	<0.04	<0.04	0.08	0.2	<0.04	<0.04	0.09	<0.04	<0.04	0.1	0.09	<0.04	2.2	0
Benzo(b)fluoranthene	2.35	<0.05	<0.05	0.11	0.26	<0.05	<0.05	0.12	<0.05	<0.05	0.15	0.12	<0.05	2.6	0
Benzo(ghi)perylene	1.26	0.06	<0.05	0.06	0.12	0.05	<0.05	0.12	<0.05	<0.05	0.07	0.07	<0.05	320	0
Benzo(k)fluoranthene	0.81	<0.07	<0.07	<0.07	0.09	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	77	0
Chrysene	2.63	<0.06	<0.06	0.12	0.19	<0.06	<0.06	<0.06	<0.06	<0.06	0.16	0.09	<0.06	15	0
Dibenzo(ah)anthracene	0.32	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.24	1
Fluoranthene	6.5	<0.08	<0.08	0.22	0.35	<0.08	<0.08	0.08	<0.08	<0.08	0.32	0.16	<0.08	280	0
Fluorene	0.75	<0.01	<0.01	<0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.02	<0.01	170	0
Indeno(123-cd)pyrene	1.56	0.04	<0.03	0.06	0.14	0.04	<0.03	0.1	<0.03	<0.03	0.07	0.08	<0.03	27	0
Naphthalene	1.04	<0.03	<0.03	0.04	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	0.08	<0.03	<0.03	2.3	0
Phenanthrene	4.93	0.04	<0.03	0.2	0.31	<0.03	<0.03	0.05	<0.03	<0.03	0.37	0.15	<0.03	95	0
Pyrene0	5.56	<0.07	<0.07	0.19	0.3	<0.07	<0.07	0.12	<0.07	<0.07	0.27	0.14	<0.07	620	0
Total PAH	35.7	0.15	<0.08	1.25	2.41	0.09	<0.08	0.73	<0.08	<0.08	1.89	1.05	<0.08	-	-

The full test certificates are included in Appendix IV of this report.

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5.5. CONTAMINATION SOURCES

Samples taken from beneath the existing slab

No elevated levels identified.

Source	Elevated Levels Present?
Heavy Metals	No
Poly Aromatic Hydrocarbons	No
Total Petroleum Hydrocarbons	No
Asbestos	No

Samples taken from north eastern area of the site

Elevated levels of Lead were identified in 2No. samples taken from the north eastern area of the site, both samples taken from Sampling Point 3 (SP03) at depths of 0.3m and 0.8mbgl.

Elevated levels of Dibenzo(ah)anthracene (PAH) were identified in SP06 at 0.3mbgl.

Source	Elevated Levels Present?
Heavy Metals	Yes
Poly Aromatic Hydrocarbons	Yes

5.6. PATHWAYS

Based on the proposed land use, the possible pathways that exist on site for any possible source of contamination are as follows;

Pathway	Pathway Present	Comments
Direct Contact with soil/ water	Yes	Potential for contact with soil/ water during future landscaping/development works
Incidental ingestion	Yes	Potential for ingestion of soils/ water during future landscaping/development works
Inhalation of soil dust/ asbestos fibres	Yes	Potential for inhalation of soil dust/ asbestos during future landscaping/development works and ground disturbance
Leaching/ migration of liquids	Yes	Potential for leaching to aquifer as the site will be developed with soft, vegetative cover
Surface water run-off	Yes	Site to be developed with residential housing with roads, therefore potential for surface water runoff present
Migration/ emission/ accumulation inhalation of vapours	Yes	Migration and emission of vapours possible, and accumulation possible in proposed residential buildings
Plant uptake/ plant uptake followed by ingestion	Yes	Proposed residential houses to have private gardens, with the potential for home grown produce, increasing plant uptake

5.7. RECEPTORS

Based on the identified sources of contamination, and the present pathways, the potential receptors for the development are:-

Receptor	Receptor Present	Comments
Site worker	Yes	Contractors carrying out ground/development works and landscaping
Maintenance staff	Yes	Future gardeners/ landscaping staff
Long term site user/ future resident	Yes	Future residents
Off-site resident	Yes	Residential housing adjacent to the southern boundary of the site
Flora & Fauna	Yes	Flora on landscaped areas
Aquifer	No	Bedrock is a Secondary A Aquifer, however there are no groundwater abstractions or source protection zones in the vicinity of the site
Surface water	No	No surface watercourses in the vicinity of the site
Buildings & Infrastructure	Yes	No buildings proposed on the site

5.8. SITE SPECIFIC MODEL

Source	Contaminant	Receptor	Pathway	Risk
Soil based contaminants (Solid)	Heavy Metals ¹	A – Construction Workers ¹ B – Maintenance Worker ¹ C – Future End user ¹ D – Off-Site Resident ¹ E – Flora & Fauna ¹	a – Direct contact with soil/ water ¹ b – Incidental ingestion ¹ c – Inhalation of soil dust/ asbestos fibres ¹ d – Leaching/ migration ¹ e – Surface water run off ¹ g – Plant uptake/ plant uptake followed by ingestion ¹	Moderate
	Polycyclic Aromatic Hydrocarbons ¹	A – Construction Workers ¹ B – Maintenance Worker ¹ C – Future End user ¹ D – Off-Site Resident ¹ E – Flora & Fauna ¹	a – Direct contact with soil/ water ¹ b – Incidental ingestion ¹ c – Inhalation of soil dust/ asbestos fibres ¹ d – Leaching/ migration ¹ e – Surface water run off ¹ f – Migration/ emission/ inhalation of vapours ¹ g – Plant uptake/ plant uptake followed by ingestion ¹	Moderate
	Total Petroleum Hydrocarbon ²	A – Construction Workers ¹ B – Maintenance Worker ¹ C – Future End user ¹ D – Off-Site Resident ¹ E – Flora & Fauna ¹	a – Direct contact with soil/ water ¹ b – Incidental ingestion ¹ c – Inhalation of soil dust/ asbestos fibres ¹ d – Leaching/ migration ¹ e – Surface water run off ¹ f – Migration/ emission/ inhalation of vapours ¹ g – Plant uptake/ plant uptake followed by ingestion ¹	Negligible
Asbestos in Made Ground	Asbestos fibres ²	A – Construction Workers ¹ B – Maintenance Worker ¹ C – Future End user ¹ D – Off-Site Resident ¹	c – Inhalation of soil dust/ asbestos fibres ¹	Negligible

¹ Source/ Pathway/ Receptor PRESENT on site

²Source/ Pathway/ Receptor NOT PRESENT on site

5.9. CONTAMINATION ISSUES

Based upon the conceptual site model, there are 10N9 contamination linkages present for the sources tested for.

1. Heavy Metals with respect to Construction Workers
2. Heavy Metals with respect to End User
3. Heavy Metals with respect to Flora and Fauna
4. Heavy Metals with respect to Maintenance Workers
5. Heavy Metals with respect to Off Site Residents
6. PAH with respect to Construction Workers
7. PAH with respect to End User
8. PAH with respect to Flora and Fauna
9. PAH with respect to Maintenance Workers
10. PAH with respect to Off Site Residents

5.10. ASSESSED RISKS AND MANAGEMENT

Elevated concentrations of Lead and Dibenzo(ah)anthracene are present in the Northern area of the site.

A site induction should warn construction workers as to the presence of contaminated material onsite. Appropriate personal protective equipment should be worn, accompanied with employing good personal hygiene standards (especially before eating) in order to minimise the risk to construction workers on site.

The contaminants identified are deemed to exist within the made ground at the surface of the site in the central northern area of the site (found in TP011 by BWB, and in SP03 and SP06 by Met Engineers), due to the large amount of testing carried out in this area of the site and the small area within which the contamination was identified it is determined that these elevated levels can be treated as a hotspot.

Dependent on the final levels and form of the proposed development, various options for remediation may be viable. One such option may be a (600mm thick in rear gardens or 450mm thick in front gardens) capping layer of clean, certified, topsoil and subsoil. This layer of clean infill would create a suitable barrier to prevent a pathway between the contamination and the potential receptors on site.

The following table details the assessed risk from the Site-Specific conceptual site model, the possible management/remediation proposals and the Residual Risk after these proposals have been implemented.

Source	Pathway	Receptor	Risk	Management / Remediation Proposals	Residual Risk
Heavy Metals and PAH (Lead and Dibenzo(ah)anthracene)	a, b, c	A	Moderate	Site induction to cover the potential for contaminants existing on site. Personal Protective Equipment to be used at all times including gloves. Good levels of Personal hygiene to be maintained including washing hands before eating.	Negligible
	a, b, c, d, g	B, C, E	Moderate	In the area where elevated levels have been identified, a site strip should be carried out to leave soft landscaped areas 450mm in front gardens and 600mm in rear gardens below final site levels. A cap of clean certified topsoil is to be imported in order to create a suitable barrier between contamination and source. However other forms of remediation may be viable and the final method will be determined within the remediation statement.	Negligible
	e	D	Low	Site to be developed with grassed gardens, reducing surface water runoff. And in non-soft landscaped areas the proposed houses and associated tarmacked roads which will provide a barrier between the source and receptor.	Negligible

All ground works should be monitored by a suitably qualified person and significant deviation from the findings of this document is to be reported to the Engineer immediately prior to commencing any further works.

5.11. ENVIRONMENTAL SUMMARY

Elevated levels of Lead and Dibenzo(ah)anthracene have been found in the central northern area of the site.

A site induction and appropriate PPE should mitigate any risk towards construction workers.

Depending on the final site levels and form of development, in the central northern area of the site sufficient Made Ground should be removed from all soft landscaped areas and replaced with 450mm in front gardens and 600mm in rear gardens of clean, certified, topsoil and subsoil. Other options may be available and the final method of remediation will be determined within the remediation statement.

A remediation statement will be required to accompany any planning application detailing the risks identified and the mitigation measures prescribed.

All ground works should be monitored by a suitably qualified person and any significant deviation from the findings of this document is to be reported to the Engineer immediately prior to commencing any further works.

6. SOAKAWAY TESTING

6.1. GENERAL

The Ground Conditions Report by HBS recommended that soakaway testing be carried out on site to assess the viability of soakaways being utilised for surface water drainage.

Infiltration testing was carried out in 2Nº trial pits (TP01 and TP05) to achieve this aim. The trial pits were excavated to depths of 1.6mbgl (TP01) to 2.2mbgl (TP05) and were filled with 300mm of water and the water level monitored over a 2 hour period. In TP01 during the first test the majority of the water soaked away within the 2 hour period, therefore the test was repeated 2Nº additional times. During the first test the water level in TP05 did not fall within the 2 hour period, and as such only 1Nº test was carried out.

TP01 was excavated to a depth of 1.6mbgl and found 200mm of concrete over 200mm of Made Ground, on top of mudstone and siltstone bedrock.

TP05 was excavated to a depth of 2.2mbgl and found 100mm of tarmac over 500mm of Made Ground, above 0.8m of clay, on top of siltstone bedrock.

6.2. RESULTS

The results of the soakaway testing are provided below;

Time (mins)	Water depth (mm)			
	TP01 (Test 1) 11/02/19	TP01 (Test 2) 11/02/19	TP01 (Test 3) 12/02/19	TP05 11/02/19
1	305	310	300	310
2	305	310	300	310
3	305	300	300	310
4	300	300	300	310
5	300	290	300	310
10	280	280	295	310
15	265	270	295	310
20	250	255	290	310
25	240	250	280	310
30	225	240	280	310
45	200	200	270	310
60	170	180	260	310
75	140	150	245	315
90	115	130	230	320
105	85	100	215	310
120	55	80	200	310

The coefficient of permeability for test No.3 in TP01 was calculated as 2.98×10^{-6} , therefore it is determined that this value is too low for soakaways to be viable for the proposed development. The full soakaway results for TP01 can be found in Appendix V of this report.

6.3. CONSLUSION

The soakaway test results show that in TP01, despite the first test returning a mildly positive result, subsequent tests showed very slow infiltration with the water level in test No3 falling by only 100mm in a 2 hour period. The test in TP05 returned a negative results with the water level remaining the same by the end of the 2 hour testing period.

Due to the above it is determined that soakaway drainage is **NOT** considered suitable for the proposed development.

7. GEOTECHNICAL ASSESSMENT

7.1. GENERAL

The site investigation was required to assess the risk to development due to potential unrecorded shallow depth coal mining in the eastern area of the site. 3No. open hole rotary boreholes to 20mbgl were undertaken to achieve this aim.

In addition the investigation was required to determine the extent of the Made Ground in a former “quarried” area in the north east of the site.

7.2. GEOLOGICAL ASSESSMENT

Artificial Deposits

The trial pits found Made Ground to depths of between 0.6mbgl (TP01 and TP05) and 3.1mbgl (TP09). The Made Ground varied in composition ranging from gravelly clay to sandy gravel.

This site investigation aimed to confirm the extent of a deeper area of Made Ground in the north eastern area of the site identified in the initial site investigation by BWB. To achieve this aim 5No trial pits (TP06 – TP10) were excavated to depths of between 1.2m (TP07) and 3.3mbgl (TP09) to prove the depth to natural ground. The only trial pit to find significantly deeper (>1mgl) Made Ground was TP09 which was located in the far north eastern corner of the site and found Made Ground to a depth of 3.1mbgl. The Made Ground in this area of the site generally comprised medium dense sandy gravelly COBBLES with high boulder content, on top of reworked firm brown CLAY with occasional gravels of coal.

Superficial Deposits

Superficial deposits comprising soft to firm clay were identified under the majority of the site with typical thicknesses ranging between 0.2m (TP05) and 1.6m (TP04). Trial pits 6 to 10 were excavated to determine the thickness of Made Ground in the north eastern area of the site, and as such were terminated once reaching natural material.

Bedrock

Bedrock was deepest adjacent to the northern edge of the existing concrete slab of the former building, and was encountered at between 0.6mbgl (TP01) and 2.7mbgl (TP02). Bedrock comprised mudstone, siltstone, and coal seams.

7.3. MINING

The initial site investigation by BWB identified several near surface coal seams, varying in thickness from 0.4m to 1.5m, the two shallowest being identified as the Winter seam and the Top Beamshaw seam. This report identified that there was a high risk of subsidence due to unrecorded shallow depth coal mining in the eastern area of the site, and as such further investigation was required.

During this site investigation by Met Engineers, TP03 found an intact thin (0.25m thick) band of shiny black coal was identified at a top depth of 1.8mbgl.

Met Engineers carried out 3No open hole rotary boreholes were undertaken to 20mbgl in the eastern area of the site to confirm the presence of any voids/workings beneath this area.

No evidence of coal or voids/workings was uncovered within the boreholes and therefore it is determined that the risk from subsidence in the eastern area of the site due to migration of crown holes as a result of unrecorded shallow depth coal mining is **NEGLIGIBLE** and no further actions are required. Rotary borehole logs are provided within Appendix II of this report.

7.4. GEOTECHNICAL SUMMARY

No evidence of coal mining voids or workings were uncovered during this site investigation, and as such no further actions with regards to risks from shallow coal mining in the east of the site are considered necessary.

All ground works should be monitored by a suitably qualified person and any significant deviation from the findings of this document is to be reported to the Engineer immediately prior to commencing any further.

8. CONCLUSIONS AND RECOMMENDATIONS

In conclusion:

- 10No contamination linkages are deemed exist on the site.
- It is considered that the area around SP03 and SP06 can be treated as a hotspot of contamination.
- In this area where elevated levels of PAH and Heavy Metals have been identified, sufficient Made Ground should be removed to allow the placement of a 450mm thick in front gardens and 600mm thick in rear gardens capping layer of clean, certified topsoil.
- A site induction and appropriate PPE should mitigate any risk towards construction workers.
- Soakaway drainage is deemed unsuitable for the proposed development.
- The open hole rotary boreholes found no evidence of coal or voids/workings, therefore it is determined that the risk from subsidence as a result of unrecorded shallow coal mining is negligible in the eastern area of the site.
- The extent of deeper Made Ground in the north eastern area of the site is limited with depths of less than 1mbgl identified in all trial pits aside from TP09 which was located in the far north eastern corner of the site and found Made Ground to a depth of 3.1mbgl.

Based on these findings, we recommend that the following should be undertaken:

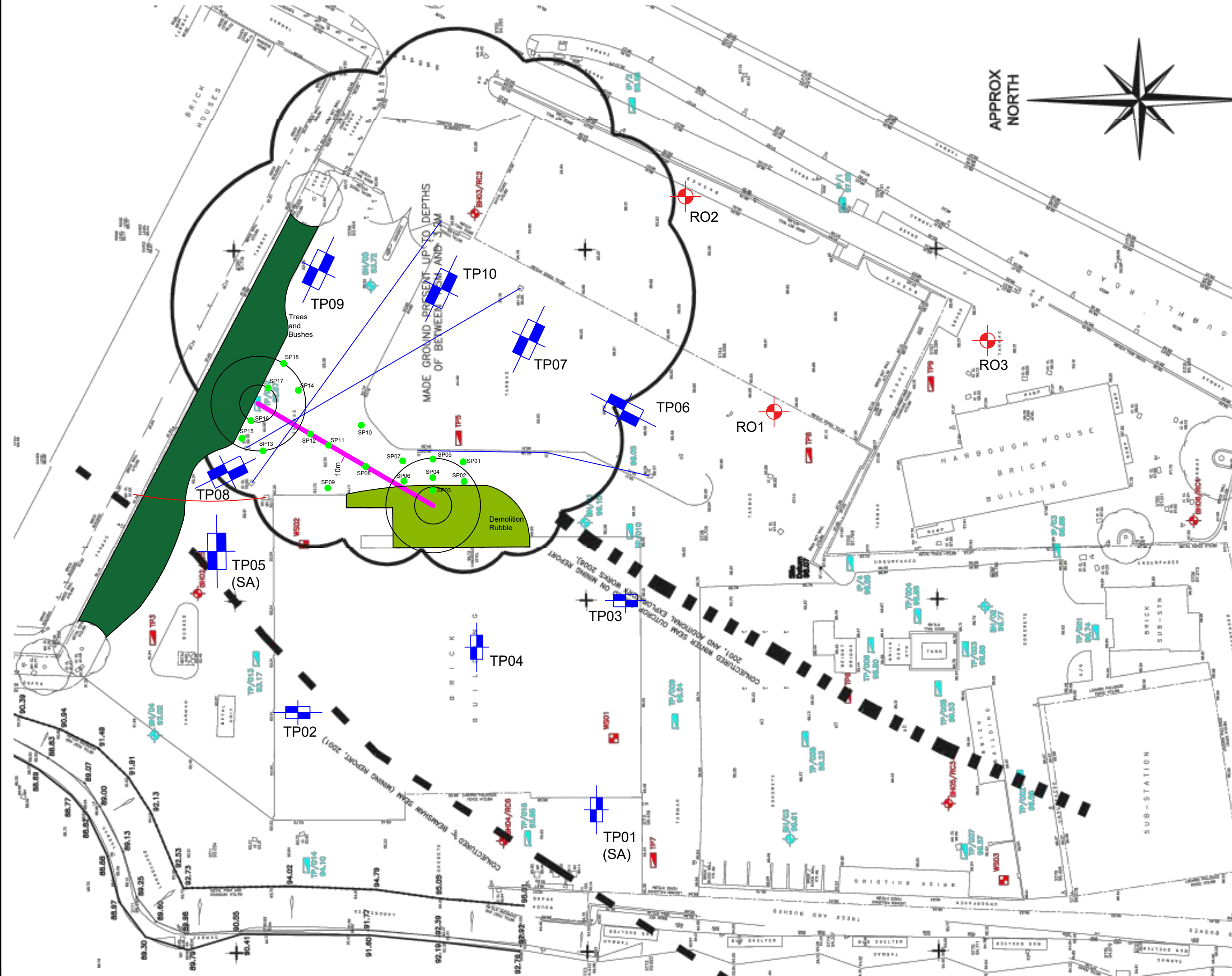
- A remediation statement will need to be prepared to accompany any planning application, detailing all remedial measures for the site as well as detailed guidance on the verification of the measures employed

APPENDIX I

Site Investigation Plan

1. Do not scale dimensions from this drawing in either paper or electronic format.
2. To be read in conjunction with all relevant Engineer's, Architect's and Other drawings and specifications.
3. All building products to be used in strict accordance with the manufacturer's recommendations.
4. Any discrepancies are to be reported to the Engineer immediately.
5. Main Contractor to provide a detailed method statement for all works prior to commencement on site.

-  = Open Hole Rotary Borehole Location
-  = Trial Pit Location
-  = Soil Sampling Location



Issue	Date	Drawn			Chkd



Met Engineers Ltd
Southgate House
Pontefrac Road
Stourton, Leeds
West Yorkshire
LS10 1SW

Tel: 0113 200 8900
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Client
NPS Property Consultants Limited

Project
Harborough Hill Road, Barnsley
P18-01848

Title
Site Investigation Location Plan

Drawn	TAW	Checked	AEC	Scale	NTS
Date	20.03.19	Date	20.03.19	Original Size	A3
Status	Final				

Drawing No
P18-01848-Met-M2-GE-001

Issue
1

APPENDIX II

Open Hole Rotary Borehole Logs

GEOINVESTIGATE Ltd.

Your Ref. P18-01848

Our Ref.

G19035

RH No.1

Sheet No. 1 of 1

Location: Harborough Hill Road / Schwabisch Gmund Way, Barnsley S71 1BP

DATE: 12/02/19

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
2.80	TARMAC / orange DRIFT Large cobbles (possible concrete) from 1.70m to 2.20m	2800					Flush lost at 1.90m		2.50
6.10	Sandy SILTSTONE	3300							5.00
11.1	MUDSTONE	5000							7.50
									10.00
16.3	SANDSTONE	5200							12.50
									15.00
20.0	SILTSTONE with MUDSTONE inclusions	3700							17.50
									20.00
	Rotary hole terminated at 20.00m								

Remarks: Casing to 1.50m

Microdrill rotary open hole borehole to 20m

No cores recovered from borehole

No gas detected from borehole on completion

Flush lost at 1.90m. No voids encountered.

Key:

 Slotted Pipe
 Plain Pipe
 Bentonite
 Gravel Filter

 Disturbed sample
 Shear vane
 Water sample
 Standard Penetration Test
 Cone Penetration Test

RH1

GEOINVESTIGATE Ltd.

Your Ref. P18-01848

Our Ref.

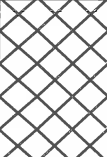
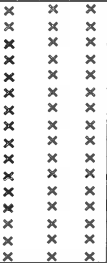
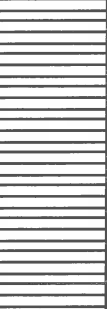
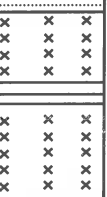
G19035

RH No.2

Sheet No. 1 of 1

Location: Harborough Hill Road / Schwabisch Gmund Way, Barnsley S71 1BP

DATE: 12/02/19

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
2.60	TARMAC / orange and brown DRIFT	2600							2.50
6.40	Light brown sandy SILTSTONE	3800							5.00
11.7	Light grey MUDSTONE	5300							7.50
17.1	Light grey SANDSTONE	5400							10.00
20.0	Grey SILTSTONE with occasional MUDSTONE inclusions	2900							12.50
							Full Flush		15.00
									17.50
									20.00
	Rotary hole terminated at 20.00m								

Remarks: Casing to 1.50m

Microdrill rotary open hole borehole to 20m

No cores recovered from borehole

No gas detected from borehole on completion

Full flush returned. No voids encountered.

Key:



Slotted Pipe

Plain Pipe

Bentonite

Gravel Filter

O Disturbed sample

Cv Shear vane

W Water sample

S Standard Penetration Test

C Cone Penetration Test

RH2

GEOINVESTIGATE Ltd.

Your Ref. P18-01848

Our Ref.

G19035

RH No.3

Sheet No. 1 of 1

Location: Harborough Hill Road / Schwabisch Gmund Way, Barnsley S71 1BP

DATE: 12/02/19

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
2.10	TARMAC / orange and brown DRIFT	2100							
6.70	Light brown sandy SILTSTONE / silty SANDSTONE	4600							2.50 5.00
12.3	Light grey MUDSTONE	5600							7.50 10.00 12.50
16.9	Light grey SANDSTONE	4600							15.00
20.0	Grey SILTSTONE with occasional MUDSTONE inclusions	3100					Full Flush		17.50 20.00
	Rotary hole terminated at 20.00m								

Remarks: Casing to 1.50m

Microdrill rotary open hole borehole to 20m

No cores recovered from borehole

No gas detected from borehole on completion

Full flush returned. No voids encountered.

Key:



Slotted Pipe

Plain Pipe

Bentonite

Gravel Filter

O Disturbed sample

Cv Shear vane

W Water sample

S Standard Penetration Test

C Cone Penetration Test

RH3

APPENDIX III

Trial Pit Logs

 Met Consultancy Group Ltd Southgate House Pontefract Road Leeds LS10 1SW Email: admin@metconsultancygroup.com Phone: 0113 200 8900				Trial Pit Log				TrialPit No TP01 Sheet 1 of 1	
Project Name: Harborough Hill Road				Project No. P18-01848		Co-ords: 434792.00 - 406642.00 Level: 96.25		Date 11/02/2019	
Location: Land off Harborough Hill Road, Barnsley, S71 1BP						Dimensions (m): 2.50 0.70		Scale 1:25	
Client: NPS Property Consultants Ltd						Depth 1.60		Logged TAW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.50	ES		0.20	96.05		Concrete	1 2 3 4 5	
				0.60	95.65		MADE GROUND. Loose light grey and brown sandy GRAVEL with high cobble content. Sand is fine to coarse, gravel is fine to coarse angular concrete and crick, cobbles are angular brick up to 200mm across. Plastic bags, metal rebar and glass also present.		
				0.90	95.35		Weak orangish brown silty MUDSTONE. Distinctly weathered.		
				1.20	95.05		Weak light grey silty MUDSTONE. Distinctly weathered.		
				1.60	94.65		Medium strong light yellowish grey SILTSTONE.		
							End of Pit at 1.60m		
Remarks: Soakaway test carried out									
Stability:		Stable		Weather:		Clear			

Trial Pit Photos

TP01

Harborough Hill Road

P18-01848



Soil Arisings. TP01.



Soil Horizons. TP01.

 Met Consultancy Group Ltd Southgate House Pontefract Road Leeds LS10 1SW Email: admin@metconsultancygroup.com Phone: 0113 200 8900				Trial Pit Log				TrialPit No TP02 Sheet 1 of 1	
Project Name: Harborough Hill Road				Project No. P18-01848		Co-ords: 434798.00 - 406643.00 Level: 96.66		Date 11/02/2019	
Location: Land off Harborough Hill Road, Barnsley, S71 1BP						Dimensions (m): 2.50 0.70		Scale 1:25	
Client: NPS Property Consultants Ltd						Depth 3.50		Logged TAW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.30	ES		0.20	96.46		Mesh reinforced CONCRETE slab.		
				2.70	93.96		Firm light grey CLAY.		
				2.90	93.76		Medium strong light grey thinly bedded SILTSTONE with 2mm ripple marks. Distinctly weathered.		
				3.50	93.16		End of Pit at 3.50m		
Remarks: Measuring stick not used due to instability,									
Stability:		Unstable		Weather:		Clear			

Trial Pit Photos

TP02

Harborough Hill Road

P18-01848



Soil Arisings. TP02.



Soil Horizons. TP02.

 Met Consultancy Group Ltd Southgate House Pontefract Road Leeds LS10 1SW Email: admin@metconsultancygroup.com Phone: 0113 200 8900				Trial Pit Log				Trial Pit No TP03 Sheet 1 of 1	
Project Name: Harborough Hill Road				Project No. P18-01848		Co-ords: 434813.00 - 406633.00 Level: 96.62		Date 11/02/2019	
Location: Land off Harborough Hill Road, Barnsley, S71 1BP						Dimensions (m): 2.50 0.70		Scale 1:25	
Client: NPS Property Consultants Ltd						Depth 2.55		Logged TAW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.40	ES		0.20	96.42		Reinforced CONCRETE slab.		
				0.60	96.02		MADE GROUND. Medium dense light orangish brown sandy gravelly COBBLE with high boulder content. Sand is medium, gravel is fine to coarse, sub-rounded to rounded sandstone, cobbles are sub-rounded to rounded sandstone up to 200mm across, boulders are sub-rounded to rounded sandstone up to 400mm across.		
				1.00	95.62		MADE GROUND. Very soft black gravelly sandy CLAY. Sand is fine, gravel is fine to medium mudstone.		
				1.80	94.82		Firm mottled orangish brown and light grey CLAY.		
				2.05	94.57		Weak black medium quality slightly shiny COAL.		
				2.50	94.12		Weak mottled orangish brown and light grey SILTSTONE.		
				2.55	94.07		Medium strong yellowish brown SILTSTONE.		
End of Pit at 2.55m									
Remarks:									
Stability:		Stable		Weather:		Clear			

Trial Pit Photos

TP03

Harborough Hill Road

P18-01848



Soil Arisings. TP03.



Soil Horizons. TP03.

 Met Consultancy Group Ltd Southgate House Pontefract Road Leeds LS10 1SW Email: admin@metconsultancygroup.com Phone: 0113 200 8900				Trial Pit Log				TrialPit No TP04 Sheet 1 of 1	
Project Name: Harborough Hill Road				Project No. P18-01848		Co-ords: 434798.00 - 406647.00 Level: 96.67		Date 12/02/2019	
Location: Land off Harborough Hill Road, Barnsley, S71 1BP						Dimensions (m): 2.50 0.70		Scale 1:25	
Client: NPS Property Consultants Ltd						Depth 2.60		Logged TAW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.25	ES		0.20	96.47		Reinforced CONCRETE slab.		
				0.70	95.97		MADE GROUND. Medium dense light orangish brown sandy gravelly COBBLE with high boulder content. Sand is medium, gravel is fine to coarse, sub-rounded to rounded sandstone, cobbles are sub-rounded to rounded sandstone up to 200mm across, boulders are sub-rounded to rounded sandstone up to 400mm across.		
				0.95	95.72		Firm greenish dark grey gravelly CLAY. Gravel is fine to coarse sub-rounded quartzite, mudstone and sandstone.		
							Stiff orangish brown sandy gravelly CLAY. Sand is fine, gravel is fine to coarse sub-rounded quartzite, mudstone and sandstone.		
				1.60	95.07		Stiff mottled orangish brown and light grey CLAY.		
				2.30	94.37		Medium strong light greyish orangish brown SILTSTONE. Distinctly weathered.		
	2.00		HVP=110	2.60	94.07		End of Pit at 2.60m		
Remarks:									
Stability:		Stable		Weather:		Clear			

Trial Pit Photos

TP04

Harborough Hill Road

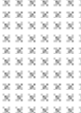
P18-01848



Soil Arisings. TP04.



Soil Horizons. TP04.

 Met Consultancy Group Ltd Southgate House Pontefract Road Leeds LS10 1SW Email: admin@metconsultancygroup.com Phone: 0113 200 8900				Trial Pit Log				TrialPit No TP05 Sheet 1 of 1	
Project Name: Harborough Hill Road				Project No. P18-01848		Co-ords: 434800.00 - 406643.00 Level: 93.00		Date 11/02/2019	
Location: Land off Harborough Hill Road, Barnsley, S71 1BP						Dimensions (m): 2.50 0.80		Scale 1:25	
Client: NPS Property Consultants Ltd						Depth 2.20		Logged TAW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.25	ES		0.10	92.90		Black tarmac		
				0.40	92.60		MADE GROUND. Loose yellowish brown very gravelly sand with high cobble and boulder content, SAND is medium. Gravel is fine to coarse sub-rounded to rounded sandstone, cobbles are sub-rounded to rounded sandstone up to 200mm across, boulders are sub-rounded to rounded sandstone up to 400mm across.		
				0.60	92.40		MADE GROUND. Medium dense multicoloured gravelly CLAY. Gravel is fine to coarse angular brick, tarmac and sandstone.		
				1.40	91.60		Firm mottled orangish brown and light grey CLAY with occasional angular cobbles of siltstone up to 200mm across.		
				2.20	90.80		Weak light grey and yellow distinctly weathered SILTSTONE.		
							End of Pit at 2.20m		
Remarks: Soakaway test carried out									
Stability:		Stable		Weather:		Clear			

Trial Pit Photos

TP05

Harborough Hill Road

P18-01848



Soil Arisings. TP05.



Soil Horizons / Infiltration Testing. TP05.

 Met Consultancy Group Ltd Southgate House Pontefract Road Leeds LS10 1SW Email: admin@metconsultancygroup.com Phone: 0113 200 8900				Trial Pit Log				Trial Pit No TP06 Sheet 1 of 1	
Project Name: Harborough Hill Road				Project No. P18-01848		Co-ords: 434829.00 - 406633.00 Level: 96.60		Date 12/02/2019	
Location: Land off Harborough Hill Road, Barnsley, S71 1BP						Dimensions (m): 2.50 0.70		Scale 1:25	
Client: NPS Property Consultants Ltd						Depth 3.05		Logged TAW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	1.00 1.00	B	HVP=100	0.15	96.45		Tarmac		
				0.40	96.20		FILL. Medium dense light cream very gravelly SAND. Sand is coarse, gravel is fine to coarse sub-rounded to rounded limestone.		
				0.70	95.90		MADE GROUND. Medium dense reddish brown very sandy GRAVEL. Sand is medium to coarse, gravel is fine to coarse angular to sub-angular red oxidised mudstone. Tapers off from south to north.		
							Firm yellowish brown gravelly CLAY. Gravel is fine to medium angular mudstone. Becomes light grey with orangish brown mottling at 1mbgl.		
				1.50	95.10		Very weak dark brown thinly laminated MUDSTONE. Destructured, recovered as coarse angular gravels.		
				2.00	94.60		Strong reddish purplish brown thinly bedded MUDSTONE.		
				2.05	94.55		Weak dark grey MUDSTONE.		
				2.80	93.80		Medium strong dark grey MUDSTONE.		
				3.05	93.55		End of Pit at 3.05m		
Remarks:									
Stability:		Stable		Weather:		Clear			

Trial Pit Photos

TP06

Harborough Hill Road

P18-01848



Soil Arisings. TP06.



Soil Arisings. TP06.

 Met Consultancy Group Ltd Southgate House Pontefract Road Leeds LS10 1SW Email: admin@metconsultancygroup.com Phone: 0113 200 8900				Trial Pit Log				TrialPit No TP07 Sheet 1 of 1	
Project Name: Harborough Hill Road				Project No. P18-01848		Co-ords: 434857.00 - 406631.00 Level: 95.00		Date 12/02/2019	
Location: Land off Harborough Hill Road, Barnsley, S71 1BP						Dimensions (m): 2.50 0.70		Scale 1:25	
Client: NPS Property Consultants Ltd						Depth 1.30		Logged TAW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.60	ES	HVP=70	0.08	94.92		Tarmac		
				0.38	94.62		FILL. Medium dense light cream very gravelly SAND. Sand is coarse, gravel is fine to coarse sub-rounded to rounded limestone.		
				0.65	94.35		MADE GROUND. Firm orangish brown mottled with light grey gravelly CLAY. Gravel is fine to coarse angular to rounded mudstone and sandstone.		
				0.90	94.10		MADE GROUND. Medium dense reddish purplish brown very sandy GRAVEL. Sand is medium to coarse, gravel is fine to coarse angular to sub-rounded red mudstone.		
				1.20			Soft orangish brown and light grey CLAY.		
				1.30	93.70		End of Pit at 1.30m		
1 2 3 4 5									
Remarks:									
Stability:		Stable		Weather:		Clear			

Trial Pit Photos

TP07

Harborough Hill Road

P18-01848



Soil Arisings. TP07.



Soil Horizons. TP07.

 Met Consultancy Group Ltd Southgate House Pontefract Road Leeds LS10 1SW Email: admin@metconsultancygroup.com Phone: 0113 200 8900				Trial Pit Log				TrialPit No TP08 Sheet 1 of 1	
Project Name: Harborough Hill Road				Project No. P18-01848		Co-ords: 434813.00 - 406658.00 Level: 92.80		Date 12/02/2019	
Location: Land off Harborough Hill Road, Barnsley, S71 1BP						Dimensions (m): 2.50 0.70		Scale 1:25	
Client: NPS Property Consultants Ltd						Depth 1.40		Logged TAW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.40	ES		0.10	92.70		Tarmac		
				0.20	92.60		FILL. Medium dense light cream very sandy GRAVEL. Sand is coarse, gravel is fine to coarse, sub-rounded to rounded limestone.		
				0.50	92.30		MADE GROUND. Medium dense orangish brown very gravelly SAND with high cobble content. Sand is fine to medium, gravel is fine to coarse angular to rounded sandstone, cobbles are sub-angular to rounded sandstone up to 200mm across.		
				0.90	91.90		MADE GROUND. Soft mottled light and dark brown gravelly CLAY. Gravel is fine to medium angular mudstone and sandstone. With rootlets.		
	1.10						Firm mottled light grey and orangish brown CLAY.		
				1.40	91.40		End of Pit at 1.40m		
1 2 3 4 5									
Remarks:									
Stability:		Stable		Weather:		Clear			

Trial Pit Photos

TP08

Harborough Hill Road

P18-01848



Soil Arisings. TP08.



Soil Horizons. TP08.

 Met Consultancy Group Ltd Southgate House Pontefract Road Leeds LS10 1SW Email: admin@metconsultancygroup.com Phone: 0113 200 8900				Trial Pit Log				TrialPit No TP09 Sheet 1 of 1	
Project Name: Harborough Hill Road				Project No. P18-01848		Co-ords: 434838.00 - 406655.00 Level: 93.10		Date 13/02/2019	
Location: Land off Harborough Hill Road, Barnsley, S71 1BP						Dimensions (m): 2.50 0.80		Scale 1:25	
Client: NPS Property Consultants Ltd						Depth 3.30		Logged TAW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
				0.10	93.00		Tarmac		
	0.20	ES					FILL. Medium dense light cream very gravelly SAND. Sand is fine to medium, gravel is fine to coarse sub-rounded to rounded limestone.		
	0.40	ES		0.30	92.80		MADE GROUND. Medium dense orangish brown gravelly SAND with high cobble and boulder content. Sand is coarse, gravel is fine to coarse sub-rounded to rounded sandstone, cobbles and boulders and sub-rounded sandstone up to 400mm across.		
				1.50	91.60		REWORKED. Firm brown CLAY with occasional fine angular gravels of coal.		
				3.10	90.00		Firm mottled orangish brown and light grey CLAY.		
	3.20		HVP=95	3.30	89.80		End of Pit at 3.30m		
Remarks: Perched water at 1.5mbgl									
Stability:		Very unstable		Weather:		Clear			

Trial Pit Photos

TP09

Harborough Hill Road

P18-01848



Soil Arisings. TP09.



Soil Horizons. TP09.

 Met Consultancy Group Ltd Southgate House Pontefract Road Leeds LS10 1SW Email: admin@metconsultancygroup.com Phone: 0113 200 8900				Trial Pit Log				Trial Pit No TP10 Sheet 1 of 1			
Project Name: Harborough Hill Road				Project No. P18-01848		Co-ords: 434848.00 - 406656.00 Level: 94.00		Date 13/02/2019			
Location: Land off Harborough Hill Road, Barnsley, S71 1BP						Dimensions (m): 2.50 0.70		Scale 1:25			
Client: NPS Property Consultants Ltd						Depth 1.40		Logged TAW			
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description				
	Depth	Type	Results								
	0.20	ES		0.15	93.85		Tarmac				
				0.40	93.60		FILL. Medium dense light cream very gravelly SAND. Sand is coarse, gravel is fine to coarse sub-rounded to rounded limestone.				
	0.60	ES		0.80	93.20		MADE GROUND. Soft dark brown mottled with reddish brown mottling sandy gravelly CLAY. Sand is medium, gravel is angular fine to coarse mudstone, sandstone and brick.				
				1.40	92.60		Firm mottled light grey and light orangish brown CLAY.				
								End of Pit at 1.40m			
1 2 3 4 5											
Remarks:											
Stability:			Stable			Weather:			Clear		

Trial Pit Photos

TP10

Harborough Hill Road

P18-01848



Soil Arisings. TP10.



Soil Horizons. TP10.

APPENDIX IV

Soil Test Results

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/01457

Issue Number: 1

Date: 27 February, 2019

Client: MET Engineers Ltd
Southgate House
Pontefract Road
Leeds
LS10 1SW

Project Manager: Ami Cooper/Thomas White
Project Name: Harborough Hill Road, Barnsley
Project Ref: P18-01848
Order No: PO-02430
Date Samples Received: 14/02/19
Date Instructions Received: 15/02/19
Date Analysis Completed: 27/02/19

Prepared by:



Holly Neary-King
Sales Executive

Approved by:



Richard Wong
Client Manager

Envirolab Job Number: 19/01457

Client Project Name: Harborough Hill Road, Barnsley

Client Project Ref: P18-01848

Lab Sample ID	19/01457/1	19/01457/2	19/01457/3	19/01457/4	19/01457/5	19/01457/6	19/01457/7	19/01457/8	Units	Method ref
Client Sample No	1	2	3	4	5	7	8	9		
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP07	TP08	TP09		
Depth to Top	0.5	0.3	0.4	0.25	0.25	0.6	0.4	0.2		
Depth To Bottom										
Date Sampled	11-Feb-19	11-Feb-19	11-Feb-19	12-Feb-19	12-Feb-19	12-Feb-19	12-Feb-19	13-Feb-19		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	4ABE	4ABE	4A	4AB	4AB	5AB	4AB	4A		
% Stones >10mm _A	19.7	18.3	9.2	30.4	35.6	35.1	14.6	32.5	% w/w	A-T-044
Organic matter _D ^{M#}	0.6	0.2	0.3	<0.1	-	-	-	-	% w/w	A-T-032 OM
Arsenic _D ^{M#}	<1	<1	<1	<1	<1	6	<1	<1	mg/kg	A-T-024s
Cadmium _D ^{M#}	<0.5	<0.5	0.5	<0.5	<0.5	0.7	0.6	<0.5	mg/kg	A-T-024s
Copper _D ^{M#}	13	3	5	4	3	23	10	3	mg/kg	A-T-024s
Chromium _D ^{M#}	10	5	10	8	6	16	9	3	mg/kg	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1	-	-	-	-	mg/kg	A-T-040s
Lead _D ^{M#}	21	7	8	8	5	42	28	9	mg/kg	A-T-024s
Mercury _D	<0.17	<0.17	<0.17	<0.17	<0.17	0.23	<0.17	<0.17	mg/kg	A-T-024s
Nickel _D ^{M#}	12	9	17	10	9	25	12	5	mg/kg	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	<1	<1	1	<1	<1	mg/kg	A-T-024s
Zinc _D ^{M#}	40	13	22	40	18	77	44	28	mg/kg	A-T-024s

Envirolab Job Number: 19/01457

Client Project Name: Harborough Hill Road, Barnsley

Client Project Ref: P18-01848

Lab Sample ID	19/01457/1	19/01457/2	19/01457/3	19/01457/4	19/01457/5	19/01457/6	19/01457/7	19/01457/8	Units	Method ref
Client Sample No	1	2	3	4	5	7	8	9		
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP07	TP08	TP09		
Depth to Top	0.5	0.3	0.4	0.25	0.25	0.6	0.4	0.2		
Depth To Bottom										
Date Sampled	11-Feb-19	11-Feb-19	11-Feb-19	12-Feb-19	12-Feb-19	12-Feb-19	12-Feb-19	13-Feb-19		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	4ABE	4ABE	4A	4AB	4AB	5AB	4AB	4A		
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	NAD	NAD	NAD	-	-	-	-		A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A	-	-	-	-		

Envirolab Job Number: 19/01457

Client Project Name: Harborough Hill Road, Barnsley

Client Project Ref: P18-01848

Lab Sample ID	19/01457/1	19/01457/2	19/01457/3	19/01457/4	19/01457/5	19/01457/6	19/01457/7	19/01457/8	Units	Method ref
Client Sample No	1	2	3	4	5	7	8	9		
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP07	TP08	TP09		
Depth to Top	0.5	0.3	0.4	0.25	0.25	0.6	0.4	0.2		
Depth To Bottom										
Date Sampled	11-Feb-19	11-Feb-19	11-Feb-19	12-Feb-19	12-Feb-19	12-Feb-19	12-Feb-19	13-Feb-19		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	4ABE	4ABE	4A	4AB	4AB	5AB	4AB	4A		
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01	0.04	<0.01	<0.01	<0.01	0.01	0.08	0.02	mg/kg	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-019s
Anthracene _A ^{M#}	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	0.08	<0.02	mg/kg	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.04	<0.04	<0.04	<0.04	<0.04	0.10	0.16	<0.04	mg/kg	A-T-019s
Benzo(a)pyrene _A ^{M#}	<0.04	<0.04	<0.04	<0.04	<0.04	0.07	0.13	<0.04	mg/kg	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	0.16	<0.05	mg/kg	A-T-019s
Benzo(ghi)perylene _A ^{M#}	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.13	<0.05	mg/kg	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	A-T-019s
Chrysene _A ^{M#}	<0.06	<0.06	<0.06	<0.06	<0.06	0.10	0.20	<0.06	mg/kg	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	A-T-019s
Fluoranthene _A ^{M#}	0.09	<0.08	<0.08	<0.08	<0.08	0.18	0.31	<0.08	mg/kg	A-T-019s
Fluorene _A ^{M#}	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.05	<0.01	mg/kg	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.04	<0.03	<0.03	<0.03	<0.03	0.05	0.13	<0.03	mg/kg	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.08	<0.03	mg/kg	A-T-019s
Phenanthrene _A ^{M#}	0.08	0.05	<0.03	<0.03	<0.03	0.17	0.34	0.05	mg/kg	A-T-019s
Pyrene _A ^{M#}	0.08	<0.07	<0.07	<0.07	<0.07	0.15	0.29	0.08	mg/kg	A-T-019s
Total PAH-16MS _A ^{M#}	0.33	0.09	<0.08	<0.08	<0.08	0.96	2.14	0.15	mg/kg	A-T-019s

Envirolab Job Number: 19/01457

Client Project Name: Harborough Hill Road, Barnsley

Client Project Ref: P18-01848

Lab Sample ID	19/01457/1	19/01457/2	19/01457/3	19/01457/4	19/01457/5	19/01457/6	19/01457/7	19/01457/8	Units	Method ref
Client Sample No	1	2	3	4	5	7	8	9		
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP07	TP08	TP09		
Depth to Top	0.5	0.3	0.4	0.25	0.25	0.6	0.4	0.2		
Depth To Bottom										
Date Sampled	11-Feb-19	11-Feb-19	11-Feb-19	12-Feb-19	12-Feb-19	12-Feb-19	12-Feb-19	13-Feb-19		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	4ABE	4ABE	4A	4AB	4AB	5AB	4AB	4A		
TPH CWG										
Ali >C5-C6 _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Ali >C8-C10 _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Ali >C10-C12 _A [#]	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Ali >C12-C16 _A [#]	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Ali >C16-C21 _A [#]	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Ali >C21-C35 _A [#]	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Total Aliphatics _A	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Aro >C8-C9 _A [#]	0.05	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Aro >C9-C10 _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Aro >C10-C12 _A [#]	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Aro >C12-C16 _A [#]	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Aro >C16-C21 _A [#]	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Aro >C21-C35 _A [#]	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Total Aromatics _A	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
TPH (Ali & Aro) _A	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
BTEX - m & p Xylene _A [#]	0.05	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s

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Client Project Name: Harborough Hill Road, Barnsley

Client Project Ref: P18-01848

Lab Sample ID	19/01457/9	19/01457/10	19/01457/11	19/01457/12	19/01457/13	19/01457/14	19/01457/15	19/01457/16	Units	Method ref
Client Sample No	9b	10	10b	SP01	SP02	SP03	SP03b	SP04		
Client Sample ID	TP09	TP10	TP10	SP01	SP02	SP03	SP03	SP04		
Depth to Top	0.4	0.2	0.4	0.2	0.3	0.3	0.8	0.3		
Depth To Bottom										
Date Sampled	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid	Soil - ES	Soil - ES	Solid		
Sample Matrix Code	4A	4AB	4AB	4AB	7	4AE	4ABE	7		
% Stones >10mm _A	33.3	26.9	18.3	30.9	<0.1	40.6	34.9	<0.1	% w/w	A-T-044
Arsenic _D ^{M#}	<1	<1	<1	<1	1	2	2	<1	mg/kg	A-T-024s
Cadmium _D ^{M#}	<0.5	0.7	<0.5	<0.5	0.7	0.5	0.7	1.0	mg/kg	A-T-024s
Copper _D ^{M#}	3	9	7	6	13	26	33	14	mg/kg	A-T-024s
Chromium _D ^{M#}	4	6	7	4	5	14	15	10	mg/kg	A-T-024s
Lead _D ^{M#}	5	29	23	21	25	331	309	63	mg/kg	A-T-024s
Mercury _D	<0.17	0.37	0.45	0.48	0.36	<0.17	<0.17	0.43	mg/kg	A-T-024s
Nickel _D ^{M#}	7	5	5	3	3	16	10	5	mg/kg	A-T-024s
Selenium _D ^{M#}	<1	1	<1	<1	<1	<1	<1	1	mg/kg	A-T-024s
Zinc _D ^{M#}	11	67	60	53	92	260	354	110	mg/kg	A-T-024s

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Client Project Name: Harborough Hill Road, Barnsley

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Lab Sample ID	19/01457/9	19/01457/10	19/01457/11	19/01457/12	19/01457/13	19/01457/14	19/01457/15	19/01457/16	Units	Method ref
Client Sample No	9b	10	10b	SP01	SP02	SP03	SP03b	SP04		
Client Sample ID	TP09	TP10	TP10	SP01	SP02	SP03	SP03	SP04		
Depth to Top	0.4	0.2	0.4	0.2	0.3	0.3	0.8	0.3		
Depth To Bottom										
Date Sampled	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid	Soil - ES	Soil - ES	Solid		
Sample Matrix Code	4A	4AB	4AB	4AB	7	4AE	4ABE	7		
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01	<0.01	0.02	0.02	<0.01	<0.10	<0.10	0.40	mg/kg	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	<0.01	<0.01	<0.01	<0.01	<0.10	<0.10	0.01	mg/kg	A-T-019s
Anthracene _A ^{M#}	<0.02	<0.02	0.04	<0.02	<0.02	<0.20	<0.20	0.55	mg/kg	A-T-019s
Benzo(a)anthracene _A ^{M#}	<0.04	<0.04	0.14	<0.04	<0.04	<0.40	<0.40	1.32	mg/kg	A-T-019s
Benzo(a)pyrene _A ^{M#}	<0.04	<0.04	0.10	<0.04	<0.04	<0.40	<0.40	0.85	mg/kg	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	<0.05	<0.05	0.14	0.06	<0.05	<0.50	<0.50	1.20	mg/kg	A-T-019s
Benzo(ghi)perylene _A ^{M#}	<0.05	<0.05	0.06	0.08	<0.05	<0.50	0.62	0.66	mg/kg	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	<0.07	<0.07	<0.07	<0.07	<0.70	<0.70	0.39	mg/kg	A-T-019s
Chrysene _A ^{M#}	<0.06	<0.06	0.15	0.09	<0.06	<0.60	<0.60	1.33	mg/kg	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	<0.04	<0.04	<0.04	<0.04	<0.40	<0.40	0.17	mg/kg	A-T-019s
Fluoranthene _A ^{M#}	<0.08	<0.08	0.28	0.09	<0.08	<0.80	<0.80	2.71	mg/kg	A-T-019s
Fluorene _A ^{M#}	<0.01	<0.01	0.02	<0.01	<0.01	<0.10	<0.10	0.29	mg/kg	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	<0.03	<0.03	0.07	0.06	<0.03	0.37	0.53	0.76	mg/kg	A-T-019s
Naphthalene _A ^{M#}	<0.03	0.04	<0.03	<0.03	<0.03	<0.30	<0.30	0.56	mg/kg	A-T-019s
Phenanthrene _A ^{M#}	<0.03	0.06	0.17	0.08	<0.03	<0.30	<0.30	1.84	mg/kg	A-T-019s
Pyrene _A ^{M#}	<0.07	<0.07	0.22	0.12	<0.07	<0.70	<0.70	2.81	mg/kg	A-T-019s
Total PAH-16MS _A ^{M#}	<0.08	0.10	1.41	0.60	<0.08	<0.80	1.15	15.8	mg/kg	A-T-019s

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Lab Sample ID	19/01457/17	19/01457/18	19/01457/19	19/01457/20	19/01457/21	19/01457/22	19/01457/23	19/01457/24	Units	Method ref
Client Sample No	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12		
Client Sample ID	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12		
Depth to Top	0.3	0.3	0.4	0.4	0.3	0.2	0.3	0.4		
Depth To Bottom										
Date Sampled	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19		
Sample Type	Solid	Solid	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	7	7	4AB	4AB	4AB	4AB	4ABE	4AB		
% Stones >10mm _A	<0.1	<0.1	33.9	26.0	25.6	30.7	32.9	27.2	% w/w	A-T-044
Arsenic _D ^{M#}	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-024s
Cadmium _D ^{M#}	0.6	<0.5	<0.5	<0.5	<0.5	0.6	0.5	<0.5	mg/kg	A-T-024s
Copper _D ^{M#}	7	9	5	4	4	3	7	5	mg/kg	A-T-024s
Chromium _D ^{M#}	5	6	5	5	4	3	5	3	mg/kg	A-T-024s
Lead _D ^{M#}	26	24	15	12	11	13	20	18	mg/kg	A-T-024s
Mercury _D	0.53	0.61	<0.17	0.21	<0.17	0.35	0.34	0.40	mg/kg	A-T-024s
Nickel _D ^{M#}	5	3	5	5	6	4	3	3	mg/kg	A-T-024s
Selenium _D ^{M#}	<1	1	<1	<1	<1	<1	1	<1	mg/kg	A-T-024s
Zinc _D ^{M#}	66	68	31	26	26	39	58	45	mg/kg	A-T-024s

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Lab Sample ID	19/01457/17	19/01457/18	19/01457/19	19/01457/20	19/01457/21	19/01457/22	19/01457/23	19/01457/24	Units	Method ref
Client Sample No	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12		
Client Sample ID	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12		
Depth to Top	0.3	0.3	0.4	0.4	0.3	0.2	0.3	0.4		
Depth To Bottom										
Date Sampled	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19		
Sample Type	Solid	Solid	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	7	7	4AB	4AB	4AB	4AB	4ABE	4AB		
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01	1.00	0.01	<0.01	0.02	0.07	<0.01	<0.01	mg/kg	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-019s
Anthracene _A ^{M#}	<0.02	1.59	<0.02	<0.02	0.03	0.09	<0.02	<0.02	mg/kg	A-T-019s
Benzo(a)anthracene _A ^{M#}	<0.04	3.26	<0.04	<0.04	0.12	0.19	<0.04	<0.04	mg/kg	A-T-019s
Benzo(a)pyrene _A ^{M#}	<0.04	2.09	<0.04	<0.04	0.08	0.20	<0.04	<0.04	mg/kg	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	<0.05	2.35	<0.05	<0.05	0.11	0.26	<0.05	<0.05	mg/kg	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.08	1.26	0.06	<0.05	0.06	0.12	0.05	<0.05	mg/kg	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	0.81	<0.07	<0.07	<0.07	0.09	<0.07	<0.07	mg/kg	A-T-019s
Chrysene _A ^{M#}	<0.06	2.63	<0.06	<0.06	0.12	0.19	<0.06	<0.06	mg/kg	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	0.32	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	A-T-019s
Fluoranthene _A ^{M#}	<0.08	6.50	<0.08	<0.08	0.22	0.35	<0.08	<0.08	mg/kg	A-T-019s
Fluorene _A ^{M#}	<0.01	0.75	<0.01	<0.01	<0.01	0.05	<0.01	<0.01	mg/kg	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.04	1.56	0.04	<0.03	0.06	0.14	0.04	<0.03	mg/kg	A-T-019s
Naphthalene _A ^{M#}	<0.03	1.04	<0.03	<0.03	0.04	0.05	<0.03	<0.03	mg/kg	A-T-019s
Phenanthrene _A ^{M#}	<0.03	4.93	0.04	<0.03	0.20	0.31	<0.03	<0.03	mg/kg	A-T-019s
Pyrene _A ^{M#}	<0.07	5.56	<0.07	<0.07	0.19	0.30	<0.07	<0.07	mg/kg	A-T-019s
Total PAH-16MS _A ^{M#}	0.12	35.7	0.15	<0.08	1.25	2.41	0.09	<0.08	mg/kg	A-T-019s

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Lab Sample ID	19/01457/25	19/01457/26	19/01457/27	19/01457/28	19/01457/29	19/01457/30			Units	Method ref
Client Sample No	SP13	SP14	SP15	SP16	SP17	SP18				
Client Sample ID	SP13	SP14	SP15	SP16	SP17	SP18				
Depth to Top	0.3	0.3	0.4	0.3	0.4	0.5				
Depth To Bottom										
Date Sampled	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AB	4AB	4ABE	4AB	4ABE	4AB				
% Stones >10mm _A	18.9	21.5	38.7	26.8	13.9	41.1			% w/w	A-T-044
Arsenic _D ^{M#}	<1	<1	<1	<1	<1	<1			mg/kg	A-T-024s
Cadmium _D ^{M#}	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			mg/kg	A-T-024s
Copper _D ^{M#}	4	5	4	4	4	4			mg/kg	A-T-024s
Chromium _D ^{M#}	6	5	3	6	3	4			mg/kg	A-T-024s
Lead _D ^{M#}	20	17	13	15	20	8			mg/kg	A-T-024s
Mercury _D	0.48	0.49	0.26	0.38	0.28	<0.17			mg/kg	A-T-024s
Nickel _D ^{M#}	3	2	4	3	3	5			mg/kg	A-T-024s
Selenium _D ^{M#}	<1	<1	1	1	2	<1			mg/kg	A-T-024s
Zinc _D ^{M#}	58	45	45	40	53	21			mg/kg	A-T-024s

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Client Project Ref: P18-01848

Lab Sample ID	19/01457/25	19/01457/26	19/01457/27	19/01457/28	19/01457/29	19/01457/30			Units	Method ref
Client Sample No	SP13	SP14	SP15	SP16	SP17	SP18				
Client Sample ID	SP13	SP14	SP15	SP16	SP17	SP18				
Depth to Top	0.3	0.3	0.4	0.3	0.4	0.5				
Depth To Bottom										
Date Sampled	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AB	4AB	4ABE	4AB	4ABE	4AB				
PAH-16MS										
Acenaphthene _A ^{M#}	0.02	<0.01	<0.01	0.06	0.02	<0.01			mg/kg	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-019s
Anthracene _A ^{M#}	0.03	<0.02	<0.02	0.06	0.03	<0.02			mg/kg	A-T-019s
Benzo(a)anthracene _A ^{M#}	<0.04	<0.04	<0.04	0.15	0.08	<0.04			mg/kg	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.09	<0.04	<0.04	0.10	0.09	<0.04			mg/kg	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.12	<0.05	<0.05	0.15	0.12	<0.05			mg/kg	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.12	<0.05	<0.05	0.07	0.07	<0.05			mg/kg	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07			mg/kg	A-T-019s
Chrysene _A ^{M#}	<0.06	<0.06	<0.06	0.16	0.09	<0.06			mg/kg	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			mg/kg	A-T-019s
Fluoranthene _A ^{M#}	0.08	<0.08	<0.08	0.32	0.16	<0.08			mg/kg	A-T-019s
Fluorene _A ^{M#}	<0.01	<0.01	<0.01	0.03	0.02	<0.01			mg/kg	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.10	<0.03	<0.03	0.07	0.08	<0.03			mg/kg	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03	<0.03	0.08	<0.03	<0.03			mg/kg	A-T-019s
Phenanthrene _A ^{M#}	0.05	<0.03	<0.03	0.37	0.15	<0.03			mg/kg	A-T-019s
Pyrene _A ^{M#}	0.12	<0.07	<0.07	0.27	0.14	<0.07			mg/kg	A-T-019s
Total PAH-16MS _A ^{M#}	0.73	<0.08	<0.08	1.89	1.05	<0.08			mg/kg	A-T-019s

REPORT NOTES

General:

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client:	MET Engineers Ltd, Southgate House, Pontefract Road, Leeds, LS10 1SW	Project No:	19/01457
Project:	Harborough Hill Road, Barnsley	Date Instructions Received:	15/02/2019 (am)
Clients Project No:	P18-01848	Cool Box Temperatures (°C):	14.0, 14.1, 14.0, 14.0

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

APPENDIX V

TP01 Soakaway Testing Results

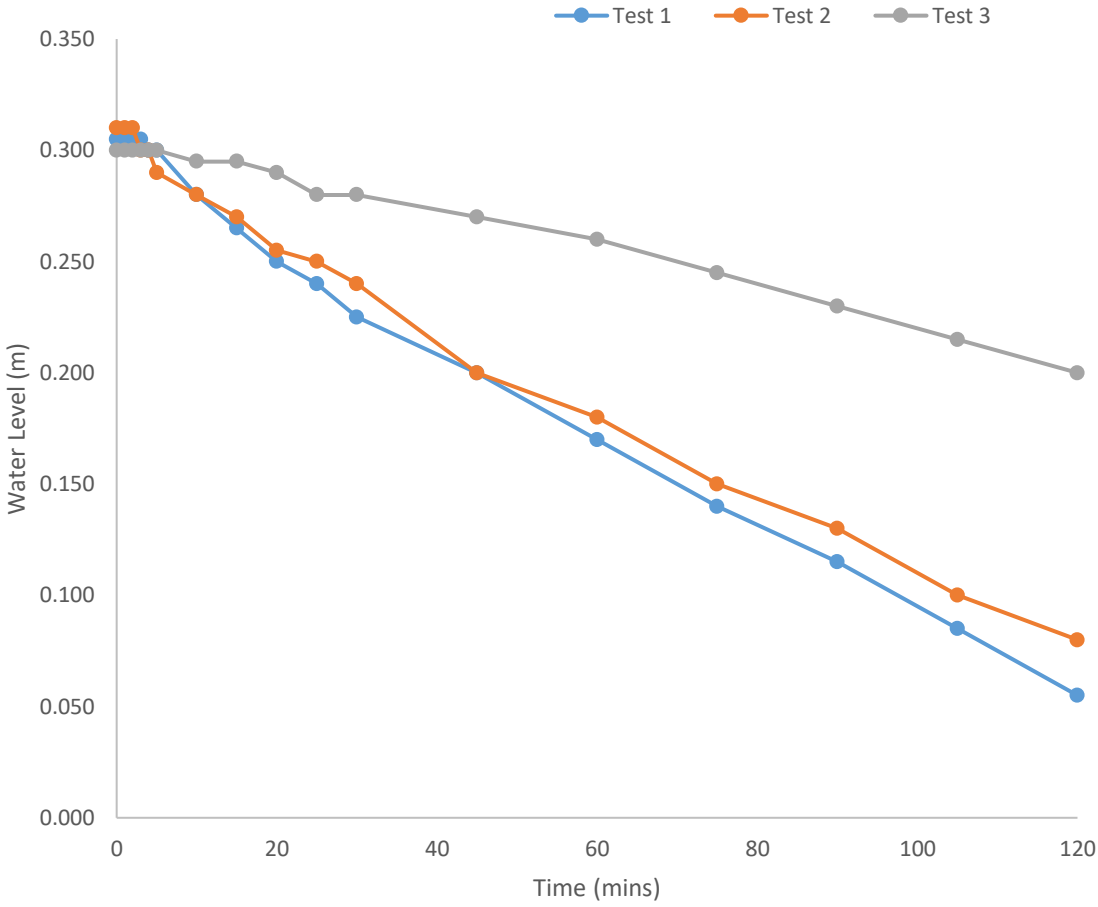
FOUL WATER LOG	
Date:	11/02/19 - 12/02/19
Project No.	P18-01848
Project Title:	Harborough Hill Road
Trial Pit No:	1

Depth Of Trial Pit (m)	1.6
Depth of Water Test (m)	0.3
Width Of Water Test (m)	0.7
Length of Water Test (m)	2.5



MET Engineers Ltd.
 Southgate House, Pontefract Road,
 Leeds, W.Yorkshire, LS10 1SW
 Tel: 0113 200 8900 Fax: 0113 200 8901
 Web: www.metengineers.com

	Water Level (m)		
Mins	Test 1	Test 2	Test 3
0	0.305	0.310	0.300
1	0.305	0.310	0.300
2	0.305	0.310	0.300
3	0.305	0.300	0.300
4	0.300	0.300	0.300
5	0.300	0.290	0.300
10	0.280	0.280	0.295
15	0.265	0.270	0.295
20	0.250	0.255	0.290
25	0.240	0.250	0.280
30	0.225	0.240	0.280
45	0.200	0.200	0.270
60	0.170	0.180	0.260
75	0.140	0.150	0.245
90	0.115	0.130	0.230
105	0.085	0.100	0.215
120	0.055	0.080	0.200



	Test 1	Test 2	Test 3
Start Water Depth (m)	0.305	0.310	0.300
Start time (mins)	0	0	0
Finish Water depth (mbgl)	0.055	0.080	0.200
Finish time (mins)	120	120	120
Effective Area at 50% (m ²)	2.71	1.96	1.96
Effective time (mins)	80	85	250
Effective Volume (m ³)	0.21875	0.20125	0.0875
Permeability Coefficient " f "	1.68E-05	2.01E-05	2.98E-06

Average Coefficient of Permeability	1.33E-05
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