University of Manchester

Manchester Engineering Campus Development (MECD)

Remediation Validation Report - Stage 1 and 2

5983-ARP-MECD-EXG-RP-Z-91001_P02

Issue | 21 October 2021

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Ove Arup & Partners Ltd
9th Floor 3 St Paul's Place
Norfolk Street
Sheffield S1 2JE
United Kingdom
www.arup.com

ARUP

Contents

			Page
1	**Introduction**		**1**
	1.1	Background information	1
	1.2	Purpose of validation report	1
2	**The site**		**3**
	2.1	Location	3
	2.2	Description and previous use	3
	2.3	Surrounding land use	4
	2.4	The development	4
	2.5	Ground conditions	4
3	**Risk assessment**		**6**
	3.1	Risk to human health	6
	3.2	Risk to groundwater	6
	3.3	Risk to flora and fauna	6
	3.4	Risk to potable water pipes	6
	3.5	Risk to buried concrete structures	6
4	**Remediation strategy**		**7**
	4.1	Need for further ground investigation beneath former buildings	7
	4.2	Management of residual contamination risks during construction	7
	4.3	Protection of controlled waters (Sherwood Sandstone aquifer)	8
	4.4	Requirement for clean cover in soft landscaping areas and tree pits	8
	4.5	Risk to buried concrete structures	9
	4.6	New water supply pipe connections	9
5	**Validation assessment**		**10**
	5.1	Management of residual contamination risks during construction	10
	5.2	Protection of controlled waters (Sherwood Sandstone aquifer)	12
	5.3	Requirement for clean cover in soft landscaping areas and tree pits	12
	5.4	Risk to buried concrete structures	13
	5.5	New water supply pipe connections	14
	5.6	Need for further ground investigation beneath former buildings	14

6 Unforeseen contamination 15

7 Summary and conclusions 16

7.1 Summary 16
7.2 Declaration 17

References

Appendices

Appendix A

Evidence of Management of Residual Risks

Appendix B

Evidence of Protection of Sherwood Sandstone Aquifer

Appendix C

Evidence of Validation of Soft Landscaping

Appendix D

Evidence of validation of concrete

Appendix E

Evidence of water supply pipe material

Appendix F

Evidence of additional ground investigation

1 Introduction

1.1 Background information

The University of Manchester has constructed a new engineering campus on land at Upper Brook Street, Manchester. Ove Arup and Partners Ltd (Arup) was appointed by the University of Manchester to provide engineering consultancy services for the project. As part of this appointment, Arup was commissioned to design, supervise and report on an intrusive geotechnical and geoenvironmental ground investigation.

The geoenvironmental risk assessment, which was first presented in the Environmental Statement for the scheme [1] identified particular remedial requirements in relation to the mitigation of potential contaminant risks associated with the soils at the site to the following:

1. Human health of future site users;
2. Quality of groundwater in the Sherwood Sandstone aquifer beneath the site;
3. Phytotoxic risk to plants;
4. Material selection for potable water pipes; and
5. Potential for sulphate attack on concrete structures.

Arup was appointed to produce an Outline Remediation Strategy for the scheme [2] and then to work with the Principal Contractor, Balfour Beatty Construction Ltd (Balfour Beatty), to prepare a Remediation Implementation Plan [3] which detailed how the actions recommended in the Outline Remediation Strategy would be implemented on site. Arup was novated to Balfour Beatty to monitor the remediation work, to ensure that works were undertaken in accordance with the agreed Remediation Strategy and Remediation Implementation Plan. The Outline Remediation Strategy and Remediation Implementation Plan were submitted to Manchester City Council's Contaminated Land Team for discussion and agreement prior to implementation on the site.

1.2 Purpose of validation report

The purpose of this report is to provide sufficient information relating to the Manchester Engineering Campus Development (MECD) to fully discharge Condition 5a of planning consent 111758/FO/2016, which pertains to the investigation of the site and Condition 5b, which pertains to the production and implementation of a remediation strategy.

As construction of the MECD development has continued for several years, it was agreed in principle with the Contaminated Land Team within Manchester City Council's Environmental Health department that the validation would be split into two stages, with Stage 1 comprising: site preparation and earthworks, foundation

construction and some external soft landscaping. Stage 2 validation covered the remaining external soft landscaping. Stage 1 validation was completed in June 2020 when this report was issued in draft to Balfour Beatty. This version of the report presents the information from Stages 1 and 2 and is the final validation report for the scheme.

This report has been produced following completion of the relevant remedial works undertaken as part of Balfour Beatty's contract. It has been produced in line with Land Contamination Risk Management [4] and describes the works that have been undertaken on site, reports on the actions that have been undertaken to address the identified areas of contamination and presents the testing data which verifies the remedial works. The report confirms that the Outline Remediation Strategy [2] has been adhered to, or the nature of any variations made to the Strategy, and that all specific remedial measures are in place.

This report should be read in conjunction with the Environmental Statement for the scheme [1], Arup's Outline Remediation Statement [2] and the Remediation Implementation Plan [3].

This report takes into account the particular instructions and requirements of our client. It is not intended for, and should not be relied upon, by any third party, and no responsibility is undertaken to any third party.

2 The site

2.1 Location

The site is located in the south-east of Manchester city centre, adjacent to the Manchester Aquatics Centre and is approximately centred on National Grid Reference SJ845970. The location of the site is shown on **Figure 1**.

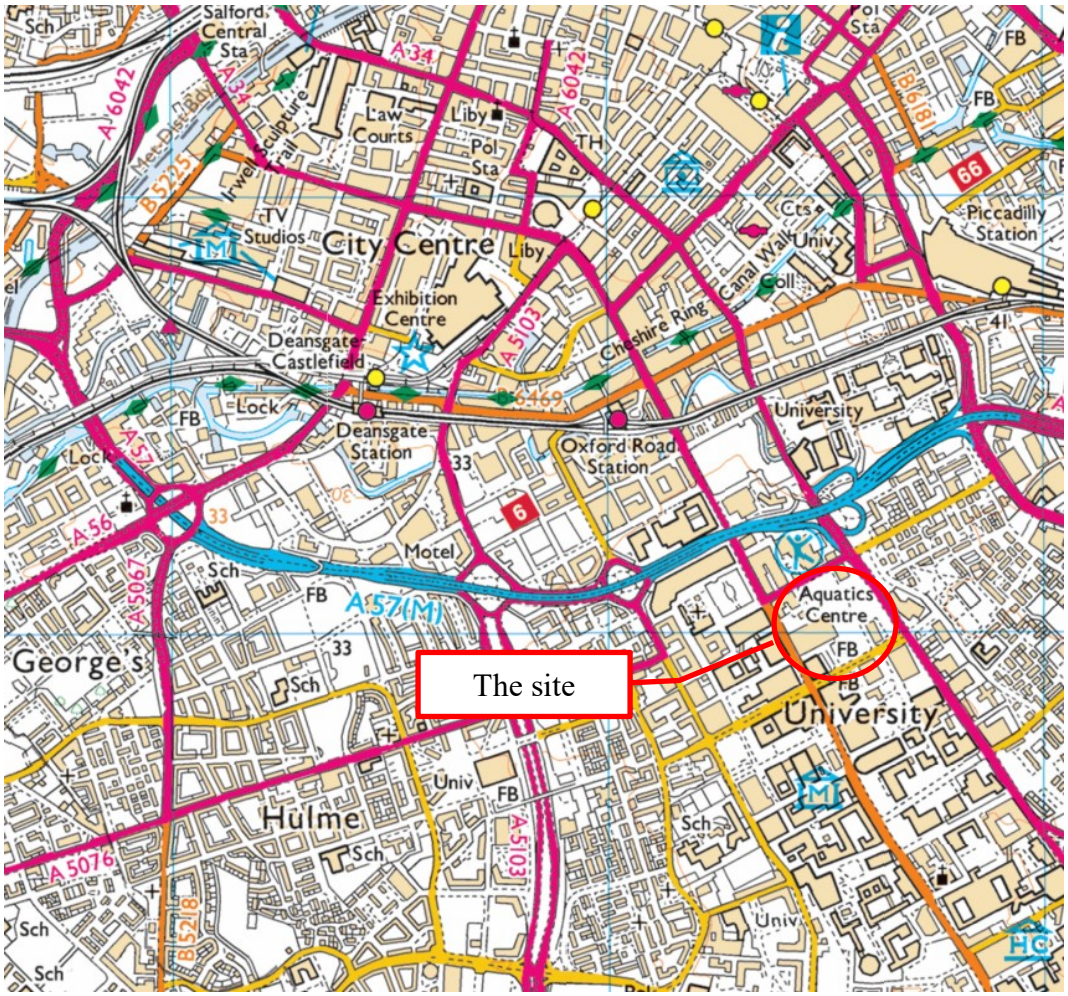


Figure 1 Site location

2.2 Description and previous use

The site is bounded by Grosvenor Street to the north, Upper Brook Street to the east, Booth Street East to the south and Oxford Road to the west. The site is part of the University of Manchester's city campus and was formerly occupied by five university halls of residence (the Grosvenor Street building, Grosvenor Place, Ronson Hall and Bowden Court Blocks 1 and 2) and the Materials Science Building (MSB), a former teaching and research facility. These buildings were demolished in 2015-2016 to make way for the MECD development.

Within the development site there are two existing buildings: Oddfellows Hall, a Grade II listed building located at the corner of Upper Brook Street and

Grosvenor Street and the James Chadwick Building, located on the corner of Upper Brook Street and Booth Street East.

The site is generally flat, with levels ranging from +38mAOD to +38.5mAOD.

2.3 Surrounding land use

The site is surrounded by university buildings to the north, south and east. The Manchester Aquatics Centre and the Manchester Business School East are located to the immediate west of the development site. A church, Deaf Institute and Grosvenor Street private residences are located off Grosvenor Street to the west of the development and remain operational during the development of MECD.

2.4 The development

The purpose of the development is to create the Manchester Engineering Campus Development (MECD), to provide facilities for higher education including laboratory spaces, teaching space, lecture theatres, workshops, cafes/restaurants, public realm and landscaping, cycle parking, disabled parking, gas bottle storage areas, new servicing arrangements and highways works.

The site is now occupied by several new buildings, as follows:

- MEC Hall: the main structure within the MECD site, being seven storeys high with a two-level basement split into two sections (north and south basements). The building is divided into teaching and laboratory space;
- Upper Brook Street building: housing large, heavy duty laboratory space;
- York Street building: housing laboratory space and supporting accommodation and back of house services.

The existing Oddfellows Hall building has been remodelled internally and extended to the west. The existing James Chadwick Building has had some minor internal reconfiguration and a link bridge constructed connecting the building to the new MEC Hall.

2.5 Ground conditions

Two phases of intrusive ground investigation were carried out for MECD prior to the start of development. The first phase was completed by WYG in 2014 and the second phase by Arup in 2015. The ground conditions recorded during these investigations are detailed in the Outline Remediation Strategy [2] and a summary is provided below:

Table 1: Generalised Sequence of Strata

Geological unit	Typical description	Typical depths (m bgl)
Made ground	Loose brown slightly clayey gravelly fine to coarse SAND	Encountered up to 3m thick.

Geological unit	Typical description	Typical depths (m bgl)
	with occasional pockets of firm brown sandy clay	Greater thickness beneath previous building plots where infilled basements are present.
Glaciofluvial deposits	Medium dense clayey fine to coarse SAND and GRAVEL	Typically 1 to 2m. Predominantly encountered in the northern part of the site.
Glacial Till	Firm to stiff brown/grey slightly sandy, slightly gravelly CLAY	Absent to 6.5m. Generally absent beneath the southern part of the site. Beneath the northern half of the site, the thickness increases towards Grosvenor Street.
Sherwood Sandstone	Red-brown SANDSTONE	2.5 to 9m. Thickness not proven. Beneath southern half of the site depth to rockhead is typically 2.5m bgl along Booth Street East boundary, increasing to 5.5m bgl in the centre of the site. In the northern half of the site, the depth to rockhead increases from 5.5 to 7.6m bgl adjacent to the Grosvenor Street boundary.
Manchester Marl	MUDSTONE	The James Chadwick Building and the diving pool for the Aquatics Centre were both sited over a sub-crop of this unit. The Manchester Marl is overlain by the Sherwood Sandstone beneath the remainder of the site.

3 Risk assessment

A detailed risk assessment was undertaken to determine the contaminative status of the site in relation to risks to human health, flora and fauna, buried construction material selection and groundwater. The full assessment is included in the Outline Remediation Strategy [2] and the conclusions are summarised below.

3.1 Risk to human health

The risk assessment identified that there are potential risks to the health of construction workers and users of adjacent sites during construction posed by the existing made ground within the site.

During the operational phase, a potential risk was identified between existing site soils in soft landscaping areas and future site users, if made ground was to be exposed at ground surface.

3.2 Risk to groundwater

The risk assessment identified a potential risk to controlled waters, namely the Sherwood Sandstone Principal Aquifer which underlies the site as a result of the existing made ground, which was found to directly overlie the bedrock in some areas of the site.

In areas of the site where glacial deposits are present, the use of piled foundations for the proposed buildings could create a preferential pathway for the migration of contaminated leachate into the aquifer beneath. Monitoring wells, installed for ground investigation purposes, could also create preferential pathways where they penetrate into the sandstone aquifer.

3.3 Risk to flora and fauna

During the operational phase, a potential risk was identified between plants in soft landscaping areas and tree pits and phytotoxic contaminants in the made ground. The development proposal includes small areas of soft landscaping including shrub and tree planting.

3.4 Risk to potable water pipes

Based on the site-specific assessment, it was recommended that polyethylene (PE) water pipe material would not be suitable for laying within the existing made ground, and that barrier pipe, wrapped steel, wrapped ductile iron pipe or copper pipe should be used for new buried water supplies within the site.

3.5 Risk to buried concrete structures

The assessment of potential for sulphate attack on buried concrete concluded that concrete conforming to design class for sulphate DS-2, would be required for new piled foundations.

4 Remediation strategy

The risk assessments identified pollutant linkages which required management or remediation to mitigate the potential risks to human health, groundwater, flora and fauna, buried concrete and water pipes.

Arup worked with Balfour Beatty to produce a Remediation Implementation Plan [3] for the scheme, which set out the following remediation objectives:

4.1 Need for further ground investigation beneath former buildings

The ground investigations carried out by WYGE and IFA were carried out before demolition and the scope was therefore constrained by the presence of existing buildings. MCC's Contaminated Land Team requested that, in order to discharge planning condition 5a for the MECD development (Ref. 111758/FO/2016), further ground investigation should be completed to adequately characterise the ground conditions within the site. Three actions were proposed to address this:

- Asbestos-related risks: The risks of encountering asbestos were to be dealt with by further targeted ground investigations carried out by specialist asbestos consultants employed by the University of Manchester and Balfour Beatty. This included investigation of the area around BHA1, a borehole installed during a previous investigation by IFA, where suspected asbestos had been noted in the made ground;
- General contamination risks: Supplementary investigation was proposed within the footprint area of each former halls of residence building, to satisfy the planning requirement for additional investigation in these areas;
- Watching brief during excavations through made ground: Excavations were to be supervised by a competent and suitably qualified engineer employed by Balfour Beatty, who would be responsible for maintaining a watching brief during all excavations through the made ground within the site and preparing records which confirm no evidence of contamination for each area.

4.2 Management of residual contamination risks during construction

Residual contamination risks exist because of the presence of made ground and potential soil contamination with asbestos. These risks were to be controlled through a combination of the following methods:

- The deposition of debris and mud on the highway was to be minimised by a combination of a rumble strip at the site exit and use of a roadsweeper vehicle;
- The recommendation made by Balfour Beatty's asbestos specialist consultant was to proceed with caution during all excavations within made ground on the site as there was a potential to encounter previously unidentified asbestos contamination. Key site operatives were to have received asbestos

familiarisation training and excavations are to be undertaken under a watching brief;

- Isolated areas of asbestos contaminated soil have been found within the site, which have been excavated and removed from site prior to the start of bulk excavation. During removal of known asbestos contaminated soil, air quality sampling was to be undertaken by the asbestos specialist;
- No mobile treatment plant was to be used during construction, such as screens and crushers, as all excavated material is to be removed from site immediately to a nearby waste recycling facility or landfill site;
- During periods of hot dry weather, dust was to be suppressed using a towable water bowser.

4.3 Protection of controlled waters (Sherwood Sandstone aquifer)

In order to mitigate the potential risk to the Sherwood Sandstone Principal aquifer which lies beneath the site, the following actions were to be taken:

- A foundation works risk assessment (FWRA) was to be carried out by the piling contractor, Expanded Piling, which identified the most appropriate piling method for the protection of the aquifer;
- All existing monitoring wells which penetrate into the sandstone principal aquifer, including any other historical wells encountered during earthworks or construction, were to be decommissioned in line with Environment Agency guidance.

4.4 Requirement for clean cover in soft landscaping areas and tree pits

The ground investigations carried out in 2014 and 2015 identified lead and other phytotoxic metals in the soil at concentrations which could affect the health of plants and trees in areas of soft landscaping area. The programme of work included for staged completion of soft landscaping areas as construction progresses. The first area to be completed was to be the Aquatics Centre car park, which is included in this Validation Report. The measures to be taken in soft landscaping areas are as follows:

- In all planted areas, existing site soils are to be covered with a minimum of 200mm of clean imported topsoil. Tree pits are to be filled with clean imported topsoil or tree growing medium;
- Soil for landscaping areas and tree pits is to be imported from an offsite source or sources. Prior to placement, the clean capping materials are to be tested at a frequency of 1 per 50m^3 if the material is from an unknown, brownfield source and 1 per 200m^3 from a greenfield source. A minimum of three samples per soil source are to be taken by Arup as Validation Engineer. The soil samples are to be tested by an MCERTS accredited laboratory for the

chemicals in the Outline Remediation Strategy and the results compared against the soil quality criteria set out within that Strategy;

- The source of any imported soil is to be determined in advance to ensure that it has not been subjected to any past industrial land use that could have resulted in contamination being present. A brief desk study is to be carried out by Arup as Validation Engineer on the proposed source to identify any other potential contaminants which may be present and to gauge the overall quality of the proposed material;
- Natural, as dug materials would not require chemical testing for use at the site provided that evidence can be produced that they are natural stone or aggregate materials and no visual or olfactory evidence of contamination is observed.

4.5 Risk to buried concrete structures

The potential risk posed by sulphate and aggressive ground conditions to buried concrete structures such as piles requires DS-2 type concrete to be used.

4.6 New water supply pipe connections

A risk assessment was carried out as part of the application process to United Utilities (UU) for a new mains water supply into the MECD development. The new supply feeds all buildings within the site including the Oddfellows Hall building. The water main enters the York Street building after passing under the pavement on the east side of York Street. From the main connection at York Street, water is supplied to all other buildings within the development mainly via a system of pipes routed within the new basements. There is one location where the pipe will be buried in the ground, the area between the MEC Hall basement and Oddfellows Hall. This short section was identified as needing to be barrier pipe, in addition to the main connection at York Street.

5 Validation assessment

This section, together with the appendices to this document, present the evidence collected to validate the required remediation actions. A summary of each action and evidence is provided in the tables, with full copies of the evidence provided in appendices.

5.1 Management of residual contamination risks during construction

Remediation action	Evidence presented	Closed out?
The deposition of debris and mud on the highway was to be minimised by a combination of a rumble strip at the site exit and use of a road sweeper vehicle.	Measures taken to control dust and debris during excavation were set out in the WH Maher & Sons Earthworks Basement Excavation Method Statement, see **Appendix A, Attachment A9.**	Yes
During periods of hot dry weather, dust was to be suppressed using a towable water bowser.		
Wagons taking excavated materials from site to be sheeted.		
The recommendation made by Balfour Beatty's asbestos specialist consultant was to proceed with caution during all excavations within made ground on the site, as there was a potential to encounter previously unidentified asbestos contamination. Key site operatives were to have received asbestos familiarisation training and excavations are to be undertaken under a watching brief.	Evidence of the outcome of Balfour Beatty's watching brief in relation to asbestos is presented in **Appendix A1.2**. Asbestos was identified on/in the ground during previous ground investigation (at BHA1, installed by IFA in 2015) demolition and construction. Balfour Beatty employed specialist consultants and contractors to provide advice and the safe removal of all asbestos encountered. Daily Activity Briefings (DAB) for the basement excavations included warning operatives to be vigilant for contamination. An example of a DAB sheet is presented in **Appendix F, Attachment F4.** The basement excavation method statement also included a requirement to check for unexpected contamination, see **Appendix A, Attachment A9.**	Yes
Isolated areas of asbestos contaminated soil have been found within the site during demolition and site preparation, which have been excavated and removed from site prior to the start of bulk excavation. During removal of known asbestos contaminated soil, air quality sampling was to be undertaken by the asbestos specialist.	Asbestos was encountered in, and removed from, the following locations during the works covered by this Validation Report: • beneath the footprint of the Grosvenor Street building during demolition; • along the proposed line of a drainage run to the west of Oddfellows Hall; • as fragments at the surface along Grosvenor Street together with fibres in made ground (this included the area around BHA1 from the IFA 2015	Yes

	investigation, where suspected asbestos had been noted), and • associated with a buried furnace within the Aquatics Centre car park area. Evidence of asbestos investigation and removal is presented in **Appendix A1.2 and Attachments A1 to A7 and A10 of Appendix A.**	
No mobile treatment plant was to be used during construction, such as screens and crushers, as all excavated material was removed from site to a nearby waste recycling facility or landfill site.	Evidence of off-site disposal of excavated arisings together with details of the waste carriers used and receiving landfills/recycling facilities, is presented in **Appendix A, Attachment A8.** Balfour Beatty has confirmed that excavated soils from the bulk excavation (European Waste Catalogue (EWC) code 17-15-04) were taken to the following locations: • Churchill Environmental Ltd, Fletcher Bank Quarry site, Bury WML102210 (non-hazardous waste disposal site) • W Maher and Sons Ltd, Daniel Adamson Road, Salford Yard (construction waste recycling facility) EPR/GB3930DG • Churchill Environmental Ltd, Woolston/Thelwall Lane, Warrington disposal ground WML50470 (non-hazardous waste disposal site) • DG Cummins, Aggregates Yard, Wincham Lane, Wincham WML 402829 (construction waste recycling facility) • Churchill Enviro Ltd – Waste treatment, Langley Road, Pendlebury, Manchester M27 8SS WML104215 (treatment of waste to produce soil, soil substitutes and aggregate) • W Maher and Sons Ltd, Ashton Old Road Recycling Depot, Ashton Old Road, Manchester M11 2XX WML104212 (treatment of waste to produce soil, soil substitutes and aggregate) Pile arisings generated by Expanded Piling Ltd (EWC Code 17-05-04) were taken to: • J O'Shea and Sons Ltd, Orchard Street, Salford WML 50093 (construction waste recycling facility) • PP O'Connor Ltd, Woodrow Way, Manchester WML401005 (construction waste recycling facility) Details provided by Balfour Beatty regarding waste removal from site are presented in **Appendix A, Attachment A8**.	Yes

5.2 Protection of controlled waters (Sherwood Sandstone aquifer)

Remediation action	Evidence presented	Closed out?
A foundation works risk assessment (FWRA) was to be carried out by the piling contractor, Expanded Piling, in order to identify the most appropriate piling method to protect the aquifer.	The FWRA prepared by Expanded is presented in **Appendix B, Attachment B1**. The FWRA identified Continuous Flight Auger (CFA) bored piles as the appropriate method for pile construction at the site, to limit any impact on the Sherwood Sandstone aquifer as a result of pile installation. Evidence of the installation of CFA piles is presented **Appendix D**, see also **Section 5.4.**	Yes
All existing monitoring wells which penetrate into the sandstone principal aquifer, including any other historical wells encountered during earthworks or construction, were to be decommissioned in line with Environment Agency guidance.	All monitoring wells which penetrated the sandstone bedrock were either to be excavated as part of the basement digs or located beneath new buildings. Monitoring wells which lie within the proposed basement areas and building footprints, where excavations were taken into the sandstone bedrock, were not decommissioned as the wells will be covered by the building floor slab, therefore will not be future pathways for contamination to enter the sandstone. Further information is provided in **Appendix B**. An old water well was found during construction of the MEC Hall north basement in September 2017. The material used to infill the well was tested to ensure it was not contaminated, and then pressure grouted. Evidence of the measures taken to treat the well is presented in **Appendix B.**	Yes

5.3 Requirement for clean cover in soft landscaping areas and tree pits

Areas of soft landscaping have been created throughout the scheme, with the final areas of soft landscaping being completed in Spring 2021.

Remediation action	Evidence presented	Closed out?
The source of any imported soil was to be determined in advance to ensure that it has not been subjected to any past industrial land use that could have resulted in contamination being present	Arup were provided with information on the proposed source of topsoil in June 2018. Evidence of the brief desk study carried out is presented in **Appendix C, Attachment C1**, which found that the material was being sourced from a greenfield site. This material was placed within the reinstated Aquatics Centre Car Park.	Yes

	Soil was imported to fill seven new tree cells to the south of Oddfellows Hall from the same source in April 2019. The cells were then capped with topsoil from a separate source in March 2020. Evidence confirming that the source was a greenfield site is presented in **Appendix C, Attachment C4.**	
Prior to placement, the clean capping materials were to be tested at a frequency of 1 per 50 m^3 if the material is from an unknown, brownfield source and 1 per 200m3 from a greenfield source. A minimum of three samples per soil source were to be taken. The soil samples were to be tested by an MCERTS accredited laboratory for the chemicals in the Outline Remediation Strategy and the results compared against the soil quality criteria which have been agreed with MCC Environmental Health department.	Topsoil was delivered to site and where possible, sampled under the supervision of a Geoenvironmental Specialist from Arup. The samples were tested by an MCERTS accredited laboratory and the results compared against the criteria set by the Outline Remediation Strategy and met the requirements. Evidence of validation testing is presented in **Appendix C.** The imported materials complied with the requirements of the Outline Remediation Strategy and were therefore suitable for use.	Yes
In all planted areas, existing site soils are to be covered with a minimum of 200mm of clean imported topsoil. Tree pits were to be filled with clean imported topsoil or tree growing medium	Evidence of the validation of imported materials is presented in **Appendix C.** It should be noted that there is an existing line of trees within the Aquatics Centre car park area and a stand of trees near the James Chadwick building that were retained from the previous development. The soil these trees were planted in has not been verified as part of the MECD remediation works.	Yes

5.4 Risk to buried concrete structures

Remediation action	Evidence presented	Closed out?
The potential risk posed by sulphate and aggressive ground conditions to buried concrete structures such as piles requires DS-2 type concrete to be used	Concrete conforming to DS-2 was specified in the concrete specification prepared by Arup for MECD (Ref. 5983-ARP-00-XX-SP-S-000023). Extracts of the relevant section(s) are presented in **Appendix D, Attachment D1** The requirement for DS-2 concrete was included in Figure B-13 of Expanded Piling's design report (Ref. 5983-EXP-MECD-B-X-CA-00001 issue 5 revision	Yes

	P05). Extracts of the relevant section(s) are presented in **Appendix D, Attachment D2** Expanded Piling's handover pack (Project Ref. 5983-EXP-MECD-B-X-CA-00001/P05 Document No. Y3843/Contract Design/rev C05) confirms the use of concrete mix C32/40 MCC 340 W/C 0.45 IIIA F5 and a minimum of 75mm cover, which is consistent with DS-2 design. Extracts of the relevant section(s) are presented in **Appendix D, Attachment D3**	

5.5 New water supply pipe connections

Remediation action	Evidence presented	Closed out?
New water connections require use of protected pipe materials where they are laid in remaining made ground	The water pipe risk assessment for MECD is presented in **Appendix E, Attachment E1** The use of protected pipe materials for specific sections of the new water supply route was specified in the Arup specification (Ref. 5983-ARP-MECD-Z-SP-ME-51-00001). Extracts from the relevant sections of this specification are presented in **Appendix E, Attachment E2**	Yes

5.6 Need for further ground investigation beneath former buildings

Remediation action	Evidence presented	Closed out?
Asbestos-related risks: The risks of encountering asbestos have been dealt with by further targeted ground investigations carried out by the asbestos specialist consultants.	Evidence confirming that asbestos related risks have been addressed by Balfour Beatty is presented in **Appendix A**; see also **Section 5.1**	Yes
General contamination risks: Investigation was to be carried out within the footprint area of each former building, to satisfy the planning requirement for additional investigation in these areas, as it had not been possible to investigate these areas when the buildings were still standing.	Evidence of the investigation scope and agreement of scope with MCC is presented in **Appendix F, Attachment F1 and F2**. Evidence of the findings of the additional investigation is presented in **Appendix F, Attachment F3**. The quality of made ground beneath former buildings was similar to that encountered elsewhere within the MECD site and was classified by Churchill Environmental Ltd as non-hazardous for the purposes of disposal. All material within the investigation area was subsequently excavated and removed	Yes

	from site as part of the excavation of the MEC Hall North and South basements.	
Watching brief during excavations through made ground: Excavations were to be supervised by a competent and suitably qualified engineer employed by Balfour Beatty, who will be responsible for maintaining a watching brief during all excavations through the made ground within the site and preparing records which confirm no evidence of contamination for each area.	Statements from Balfour Beatty regarding the watching brief during excavation of the South and North basements for MEC Hall are presented in **Appendix F, Attachment F4.** Daily Activity Briefings and the method statement for basement excavations included warning to be vigilant for contamination. An example DAB sheet is presented in **Appendix F, Attachment F4 and Appendix A, Attachment A9.**	Yes

6 Unforeseen contamination

There was one instance of unforeseen contamination being found during the period covered by this report: the discovery of a buried boiler with asbestos lagging and surrounding asbestos contaminated soil within the Aquatics Centre car park.

Manchester City Council (MCC) Contaminated Land Team was notified of the incident on 10th August 2017, which was logged in their records. A copy of the notification email sent to MCC is included as **Attachment A6** in **Appendix A**.

Details of the actions taken by Balfour Beatty to deal with the contamination are presented in **Attachment A5** in **Appendix A**.

7 Summary and conclusions

7.1 Summary

The following remediation requirements were identified for the MECD site:

- Additional investigation within the footprints of former buildings, to properly characterise the made ground within the site (required to fully discharge Condition 5a of the planning consent for the development);
- Management of residual risks posed by ground contamination during construction;
- Protection of the Sherwood Sandstone aquifer during piling and operation of the site;
- Use of clean, imported topsoil to prevent a potential risk to human health and phytotoxic risk to plants in soft landscaping areas completed to April 2020;
- Installation of suitable pipe materials for new potable water pipes laid within the site, and
- Use of DS-2 concrete design to protect buried structures from aggressive ground conditions.

Information has been submitted to Arup to support the measures taken by Balfour Beatty and their sub-contractors to address these remediation requirements. In summary, the following remediation measures have been taken:

- Additional ground investigation within the footprints of former buildings, post-demolition;
- Watching brief for contamination during all bulk excavations, delineation and removal of contaminated material when found;
- Additional investigations for the presence of asbestos on and in soil, including the area at borehole BHA1 identified during previous investigations;
- Foundation Works Risk Assessment and use of Continuous Flight Auger methods for the installation of piled foundations, to protect the Sherwood Sandstone aquifer;
- Removal (by excavation) or blocking of groundwater monitoring standpipes with response zones in the Sherwood Sandstone aquifer, to protect the aquifer;
- Excavation and removal of asbestos contaminated soil and disposal to licensed landfill facilities;
- Excavation and removal of made ground within new building footprints and disposal to licensed landfill facilities or soil recycling facilities, as appropriate;
- Provision and laying of clean imported topsoil within soft landscaping areas of the site;
- Use of Design Class for Sulphate DS-2 concrete in all piled foundations, to protect against corrosion by sulphate;

- The specification of protected pipe materials where water supply pipes are to be laid within potentially contaminated ground.

In accordance with the requirements of planning condition 5 of consent 111758/FO/2016, MCC's Contaminated Land Team has been notified of the presence of unexpected contamination on one occasion during the period covered by this report.

This report is submitted as evidence of the measures taken during development of the site and is intended to discharge Condition 5a (relating to the investigation of the site) and Condition 5b (relating to the remediation of the site) of planning consent 111758/FO/2016.

7.2 Declaration

We confirm that the remediation works described above have been completed to the satisfaction of Arup in accordance with the agreed Remediation Strategy and Remediation Implementation Plan.

References

[1] Deloitte (2016) Manchester Engineering Campus Development (MECD), Manchester. Environmental Statement (Ground Conditions and Contamination chapter is Chapter 8)

[2] Arup (2016) University of Manchester MECD: Outline Remediation Strategy. Report Ref. REP/235779/GEO Issue 12th September 2016

[3] Arup (2017) Balfour Beatty Construction Ltd: Manchester Engineering Campus Development (MECD) Remediation Implementation Plan. REP/235779/RIP Issue 10th August 2017

[4] Defra and Environment Agency Land Contamination Risk Management (LCRM) available at: https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm

Appendix A

Evidence of Management of Residual Risks

A1 Evidence of management of residual risks

A1.1 Management of construction-related risks

Balfour Beatty provided their methodology for controlling risks from unexpected contamination, mud and dust in the Excavation Method Statement for the development, see **Attachment A9** to this appendix.

A1.2 Evidence from watching brief

A watching brief for asbestos was maintained by Balfour Beatty and specialist asbestos consultants throughout the demolition and construction process. The following is a timeline of works carried out with respect to asbestos within the site during demolition and construction:

- Environmental Essentials carry out a survey of the 'wendy duct', a communications duct which ran east-west across the MECD site between the Grosvenor Building and the Material Science Building, and confirmed that it did not contain asbestos (September 2016), reported in Environmental Essentials Ltd, Targeted Refurbishment Survey, Grosvenor Group Halls of Residence (External Ducts x 2), Grosvenor Street, Manchester Issue No. 2 dated 20th May 2014 – **Attachment A1** to this Appendix;
- All buildings to be demolished were stripped of asbestos by Kaefer C&D, with air monitoring and certification for this work provided by Environmental Essentials Ltd (2015). The buildings were subsequently demolished by Connell Bros Ltd from April 2015 to September 2016. Demolition arisings were stockpiled on site for use as a piling mat during construction of the new buildings. Supporting information relating to asbestos during demolition is provided in Appendix D of the Demolition Works Issue of the Health and Safety file 5983-ARP-00-XX-RP-C-000002-Rev A issued on 15th November 2016;
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- A specialist asbestos consultant (Redhill Analysts Ltd, later trading as Lucion Environmental Ltd) was contracted to test the stockpiled soil from the footings of the Grosvenor Street building. It was confirmed that the material contained asbestos and recommended that the material should be taken offsite for disposal to landfill. This was done together with

background air quality monitoring for asbestos fibres carried out by Redhill Analysts Ltd during removal of the stockpiles (June 2016). Reported in Lucion Environmental Ltd (2016) Manchester Engineering Campus Development Project – Asbestos in Soils Risk **Assessment & Sampling Strategy – Attachment A2** to this Appendix;

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- Churchill Environmental carry out trial pitting and stockpile sampling in the northern area of the site along Grosvenor Street previously investigated for surface asbestos by Lucien to check for the potential presence of asbestos in soil to obtain information for disposal, including the location of BHA1 from the IFA 2015 investigation, where potential asbestos contamination had been identified during a previous phase of ground investigation by Structural Soils. Asbestos fibres were detected in 5 out of 13 samples tested. Churchills conclude that the materials can be disposed of as non-hazardous waste (January 2017), reported in emails and laboratory test data - **Attachment A5** to this Appendix;

- Excavations within the surface car park adjacent to the Aquatics Centre uncovered a buried boiler. Suspected asbestos lagging was present in the boiler and in soil surrounding the furnace. Churchill Environmental was called to site to investigate the furnace and surrounding fill in July 2017. Kaefer were contracted to remove the furnace and surrounding soil for disposal offsite and this work was certified by Santia Ltd, a specialist asbestos management company. Following this incident, Balfour Beatty

continued a watching brief for asbestos in this area, but no further evidence of asbestos was found (September 2017), reported in emails, photo evidence and signoff from Santia Ltd – **Attachment A6** to this Appendix. In line with the planning condition for contamination, this incident was notified to the Contaminated Land Team in Manchester City Council by email – **Attachment A7** to this Appendix.

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Buried cast iron boiler uncovered in ground within Aquatics Centre car park on Monday 31st July 2017, notified to Arup on 1st August 2017. Testing of samples of soil by a specialist contractor confirmed the presence of loose asbestos insulation fibres of chrysotile and amosite.

Boiler and surrounding stockpiled soil were removed from site by Kaefer (soil classified as hazardous waste) and the area made safe by First Order Red/Santia.



Top of boiler uncovered in Aquatics Centre car park. At first it was believed to be a buried tank.



Excavation of the boiler



The excavated boiler

Interior of boiler



Image showing the location that the boiler was removed from, an old floor slab in a former basement area.

Attachment A1 – Environmental Essentials survey of "Wendy Duct"

Attachment A2 – Lucion Environmental Risk Assessment and Sampling Strategy

Attachment A3 – Lucion Environmental Former Grosvenor Street Residences report

Attachments A4 – Lucion Environmental Soil Investigation Works and Air Quality Monitoring

Attachment A5 – Churchill Environmental trial pitting exercise

Attachment A6 – Santia Ltd signoff of asbestos removal area

Attachment A7 – Notification of unexpected contamination to MCC Contaminated Land Team

Attachment A8 – Balfour Beatty waste transfer information, including landfill destinations

Attachment A9 – W. Maher and Sons basement excavation method statement

Attachment A10 - Asbestos removal method statement

Appendix B

Evidence of Protection of Sherwood Sandstone Aquifer

B1 Evidence of protection of Sherwood Sandstone aquifer

B1.1 Use of CFA piling methods

Expanded Piling's Foundation Works Risk Assessment is presented as **Attachment B1** to this appendix.

Arup's *piling and retaining wall specification* 5893-ARP-00-XX-SP-S-000001 C2 1st December 2016, specified the use of contiguous bored piles to form the MEC Hall north and south basements; cast in-situ bored piles outside basement areas including MEC Hall, York Street building, Upper Brook Street building and Oddfellows Hall extension. This specification set the requirements for Expanded Piling's contract for MECD.

Expanded Piling prepared a design report for the piles required at MECD: Expanded Piling, Project Reference: 5983-EXP-MECD-B-X-CA-00001/P05 Contract Design – Contiguous piled embedded wall and bearing piles, Document No. Y3483/Contract Design/rev C05 dated 21st February 2017. This document confirms that CFA piling was to be used at the site (see also **Appendix D, Attachment D2**).

Expanded prepared a handover pack containing all as-built piling information: Expanded Piling, ITP No. and Revision: 5983-EXP-MECD-B-QP-Y-00027 AB01, MECD Piling Handover Pack. Works: CFA and Rotary Piles. This document confirms that CFA piles were installed at the site (see also **Appendix D, Attachment D3**).

The following photographs show the use of the CFA piling rig at MECD:



CFA piling rig on site at MECD 29th March 2017



MEC Hall south basement showing contiguous piled wall exposed on sides of basement and exposed red sandstone in base of excavation. Note heap of excavated spoil in top left corner of photograph (taken 26th July 2017)



MEC Hall south basement showing heap of excavated spoil being collected and removed from basement for offsite disposal. Piled wall structure visible behind spoil heap (taken 26th July 2017)



MEC Hall north basement showing excavations through sandstone and removal of spoil from excavation. Piled walls visible in sides of basement (taken 6th November 2017)

B1.2 Treatment of existing standpipes/wells

Existing monitoring wells and areas where historical abstraction wells could be encountered are shown on Drawing 5983-ARP-MECD-G-SI-C-00-2XE02, which is presented as **Attachment B2** to this appendix.

All historical monitoring wells which penetrated the sandstone bedrock (installed for ground investigation purposes) were either excavated as part of the basement dig, or located beneath new buildings:

Monitoring Well Ref.	Location	Treatment
BHG2	Within MEC Hall south basement excavation.	All historical monitoring wells were removed during excavation of MEC Hall south basement, which extended into the sandstone bedrock.
BHG3		
BHG1		
BH104		
BHV1A		
BHV4AB		
BH103	Within MEC Hall north basement excavation.	All historical monitoring wells were removed during excavation of MEC Hall south basement, which extended into the sandstone bedrock.
BHA2		

BHA1A	Within footprint of York Street building.	Removed during excavation of foundations for York Street building.
BHA3	Beneath new drainage attenuation tank to south of Oddfellows Hall	Removed during excavation works to install the attenuation tank.
RBH101	Within footprint of Oddfellows Hall extension.	Removed during construction of foundations for Oddfellows Hall extension.
WS101	Within footprint of new Upper Brook Street building	Removed during excavation of foundations for Upper Brook Street building.

B1.3 Treatment of water well identified during construction

In September 2017, a suspected old infilled water well approximately 1m diameter was found in the area of the MEC Hall north basement, immediately adjacent to a proposed lift pit. The well was within the Sherwood Sandstone. Advice was also sought from Arup, in case the materials used to infill the well were contaminated.

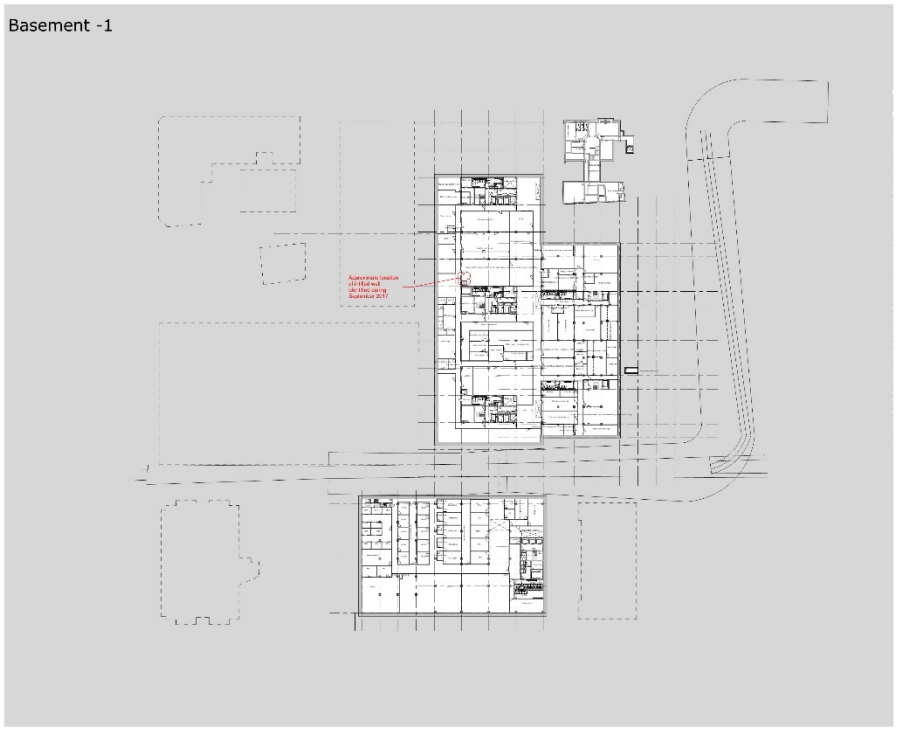
Expanded Piling Ltd contracted ESG Ltd to investigate the well. ESG drilled three boreholes using dynamic windowless sampling methods to depths of up to 6.9m bgl through the well infill material. The well was found to be infilled with brown made ground of gravel with brick and ash. No visual or olfactory evidence of contamination was noted. Intact sandstone bedrock was proven at the base of the boreholes, confirming the depth of the well.

Samples of the well infill were taken for analysis by ESG. ESG's factual report on the investigation is presented as **Attachment B3** to this appendix. The chemical testing identified elevated concentrations of lead, but within the range detected in the made ground at the MECD site during previous ground investigations. No contamination with Polynuclear Aromatic Hydrocarbons (PAH) or petroleum hydrocarbons (TPH) was identified and no asbestos was detected in the samples taken. The infill material was found to be dry and no groundwater seepages were noted.

Arup did not request the infill material to be removed, as it was felt that the material posed a low risk to groundwater quality, being dry and above the water table. It was proposed to grout the well in order to stabilise the ground as significant voiding had been noted in the infill material. Grouting was carried out by ESG on 14th September 2017 using the boreholes drilled through the well infill. Grout take was recorded on the borehole logs.



Location of infilled well within MEC Hall North construction area (in foreground of photograph, where dynamic sampling rig is located)







View of infilled well feature within MEC Hall North basement. The well is located a few metres to the right of the concrete ring where the dynamic sampler is located (taken 14th September 2017)



Drilling of boreholes through well infill material. Plastic casing was inserted in the boreholes to allow grouting to be completed after drilling.

Attachment B1 – Foundation Works Risk Assessment

Attachment B2 - Drawing 5983-ARP-MECD-G-SI-C-00-2XE02 existing monitoring wells

Appendix C

Evidence of Validation of Soft Landscaping

C1 Evidence of Validation of Soft Landscaping

C1.1 Aquatics Centre car park area

The following documents are attached to this appendix, as evidence of soft landscaping validation within the Aquatics Car Park area:

Attachment C1 Topsoil source check;

Attachment C2 Topsoil sampling and placement validation, and

Attachment C3 Topsoil test results

Arup reviewed the topsoil testing results and confirmed to Balfour Beatty that the topsoil validation testing complied with the requirements of the Outline Remediation Strategy.



New soft landscaping alongside Aquatics Centre. Tree pits and soil validated June 2018

It should be noted that during the placement of topsoil in the Aquatics Centre Car Park, a small quantity of surplus topsoil was placed on a small area of landscaping adjacent to the new Active Travel Hub building. Although the topsoil is chemically suitable for use, the thickness was not verified by Arup at the time of placement. This area is very small and has been planted with dense shrubbery, as shown in the photograph below. No further validation has been carried out in this area.



Small area of topsoil placement with dense shrub planting adjacent to Active Travel Hub

Furthermore, there is a line of existing mature trees within the Aquatics Centre car park which have been retained. The soil surrounding these trees was not disturbed as part of the construction of the car park, no new soil has been placed around these trees and therefore the soil in that area has not been validated by Arup.



Line of existing trees within Aquatics Centre car park, not disturbed as part of MECD construction

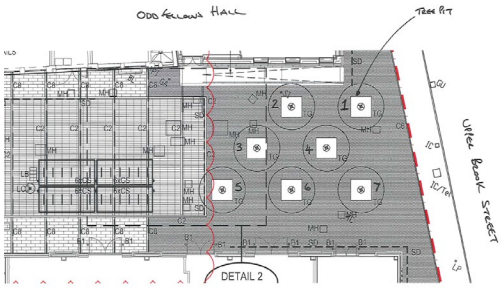
C1.2 Tree pits to south of Oddfellows Hall

The following documents are attached to this appendix, as evidence of validation to seven tree pits installed to the east of Oddfellows Hall:

Attachment C4 Topsoil source check;

Attachment C5 Topsoil sampling and placement validation, and

Attachment C6 Topsoil test results



Location of tree pits to east of existing Oddfellows Hall. Upper Brook Street is located to the east of the tree pits.

The tree pits were constructed in two stages. The first stage was carried out on 1st April 2019. During this stage, the tree pits were dug and the proprietary plastic tree root system was installed. Arup was not present for this stage of the works. Balfour Beatty confirmed that the source of topsoil placed in the tree cells was the same as used for the Aquatics Centre Car Park in **Attachment C1**. A statement to this effect is presented in **Attachment C4** but no validation samples were taken at the time. The tree cells were then covered over with hardstanding as they were located in an area of the site being used as a temporary site access for vehicles.

The tree pit locations were uncovered in March 2020 for planting and some of the topsoil that had been placed in April 2019 was dug out, as shown in the photographs in **Attachment C5**. At the time, Arup was not able to be present on the site due to restrictions on site visits as a result of the COVID-19 outbreak. Samples of the imported topsoil placed in the tree pits were taken by Balfour Beatty for testing in line with the remediation strategy (see **Attachment C6**). As the soil placed in March 2020 was from a new source, a minimum of three samples was required to be taken. However, only two samples were taken at the time, meaning that a third verification sample needed to be taken before validation can be closed out in this area.

Balfour Beatty took the third sample in May 2021 (sample ref. OFH-1-0-ES-0.70 result in **Attachment C8**). Arup reviewed the topsoil testing results provided and confirmed to Balfour Beatty that the topsoil validation testing complied with the requirements of the Outline Remediation Strategy.

C1.3 Upper Brook Street and Podium landscaping (November 2020)

Topsoil was imported and laid in these areas in November 2020 and sampled by Socotec in February 2021. Balfour Beatty confirmed that the source of this soil was the Miller Homes site at Congleton. A ground investigation report was provided to Arup for review, which confirmed that the site had been agricultural land that was now being redeveloped for housing, it was deemed that the site met the requirement for greenfield land (see **Attachment C10**). A sample of soil from this site was tested prior to import by Tim O'Hare Associates, which showed that the material met the requirements of the specification. Thirteen samples of topsoil were taken from the Upper Brook Street landscaping and the planters on the podium area (see plan in **Attachment C9**) by Socotec, all of which met the requirements of the Outline Remediation Strategy.

C1.4 Upper Brook Street and Podium landscaping

Topsoil to these areas was imported and laid in January and February 2021 using topsoil sourced from the Miller Homes site, Congleton (previous source of topsoil checked and confirmed as being greenfield, see **Attachment C10**).

Analysis of five topsoil samples taken by Socotec from the various tree pits and planters (see location drawing in **Attachment C8**) demonstrated that the topsoil met the requirements of the Outline Remediation Strategy with the exception of one sample (P5 AQ-1-0-ES-0.70) which was taken from a rectangular planter to the south of the Aquatics Centre. This sample contained lead in excess of the required limit in the Outline Remediation Strategy (839mg/kg compared with the screening value of 300mg/kg).

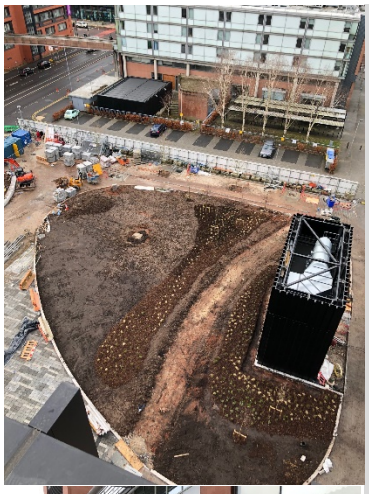
Balfour Beatty confirmed that this soil was from the Miller Homes site which had been screened and confirmed to be greenfield. In addition, analysis was carried out prior to import by Tim O'Hare Associates in January 2020 (see **Attachment C8**) which did not show any indication of elevated lead concentration. All other samples from the same batch met the quality requirements, therefore this sample was not considered to be representative of topsoil sourced from the Miller Homes site generally and is not considered to represent a significant risk to health of future site users.

Subsoil was imported for use in the Upper Brook Street and Podium areas comprising quarried red sandstone from Bold Heath Quarry (see **Attachment C7**). No chemical testing was carried out on this material.

For all areas of topsoil laid from 2020 onwards during the Coronavirus pandemic, Balfour Beatty confirmed that the material was laid to the depths required in the Outline Remediation Strategy, see **Attachment C11.**



Planter 1 on podium topsoil and subsoil placement February 2021



Planter on podium topsoil and subsoil placement February 2021



Rectangular planter by Aquatics Centre February 2021. Material in planter is subsoil (quarried sand from Bold Heath quarry)



Soil placed in Planter 2 podium February 2021



Topsoil placement to Planter 2 podium February 2021

Attachment C1 Topsoil source check for Aquatics Car Park

Attachment C2 Topsoil sampling and placement validation, Aquatics Car Park

Attachment C3 Topsoil test results Aquatics Car Park

Attachment C4 Topsoil source check Oddfellows Tree Pits

Attachment C5 Topsoil sampling and placement validation, Oddfellows Hall tree pits

Attachment C6 Topsoil test results, Oddfellows Hall tree pits

Attachment C7 Subsoil test results, Bold Heath Quarry source

Attachment C8 Topsoil test results, Upper Brook Street and podium landscaping (Jan/Feb 2021)

Attachment C9 Topsoil test results, Upper Brook Street landscaping and podium planters (Nov 2020)

Attachment C10 Record of topsoil source check (Miller Homes, Congleton)

Attachment C11 Confirmation of depths topsoil laid

Appendix D

Evidence of validation of concrete

D1 Evidence of validation of concrete

The evidence presented in this appendix is to verify that protected concrete materials (specifically, conforming to design class for sulphate DS-2) have been used in below ground structures at MECD.

Attachment D1 presents Arup's piling and retaining wall specification 5893-ARP-00-XX-SP-S-000001 C2 1st December 2016, specified the use of contiguous bored piles to form the MEC Hall north and south basements; cast in-situ bored piles outside basement areas including MEC Hall, York Street building, Upper Brook Street building and Oddfellows Hall extension. Concrete conforming to DS-2 was to be used for all external structures. This specification set the requirements for Expanded Piling's contract for MECD.

Attachment D2 presents Expanded Piling's design report for the piles required at MECD, Expanded Project Reference: 5983-EXP-MECD-B-X-CA-00001/P05 Contract Design – Contiguous piled embedded wall and bearing piles, Document No. Y3483/Contract Design/rev C05 dated 21st February 2017. This document confirms that CFA piling was to be used at the site. Section 6.5 of this document stated that the concrete mix to be used was to be appropriate for Design Class for Sulphate DS-2. The design report also confirmed that the cover thickness of piles was consistent with requirements for DS-2 (minimum requirement 75mm).

Attachment D3 presents the handover pack containing all as-built piling information: Expanded Piling, ITP No. and Revision: 5983-EXP-MECD-B-QP-Y-00027 AB01, MECD Piling Handover Pack. Works: CFA and Rotary Piles. This document confirms that CFA piles were installed at the site. Pages 1595 and 1596 of this document detail the concrete mix used for the piles (C32/40 MCC 340 W/C 0.45 IIIA F5) which is consistent with the requirements for DS-2.

Attachment D1 piling and retaining wall specification 5893-ARP-00-XX-SP-S-000001 C2

Attachment D2 Expanded Piling's design report for the piles required at MECD, Expanded Project Reference: 5983-EXP-MECD-B-X-CA-00001/P05

Attachment D3 Expanded Piling, ITP No. and Revision: 5983-EXP-MECD-B-QP-Y-00027 AB01, MECD Piling Handover Pack

Appendix E

Evidence of water supply pipe material

E1 Evidence of validation of water supply pipe material

The evidence presented in this appendix is to verify that consideration has been given to the need for protected water supply pipe material to be used within the MECD site.

Attachment E1: United Utilities application form for new water connection to MECD site, including risk assessment for protected pipe material.

Attachment E2: Extract from Mechanical, Electrical and Public Health Engineering Employer's Requirements. 5983-ARP-MECD-Z-SP-ME-51-00001 including drawing 5983-ARP-MECD-EXG-SI-C-94-2XE01 Revision T4 showing the route of new water supplies through the site.

Appendix F

Evidence of additional ground investigation

F1 Evidence of additional ground investigation

The evidence presented in this appendix is to verify that additional ground investigation was carried out within the footprints of existing buildings after demolition but before the start of construction.

Attachment F1 - Rationale and specification for validation testing within building footprint areas

Attachment F2 - Agreement of scope of investigation from Manchester City Council

Attachment F3 - Results of additional testing within building footprint areas

Attachment F4 – Balfour Beatty statements confirming no unexpected contamination and example Daily Activity Briefing sheet

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Top of boiler uncovered in Aquatics Centre car park. At first it was believed to be a buried tank.



Excavation of the boiler



The excavated boiler

Interior of boiler



Image showing the location that the boiler was removed from, an old floor slab in a former basement area.

Attachment A1 – Environmental Essentials survey of "Wendy Duct"

Targeted Refurbishment Survey

Grosvenor Group Halls of Residence (External Ducts x2)
Grosvenor Street
Manchester



Environmental Essentials Ltd.

Midland Office
Unit 3 Arlington Court, Cannel Row, Silverdale Enterprise Park, Newcastle-under-Lyme, Staffordshire, ST5 6SS.
Tel: 0845 456 9953 Fax: 0845 456 9954
Scotland Office
Suite 18 Evans Business Centre, Bellshill Industrial Estate, Belgrave Street, North Lanarkshire, ML4 3NP.
Tel: 0800 980 2038
North Wales Office
Unit 5430, Ground floor, North Wales Business Park, Abergele, LL22 8LJ.
Tel: 0800 054 6432
Yorkshire Office
Suite 6 Evans Easy Space, Evans Business Centre, Monckton Road, Wakefield, WF2 7AS
Tel: 01924 888195

UKAS TESTING 2719 UKAS INSPECTION 351

Total number of pages inclusive of appendices: 29

Contents

1. Executive Summary [Conclusions and actions]
2. Contract Review
3. Objectives
4. Agreed survey scope, exclusions and caveats
5. Survey methodology, risk assessments and recommendations

Appendix A Survey Results

Appendix B Bulk Analysis Results

Appendix C Plans

1. Executive Summary/Conclusions

1.1 Asbestos identified or presumed

There were no asbestos containing materials identified during the course of this survey

1. Executive Summary/Conclusions

1.2 Inaccessible areas

The Client should be aware that this section only contains a list of rooms/areas that were inaccessible. Elements or items within a room/area that were inaccessible (e.g. within timber boxings) will be recorded by the Surveyor and these will be detailed within either Appendix A – Survey Results.

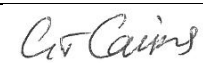
No inaccessible areas.

1.3 Additional information

* Due to the confined nature of the ducts and the large amounts of services/cabling present, inspections to some areas proved extremely difficult. Inspections were made as far as reasonably practicable.

* The walls were inspected for residual asbestos however none was identified. Due to the ducts being damp large amounts of efflorescence/salt deposits were present which made inspections difficult.

2. Contract Review

Name and address of site:	Grosvenor Group Halls of Residence (External Ducts x2), Grosvenor Street , Manchester		
Name and address of client:	University of Manchester, 4th Floor, Beyer Building, Oxford Road, Manchester, M13 9PL		
Client contact/representative:	Marc McVey (Buro Four)		
Type of survey:	Targeted Refurbishment		
Date of survey:	25 September 2014		
Environmental Essentials Project No.	P-143886		
Project Manager:	Andy Jones		
Lead Surveyor[s]:	George Cairns	Signature	
Report Technically reviewed by:	Andy Jones	Signature	
Report issue date:	01 October 2014		

3. Objectives

3.1 University of Manchester commissioned Environmental Essentials Ltd to undertake a TR Survey of:

Grosvenor Group Halls of Residence (External Ducts x2), Grosvenor Street , Manchester

3.2 The purpose of the survey is to enable those responsible for the management of the site to compile the necessary risk assessments, ascertain any necessary restrictions on the operation of the site and make due provision for the management of asbestos containing materials [ACMs] identified as part of the duty holders ongoing obligations under Regulation 4 of the most current Control of Asbestos Regulations.

3.3 The scope of the survey was defined by Andy Jones and Marc McVey as:

Survey to external service duct systems x2 - Generally runs along the road between Grosvenor Buildings and Material Science Centre. The survey was conducted to allow M&E Engineers to enter the ducts to make their necessary assessments for the future demolition project. No specific refurbishment works are being undertaken at this point.

4. Agreed survey scope, Exclusions and Caveats

Quote Ref.	N/A
Version No	01

1. Customer Details		Info Provided By: Customer	Consultant: Desktop	Consultant: Site Visit	Consultant: Info Gap
Name	The University of Manchester		x		
Address	4th Floor Beyer Building, Oxford Road, Manchester		x		
Post Code	M13 9PL		x		
Contact Name	Marc McVey		x		
Position	Project Manager (BuroFour)		x		
Telephone Number	07786 111726		x		
Mobile Number					
Email Address	mmcvey@burofour.com		x		
Other Details – e.g. ultimate customer	The University of Manchester – Lynn Fleming (Asbestos Manager)		x		

2. Property Details					
Site Name	Grosvenor Group Halls of Residence (GGHoR) External Ducts x2				
Address	Grosvenor Street, Manchester				
Post Code	M1 7HR				
Customer's Authorised Site Contact	Marc McVey / Marcus Watkins (Buro Four)				
Description of Building Use	External Service Ducts x2		x		
Building Construction	Brick / Concrete		x		
Age of Building(s)	Unknown				
Any Listed Buildings	N/A				
Number of Buildings Included	N/A				
Number of Floors Included	N/A				
Number of Rooms/Areas Included	N/A				
Known Refurbishments, etc.	N/A				
Vacant or Occupied Building(s)	N/A				
Details of Known Plant/Equipment (see also Sections 7 and 8)					
Known Risers/Shafts	N/A				
Known Building Condition					
Known Hazards					
Known Past History/Former Uses					
Local Hospital nearest to planned works.	St Mary's Hospital, Oxford Road		x		

3. Available Desktop Information					
Previous Asbestos Information and Details Regarding this Information (To include Surveys, Remedial / Removal Works, Known Asbestos Materials etc.)	None		x		
Other Relevant Details Including Any Potential Hazards					

4. General Scope of Works						
Reasons for Survey	For general access (at this point of the project)			x		
Extent of Survey	Specified Areas- (Include Full Detailed Scope in Section 7)			x		
Grounds Included	No			x		
Associated Buildings Included	No			x		
Plans Available (Format)	Yes	PDF / CAD Plans		x		
Access Restrictions	Duct Hatches / Openings			x		
Access Arrangements	Garside & Laycock appointed by the University / BuroFour to open up all access hatches / openings. Contact Fergus green on 07815 786569 fergus.green@spie.com			x		
Are Temporary Reinstatement Works Required? (e.g. hardboard patches or duct tape to seal intrusive inspection points during refurbishment / pre demolition surveys)	No			x		
Is Access Equipment Required to Inspect Any Areas Within The Scope of Works? (Please supply details e.g. MEWP / tower scaffold and any other important information such as approx heights)	No			x		
Suitable access equipment to be supplied by?	University / Garside & Laycock			x		
Approx Number of Samples to be Taken (If this is unknown then please state "As per HSG264 requirements")	As per HSG264 requirements			x		

5. Scope of Works (Reporting)					
Electronic Copy of Report (PDF) or Paper Copy (Additional Costs May Apply for Paper Copies)	PDF emailed to customer and monthly disk of reports issued to Asbestos Manager	x			
Report Style	Room Led Format (as per framework specification)	x			
Photos Required?	Yes	x			
Is access to a Web Portal required? Subscription To Allow Access To Reports Over The Internet (Additional Charges Apply)	No	x			
Other Relevant Details					

6. Site Visit					
Carried Out By	Andrew Jones (EE) / Adam Whalley (EE) / Marcus Watkins (BF)			x	
Date	29/08/14			x	
Details	X2 ducts identified – one with metal access hatches and the other with openings sealed with concrete beams. Both are to be surveyed from one end of the site to the other (from Booth Street East to Grosvenor Street). Issues with access into the ducts was identified and agreed for a general contractor (arranged by the University / BuroFour) to undertake the opening up works. Survey to obtain asbestos information (management) not for any specific refurbishment works at this point.			x	

7. Full & Detailed Scope of Works

(Please include a full detailed summary of the agreed Scope of Work – Please include any annotated site layout plans highlighting areas or specific surfaces to be inspected (these can be included as a separate attachment) and detailed descriptions of the planned work / scope)









The photographs show the access hatches and the general location of the ducts. Only ducting that passess externally will be surveyed, therefore should any ducts pass into the buildings these will be omitted at this stage of the project.

Garside & Laycock will open up all of the access hatches (appointed by BuroFour / University).

Attached to the back of the scoping form is a site plan provided by BuroFour highlighting (in yellow) the extent of the ducting to be surveyed (running from Booth Street East to Grosvenor Street).

The surveyor is to be undertaken to allow M&E surveyors to enter the ducts to assess the services / plant present. At this stage of the project this survey is not a refurbishment survey. Lagging however will be inspected beneath.

8. Any Exclusions to the Works

Special attention should be paid to the need for any exclusion from the survey scope. This is especially important during Refurbishment surveys, as this type of survey will involve damage to the fabric of the building. To prevent the occurrence of unnecessary damage and to ensure the scope of works reflects the reasons for the survey, please consider the need for potential exclusions.

The below list gives examples of likely exclusions, this list is however not exhaustive and it is the responsibility of the customer to highlight any areas / materials which are to be excluded from intrusive inspection.

Please note that for Demolition Surveys (Former Type 3 Surveys) all locations will be required for inspection unless unsafe to do so or if a specific void or cavity etc is inaccessible.

Indicate as Appropriate

Possible Exclusions	**Included / Excluded and Any Related Comments**	
	Included (ü)	**Excluded (ü)**
Inspection within floor duct's (access hatch <25kg approx. and where not sealed closed)	ü	
Inspection within boxing (this may cause damage where boxing is sealed / nailed)		ü
Inspection within ceiling voids		ü
Inspection within roof voids		ü
Inspection within solid wall cavities (this would involve only core inspection points)		ü
Inspection to the rear of known asbestos (this will generally require the assistance of a licensed removal contractor and in some instances a 14 day notification will be required to the HSE prior to the work)		ü
Inspection to the rear of window sills / constructions		ü
Inspection to the rear of door surrounds and skirting boards		ü
Inspection beneath fixed flooring (parquet, over-board, etc)		ü
Inspection within fire doors		ü
Inspection beneath lagging	ü	
Inspection within drainage system		ü
Inspection to high level areas		ü
Listed building features (full details to be provided)		ü
Inspection through roof structures		ü

Comments

Management survey for general access purposes however inspection beneath lagging will be undertaken

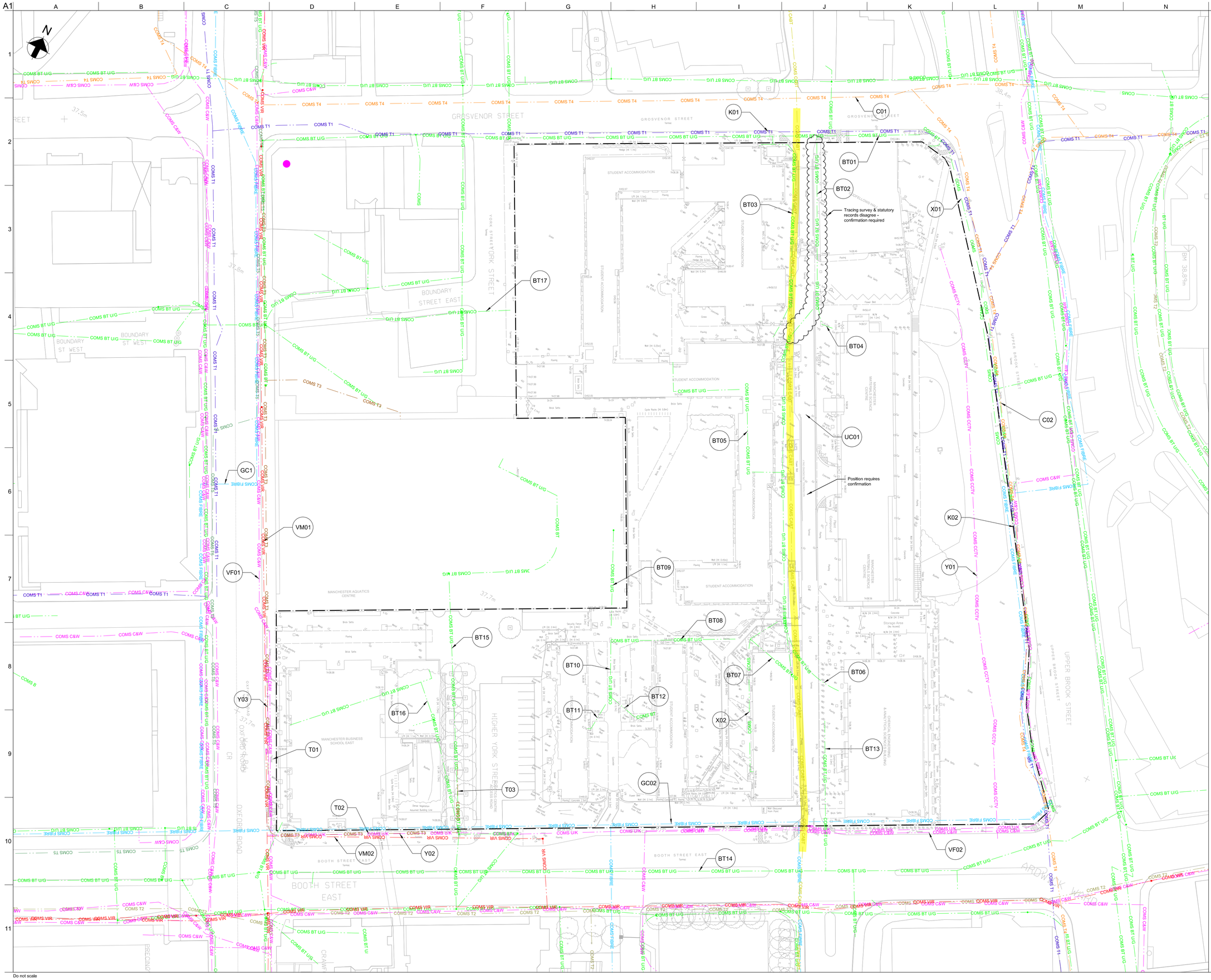
The below items **will be** excluded from internal inspection due to safety reasons unless provisions can be made prior to the survey i.e. isolation, lift engineer etc. Please specify inclusions required and procedures which will be adopted to facilitate inspection.

Exclusion	**Procedure to Facilitate Inspection**
Electrical Equipment	
Plant: e.g. boilers, ventilation units / ducts, etc	
Machinery	
Lift carriages / lift shafts	
Full dismantling of heater units	

Comments

Asbestos Consultancy Use Only	
Information Gap Details N.B. Summarise all significant gaps in the required information.	
Customer Contacted to Fill Information Gaps N.B. Details and outcomes.	
Pricing Details N.B. Summarise relevant items that will effect pricing; e.g. number of staff, building plans available (if any), number of samples / inspection points, number of days, out of hours working, overnight accommodation, number of samples, number and types of reports, access hire, etc.	2 Man Survey Team
Other Details	
Timescale – Site Works	1 Day (heavily dependent upon the general contractors opening up in a timely fashion). If opening up proves an issue then further site visits may be required at an additional cost(in accordance with the contractual framework rates).
Timescale – Reporting	10 Days
Asbestos Consultant Contact Name and Designation (Print)	Andrew Jones (Project Manager)
Signature	
Date	19/09/2014

A1



Notes

1. All dimensions are in mm, all levels in mOD unless specified otherwise.
2. This map is reproduced from Ordnance Survey Material with the permission of the Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office (c) Crown Copyright. License Number 0100031673 (2013).
3. Where electricity and telecommunications cables are indicated there may be multiple cables present.
4. Positions of services and plant on this drawing are indicative only and are taken from utilities tracing survey 7855/002 rev 0 undertaken by N D Oliver & Co Ltd dated 25/07/2013 and utility company plans obtained by University of Manchester in August 2013. No guarantee is given for the accuracy of information and it is intended for information only.
5. Layout is based on topographical survey drawing 7855/001 rev 0 undertaken by N D Oliver & Co Ltd dated 25/07/2013.
6. Services may exist at various depths and their routes may deviate within the vicinity of the routes shown.
7. These drawings are not for construction and should not relied on for site related works.

Key

- Site Boundary (awaiting comfirmation)
- COMS BT U/G — Telecoms - BT - Underground
- COMS — Telecoms - Private Telephone Cable Routes
- COMS VIR — Telecoms - Virgin Media
- COMS FIBRE — Telecoms - Fibernet / Global Crossing
- COMS C&W — Telecoms - Cable & Wireless (Vodafone)
- COMS CABT — Telecoms - University Comms Data Link
- COMS T1 — Telecoms - Kingston / Affinill
- COMS T2 — Telecoms - Verizon
- COMS T3 — Telecoms - Gamma
- COMS T4 — Telecoms - Colt
- COMS T5 — Telexoms - Geo Networks Ltd
- COMS CCTV — Telecoms - U of M CCTV Cable
- COMS U/K — Telecoms - Commications Cable Routes
- Telecoms - Mobile Phone Mast
- C01 — Reference to Arup Utility Tracker Spread Sheet

APPROX ROUTE OF UoM COMMS DATA LINK - MAIN DUCT ROUTE HIGHLIGHTED BUT SPURS INTO BUILDINGS ARE UNKNOWN. RECOMMEND CONFIRM NO ASBESTOS IS PRESENT AND THEN SURVEY TO TRACE INTERCONNECTIVITY AND ROUTING, PARTCILALRY TO UNDERSTAND THOUGH CONNECTIVITY BETWEEN NORTH AND SOUTH CAMPUSES. TWES , ARUP 16 JULY 14

Issue	Date	By	Chkd	Appd
03	16/07/14	AS	JB	TWS
	University Comms Link Updated			
02	17/06/14	AS	JB	TWS
	Updated Utilities, Site Boundary Added			
01	27/05/14	AS	JB	TWS
	First Issue			

ARUP

6th Floor, 3 Piccadilly Place
Manchester M1 3BN
Tel+44(0161) 228 2331 Fax+44(0161)228 6879
www.arup.com

Client
University of Manchester

Job Title
Manchester Engineering Campus Development MECD

Utilities - Communications

Scale at A1 1:500

Discipline Civils

Job No 235779-00

Drawing Status Draft

Drawing No ~~MECD-ARP-SW-SK-CU-004~~

Issue 03

Do not scale

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5. Survey methodology, risk assessments and recommendations

5.1 Survey Methodology, Risk Assessment and Recommendation

Environmental Essentials Ltd are UKAS Accredited as an Inspection Body under BS EN ISO 17020 which covers all types of Asbestos survey. Environmental Essentials Ltd are also UKAS Accredited as a Testing Laboratory under BS EN ISO 17025 which covers both the Sampling and Analysis of bulk materials thought to contain Asbestos.

Survey types as defined within HSG264 Asbestos: The Survey Guide are as follows:

Management Survey
A Management survey is "The Standard Survey" and will identify and assess the risks from Asbestos associated with normal occupancy of a building whilst also considering routine maintenance activities.

Refurbishment or Demolition Survey
These types of survey serve to identify all Asbestos materials as far as reasonably practicable within the fabric of a building prior to any such works.

This Targeted Refurbishment Survey was undertaken in accordance with the methods defined in HSG264 Asbestos: The Survey Guide, HSG248 Asbestos: The Analysts Guide and Environmental Essentials' in-house procedures. **Further information with regard to methods is available within the Project specific "Survey Plan".**

During the course of the survey, Environmental Essentials will have risk assessed each material identified and assigned individual risk scores. Materials can be risk assessed using two separate scoring systems – The Material Risk Assessment and the Priority Risk Assessment.

The Material Risk Assessment considers the type and condition of ACM's and their ability to release fibres into the air. It comprises of four separate elements as follows:

- Product Type
- Extent of damage and deterioration
- Surface treatment
- Asbestos type

A simple algorithm can be used to assess these four parameters during the survey. Each parameter is scored as high = 3, medium = 2, or low = 1; two categories allow a nil score.

Presumed or Strongly Presumed ACM's will be scored as containing Crocidolite asbestos [3], unless analysis of similar samples from the building consistently show a different type or if there is a reasoned argument that another type of asbestos was used.

The value assigned to each of the four parameters is added together to give a total score of between 2 and 12.

Those materials with a Material Risk assessment score of 10 or more should be regarded as an immediate high risk with a significant potential to release fibres if disturbed. Scores of between 7 and 9 are regarded as medium risk and between 5 and 6 a low risk. Scores of 4 or less are a very low risk. Non-asbestos materials are not assigned a risk score.

All Management surveys will include a Material Risk Assessment for Asbestos Containing Materials identified. Unless requested by the Client or advised, materials identified within a Demolition survey will not include a Material Risk Assessment as it is anticipated that all materials will be removed from site.

The Material Risk Assessment highlights immediately the materials of high risk. The priority for Asbestos Management is determined by carrying out a further assessment called the Priority Risk Assessment.

5. Survey methodology, risk assessments and recommendations

This Assessment is described in detail within HSE Guidance document HSG 227, is the responsibility of the Duty holder and should be carried out by a person with a detailed knowledge of the site and the activities performed within.

Environmental Essentials' can assist in this process by undertaking a Priority Risk Assessment during the course of a survey, however it is ultimately the responsibility of the Duty holder to consider this Assessment to ensure it is correct using their knowledge of the operation and maintenance requirements of the premises.

The Priority Risk Assessment addresses the likelihood of the asbestos material being disturbed. It is important to remember that even asbestos materials in the poorest condition only represent a risk to health if the fibres are disturbed into the air we breathe. The Priority Risk Assessment algorithm takes into account factors such as:

- Maintenance activities
- Likelihood of disturbance
- Human exposure potential
- Occupant activity

The combination of the Material and Priority Risk Assessments form the "Total Risk Score" for each particular material, which is used as the basis of an Asbestos Management/Action Plan. If a Client has not requested a Priority Risk Assessment then the Total Risk Assessment stated within the Survey Results will be reflective of the Material Risk Assessment only.

The undertaking of Priority Risk Assessments falls outside Environmental Essentials' scope of UKAS Accreditation.

Examples of the algorithms used when compiling Material and Priority Risk Assessments can be seen within Table 1 and Table 2 of this survey Report.

5.2 Recommendations

The survey team will make a recommendation for each ACM identified and this will be based upon the initial Material Risk Assessment. Further Priority Risk Assessments may identify alternative actions and timescales to be considered.

Recommendations are a subjective assessment made by the survey team at that point in time based upon their knowledge of asbestos materials and management only. Environmental Essentials Ltd cannot account for further changes in site conditions and use. Recommendations made will be as specific as possible at that point in time however will not take into account the logistics of site operations or budgets available to the client.

5.3 Bulk Identification

The analysis of bulk samples has been undertaken by Environmental Essentials' approved analytical laboratory, which holds Accreditation by UKAS as a Testing Laboratory. Certification, for the analysis of samples taken during this survey, is detailed within Appendix C.

Certificates/Schedules of the Laboratory's UKAS Accreditation can be provided at any time upon request.

Analysis of bulk samples was carried out in accordance with HSE Guidance HSG248 – The Analysts Guide.

Terminology

"Chrysotile" = White Asbestos
"Amosite", "Grunerite" = Brown Asbestos
"Crocidolite", = Blue Asbestos
"Asbestos Actinolite", "Asbestos Anthophylite", "Asbestos Tremolite"
"No asbestos detected" – is attributed to the sample analysis as a result of organic, man-made mineral fibre or no fibres being detected within the sample mass.

5. Survey methodology, risk assessments and recommendations

Table 1 Material Risk Assessment Algorithm

Product type [or debris from product]

Score	Examples of scores
1	Asbestos reinforced composites [plastics, resins, mastics, roofing felts, vinyl floor tiles, semi- rigid paint, decorative finishes and asbestos cement etc]
2	Asbestos insulating board, mill boards, other low-density boards, textiles, gaskets, ropes and woven materials and asbestos Paper
3	Thermal insulation [e.g. pipe and boiler lagging], sprayed asbestos, loose asbestos, asbestos mattresses and packing.

Extent of damage/deterioration

Score	Examples of scores
0	Good condition: no visible damage
1	Low damage: a few scratches or surface marks, broken edges on boards or tiles, etc.
2	Moderate damage: significant breakage of materials or several small areas where material has been damaged exposing fibrous edges.
3	High damage or deterioration of materials, sprays and thermal insulation. Visible asbestos contamination by debris or residues.

Surface treatment

Score	Examples of scores
0	Composite materials containing asbestos, reinforced plastics, resins, vinyl tiles
1	Enclosed sprays or insulation, AIB [with exposed face encapsulated], cement sheets, etc.
2	Unsealed AIB, encapsulated insulation and sprays.
3	Unsealed insulation and sprays.

Asbestos type

Score	Examples of scores
1	Chrysotile
2	Amphibole asbestos (excluding Crocidolite)
3	Crocidolite

5. Survey methodology, risk assessments and recommendations

Table 2 Priority Risk Assessment Algorithm

Assessment Factor		Score	Examples of score variables
Normal occupant activity	Main type of activity in area	0	Rare disturbance activity (e.g. little used store room)
		1	Low disturbance activities (e.g. office type activity)
		2	Periodic disturbance (e.g. industrial or vehicular activity which may contact ACMs)
		3	High levels of disturbance, (e.g. fire door with asbestos insulating board sheet in constant use)
	Secondary activities for area	As above	As above
Likelihood of disturbance	Location	0	Outdoors
		1	Large rooms or well ventilated areas
		2	Rooms up to 100m2
		3	Confined spaces
	Accessibility	0	Usually inaccessible or unlikely to be disturbed
		1	Occasionally likely to be disturbed
		2	Easily disturbed
		3	Routinely disturbed
	Extent/amount	0	Small amounts or items (e.g. strings, gaskets)
		1	≤10m2 or ≤10m pipe run
		2	>10m2 to ≤50m2 or >10m to ≤50m pipe run
		3	>50m2 or >50m pipe run
Human exposure potential	Number of occupants	0	None
		1	1 to 3
		2	4 to 10
		3	>10
	Frequency of use of area	0	Infrequent
		1	Monthly
		2	Weekly
		3	Daily
	Average time area is in use	0	<1 hour
		1	>1 to <3 hours
		2	>3 to <6 hours
		3	>6 hours
Maintenance activity	Type of maintenance activity	0	Minor disturbance (e.g. possibility of contact when gaining access)
		1	Low disturbance (e.g. changing light bulbs in asbestos insulating board ceiling)
		2	Medium disturbance (e.g. lifting one or two asbestos insulating board ceiling tiles to access a valve
		3	High disturbance (e.g. removing a number of asbestos insulating board ceiling tiles to replace a valve or for re-cabling)
	Frequency of maintenance activity	0	ACM unlikely to be disturbed for maintenance
		1	≤1 per year
		2	>1 per year
		3	>1 per month

Appendix A - Survey Results

Service Type	**Targeted Refurbishment Survey**		
Project number	P-143886	**Surveyors**	George Cairns
Client	University of Manchester	**Survey date**	25 September 2014
Site Address	Grosvenor Group Halls of Residence (External Ducts x2), Grosvenor Street Manchester	**Analyst**	Nathan Remers
		Analysis date	26 September 2014



Sample No	Building	Floor	Analysis
-	Grosvenor Group Halls of Residence (External Ducts x2)	-1 Basement Level	-
Area/Location/Position	**Material description**	**Quantity**	
001 - Duct 1 general comments - General Notes	-	-	
Product type	**Condition**	**Surface Treatment**	**Asbestos type**
-	-	-	-
Material Risk Score	**Priority Risk Score**	**Total Risk Score**	**Confirmation of product type**
-	-	-	-
Recommended action	-		
Recommendation comments	-		
Surveyor comments	The duct is made up of a concrete cylinder construction. Metal pipe brackets. Inspection beneath the sampled materials revealed a mmmf insulation to the metal pipework.		



Sample No	Building	Floor	Analysis
P-143886/S009	Grosvenor Group Halls of Residence (External Ducts x2)	-1 Basement Level	No asbestos detected
Area/Location/Position	**Material description**	**Quantity**	
001 - Duct 1 - Bitumen wrap around the mmmf insulation to pipework	Bituminous products	N/A	
Product type	**Condition**	**Surface Treatment**	**Asbestos type**
-	-	-	-
Material Risk Score	**Priority Risk Score**	**Total Risk Score**	**Confirmation of product type**
-	-	0	Non-asbestos material
Recommended action	-		
Recommendation comments	-		
Surveyor comments	-		



Sample No	Building	Floor	Analysis
P-143886/S007	Grosvenor Group Halls of Residence (External Ducts x2)	-1 Basement Level	No asbestos detected
Area/Location/Position	**Material description**	**Quantity**	
001 - Duct 1 - Bitumen wrap around the mmmf insulation to pipework	Bituminous products	N/A	
Product type	**Condition**	**Surface Treatment**	**Asbestos type**
-	-	-	-
Material Risk Score	**Priority Risk Score**	**Total Risk Score**	**Confirmation of product type**
-	-	0	Non-asbestos material
Recommended action	-		
Recommendation comments	-		
Surveyor comments	Sample was taken from the main pipe. Main pipe is cut off at the duct cover just in front of the where the duct ends.		



Sample No	Building	Floor	Analysis
P-143886/S008	Grosvenor Group Halls of Residence (External Ducts x2)	-1 Basement Level	No asbestos detected
Area/Location/Position	**Material description**	**Quantity**	
001 - Duct 1 - Bitumen wrap around the mmmf insulation to pipework	Bituminous products	N/A	
Product type	**Condition**	**Surface Treatment**	**Asbestos type**
-	-	-	-
Material Risk Score	**Priority Risk Score**	**Total Risk Score**	**Confirmation of product type**
-	-	0	Non-asbestos material
Recommended action	-		
Recommendation comments	-		
Surveyor comments	Sample was taken from the small pipe that has now not in use..		



Sample No	Building	Floor	Analysis
P-143886/S006	Grosvenor Group Halls of Residence (External Ducts x2)	-1 Basement Level	No asbestos detected
Area/Location/Position	**Material description**	**Quantity**	
001 - Duct 1 - Second layer of Bitumen wrap around the mmmf insulation to pipework	Bituminous products	N/A	
Product type	**Condition**	**Surface Treatment**	**Asbestos type**
-	-	-	-
Material Risk Score	**Priority Risk Score**	**Total Risk Score**	**Confirmation of product type**
-	-	0	Non-asbestos material

Recommended action	-
Recommendation comments	-
Surveyor comments	Sample was taken from the small pipe that has now not in use..



Sample No	Building	Floor	Analysis
P-143886/S005	Grosvenor Group Halls of Residence (External Ducts x2)	-1 Basement Level	No asbestos detected
Area/Location/Position	**Material description**	**Quantity**	
001 - Duct 1 - Bitumen wrap around the mmmf insulation to pipework	Bituminous products	N/A	
Product type	**Condition**	**Surface Treatment**	**Asbestos type**
-	-	-	-
Material Risk Score	**Priority Risk Score**	**Total Risk Score**	**Confirmation of product type**
-	-	0	Non-asbestos material

Recommended action	-
Recommendation comments	-
Surveyor comments	Sample was taken from the small pipe that has now not in use..



Sample No	Building	Floor	Analysis
P-143886/S004	Grosvenor Group Halls of Residence (External Ducts x2)	-1 Basement Level	No asbestos detected
Area/Location/Position	**Material description**	**Quantity**	
001 - Duct 1 - Second layer of Bitumen wrap around the mmmf insulation to pipework	Bituminous products	N/A	
Product type	**Condition**	**Surface Treatment**	**Asbestos type**
-	-	-	-
Material Risk Score	**Priority Risk Score**	**Total Risk Score**	**Confirmation of product type**
-	-	0	Non-asbestos material

Recommended action	-
Recommendation comments	-
Surveyor comments	Sample was taken from the main pipe.



Sample No	Building	Floor	Analysis
P-143886/S003	Grosvenor Group Halls of Residence (External Ducts x2)	-1 Basement Level	No asbestos detected
Area/Location/Position	**Material description**	**Quantity**	
001 - Duct 1 - Bitumen wrap around the mmmf insulation to pipework	Bituminous products	N/A	
Product type	**Condition**	**Surface Treatment**	**Asbestos type**
-	-	-	-
Material Risk Score	**Priority Risk Score**	**Total Risk Score**	**Confirmation of product type**
-	-	0	Non-asbestos material

Recommended action	-
Recommendation comments	-
Surveyor comments	Sample was taken from the main pipe.



Sample No	Building	Floor	Analysis
P-143886/S002	Grosvenor Group Halls of Residence (External Ducts x2)	-1 Basement Level	No asbestos detected
Area/Location/Position	**Material description**	**Quantity**	
001 - Duct 1 - Second layer of Bitumen wrap around the mmmf insulation to pipework	Bituminous products	N/A	
Product type	**Condition**	**Surface Treatment**	**Asbestos type**
-	-	-	-
Material Risk Score	**Priority Risk Score**	**Total Risk Score**	**Confirmation of product type**
-	-	0	Non-asbestos material
Recommended action	-		
Recommendation comments	-		
Surveyor comments	-		



Sample No	Building	Floor	Analysis
P-143886/S001	Grosvenor Group Halls of Residence (External Ducts x2)	-1 Basement Level	No asbestos detected
Area/Location/Position	**Material description**	**Quantity**	
001 - Duct 1 - Bitumen wrap around the mmmf insulation to pipework	Bituminous products	N/A	
Product type	**Condition**	**Surface Treatment**	**Asbestos type**
-	-	-	-
Material Risk Score	**Priority Risk Score**	**Total Risk Score**	**Confirmation of product type**
-	-	0	Non-asbestos material
Recommended action	-		
Recommendation comments	-		
Surveyor comments	-		



Sample No	Building	Floor	Analysis
-	Grosvenor Group Halls of Residence (External Ducts x2)	-1 Basement Level	-
Area/Location/Position	**Material description**	**Quantity**	
002 - Duct 2 - General Notes	-	-	
Product type	**Condition**	**Surface Treatment**	**Asbestos type**
-	-	-	-
Material Risk Score	**Priority Risk Score**	**Total Risk Score**	**Confirmation of product type**
-	-	-	-

Recommended action	-
Recommendation comments	-
Surveyor comments	Duct 2 was a pit with a concrete ceiling and floor with brick walls. Electric cables pass through the brickwork via a plastic collar



Sample No	Building	Floor	Analysis
-	Grosvenor Group Halls of Residence (External Ducts x2)	-1 Basement Level	-
Area/Location/Position	**Material description**	**Quantity**	
003 - Duct 3 - General Notes	-	-	
Product type	**Condition**	**Surface Treatment**	**Asbestos type**
-	-	-	-
Material Risk Score	**Priority Risk Score**	**Total Risk Score**	**Confirmation of product type**
-	-	-	-

Recommended action	-
Recommendation comments	-
Surveyor comments	Duct 3 has a concrete ceiling and floor. Brick walls. Plastic and metal pipework. Electric cables pass through the brickwork via a plastic collar.

Appendix B - Bulk Analysis Results

2719

CERTIFICATE OF BULK FIBRE ANALYSIS

Certificate Ref No:	**P-143886**	**Issue Date:**	**01 October 2014**
Page:	**1 of 2**	**Samples Taken:**	**25 September 2014**
		Sampled by:	**George Cairns**
Client Order Ref:	**TBC**	**Date Analysed:**	**26 September 2014**
Client:	**University of Manchester**	**Analysed By:**	**Nathan Remers**
Address:	**4th Floor, Beyer Building Oxford Road Manchester M13 9PL**	**Laboratory:**	**Lab L1**
		Site:	**Grosvenor Group Halls of Residence (External Ducts x2)**

Sample No. [Lab Ref]	Site Location	Asbestos Type Detected	Material Typical of:
001	Grosvenor Group Halls of Residence (External Ducts x2) - -1 - 001 Duct 1 - Bitumen wrap around the mmmf insulation to pipework	No asbestos detected	Non-asbestos material
002	Grosvenor Group Halls of Residence (External Ducts x2) - -1 - 001 Duct 1 - Second layer of Bitumen wrap around the mmmf insulation to pipework	No asbestos detected	Non-asbestos material
003	Grosvenor Group Halls of Residence (External Ducts x2) - -1 - 001 Duct 1 - Bitumen wrap around the mmmf insulation to pipework	No asbestos detected	Non-asbestos material
004	Grosvenor Group Halls of Residence (External Ducts x2) - -1 - 001 Duct 1 - Second layer of Bitumen wrap around the mmmf insulation to pipework	No asbestos detected	Non-asbestos material
005	Grosvenor Group Halls of Residence (External Ducts x2) - -1 - 001 Duct 1 - Bitumen wrap around the mmmf insulation to pipework	No asbestos detected	Non-asbestos material

Key: Chrysotile 'White Asbestos', Asbestos Grunerite [Amosite] 'Brown Asbestos', Crocidolite 'Blue Asbestos'

The analysis detailed in this certificate was undertaken by Polarised Light Microscopy in accordance with our documented procedures which are in conformance with the guidelines detailed in the Health & Safety Executive Guidance Note HSG248 'The Analysts' Guide for sampling, analysis and clearance procedures'.

For samples submitted by the Client or Client's representative Environmental Essentials Ltd cannot validate the accuracy of the sample in relation to the sampling procedures and as such cannot guarantee the accuracy of the results and information relating to those samples.

The description of the type of product is based on a visual examination of the material and is given for guidance purposes only. Environmental Essentials accepts no liability for any actions the Client may take based on the product types detailed on this certificate.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

This Certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Authorised By: Andy Jones

Position: Project Manager

Signed:

Midland Office (Lab L1) - Unit 3 Arlington Court, Silverdale Enterprise Park, Newcastle under Lyme, Staffordshire, ST5 6SS. Tel: 0845 456 9953.
E-mail: laboratory@environmentalessentials.co.uk
Scotland Office (Lab L2) - Suite 18 Evans Business Centre, Bellshill Industrial Estate, Bellshill, ML4 3NP. Tel: 0800 980 2038.
E-mail: scotland@environmentalessentials.co.uk
North Wales Office (Lab L4) - Unit 5430, Ground Floor, North Wales Business Park, Abergele, LL22 8LJ. Tel: 0800 054 6432.
E-mail: northwales@environmentalessentials.co.uk
Yorkshire Office (Lab L5) - Office S6 Evans Business Centre, Monckton Road, Wakefield, WF2 7AS. Tel: 01924 888195.
E-mail: yorkshire@environmentalessentials.co.uk
NB – "Laboratory: Mobile" indicates material sample analysis undertaken within the UKAS Accredited Mobile Laboratory Facility.

Registered in England
Company Registration No. 5097507

2719

CERTIFICATE OF BULK FIBRE ANALYSIS

Certificate Ref No:	**P-143886**	**Issue Date:**	**01 October 2014**
Page:	**2 of 2**	**Samples Taken:**	**25 September 2014**
		Sampled by:	**George Cairns**
Client Order Ref:	**TBC**	**Date Analysed:**	**26 September 2014**
Client:	**University of Manchester**	**Analysed By:**	**Nathan Remers**
Address:	**4th Floor, Beyer Building Oxford Road Manchester M13 9PL**	**Laboratory:**	**Lab L1**
		Site:	**Grosvenor Group Halls of Residence (External Ducts x2)**

Sample No. [Lab Ref]	Site Location	Asbestos Type Detected	Material Typical of:
006	Grosvenor Group Halls of Residence (External Ducts x2) - -1 - 001 Duct 1 - Second layer of Bitumen wrap around the mmmf insulation to pipework	No asbestos detected	Non-asbestos material
007	Grosvenor Group Halls of Residence (External Ducts x2) - -1 - 001 Duct 1 - Bitumen wrap around the mmmf insulation to pipework	No asbestos detected	Non-asbestos material
008	Grosvenor Group Halls of Residence (External Ducts x2) - -1 - 001 Duct 1 - Bitumen wrap around the mmmf insulation to pipework	No asbestos detected	Non-asbestos material
009	Grosvenor Group Halls of Residence (External Ducts x2) - -1 - 001 Duct 1 - Bitumen wrap around the mmmf insulation to pipework	No asbestos detected	Non-asbestos material
	End of report		

Key: Chrysotile 'White Asbestos', Asbestos Grunerite [Amosite] 'Brown Asbestos', Crocidolite 'Blue Asbestos'

The analysis detailed in this certificate was undertaken by Polarised Light Microscopy in accordance with our documented procedures which are in conformance with the guidelines detailed in the Health & Safety Executive Guidance Note HSG248 'The Analysts' Guide for sampling, analysis and clearance procedures'.

For samples submitted by the Client or Client's representative Environmental Essentials Ltd cannot validate the accuracy of the sample in relation to the sampling procedures and as such cannot guarantee the accuracy of the results and information relating to those samples.

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Authorised By: Andy Jones

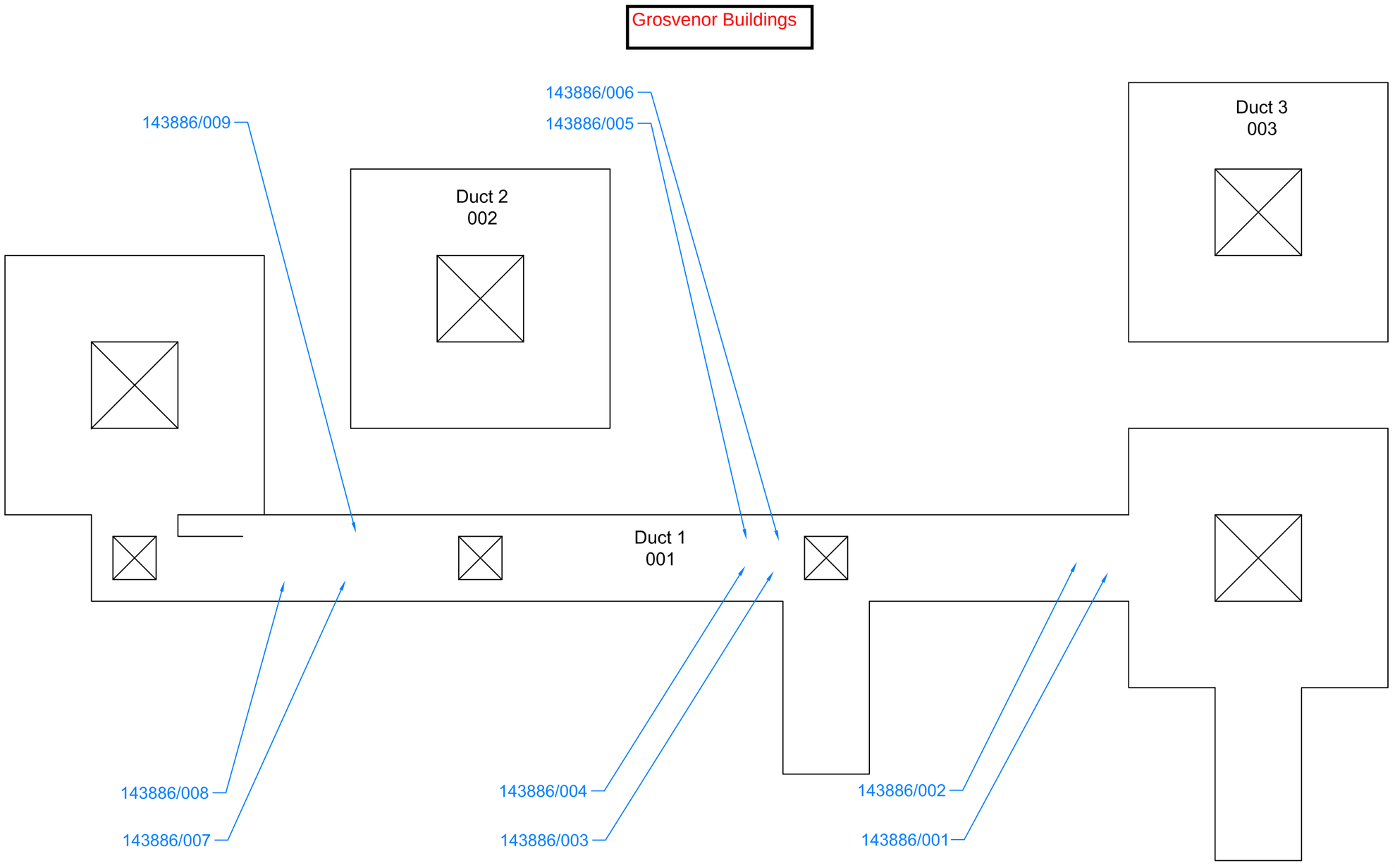
Position: Project Manager

Signed:

Midland Office (Lab L1) - Unit 3 Arlington Court, Silverdale Enterprise Park, Newcastle under Lyme, Staffordshire, ST5 6SS. Tel: 0845 456 9953.
E-mail: laboratory@environmentalessentials.co.uk
Scotland Office (Lab L2) - Suite 18 Evans Business Centre, Bellshill Industrial Estate, Bellshill, ML4 3NP. Tel: 0800 980 2038.
E-mail: scotland@environmentalessentials.co.uk
North Wales Office (Lab L4) - Unit 5430, Ground Floor, North Wales Business Park, Abergele, LL22 8LJ. Tel: 0800 054 6432.
E-mail: northwales@environmentalessentials.co.uk
Yorkshire Office (Lab L5) - Office S6 Evans Business Centre, Monckton Road, Wakefield, WF2 7AS. Tel: 01924 888195.
E-mail: yorkshire@environmentalessentials.co.uk
NB – "Laboratory: Mobile" indicates material sample analysis undertaken within the UKAS Accredited Mobile Laboratory Facility.

Registered in England
Company Registration No. 5097507

Appendix C - Plans



KEY

- ASBESTOS LOCATION
- SAMPLE LOCATION
- ASBESTOS REMOVED
- AREAS OF NO ACCESS
- STAIRS
- DUCT / VOID ACCESS
- SPECIFIED AREAS

NOT TO SCALE

DRAWING External Ducts	
SHEET: 1 of 1	
SITE NAME: Grosvenor Group Halls of Residence (External Ducts x2)	
Site Address: Grosvenor Street Manchester	Project: P-143886
	Survey Date: 25/09/14
	Surveyors: GC/SZ
Client: University of Manchester	Drawn By: PH

environmental essentials
Unit 3, Arlington Court
Silverdale Enterprise Park
Cannel Row
Newcastle-under-Lyme
Staffs. ST5 6SS
Telephone 0845 456 9953
Facsimile 0845 456 9954

Attachment A2 – Lucion Environmental Risk Assessment and Sampling Strategy

Manchester Engineering Campus Development Project- Asbestos in Soils Risk Assessment & Sampling Strategy



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Lucion Environmental

Contents

1.0 Preliminary Information & Scope of Works

2.0 General Strategy For Compliance with CAR 2012

3.0 Soil Sampling Strategy & Air Monitoring

4.0 Appendix A-Asbestos in Soils Investigation Report (Job Ref: 126637)

5.0 Appendix B-Risk Assessment

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1.0 Preliminary Information

1.1 Lucion Environmental Ltd were instructed by Mr. Rupert Sheldon of Buro Four Project Services (Client) to prepare a soil sampling strategy on the Manchester Engineering Campus Development (MECD) site, formerly the site of the Grosvenor Hall of Residences, Manchester Materials Science Centre, Ronson Hall and Bowden Court Buildings, part of The University of Manchester.

1.2 In order to facilitate the proposed MECD development Connell Bros Ltd were awarded the demolition phase on the site in April 2015, completed in September 2016 with handover of the site to Balfour Beatty for the construction phase of the project.

1.3 In August 2013 White Young Green (WYG) were commissioned by The University of Manchester to undertake a Phase 1 Desk Top Study of the site. The study reviewed previous historical maps, previous land uses, and some initial sampling was undertaken at the site as detailed within the report. Further to this the report detailed the potential Source-Pathway-Receptor linkages with regard to contaminants including asbestos. A preliminary site risk assessment was undertaken and completed with respect to ground contaminants at that stage.

1.4 Prior to the demolition work undertaken by Connell Bros Ltd asbestos demolition surveys were undertaken and completed. Following such surveys the asbestos found was removed by a University appointed Licensed Asbestos Removal Contractor, Kaefer C & D, and associated air monitoring and certification provided by Environmental Essentials Ltd. Buro Four Project Services will provide a completion pack for such works along with completed demolition phased work completed by Connell Bros Ltd to Balfour Beatty.

1.5 During the demolition phase works building foundations were removed as part of the scope of works on the site. It is the arisings of such excavations works at the North of the site initially where the Grosvenor Place Building was situated parallel to the Grosvenor Street road, where in made ground was found to have small fragments of asbestos. Upon sampling and analysis of the surface debris by Environmental Essentials Ltd it was confirmed the asbestos was asbestos cement and asbestos insulation board. Anecdotal evidence suggests the asbestos found emanated from the previous Victorian Houses that existed on/around the site and it is the likely the demolition arisings from these buildings used as fill at the time, hence the possible source of asbestos contamination.

1.6 The remaining foundation excavations were undertaken by Connell Bros Ltd in the vicinity of the already confirmed asbestos stockpiles , with a “watching brief” and background air monitoring to validate control measures.

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1.7 In June 2016 Redhill Analysts Ltd were invited to a meeting with all stakeholders for the demolition project at that stage and Balfour Beatty who were to be awarded the construction phase on the MECD project. Following discussions with regard to the asbestos found on site, Redhills were appointed to undertake soil sampling on the stockpiles to provide validation of the asbestos through asbestos quantification. This would allow the Client and stakeholders to establish according to guidance on the classification and assessment of waste in the UK as detailed within Technical Guidance WM3 which classifies waste as non-hazardous or hazardous.

1.8 Through discussion on site, results from soil testing undertaken, email correspondence and subsequent meetings it was decided that removal of the two spoil heaps would be undertaken and taken to a landfill site. Re-use of soil and perhaps capping on site was not an option for the proposed site development. A system of remediation involving "hand picking" the visible asbestos and then validating the soil with further testing would not be viable from a risk, safety, time or costs factor, particularly as at the time, the discovery of asbestos was an uncertainty.

1.9 During the removal of the spoil heaps on the the North side of the site where the Grosvenor Place Buildings originated background PCOM monitoring was undertaken throughout and certificates provided. All air monitoring results were <0.01f/cm3.

1.10 In August 2016, Redhill Analysts Ltd were appointed to undertake further asbestos soil sampling as requested by the Client in line with proposed drainage routes and trenches that Balfour Beatty would be undertaking excavations. Connell Bros Ltd assisted the sampling through excavation of 25 trial pits, from which the arising were sampled and soil samples sent to the Lucion Gateshead laboratory for qualitative and quantitative analysis. It must be noted on site not all areas of proposed drainage routes were investigated and some routes, particularly those where a large mound of demolition arisings were in situ from the demolition works from the Manchester Materials Science Centre.

1.11 The results of the 25 soil samples taken, provided 5 sampled locations where asbestos was identified. The results are detailed in the report within Appendix A. From the samples taken 4 out of 5 are above the hazardous waste threshold of 0.1 %w/w.

1.12 WM3 guidance details that if the waste contains fibres that are free and dispersed then the waste will be hazardous if the waste as a whole contains 0.1% or more asbestos. If the waste contains any identifiable pieces of suspected asbestos containing material they must be assessed as set out below. This would also apply to any dispersed fibres produced by deliberately breaking up such identifiable pieces. Where the waste contains identifiable pieces of asbestos containing material (i.e. any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye), then these

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pieces must be assessed separately. The waste is hazardous if the concentration of asbestos in the piece of asbestos containing material is 0.1% or more. The waste is regarded as a mixed waste and classified accordingly." Given the presence of ACM fragments within the material in this area, the material currently represent a mixed waste - as a result, unless fragments of ACM are separated the material would be classified as hazardous, regardless of the quantification results for the free fibre content of the matrix. The material would be classified as either European Waste Catalogue (EWC) Code 17-05-03 (Soils and stones containing dangerous substances) or as EWC Code 17 06 05 (Construction material containing asbestos).

1.13 In certain circumstances, hand picking of ACM fragments visible to the naked eye can be undertaken with a view to improving the likelihood that the material would be classified as non-hazardous waste. From the survey team and samples received the fragments are not visible to the naked eye so hand picking of ACM fragments would not be a worthwhile operation in order to perhaps classify the material non-hazardous alongside further validation testing at this stage.

1.14 In order to ascertain the zones of "hot spots" to the North of site site and South of the site near the Aquatic Car Park Entrance further soil sampling is required. Using BS10175:2011 -Investigation of potentially contaminated sites-Code of Practice, Lucion Environmental Ltd propose a Non Targeted Sampling approach using a grid system with a 10m centre or less across the two areas where initial surface sampling verified asbestos. Zones to be gridded will be agreed with the Client and Balfour Beatty on site and at depths to be agreed according to the excavation depth that drainage/trench works are proposed. Along with sample density being a consideration the sample depth is to be agreed and as the guidance suggests a fixed depth of 0.5m intervals should be followed with additional interim samples at depth where soil strata changes occur. Further sampling at the boundaries of the made ground to the natural ground to 0.25m should be undertaken to further validate/verify the sampling approach and any possible "hot spot" is delineated.

1.15 It will be necessary to demonstrate that risk assessments are valid and that asbestos fibres are not being produced during any work activities. Fixed boundary background monitoring is advised during the works on site in accordance with HSG 248 "The Analysts' Guide for Sampling Analysis, and clearance procedures" and Environmental background monitoring as detailed within Chapter 12 of Ciria C733 Asbestos In Soils.

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2.0 General Strategy For Compliance with CAR 2012

Control of Asbestos Regulations 2012

2.1 This section of the document details the general requirements for the site to ensure compliance under The Control of Asbestos Regulation 2012 is achieved and that risks to human health are minimised. The generally accepted methods of controlling work with asbestos are to prevent exposure and prevent the spread of asbestos.

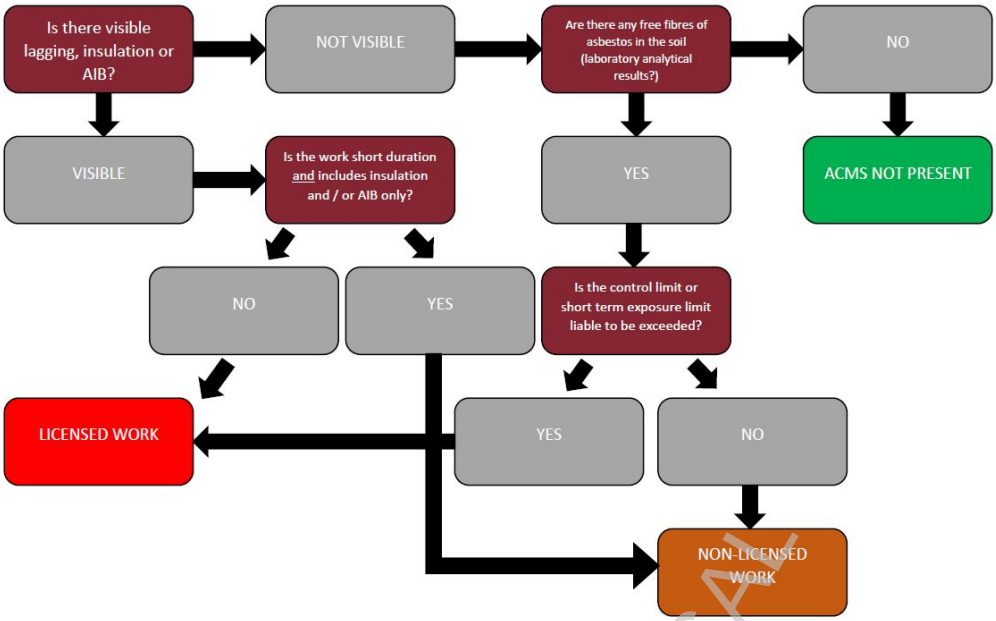
2.2 Before any work is undertaken where there is the potential for employees or local stakeholders to be exposed to asbestos it is important that all parties undertake a risk assessment. It is the responsibility of each employer to make their own assessments of the risks involved, however the information contained within this document is likely to support individual risk assessments.

2.3 This section of the document is structured to follow the numerical order of the Control of Asbestos Regulations 2012 where a regulation number is not included this is deliberate and is because that particular Regulation has no significant bearing on the management or remediation of land / made ground or soil affected by asbestos or asbestos-containing materials.

2.4 Interpretation (Regulation 2)

2.4.1 The main point of consideration under Regulation 2 is to determine whether or not the work proposed under the remediation strategy is licensable work or not, if the work is deemed licensable then the work needs to be supervised by a LARC. It is clear that any earthworks involving licensed asbestos work can only be supervised by a LARC as the pre-requisite skills for using the plant, machinery and equipment required for significant earthworks is likely not to be contained in house by a LARC. The methodology will therefore require the use of an earthworks contractor under the supervision of a LARC and this approach is considered acceptable by the HSE. In deciding
whether work is licensable or not in this situation it is useful to follow the decision process flow chart below. Please note in the flow chart below that the control limit referred to is 0.1 f/cm3 when measure over a four hour period and the sporadic and low intensity (or short term exposure limit) is a peak exposure that may occur of 0.6 f/cm3 when measured over a 10 minute period.

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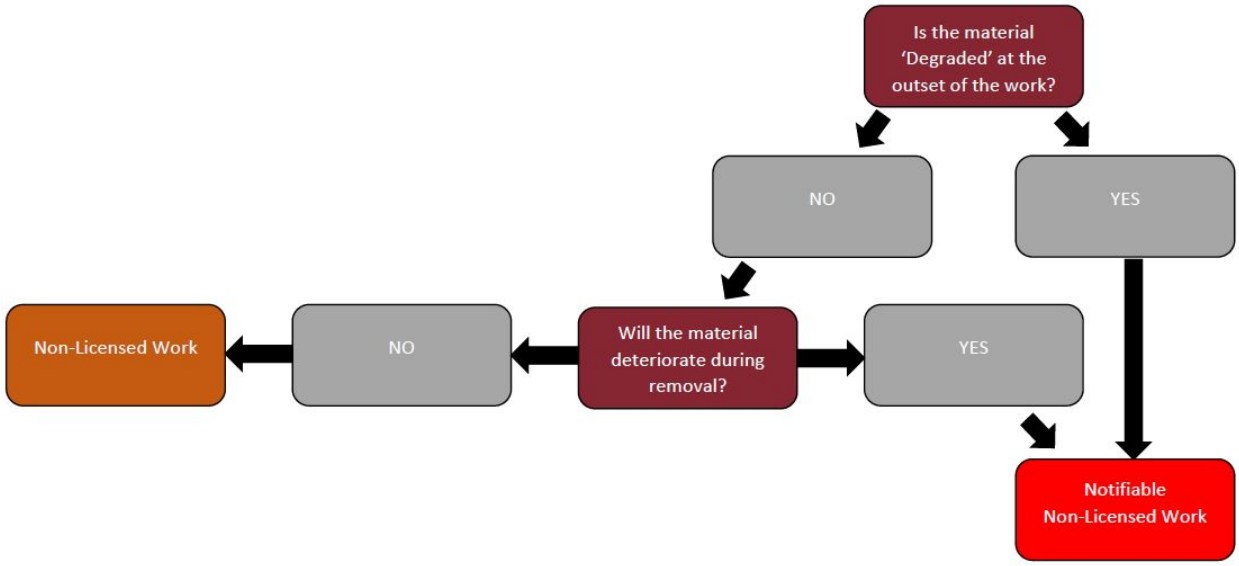
2.4.2 If the work is deemed licensable this will require a fourteen day statutory notification to the enforcing authority before any work in undertaken unless a waiver has been requested and granted.

2.5 Application of these Regulations (Regulation 3)

2.5.1 The main point of consideration under Regulation 3 is to decide whether work that has been deemed not to be licensable is considered notifiable or not i.e. is the work non-licensed work (NLW) or notifiable non-licensed work (NNLW). If, after the work is deemed not to be licensable, the work is also deemed not to be notifiable then the following requirements do not apply to the work:

- Notify the work (Regulation 9)
- Demarcate a designated area (Regulation 18 (1) (a))
- Maintain Health records (Regulation 22)

In deciding whether work is notifiable or not in this situation it is useful to follow the decision process flow chart below, please note in the assessment under Regulation 3 remediation of soils will not be classed as maintenance work but as removal work.



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2.6 Identification of the presence of asbestos (Regulation 5)

2.6.1 Regulation 5 requires any employer to identify the presence of asbestos, its type and condition before any work is undertaken. For the purposes of this strategy the summary of asbestos and asbestos-containing materials described in section 1.3 should suffice as this draws information from the sources defined in section 1.1.4. It is important to remember that the assessments made by employers should be revised should the situation on site change at all during the course of any remediation work.

2.7 Assessment of work which exposes employees to asbestos (Regulation 6)

2.7.1 Regulation 6 requires a **suitable and sufficient** risk assessment of potential exposure to asbestos to be made by the employers of the people involved in undertaking the remediation work i.e. LARC / earthworks contractor / analyst. This risk assessment needs to be:

- Carried out in time to enable appropriate precautions to be taken before work begins
- Be specific to the task being undertaken
- Establish the extent of the potential risk and who could be affected
- Identify the steps taken to remove the risks or where this is not possible reduce to the lowest level reasonably practicable
- Record the findings of the assessment and communicate the findings to employees and anyone else who could be affected in an understandable way
- Reviewed regularly or when considered no longer valid i.e. if the scope of the work changes or the type of asbestos-containing material being worked with alters.

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2.7.2 Employers must make sure that whoever carries out the risk assessment and provides advice on the prevention and control of exposure is competent to do so, a competent person would be considered as being a person who has the ability and skills described below:

- Have adequate knowledge, training and expertise in understanding the risks from asbestos and be able to make informed and appropriate decisions about the risks and precautions needed;
- Know how the work activity may disturb asbestos
- Be familiar with and understand the requirements of CAR 2012
- Have the ability and authority to collate all the necessary and relevant information
- Be able to assess other non-asbestos risks on site
- Be able to estimate the expected level of exposure to decide whether or not the control limit is likely to be exceeded.

2.7.3 To be considered suitable and sufficient the risk assessment needs to include

- For non-licensable work, a statement of why the work meets the criteria for non-licensable rather than licensable work, and whether it is NNLW
- A description of the work being carried out and the expected scale and duration
- A description of the type(s) of asbestos and results of any survey or analysis or a statement that the assumption is that the asbestos is not chrysotile alone
- A description of the quantity, form, size, means of attachment (if any), extent and condition of the ACMs present
    - The details of the expected exposure should be recorded and include

- Data on the concentrations of asbestos fibre likely to be present
- Whether the control limit is likely to be exceeded
- The number of people who could be affected
- The level of expected exposure so that suitable respiratory protective equipment (RPE) and personal protective equipment (PPE) can be selected
- Whether anyone other than the organisations own employees may be exposed
- Whether intermittent higher exposures may arise and their frequency and duration
- Any results from air monitoring available in similar circumstances

    - The steps taken to control exposure to the lowest level reasonable practicable should be recorded e.g.:

- The type of controlled wetting and method of application
- Using local exhaust ventilation (LEV)
- Wrap and cut techniques (for pipes lagged with asbestos materials that may be identified during future excavations)
- Shadow vacuuming

    - For licensable work with asbestos there are additional requirements on the risk assessment and these are:

- The reasons for the chosen work methods
- The method or arrangements required to ensure that the work area will be left clean for reoccupation

    - For the proposed project it will be important for representatives of the Principal Contractor to ensure that risk assessments completed by any contractors engaged are inclusive of the requirements of this section of the strategy and in doing this this will ensure compliance with Regulation 6 of CAR 2012.

2.8 Plans Of Work (Regulation 7)

    - Regulation 7 requires that any employer engaged in the project must prepare a written plan of work (method statement) before work on

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asbestos is carried out and that a copy of this plan of work is kept at the site where the remediation is being undertaken. The employers must also ensure that the work is adequately supervised to ensure that the plan of work is being followed.

- It is likely that the plan of work will contain elements of the risk assessments undertaken in accordance with section 2.5 and again it is important that these plans are reviewed should they be considered no longer valid i.e. if the scope of the work changes or the type of asbestos-containing material being worked with alters. In addition and where necessary the plan of work should include a site layout drawing, a description of the location and nature of the asbestos present and which asbestos-containing materials will be affected by the work. It is also important that the contents of the plan of work are communicated to any employees undertaking the work.

- The plan of work **must** contain the following information:

- The nature and probable duration of the work
- The number of people involved in the work
- The address and location where the work is to be carried out
- The methods to be used to prevent or reduce exposure to asbestos, e.g. prevention and control measures, arrangements for keeping premises and plant clean and arrangements for the handling and disposal of asbestos waste;
- The type of equipment, including PPE and RPE, used for:
  - Protecting and decontaminating those carrying out the work;
  - Protecting other people present at or near the worksite.

- For the proposed project it will be important for representatives of the Principal Contractor to ensure that plans of work completed by any contractors engaged are inclusive of the requirements of this section of the strategy and in doing this this will ensure compliance with Regulation 7 of CAR 2012.

2.9 Notification of work with asbestos (Regulation 9)

- Regulation 9 may require that the appropriate enforcing authority is notified before any work is undertaken on asbestos.

- If the work is deemed licensable following the assessment under Regulation 2 the required notification period will be a statutory 14 days and this notification will be made by the licensed contractor using an on-line ASB5 form.

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- If the work is deemed not to be licensed under assessment following Regulation 2 but is deemed to be notifiable non-licensed work under assessment following Regulation 3 then the notification must be submitted by the contractor undertaking the work before the work starts (no timescale) and this notification should be submitted on line using form NNLW1.

- Notification is not required for work that is deemed non-licensed work.

- The work on the proposed project will be undertaken on a civil engineering / construction site and therefore the relevant enforcing authority will be the Health and Safety Executive (HSE).

2.10 Information, instruction and training (Regulation 10)

- Regulation 10 requires that anybody who is liable to disturb asbestos in their work or those that supervise such employees receives the correct level of information instruction and training.

- As a minimum anyone engaged in working on the site should receive an asbestos awareness course that should include:

- The properties of asbestos and its effects on health, including the increased risk of lung cancer for asbestos workers who smoke
- The types, uses and likely occurrence of asbestos and ACMs in buildings and plant and on the site being worked on.
- The general procedures to be followed to deal with an emergency, e.g. an uncontrolled release of asbestos dust into the workplace
- How to avoid the risks from asbestos

- Anyone engaged in non-licensed work or notifiable non-licensed work should undergo additional training and this training should be task specific and related to the project in hand. This training should be refreshed on an annual basis.

- Licensed contractors engaged in licensed work activities should undergo additional training and this also should include the items detailed in paragraph 251 of CAR 2012. This training should be refreshed on an annual basis.

- Information provided to the employees undertaking the work and should include the risk assessments and plans of work detailed in 2.5 and 2.6 as well as the results of any air monitoring.

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- For the proposed project it will be important for representatives of the Principal Contractor to ensure that the training required by Regulation 10 is held by those individuals undertaking the work. Ensuring this will ensure compliance with Regulation 10 of CAR 2012.

2.11 Prevention or reduction of exposure to asbestos (Regulation 11)

- Regulation 11 requires that any exposure to asbestos is prevented so far as is reasonably practicable. For the proposed project work with asbestos will be required and therefore prevention is not possible, it is therefore the duty of any employers engaged in working with the asbestos to ensure that this exposure is as low as is reasonably practicable. Work with asbestos should only be carried out when it is unavoidable.

- Where it is not reasonably practicable to prevent exposure to asbestos the levels of airborne asbestos fibres must be reduced to the lowest level reasonably practicable by means other than Respiratory Protective Equipment (RPE) in usual circumstance this will mean the use of other methods of control e.g. controlled wetting will be required. These control measures must be documented in the risk assessments or plans of work described in section 2.5 and 2.6 above.

- Any employers engaged in undertaking asbestos work should ensure that those people involved and who might be exposed to asbestos as low as is reasonably practicable.

- Reduction of exposure to asbestos is likely to include the provision of personal protective equipment (PPE) and respiratory protective equipment (RPE). In particular it is important that this RPE is matched to:

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- The job
- The environment
- The anticipated maximum exposure
- The wearer (taking into account facial hair and glasses)
- Compatible with other PPE

- It is important that RPE with tight fitting face-pieces i.e. disposable masks, half face ori-nasal respirators and full face respirators are initially provided with a face fit test by a competent organisation. The fit test should be repeated whenever changing to a different model of RPE or where the characteristics of the wearer significantly change e.g. significant weight gain or loss.

2.12 Use of control measures (Regulation 12)

- Regulation 12 requires that any equipment used as a form of control measure is effective and this should include regular checks which should be at least at the start of every shift. If a problem is identified with the control measure it is important that prompt action is taken to rectify the problem.

- A record of inspections should be kept on site for inspection by the enforcing authorities.

- Further information pertaining to each particular type of control measure is detailed within CAR 2012.

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2.13 Arrangements to deal with accidents, incidents and emergencies (Regulation 15)

- Regulation 15 requires that any employer who is undertaking work with asbestos to prepare procedures on what to do if there is an accidental, unplanned or uncontrolled release of asbestos fibre.

- In all cases where there has been an uncontrolled release of asbestos materials the employer should take steps to:

- Warn people who may be affected
- Exclude people from the area, who are not needed to deal with the release
- Identify the cause of the uncontrolled release
- Regain adequate control as soon as possible.

- In particular, employers must make sure that:

- Anyone in the work area affected who is not wearing PPE, including RPE, leaves that area immediately
- Arrangements are made to decontaminate anyone who is contaminated with dust and debris
- Any clothing or PPE is decontaminated or disposed of as contaminated waste;
- Measures are taken to contain and reduce fibre release.

2.14 Duty to prevent the spread of asbestos (Regulation 16)

- Regulation 16 requires that any employer who is undertaking work with asbestos to prevent or where this is not possible reduce to the lowest level reasonable practicable the spread of asbestos. This will involve using control measure and safe systems of work that facilitate this

- Preventing spread usually includes the construction of an asbestos enclosure however in projects that involve the movement and excavation of large volumes of earth and land using heavy plant and equipment the use of an enclosure is likely not to be reasonably practicable, for this reason it is imperative that suitable control measures as required by Regulation 13 (see section 2.10) and validation of the control measures being used by utilising an appropriate reassurance and personal air monitoring strategy are included in the working method.

- Even though an enclosure is not being used to prevent the spread of asbestos it is important that boundaries of any work areas are clearly defined using physical obstructions such as ropes, barriers or fencing. It is also important that these work areas are suitably signed.

- In order to further facilitate the spread of asbestos it is essential that suitable primary and full decontamination procedures are used as applicable in order to avoid further spread and that hygiene facilities are used correctly where appropriate.

- In particular for licensable work in open air where it is not practicable to enclose the work area the risk assessment should establish what will be required to ensure that, as far as is reasonably practicable the spread of asbestos is prevented and the work area cleaned and in addition air monitoring will be required to ensure that asbestos fibres are not being spread from the work area.

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2.15 Cleanliness of premises and plant (Regulation 17)

- Regulation 17 requires that any employer who is undertaking work with asbestos ensures that any asbestos dust or debris is regularly cleaned up. In particular procedures will need to be set up to clean:

- Work areas including transit and waste routes
- Plant and equipment
- Hygiene facilities

- A site validation procedure will be required particularly for licensable work with asbestos this will need to be proposed and agreed with the regulator and will make reference to the Remediation Method Statement and Materials Management Plan provide by others. It is likely that this validation procedure will require inspections by geotechnical consultants, accredited asbestos consultancies and will also involve some form of sampling. It is important that the Remediation Method Statement and Materials Management Plan are read in conjunction with this report.

2.16 Designated areas (Regulation 18)

- Regulation 18 requires that any employer who is undertaking work with asbestos-containing materials are separated and clearly and restricted to only those people required to work in the area. Food and drink must not be consumed in areas where asbestos work is being undertaken.

- All areas where asbestos work is being undertaken should be segregated and demarcated as asbestos areas except from those areas where the work is completely defined under Regulation 3 (2) as being non-licensed work.

- For the planned project it is likely that an asbestos enclosures will not be used however suitable provisions must be made for putting physical barriers in place to prevent people from inadvertently entering and asbestos area.

- Any area where an employee may be exposed to level of asbestos in the air that would exceed the control limit or the sporadic and low intensity limit must also be as a Respirator Zone and these zones must be marked with suitable warning notices and appropriate PPE and RPE worn.

- All licensable work with asbestos should be carried out in an area designated as a respirator zone and an asbestos area.

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- Where it is not necessary to segregate an asbestos area or to designate a respirator zone (because the control limit will not be exceeded, or is not liable to be exceeded), RPE will still be required unless it is not reasonably practicable.

2.17 Washing and changing facilities (Regulation 23)

- Regulation 23 requires that adequate washing, changing and storage facilities are provided for employees who are undertaking work with asbestos.

- Suitable facilities should be provided including

- Toilet facilities
- Facilities for washing and changing for non-licensable work
- Full hygiene facilities for licensable work
- An area to eat and drink (for licensable work these should be located as close as is reasonably practicable to the hygiene facilities).
- Hygiene facilities must meet the requirement of Paragraph 523 of CAR 2012.

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3.0 Soil Sampling Strategy & Air Monitoring

The sampling strategy referred to in BS10175:2011 for any phase of intrusive investigation that follows the preliminary investigation should take into account:

- the objectives of the investigation and findings of the risk assessment to date;
- the data requirements (quantity, type and quality) for the planned risk assessment and/or to permit statistical analysis of the data;
- the possibility of dividing the site into zones or areas);
- the location, pattern and number of sampling points;
- the depths from which samples are to be collected and any monitoring requirements
- the methodology by which samples are to be collected, stored and preserved), taking into account any off-site analysis to be undertaken;
- any measures needed to protect personnel and the environment, including avoiding creation of additional migration pathways.

Additional site-specific factors that might affect the location of sampling points (for example, site size, topography, depth and direction of groundwater, and physical obstructions) should be identified). Locations for soil sampling should be selected based on one or both of the following approaches:

a) targeted (judgmental) sampling, which focuses on known, suspected or point source areas of contamination.

b) non-targeted sampling, which characterizes the contamination status of a defined area or volume of a site or zone

The number and pattern of sampling locations should be informed by the risk assessment and the required degree of confidence that hazards have been identified.

For the two areas to the North & South of the site, where positive samples were identified in report Job Ref:126637 taken on the 24th August 2016, the sampling zones will focus around the these samples, S10 to S14 in the North and S2 and S3 to the South. The latter sample data and photographic evidence of previous sampling positions is detailed within Appendix A of this report. A non targeted grid system will be employed of 10m centres or less i.e. spacing between sample locations vai trial pits excavated. Where positive sample point positions are estimated in line with previous trial pits locations in line with the report in Appendix A this may require some targeted sampling around such locations. If locations can be identified trial pits may be zoned in using a 1-2m centre from these locations in order to understand the possible delineation of the previous positive sources of contamination. However, since the site has been handed to Balfour Beatty the exact locations may be difficult to define as a covering of hardcore exists of the profile of the site in these areas. New trial pit positions need to be plotted and recorded by a competent engineer with GPS equipment (Client to arrange), geotechnical information on soil strata and depths logged (geotechnical consultant for Client to appoint) and trial pits to be excavated by a competent and

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qualified driver with asbestos awareness training, and JCB to have a Hepa filter attached as an additional control measure, with cab windows to be kept closed at all times.

Sampling should be undertaken and recorded at depths of 0.5m intervals, with additional sampling at interim levels where soil strata recorded by geotechnical consultant is confirmed as differing. Where made ground reach natural substrate further sampling of the boundary walls and area should be added as a composite sample taking to a depth of 0.25m beyond the natural substrate to validate the possible delineation of contamination for any subsequent remediation and provide lines of evidence to relevant planning authorities.

The new Joint Industry Working Group (JIWG) guidance document "Control of Asbestos Regulations 2012: Interpretation for Managing and Working with Asbestos in Soil and Construction & Demolition materials" (CAR-SOIL, 2016) supports our methodology of using trial pits/trenches. Along with suitable and sufficient barrier segregation, RPE/PPE and background air monitoring during such intrusive investigations, in line with Regulation 11 in terms of reducing exposure to the lowest levels reasonably practicable.

It will be necessary to demonstrate that risk assessments are valid and that asbestos fibres are not being produced during any work activities. Fixed boundary background monitoring is advised during the works on site in accordance with HSG 248 "The Analysts' Guide for Sampling Analysis, and clearance procedures".

In addition to this personal sampling will be undertaken to operatives to validate the control measures are adequate and both the control limit of 0.1 f/cm3 when measured over a four hour period and the sporadic and low intensity (or short term exposure limit) is a peak exposure that may occur of 0.6 f cm/3 when measured over a 10 minute period are not exceeded.

A P403 & P404 analyst from our UKAS accredited laboratory will undertake such air monitoring and as part of the standard HSG 248 reassurance air testing we will need to cut the filter into two parts, one of which will be analysed on-site using Phase Contrast Optical Microscopy (PCOM) with the other half to be retained and stored. In the event that the on-site reading indicates an exceedance of the control limit, the stored half will be analysed by Scanning Electron Microscopy technique by our UKAS accredited laboratory to determine fibre type as referred to in CIRIA C733 Asbestos in soils and made ground guidance. It will initially be necessary to utilise a "watching brief" during future excavation works in areas where asbestos-containing materials are suspected. This will be with the view to identify any potential asbestos-containing materials.

In addition to the standard background air monitoring using PCOM method it is advised when works are undertaken with soils contaminated with asbestos that in order to avoid civil liabilities Ciria C733 Asbestos in Soils and Made Ground Recommends a monitoring

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regime that takes into account any background levels of asbestos prior to any activity based works are undertaken, and it is recommended this should achieve 0.0001f/cm3.

We propose that such monitoring is undertaken for at least 2 to 3 days prior to any works being undertaken to establish these baseline limits, and for at least a day representative of activities on site once they have begun excavation works as per construction phase.The ambient air monitoring will be carried out at the perimeter of the site and will be informed by Chapter 12 of guidance document "CIRIA C733: Asbestos in Soils and Made Ground and other expert information currently available e.g. CIRIA Webinar 1: Measurement of asbestos in soil and air. This approach aims to make a comparison between the background asbestos concentrations prior to works and when works start in relation to any asbestos in soils and other materials.

The CAR-Soil guidance supports the approach of undertaking background monitoring in order to assess and validate the control measures are adequate in reducing the risk from spread of asbestos. It details the method of undertaking static boundary monitoring and near-source static sampling, to assess the release and spread of asbestos fibre concentrations near sources (e.g. work without an enclosure, near activities which involve disturbance of asbestos in soil or C&D materials).

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Appendix A

Asbestos in Soils Investigation Report 126637

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Asbestos in Soils Site Investigation

Job Ref No: ***126637****, Account Ref No:* ***1169****, Contract Ref No:* ***16949***

Former Grosvenor Residences Grosvenor Street Manchester Greater Manchester M1 7HR

Title*: Manchester Engineering Campus Development-Soil Sampling Investigation*



latlng: 53.471361,-2.233423



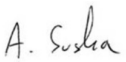
on site photo

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Total Records	Analysed Records	No Asbestos Detected	R3	R2	R1
25	25	20	0	5	0

Head Office
7 Halifax Court, Dunston,
Gateshead, NE11 9JT
E: *info@lucion.co.uk*
T: *0345 5040 303*

Report Summary

This certificate is for the attention of	**Marc McVey** **The University of Manchester** The University of Manchester Accounts Payable LG.015 John Owens Building Oxford Road Manchester M13 9PL United Kingdom
Contract Title	Manchester Engineering Campus Development-Soil Sampling Investigation
Survey Type	Asbestos in Soils Site Investigation
Site Address	Former Grosvenor Residences Grosvenor Street Manchester Greater Manchester M1 7HR
Buildings Surveyed	Former Grosvenor Residenses, Grosvenor Street Residences
Report Comments	Soil sampling of trial pit arising's along all proposed drainage routes, see plan provided and marked indicative trial pit locations. Additional trial pits and sampling at locations where previously known stockpiles of soil removed containing asbestos too. Yellow X-follow routes of proposed drainage according to key (Blue/Brown/Orange/Red routes on key)-25 trial pits Green X- additional trial pits around previously identified stockpiles removed-approx 6. The number of trial pits and samples to be reviewed on site by Buro Four acting as PM on behalf of Univeristy of Manchester Marc McVey Project Manager Mob. 07786 111726 Surveyors to pick up containers from Oldham office, these should be delivered from Gateshead lab on Tuesday. Survey team will need a trowl to undertake soil sampling along with PPE and RPE.
Surveyor(s)	Phill Bodham, Martin Clegg
Surveyor signature(s)	
Survey Date	Friday, 5th August, 2016
Analyst(s)	Agnes Suska
Analyst signature(s)	
Analysis date	Tuesday, 23rd August, 2016
Approved signatory	Lee Kerridge

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Approved signature	
Approval date	Wednesday, 24th August, 2016
Report Rendered on	Tue 4 Oct 2016 @ 15:13:25

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Report Contents

Asbestos Register and Executive Summary . . . 5
Introduction . . . 6
Site Investigation Scope . . . 7
Site Data . . . 8
Site Investigation Methodology . . . 9
Method of Sample analysis . . . 9
HSG 248 Asbestos: The Analysts' Guide for Sampling, Analysis and Clearance Procedures . . . 9
Sampling Strategy . . . 10
Results and Findings . . . 10
Initial Risk Level Assessment . . . 10
Recommendations . . . 13
Cited References and Further Reading . . . 15
Management Recommendation Detail . . . 16
Areas Excluded & Not Fully Accessed During Survey . . . 17
Survey Inspection Detail, Sample Test Report and Risk Level Assessment Report . . . 17
Annotated Plans and Other Additional Documents . . . 21
Additional Advice and Information . . . 21
Post Survey Support . . . 22
Material Test Certificate . . . 23

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Asbestos Register and Executive Summary

Ordered By Building, Level and Location

Building	Level	Location	Item / Product Examined	Material Description	Risk Level (Material Score)	Initial Control Recommendation
Former Grosvenor Residenses	0	999/externals	Soil sample	Asbestos-containing Soil	R2 (10)	Remove
Former Grosvenor Residenses	0	999/externals	Soil sample	Asbestos-containing Soil	R2 (12)	Remove
Former Grosvenor Residenses	0	999/externals	Soil sample	Asbestos-containing Soil	R2 (10)	Remove
Former Grosvenor Residenses	0	999/externals	Soil sample	Asbestos-containing Soil	R2 (10)	Remove
Former Grosvenor Residenses	0	999/externals	Soil sample	Asbestos-containing Soil	R2 (10)	Remove

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Introduction

This report aims to:

- Introduce pertinent legislation relating to the management of asbestos including when in made ground and soils
- Outline the sample testing and inspection methodology employed by the surveyor
- Relate the significance of the report contents to the Control of Asbestos Regulations (2012) and CIRIA guidance C733
- Detail site findings compliant with Regulation 4 of the Control of Asbestos Regulations (2012)
- Serve as a reference document to assist in making further steps towards the management of any asbestos containing materials at the site

Regulation 4 of the Control of Asbestos Regulations (2012) states the obligations that persons defined as "duty holders" have to manage asbestos containing materials in non-domestic premises. This instrument defines a duty holder as being:

> *"Every person who has, by virtue of a contract or tenancy, an obligation of any extent in relation to the maintenance or repair of non-domestic premises or any means of access thereto or egress there from; or*
>
> *In relation to any part of non-domestic premises where there is no such contract or tenancy, every person who, to any extent, has control of that part of non-domestic premises or any means of access thereto or egress there from" -* ***CAR, 2012.***

Regulation 4 also states the following:

> *"In order to enable him [sic "dutyholder"] to manage the risk from asbestos in non-domestic premises, the dutyholder shall ensure that a suitable and sufficient assessment is carried out as to whether asbestos is or is liable to be present in the premises"*

This report satisfies this requirement, unless stated otherwise, by detailing the site investigation findings by reporting the presence of asbestos containing materials in exploratory locations carried out on site.

The Hazardous Waste Regulations were implemented in England and Wales (July 2005), which replaced the Special Waste Act 1996. The regulations outline the required documentation associated with both the collection and disposal of hazardous waste. The regulations do cover asbestos as an exception from hazardous waste produced by households (domestic waste). Also, refer to technical guidance WM2 Hazardous Waste - Interpretation of the definition and classification of hazardous waste.

Health and Safety Guidance - Publication "Asbestos: The Survey Guide (HSG 264)" details asbestos surveying techniques and how assessment of materials can be categorised by risk, which relevant draw across can be made for asbestos in made ground.

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Site Investigation Scope

Site Address: **Former Grosvenor Residences Grosvenor Street Manchester Greater Manchester M1 7HR**

Surveyed Area(s): **Former Grosvenor Residenses, Grosvenor Street Residences**

A limited site investigation was undertaken to characterise the site so far as was reasonably practical within the timeframe and budget agreed with the client. Methods used to carry out the investigation were agreed with the client prior to any commencement of works by way of acceptance of our contract / quotation.

This inspection was conducted in accordance with Health and Safety Guidance - Publication "Asbestos: The Survey Guide (HSG 264)" and “Asbestos: The analysts' guide for sampling, analysis and clearance procedures (HSG 248)”. Lucion Environmental Ltd cannot accept any liability for loss, injury, damage or penalty issues that arise for reasons of survey scope limitations. Lucion Environmental Ltd cannot be held responsible for any damage caused as part of this inspection carried out on your behalf.

The scope of this inspection relates to land investigation only.

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Site Data

Site ID	89935
Address	Former Grosvenor Residences Grosvenor Street Manchester Greater Manchester M1 7HR
Property Type	Educational
Property Build Date	mixed construction age
Property Construction type	Mixed Constructions
Property access notes	Kevin Brooks (07790 548 708)-Connell Brothers site manager
Property access restrictions	Parking available via Grosvenor Street to Connells compound adjacent stacked portacabins
Property in Conservation area?	NO
Listed Building?	NO
Property Alterations	Property no longer exists and is rubble
Property Plant or equipment installed?	NO

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Site Investigation Methodology

The inspection findings detailed in this report were gathered using documented in house inspection (TOP01.01), sampling procedures (TOP01.02) and made ground stepped approach (TOP01.08) that implement the requirements of the Health and Safety Executive Publications HSG 264 (Asbestos: The survey guide) and HSG 248 (Asbestos: The analysts' guide for sampling, analysis and clearance procedures). Individual site investigation methodologies derived from in house preliminary risk assessments or specific client requirements are implemented using available guidance documents as reference i.e. CIRIA C733, WM2 and CLR11.

Sampling of Asbestos Containing Soils (ACMs)

A representative sample of suspected bulk asbestos material is taken, along with an accompanying soil matrix, according to the "sampling strategy". An assessment (where necessary or possible) of the material's extent and condition is made. Laboratory screening analysis will determine the form and presence of any asbestos fibres (fibre type), while quantitative laboratory analysis will assess the total percentage of asbestos within a soil sample.

Method of Sample analysis

The asbestos fibre identification results detailed in this report and the appended certificate of bulk analysis were obtained using documented in house testing procedures (TOP01.03 & TOP01.03.01) that implements the requirements of Health and Safety Executive Publication HSG 248, Appendix 2 (Asbestos: The analysts' guide for sampling, analysis and clearance procedures). All samples collected during the course of this inspection are tested in accordance with these methods.

HSG 248 Asbestos: The Analysts' Guide for Sampling, Analysis and Clearance Procedures

Publication HSG 248 describes a two stage approach to the detection and subsequent identification of asbestos fibre in bulk (i.e. suspect sample) materials. Initially the microscopist will examine the material under a low power stereo light microscope. The microscopist then performs extensive optical tests using polarised light microscopy in order to confirm or refute that the material contains an asbestos mineral. This technique allows for the detection of the six common forms of asbestos fibre as follows:

Asbestos Fibre Type	Common Nomenclature
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	N/A
Fibrous Anthophyllite	N/A
Fibrous Tremolite	N/A

The results of this test are given, where appropriate, in the inspection detail report for each sample taken and are summarised in the management recommendation report. They are also separately detailed in the bulk-analysis report appended to this report. The homogeneity of asbestos containing materials can differ depending on their type.

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Typcially, homogeneous materials include sprayed coatings, insulating board and asbestos cement products. Other materials are typically less homogeneous including pipe lagging (due to patch repairs, hand mixing at time of application), textured coatings (due to low concentration of asbestos fibre and hand application), composites (due to low concentration of asbestos fibre and material matrix) and debris samples (due to the potentially inconsistent ocurrences that have led to their presence). Whilst sampling frequencies / techniques and analysis methods attempt to address the issue of non-homogeneity it should be realised that sampling in accordance with HSG 264 and analysis in accordance with HSG 248 cannot always obviate the problems of determining asbestos fibre content in non-homogeneous materials. The results of sample analysis presented in this report therefore pertain to the samples analysed and so relate only to the time at which sampling took place and to the conditions prevailing during that time.

Sampling Strategy

A site and project specific sampling strategy has been developed in line the timeframe and budget agreed with the client. Ultimately, the sampling strategy adopted attempts to adequately characterise the potential presence of asbestos across the site as far as is reasonably practicable. However, following laboratory testing and data review it may be deemed more cost effective to undertake further soil sampling to further delineate the presence of asbestos at the site.

Results and Findings

The item examination and inspection findings, bulk analysis results, material assessment and initial risk level assessment are reported in the form of an asbestos inspection and testing detail register. The purpose and structure of this register are explained in the proceeding sections.

Initial Risk Level Assessment

The initial risk level assessments made within this report for those items strongly presumed, or positively proven by sampling and subsequent analysis, to contain asbestos have been made on the basis of the Material Assessment Algorithm detailed within the publications HSG 264 and HSG 227.

This assessment aims to elucidate the potential for a particular material to release hazardous fibres and expose those within the specific area to asbestos dust. The following table gives the scoring strategy for the initial risk level assessment and indicates the scoring degree of those points that are considered, namely product type, condition, surface treatment and asbestos fibre type present.

	Score	Score Category
Product Type An assessment of the inherent risk a product may pose (Product debris is assessed on the product type from which it originates)	1	**Asbestos reinforced composites** - Plastics / resins / mastics / felts / vinyl tiling / semi rigid paints / decorative finishes / asbestos cement and other such similar bound materials.
	2	**Materials of a medium asbestos content including** - Asbestos insulating board / millboard / low density insulation board / textiles / gaskets / ropes / papers / debris from asbestos containing composite material and cement.
	3	**Materials of a high asbestos content including** - Thermal insulation / sprayed asbestos / loose asbestos / packing / filled padding / all other debris.

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	Score	Score Category
Material Condition An assessment of the damage or deterioration in condition of product	0	**Undamaged** - No visible signs of damage
	1	**Minor damage** - Light material surface abrasion / abrasion to edges
	2	**Medium damage** - Evidence of loose asbestos fibre protruding from material / poor condition of material is notable
	3	**Major damage** - Significant damage to materials often resulting in the short-term production of asbestos containing debris / delamination of sprays and thermal insulation / asbestos debris

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	Score	Score Category
Surface Treatment An assessment of the level of fibre retention the surface of a material may be capable of	0	**Composite materials** - Plastics / resins / mastics / felts / vinyl tiling / semi rigid paints / decorative finishes
	1	**Sealed and enclosed materials** - Painted asbestos insulating board (with exposed face painted or encapsulated) / enclosed asbestos lagging and sprayed asbestos (as originally installed) / unsealed asbestos cement products
	2	**Unsealed and encapsulated materials** - Unsealed asbestos insulating board / asbestos lagging, sprayed asbestos and woven material encapsulated (remedially)
	3	**Unsealed friable materials** - Unsealed asbestos lagging and sprayed asbestos
Asbestos Fibre Type An assessment of asbestos fibre types propensity to cause asbestos related diseases	1	**Serpentine Asbestos** - Chrysotile
	2	**Amphibole Asbestos** - Amosite / Anthophyllite / Tremolite / Actinolite
	3	**Amphibole Asbestos** - Crocidolite

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Material / Accessibility Score

Following the rating of a material using the above criteria, the resulting aggregated additive material score may be assessed in terms of accessibility to derive an assessment of initial risk level as follows:

	Very Low Risk (2-4)	Low Risk (5-6)	Medium Risk (7-9)	High Risk (10-12)
Inaccessible (1)	R3	R3	R3	R2
Periodically Accessed (2)	R3	R3	R2	R1
Frequently Accessed (3)	R3	R2	R1	R1

General Interpretation of Risk Assessment Level

Risk Assessment Level	Interpretation of the Recommended Control Action [1]
R1	immediate implementation
R2	as soon as practicable - *in interim period material should be regularly inspected and its management planned for*
R3	not immediately necessary - *material should be regularly inspected and its management planned for*

Recommendations

In addition to the risk assessment level assigned to strongly presumed and identified asbestos containing material, a management control action recommendation is also made. In the case of survey carried our prior to refurbishment or demolition works, the "normal" recommendation will be "remove" as the surveyor assumes that asbestos removal will take place prior to other works commencing (unless the surveyor has been advised otherwise in advance of the survey).

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1. The risk level assessment is determined on the basis of information collated during the course of the survey. The risk assessment level needs to be reviewed periodically, (normally in line with a frequency defined in an asbestos management plan) to verify its validity and prior to any refurbishment work within the building/ site.

The current recommendations conventionally made by the surveyor may include the following:

Recommendation	Description	Notes
Air Monitoring	Sampling of air for asbestos fibre concentration. Necessary where a risk of fibre exposure is present and assessment of such exposure presence or absence is prudent.	UKAS accredited analytical laboratory should perform reassurance air testing.
Access Restriction	Restriction of access to area / location only to personnel wearing appropriate PPE / RPE.	Suitability of RPE / PPE must be carefully assessed and procedure invoked to ensure these control measures are adhered to.
Access Prohibition	Prohibition of access to area / location to all personnel.	Area should be marked clearly as being prohibited to all personnel, possibly in conjunction with asbestos warning stickers.
Environmental Clean	A cleaning process used to prevent the spread of asbestos containing contaminants.	Services of a licensed asbestos removal contractor should be engaged and all works carried out under appropriate controlled conditions. Works should also be accompanied by an appropriate air test performed by a UKAS accredited laboratory.
Material Repair	Repair of the material in such a manner as to minimise the release of asbestos fibre.	Repair of materials is recommended by the Health and Safety Executive as an alternative to removal, where reasonably safe to so.
Material Encapsulation	Encapsulation of the material in a manner that ensures the complete enclosure of any remaining asbestos fibres.	Encapsulation of materials is a possible alternative to their removal, where reasonably safe to do so. Works should also be accompanied by appropriate air test performed by a UKAS accredited laboratory.
Material Removal	Removal of the material in instances where it is remaining in situ would lead to a high residual risk level. Or removal may be necessary to permit work within the location. Removal of materials may also be carried out on a preventive basis.	Removal works should be carried out in accordance with the relevant ACOP (approved code of practice), L143
Any recommendations made within this report are made on the basis of findings collated at the time of survey. *Recommendations should undergo careful client evaluation prior to a final management decision being made.* *Lucion Environmental Ltd does not accept any responsibility for any works carried out as a result of recommendations made within this report.*		

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If any remedial works need to be carried out, decide whether or not they need to be carried out by a licensed contractor. If you are unsure about this we can offer advice as to what you should do.

Cited References and Further Reading

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Management Recommendation Detail

Building	Level	Location	Item / Product Examined	Sample No.	Material Description	Fibre Type	Material Score	Extent	Risk Level Assessment	Initial Control Recommendation	Photograph
Former Grosvenor Residenses	0	999/ externals	Soil sample	126637-11	Asbestos-containing Soil	Chrysotile	10	Extent Indiscernible	R2	Remove	
Former Grosvenor Residenses	0	999/ externals	Soil sample	126637-10	Asbestos-containing Soil	Crocidolite	12	Extent Indiscernible	R2	Remove	
Former Grosvenor Residenses	0	999/ externals	Soil sample	126637-14	Asbestos-containing Soil	Chrysotile	10	Extent Indiscernible	R2	Remove	

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table continued from previous page...

Building	Level	Location	Item / Product Examined	Sample No.	Material Description	Fibre Type	Material Score	Extent	Risk Level Assessment	Initial Control Recommendation	Photograph
Former Grosvenor Residenses	0	999/ externals	Soil sample	126637-2	Asbestos-containing Soil	Chrysotile	10	Extent Indiscernible	R2	Remove	
Former Grosvenor Residenses	0	999/ externals	Soil sample	126637-3	Asbestos-containing Soil	Chrysotile	10	Extent Indiscernible	R2	Remove	

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Areas Excluded & Not Fully Accessed During Survey

Asbestos should be presumed to be present within Locations and Items not accessed until a further assessment can be performed.

Additional surveyor comments.

Building	Level	Location	Item / Product Examined	Accessibility	Access Comments	Photograph
Nothing to report						

Survey Inspection Detail, Sample Test Report and Risk Level Assessment Report

Asbestos should be presumed to be present within Locations and Items not accessed until a further assessment can be performed.

Additional surveyor comments.

Building: Former Grosvenor Residenses **Level: 0** **Location: 999/externals**

Item / Product Examined	Material Description	Sampling Strategy	Sample No.	Extent	Product Score	Material Condition	Surface Treatment	Fibre Id.	Material Score	Accessibility Score	Risk Level Assessment
Soil sample	Soil	Sample	126637-1								 NAD
		Debris									
Soil sample	Asbestos-containing Soil	Sample	126637-2	Extent Indiscernible	3	3	3	Chrysotile	10	1	 R2
		Debris									
Soil sample	Asbestos-containing Soil	Sample	126637-3	Extent Indiscernible	3	3	3	Chrysotile	10	1	 R2
		Debris									
Soil sample	Soil	Sample	126637-4								 NAD
		Debris									
Soil sample	Soil	Sample	126637-5								 NAD
		Debris									
Soil sample	Soil	Sample	126637-6								 NAD
		Debris									
Soil sample	Soil	Sample	126637-7								 NAD
		Debris									

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table continued from previous page...

Building: Former Grosvenor Residenses **Level: 0** **Location: 999/externals**

Item / Product Examined	Material Description	Sampling Strategy	Sample No.	Extent	Product Score	Material Condition	Surface Treatment	Fibre Id.	Material Score	Accessibility Score	Risk Level Assessment
Soil sample	Soil	Sample	126637-8								 NAD
		Debris									
Soil sample	Soil	Sample	126637-9								 NAD
		Debris									
Soil sample	Asbestos-containing Soil	Sample	126637-10	Extent Indiscernible	3	3	3	Crocidolite	12	1	 R2
		Debris									
Soil sample	Asbestos-containing Soil	Sample	126637-11	Extent Indiscernible	3	3	3	Chrysotile	10	1	 R2
		Debris									
Soil sample	Soil	Sample	126637-12								 NAD
		Debris									
Soil sample	Soil	Sample	126637-13								 NAD
		Debris									
Soil sample	Asbestos-containing Soil	Sample	126637-14	Extent Indiscernible	3	3	3	Chrysotile	10	1	 R2
		Debris									

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table continued from previous page...

Building: Former Grosvenor Residenses **Level: 0** **Location: 999/externals**

Item / Product Examined	Material Description	Sampling Strategy	Sample No.	Extent	Product Score	Material Condition	Surface Treatment	Fibre Id.	Material Score	Accessibility Score	Risk Level Assessment
Soil sample	Soil	Sample	126637-15								 NAD
		Debris									

Building: Grosvenor Street Residences **Level: 0** **Location: 999/externals**

Item / Product Examined	Material Description	Sampling Strategy	Sample No.	Extent	Product Score	Material Condition	Surface Treatment	Fibre Id.	Material Score	Accessibility Score	Risk Level Assessment
Soil sample	Soil	Sample	126637-16								NAD
		Debris									
Soil sample	Soil	Sample	126637-17								NAD
		Debris									
Soil sample	Soil	Sample	126637-18								NAD
		Debris									
Soil sample	Soil	Sample	126637-19								NAD
		Debris									
Soil sample	Soil	Sample	126637-20								NAD
		Debris									
Soil sample	Soil	Sample	126637-21								NAD
		Debris									
Soil sample	Soil	Sample	126637-22								NAD
		Debris									
Soil sample	Soil	Sample	126637-23								NAD
		Debris									
Soil sample	Soil	Sample	126637-24								NAD
		Debris									
Soil sample	Soil	Sample	126637-25								NAD
		Debris									

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Annotated Plans and Other Additional Documents

The following documents accompany this report and should be regarded as an integral part of this report.

They can be downloaded from http://web.lucion.co.uk/reports/126637/attachments.

- Method Statement [http://web.lucion.co.uk/method_statements/126637?s=72a31e60c77d00807610aefbca209aa4]
- Risk Assessment [http://web.lucion.co.uk/risk_assessment/126637?s=a5a86ec43af5d6c7d184151cb4cb7fd7]
- -lucion_soil_cert_126637.pdf
- A4-Plan_126637_Former-Grosvenor-Residenses.pdf

Additional Advice and Information

As the reader of this report you are recommended to make sure that it meets with your requirements. Publication HSG 264 Asbestos: The survey guide suggests the following:

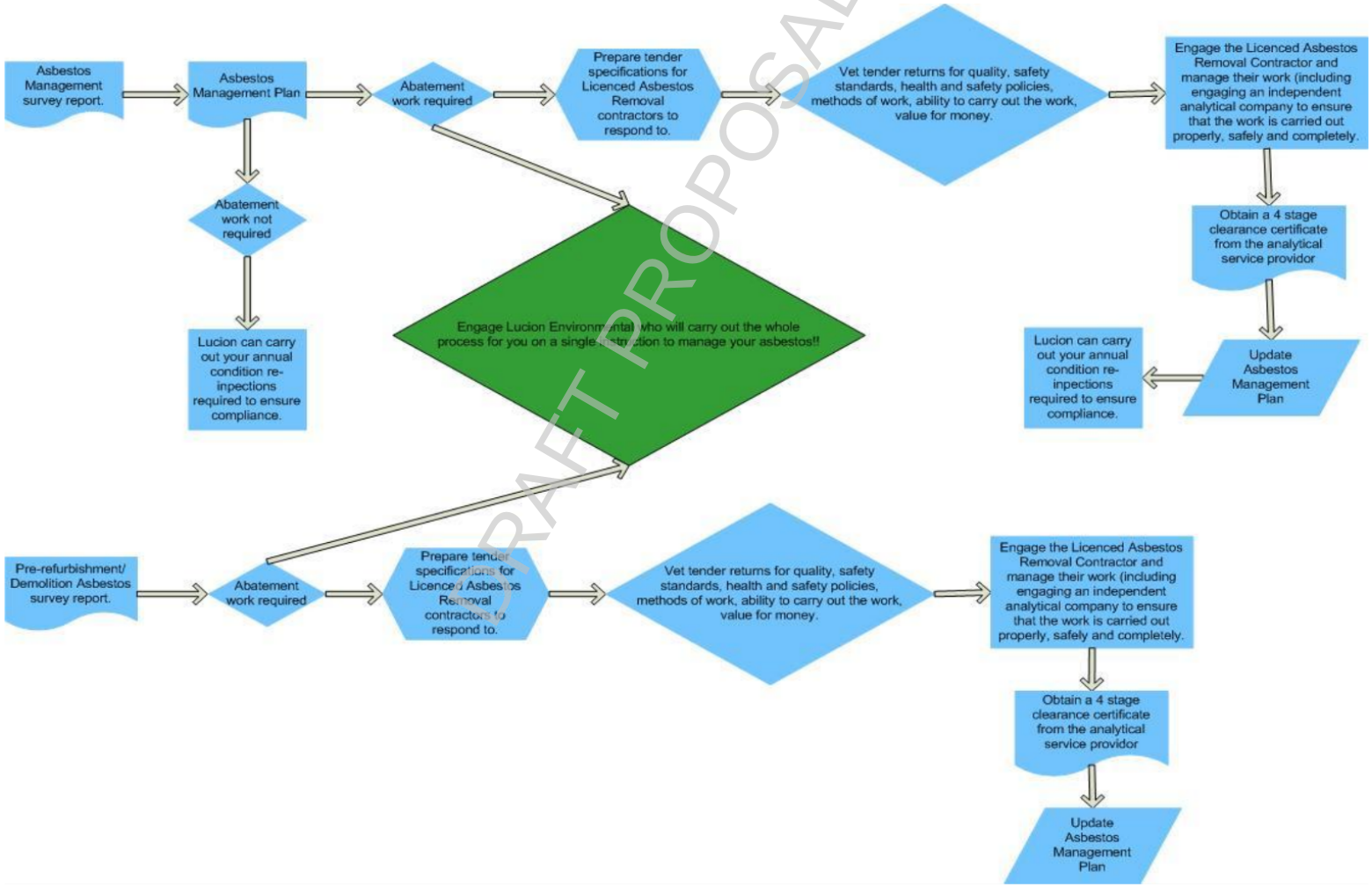
- Check your report against our quotation or your tender
- Check for any caveats or disclaimers you are unsure of
- Check that the survey is as you requested
- Check you understand the included plans
- Check that we have accessed all the areas and rooms you wanted us to

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Post Survey Support

The ultimate aim of any management plan must be the prevention of exposure to personnel working on your premises. You should therefore make this register available for consultation and keep it regularly updated. Publications relating to the Control of Asbestos Regulations (2012) suggest an annual reinspection as minimum (more frequently for higher risk materials) by a competent person.

Remember, an asbestos survey is the first step in asbestos management. Effective asbestos management often needs specialist advice; have a look at the diagram below which shows the basic steps in formulating a typical asbestos management plan. Lucion realise that you may need some assistance in drafting your management plan; please give us a call on **0191 4618999** or send an email to enquiries@lucion.co.uk or visit the lucion website [http://lucion.co.uk] for advice on any of the steps shown below:



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Asbestos Fibre Identification Material Test Certificate

Job Ref No: ***126637****, Account Ref No:* ***1169****, Contract Ref No:* ***16949***

This certificate is for the attention of	**Marc McVey** **The University of Manchester** The University of Manchester Accounts Payable LG.015 John Owens Building Oxford Road Manchester M13 9PL United Kingdom
Site Address	Former Grosvenor Residences Grosvenor Street Manchester Greater Manchester M1 7HR
Sampled Buildings	Former Grosvenor Residenses, Grosvenor Street Residences
Analyst(s)	Agnes Suska
Analyst signature(s)	A. Suska
Analysis date	Tuesday, 23rd August, 2016
Approved signatory	Lee Kerridge
Approved signature	
Approval date	Wednesday, 24th August, 2016
Report Rendered on	Tue 4 Oct 2016 @ 15:13:25

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Analysis method - In-house method TOP01.03 in accordance with HSG 248 - Asbestos: The Analysts' Guide For Sampling, Analysis and Clearance Procedures H.S.E. 2005. All analysis carried out at Lucion's Head Office laboratory.

Lucion bear no responsibility for sample collection or sample description related information provided by the client.

Where Lucion Environmental Ltd has not undertaken sampling; any prior sampling activity is beyond the company's responsibility. Where Lucion Environmental Ltd has sampled the test material, this has been done in accordance with in-house method TOP01.02. Any opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The results quoted in this report relate to:

1. Samples analysed in accordance with methods described above
2. Samples analysed and not necessarily to the material from which the samples were taken
3. The time during which sampling took place and to the conditions prevailing during that time

The samples referred to in this report will be retained for 6 months unless requested otherwise.

Total Samples	No Asbestos Detected	Asbestos-Containing Samples
25	**20**	**5**

Head Office
7 Halifax Court, Dunston,
Gateshead, NE11 9JT
E: *info@lucion.co.uk*
T: *0345 5040 303*

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Fibre Identification Analysis Results

Sample No.	Building	Level	Location	Item / Product Examined	Material Description	Analyst Comments	Fibre Identification
126637-1	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-2	Former Grosvenor Residenses	0	999/ externals	Soil sample	Asbestos-containing Soil	cement fragment	Chrysotile
126637-3	Former Grosvenor Residenses	0	999/ externals	Soil sample	Asbestos-containing Soil	cement - positive	Chrysotile
126637-4	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-5	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-6	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-7	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-8	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-9	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-10	Former Grosvenor Residenses	0	999/ externals	Soil sample	Asbestos-containing Soil	cistern - positive	Crocidolite
126637-11	Former Grosvenor Residenses	0	999/ externals	Soil sample	Asbestos-containing Soil	cement fragment	Chrysotile
126637-12	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-13	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-14	Former Grosvenor Residenses	0	999/ externals	Soil sample	Asbestos-containing Soil	cement fragment	Chrysotile
126637-15	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-16	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-17	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-18	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-19	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-20	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-21	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-22	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-23	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-24	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-25	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD

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Asbestos Fibre Quantification Test Certificate

Job Ref No: ***126637****, Account Ref No:* ***1169****, Contract Ref No:* ***16949***

This certificate is for the attention of	The University of Manchester
Contract Title	Mechanical Engineering Development Campus-Soil Sampling Investigation
Site Address	Former Grosvenor Residences Grosvenor Street Manchester Greater Manchester M1 7HR
Analyst(s)	Agnes Suska
Analyst signature(s)	A. Suska
Analysis date	Tuesday, 23rd August, 2016
Approved signatory	Lee Kerridge
Approved signature	
Approval date	Wednesday, 24th August, 2016
Report rendered on	Wed 24 Aug 2016 @ 09:22:55

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Samples Description* - Soil sampling of trial pit arising's along all proposed drainage routes, see plan provided and marked indicative trial pit locations. Additional trial pits and sampling at locations where previously known stockpiles of soil removed containing asbestos too. Yellow X-follow routes of proposed drainage according to key (Blue/Brown/ Orange/Red routes on key)-30 trial pits Green X- additional trial pits around previously identified stockpiles removed-approx 6. The number of trial pits and samples to be reviewed on site by Buro Four acting as PM on behalf of Univeristy of Manchester Marc McVey Project Manager Mob. 07786 111726 Surveyors to pick up containers from Oldham office, these should be delivered from Gateshead lab on Tuesday. Survey team will need a trowl to undertake soil sampling along with PPE and RPE.

Analysis requested - Qualitative and quantitative analysis of soil / loose aggregate samples for mass determination of asbestos.

Analysis method - The analysis was carried out using our in-house documented method based upon EA Blue Book Draft August 2014. Our method includes initial examination of the entire sample which should be approximately 1kg in weight. A representative sub-sample of approximately 20g is then analysed in detail using stereo microscopy. Quantification is carried out using our documented in-house procedure TOP01.03.01 by hand-picking/weighing of loose fibres and bound fibres for gravimetric analysis. Final % asbestos weight is determined based upon upper matrix asbestos % as documented in HSG264.

* Lucion bear no responsibility for sample collection or sample description related information provided by the client.

Where Lucion Environmental Ltd has not undertaken the sampling; any prior sampling activity is beyond the company's responsibility. Where Lucion Environmental Ltd has sampled the test material, this has been done in accordance with in-house methods.

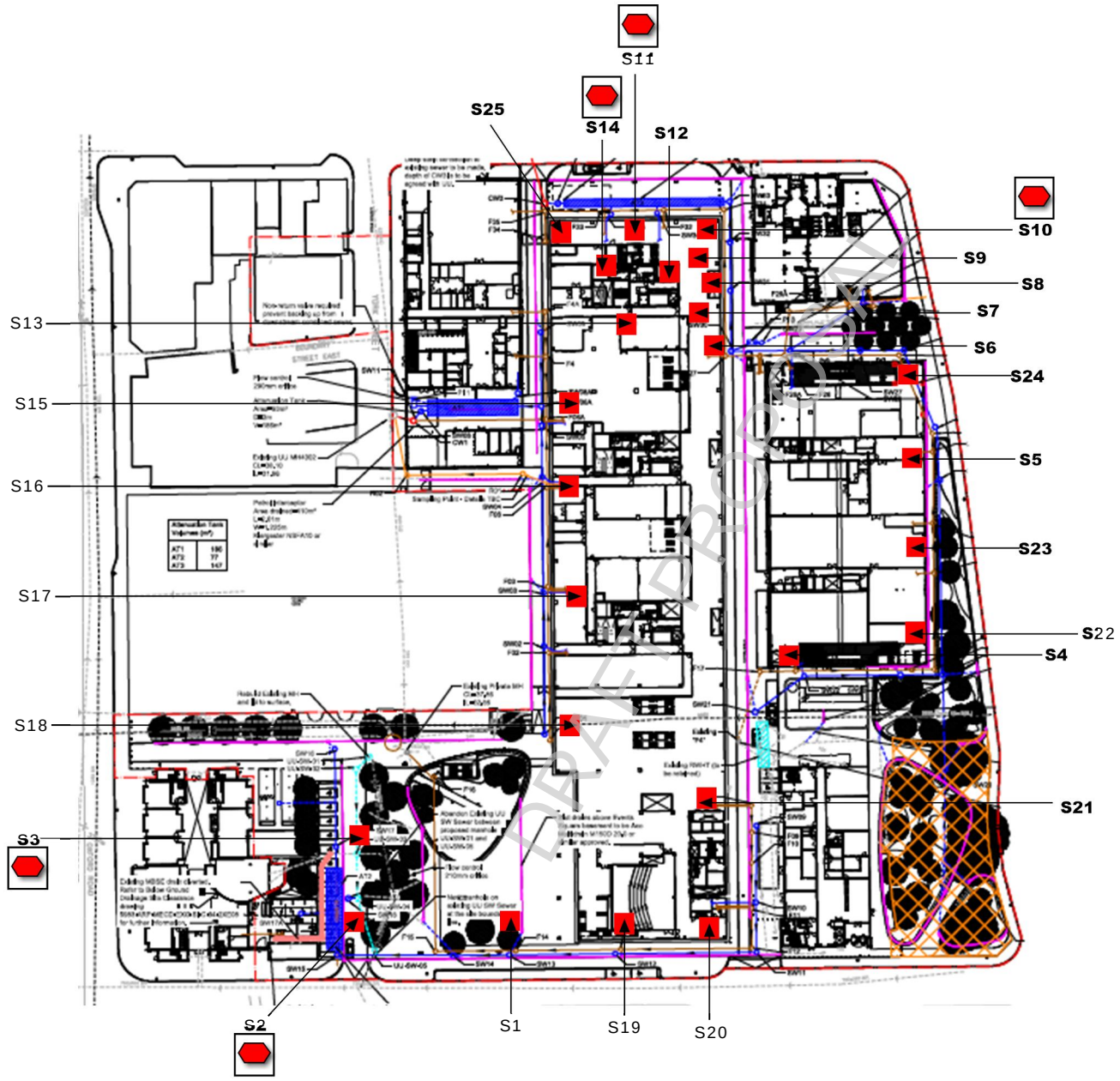
Job No.	Sample No.	Sample weight (g)	% asbestos by hand picking & weighing	% asbestos by SEM fibre counting	Total % asbestos in samples	Reported Result (%)
126637	126637-2	883.78	0.3062%	0.0%	0.3062%	0.3062%
126637	126637-3	969.39	0.0998%	0.0%	0.0998%	0.0998%
126637	126637-10	1050.14	1.2683%	0.0%	1.2683%	1.2683%
126637	126637-11	1190.01	0.1677%	0.0%	0.1677%	0.1677%

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Job No.	Sample No.	Sample weight (g)	% asbestos by hand picking & weighing	% asbestos by SEM fibre counting	Total % asbestos in samples	Reported Result (%)
126637	126637-14	829.82	0.2335%	0.0%	0.2335%	0.2335%

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Lucion Report	**126637**
Survey Location	**Former Grosvenor Residences**
Plan Location	**Soil Sampling Investigation**
Survey Date	**05/08/2016**
Surveyor(s)	**P Bodham / M Clegg**
Material Symbols	
Asbestos containing **bituminous product**	
Asbestos containing **cement**	
Asbestos containing **composite product**	
Asbestos containing **gasket**	
Asbestos containing **insulation**	
Asbestos containing **insulating board**	
Asbestos containing **paper product**	
Asbestos containing **sprayed coating**	
Asbestos containing **textured coating**	
Asbestos containing **woven product**	
Asbestos containing **debris of unknown origin**	
No Access Area - Asbestos Presumed Present	NA
No Access Item -Asbestos Presumed Present	
Survey Area	

Please note: Asbestos containing material symbol locations are only INDICATIVE of the area of location; not the exact position of the material; refer to report register for details. Drawing NOT to scale.

Appendix B-MECD Risk Assessment

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Risk-Assessment

Job Ref No: ***136924****, Account Ref No:* ***1****, Contract Ref No:* ***16949***

Former Grosvenor Residences Grosvenor Street Manchester Greater Manchester M1 7HR

Title*: Manchester Engineering Campus Development Project*



latlng: 53.471361,-2.233423



on site photo

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The scoring system to assess Risk Factor used below considers Severity of consequences resulting from the hazard (1=Low, 2=Medium, 3=High) and the Probability that something could happen (1=Low, 2=medium, 3=High). The two variables are multiplied to give a figure which will determine the 'acceptability' of a particular hazard (1-2 = Acceptable, 3-4 = Tolerable, 6-9 Unacceptable). The scores are likely scores only; if you disagree with them they should be amended appropriately. Refer to SOP01.14. Residual Risk is scored accordingly (1-9) any score of 3-9 (Tolerable – Unacceptable) will require contact with your line manager before proceeding.

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7 Halifax Court, Dunston,
Gateshead, NE11 9JT
E: *info@lucion.co.uk*
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The following table shows the risks that the Surveyor(s) have selected as applicable to this Job.

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Sharp objects / edges	Inappropriate handling of tools. Sharp edges, broken glass in buildings.	1	3	3	Take care whilst handling equipment. Assess risks prior to commencement of work and address any hazards identified.	Site	Risk assessment of work area. Wear PPE including gloves	1
Debris - grit / objects etc	Debris entering eyes and falling / flying objects hitting personnel	2	2	4	Wear eye protection. Keep head away from fall zone. Wear head protection	Site	Safety glasses, hard hat with visor fitted	2
Electricity - equipment and wiring	Contacting live electrical components / equipment	3	2	6	Consult electrical status on methods statement to ascertain as to whether equipment has been declared live or dead, arrange electrical isolation or competent person accompaniment. If encountered, do not go near loose or damaged wiring until it has been isolated. Do not open fuse boxes or tamper with electrical equipment.	Site	Insulated tools. Permit to work. Wear suitable PPE. Planned maintenance inspections. Isolation cert issued before commencement of work.	3
Electricity - substation access	Electrocution through contact with exposed busbars and exposed wiring	3	2	6	For substation entry follow set procedures laid down in substation access training carried out with the client (where applicable).	Site	Do not enter substations unless valid training is held. Always following subsation entry procedures - stop, listen, smell, look, enter	3

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table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Moving plant and equipment	Contact with moving machinery	3	1	3	Avoid access, keep at a safe distance and do not compromise guards, arrange for machines to be isolated and locked off.	Site	Ensure machinery is isolated and locked off by competent person. Adhere to permit to work if being used. Wear suitable PPE at all times and ensure no loose items on person	3
Noise	Machinery, plant or processes generating noise	2	2	4	Avoid access into noisy areas where possible. Observe on site warnings and requirements. Wear hearing protection as required or as indicated as mandatory on blue safety signs.	Site	Wear suitable hearing protection. Follow on site instructions.	2
Fire	Ignition of flammable substances	3	1	3	Sites: Avoid sources of ignition. No smoking on site. Consult fire safety plan for property and discuss arrangements with team. For regional offices: Fire risk assessment for each office, emergency plan, fire alarm systems, appointed responsible persons to take weekly checks. Good housekeeping in offices, all personnel have basic fire training.	All	Be aware of plan or emergency evacuation procedure for site or office.	3
Asbestos fibres - respirable	Inhalation of asbestos dust	3	2	6	To comply with Regulation 16 Control of Asbestos Regulations (2012) you have a duty to prevent the spread of asbestos fibres. Therefore, ensure that all materials to be sampled are adequately wetted with surfactant prior to and during sampling. Select minimum disturbance point to take sample from. Ensure tools are decontaminated following each sampling activity. Ensure no personnel are adjacent sampling activities. Only trained and qualified personnel are to undertake sampling activities. In addition. Refer TOP01.02. ALWAYS WEAR HALF MASK IN SUSPECT AREAS & DURING SAMPLING.	Site, client staff, public	Orinasal half mask fitted with P3 type filters. Valid face fit certificate. Follow HSG 264 /HSG 248 Guidelines.	3
Asbestos fibres - contactable	Disturbance of asbestos fibres when sampling materials and conducting air monitoring activities	2	2	4	Building surveys- Wear disposable overalls during sampling and intrusion; treat as contaminated waste after use. Use safe sampling techniques to ensure coveralls do not become contaminated via sampling activities and minimise fibre release at source. Use reinstatement method as per method statement on completion of sampling if applicable. Do not wear outer clothes under coveralls during 4 stages clearances. Follow HSG 264 and HSG 248 decontamination guidelines. Refer TOP02.08 and SOP01.16. Highways asset surveys (IAN 63/05): Type 5/6 coveralls not required for general sampling, coring and trail pit digging on highways works- requirement for high visibility to traffic supersedes this (unless specifically stated otherwise in the method statement). Combat any potential fibre release at source using appropriate suppression methods i.e: wet cutting method, surfactant spray. If gloves are used for contact with ACMs or presumed ACMs dispose of as contaminated waste. Refer to TOP01.05 Surveying for Asbestos in Highways Assets for full procedures.	Site, client staff, public	Disposable asbestos grade overalls (Cat 5 / 6) if required. Follow HSG 264/HSG 248 Guidelines.	2

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table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Asbestos fibres - tool contamination	Contamination of tools following sampling of ACMs or use during visual inspection	2	2	4	Clean with wet wipes and bag wipes after use. Dispose of wipes as contaminated waste in uncleanble (e.g. brush)	Site	Wear PPE / RPE when cleaning. Use only issued tools and equipment and ensure that pliers have had serrations removed from jaws	2
Asbestos fibres - sampling	Rendering asbestos fibre airborne	2	2	4	Keep materials wet during sampling and double bag. Use safe sampling techniques as per qualifications and training. Use injection method for sprayed coating and insulation.	Site	Follow HSG 264 Guidelines and TOP01.02	2
MMMF - respirable and contactable	Disturbance of MMMF whilst examining locations containing it	2	3	6	Wear orinasal half mask and disposable overalls	Site	Orinasal half mask fitted with P3 type filters. Valid face fit certificate. Disposable Type 5 overalls Follow HSG 264 Guidelines and TOP01.02.	2
Temporary access - incl. ladders	Ladders, platforms, mobile scaffold, fixed scaffold to asbestos enclsoures / inspections areas not secured	2	2	4	Ensure temporary access equipment has been made available and has been inspected by the persons providing it and is fit for purpose. Ensure ladders have been inspected and are Class 1 (EN131 or BS2037) rated. Consider using ladder stoppers to improve the ladders stability at its base. Do not exceed a ladders weight rating if one is present.	Site	Do not use equipment if not demonstrable as fit for purpose. Regular recorded inspection of ladders and steps.	2
Used hypodermic needles	Puncturing skin with needles	3	1	3	Carry out visual inspection / risk assessment prior to commencement of work. Wear safety foot wear and gloves at all times. Needles to be removed by specialist company - if encountered STOP work and inform manager or client.	Site	Safety footwear / gloves / eye protection to be worn.	3

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table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Moving vehicles / plant	Contact with moving vehicles including forklift trucks, excavators, lorries etc	3	2	6	Wear Hi Visibility clothing and protective footwear. Ensure that you have informed all on site of your presence. Do not work behind stationary vehicles. Pay attention in warehouses and especially when wearing hearing protection. One man to prevent entry from vehicles if appropriate. Stick to man routes on site. Erect no entry signs. Fence off.	Site	Wear suitable PPE at all times. All persons working from platform must be suitably trained	3
Car Parks (presence of moving vehicles)	Being struck by moving vehicles, or injuring a car park user	3	1	3	Drive slowly to allow for unexpected vehicle movement. Ensure area is adequately lit with daylight, street lamps, fixed lighting or head lights from the vehicle. If possible use the car park during a low occupancy time. Make sure all drivers are appropriately licensed and experienced. Ensure all roads are free from moving traffic before exiting the vehcile, and ensure the roads are free from moving traffic when unloading / loading equipment from the vehicles. Use a full 360 degree check of the vehilce before driving away, and adopt Lucion's RISE program - Reverse Into Spaces Everytime, to ensure safety when later pulling away from a parking space. Stick to designated safe walkways if present.	Site, client, public	Ensure driving licence is kept on record and that the Lucion personnel have undergone the H&S induction, including driver training. Keep to 5mph when driving within car parks. Work wearing Hi Vis clothing (vest or jacket) to ensure maximum visibility. Use designated walkways.	3
Water	Drowning in water i.e: docks, lagoons, ponds, rivers, pools, water tanks and other liquid/slurry filled vessels	3	1	3	Obey warning signage. Do NOT move through sites in darkness or poor light conditions. Keep away from unguarded edges and NEVER climb up near to tanks etc. Do not stand or lean on tank lids.	Site	Wear life jacket if working conditions dictate the need.	3
Substances hazardous to health	Incorrect use and control of substances hazardous to health	3	1	3	COSHH data sheets should be obtained for all chemicals present on site. Avoid contact with substances potentially hazardous to health. Wash hands before breaks	Site	Follow COSHH Guidelines. Wear PPE	3

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table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Floor obstructions - loose / uneven	Poor housekeeping, debris on site, poor visibility, wet / slippery surfaces, floor coverings in poor condition, trailing cables, loose wires, open hatches . Erection of access equipment on uneven or slippery surfaces.	2	2	4	Clear working area of obstacles, debris and be vigilant at all times of presence of trip hazards. Take care when working in wet / slippery areas. Maintain good housekeeping, make sure all trip hazards are tidied away. Ensure all hatches are closed. Ensure surface for erection of ladders / steps must be level and clear of debris. Ladders must be footed at all times.	Site	Wear PPE including appropriate footwear. Use adequate lighting in poorly lit areas. Cable ties & regular inspections. Site audits. Careful ladder siting and footing at all times.	2
Climate - cold	Exposure to cold temperatures. Excessive exposure to wind and elements causing a drop in core body temperature and numbing of extremities	2	2	4	Take regular breaks and ensure that welfare facilities are kept warm. When stopping for breaks remove outer layers to ensure body can warm up. Have a warm drink at break times.	Site	Welfare facility heating, warm clothing, thermal under garments. Modify driving behaviour for prevailing conditions.	2
Climate - winds	High winds - operating access equipment and going up ladders	2	2	4	Check weather reports. Wind speed should be < 17mph if working on mobile tower scaffold. If working at height for long duration an anemometer should be used to monitor wind speed.	Site	Check weather reports. Use anemometer if work is over long duration. Wear PPE	2
Poor visibility (enclosures)	Inadequate lighting around area of enclosure or within enclosure or inspection area	2	1	2	Ensure lighting is well positioned around area of enclosure and within enclosure or inspection area	Site	Suitable Lighting	2

DRAFT PROPOSAL

table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Falls from height - access equipment and from exposed edges etc	Includes: incorrect use of access equipment, falls from roofs/ scaffolds, into trenches etc may cause fatal injuries.	3	2	6	Access equipment: Keep body centred within ladder stiles. Do not work from the top 3 steps of ladder (for handhold only). Maintain 3 points of contact at all times on all access equipment. Ladders should never be used outdoors in wet / snowy / icy conditions. Remain within scaffold guardrails. Wear harness in MEWPs and ensure platform safety gate is closed at all times. MEWP must have valid LOLER certification. Exposed edges: Where falls from exposed edges are possible (i.e flat roofs etc) do not work within 2m of edge unless suitable fall arrest system in place. For trenches consider protective measures to restrict falls i.e: fences etc. General: All Lucion field staff are given Work at Height training as part of basic skills course and induction. Scaffolds: Only work from inspected scaffolds with an up to date "scafftag" in place. Do not access any unsafe scaffold; report defects to site manager. Flat roof access: Falls occur from the edges of roofs; through gaps or holes in roofs; and through fragile roof materials and roof lights. Roof areas of buildings are often required to be surveyed as part of the building and may also need to be accessed for other works. Any edge protection present must be firmly secured to the building, and a minimum of 910mm in height. When working on flat roofs with no edge protection ensure you never go nearer than 2m to the edge. Before accessing a flat roof ensure it is structurally safe and can support your weight. NEVER work on fragile roofs. Pay particular attention if slippery surfaces/ice are present. If in doubt do not access! Getting on and off the roof is a major risk. A secure means of entry and exit is essential. A general access scaffold or tower scaffold (preferably of the stairway design) will provide suitable access if no roof hatches or roof level doorways care present. A properly secured ladder is the minimum requirement. Ladders access should only be used on roofs up to one storey in height. Where a ladder is used it should be wherever possible setup where an inner 90 degree corner is present, to provide safer access and disembarking at the top. The ladder must extend at least 3 rungs above the level of the roof that is to be accessed. Ladder use is prohibited on all flat roof areas themselves. Where fall restraint systems are used these will be assessed specific to the works and fully detailed in the Method Statement. Where required specific training will be provided in their use.	Site, other persons in vicinity	Inspected fall restraint and/or fall arrest harness. Conform to WAH Regs 2005. Wear PPE.	3
Manouvering vehicles	Striking another person or object when manouvering	2	1	2	RISE - Reverse Into Spaces Everytime. Perform "circle of inspection" by walking round vehicle before moving off. Use a banksman to assist in parking. Ensure area is safe and suitable to park in.	Vehicle driver and bystander	Signage on all Lucion buildings. Training given to all drivers. RISE initiative	2
Non-structural floors	Falling from walkways, or from crawl boards onto non-structural flooring e.g. plasterboard ceilings in loft spaces	3	2	6	Ensure barriers are present on walkways. Make sure walkways are structurally safe prior to use. Ensure crawl boards are available, and make sure enough crawl boards are available to provide adequate working space. Do not deviate from walkways or crawl boards. Do not walk on top of beams. Use fall arrest harnesses if RA deems necessary. Consider crash decks or netting under ceiling to limit fall.	Site	Barriers. Crawl Boards. Harnesses. Possible need to crash decks or catchment netting - If not present STOP and consult Loft Working Guidance and speak to manager.	3

DRAFT PROOF

table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Presence of animals including rodents and insects.	Being attacked / stung by bees / wasps when disturbing their environments. Animals not secured or under the control of owner. Possibility of being bitten by rodents	2	1	2	Ensure area is free form insect, animal (inlcuding bats) and bird nests. Do not enter area if suffer allergic reactions to insect bites / stings. Do not enter any area where there is an uncontrolled animal. If animal cannot be controlled / secured contact your line Manager for advice. If you are at risk leave the area immediately in a calm and orderly manner. Be aware of signs of rodent infestation, in particular the presence of rodent droppings, chewed items, nests etc. Avoid contact with rodents generally. Heavy infestations may require extermination by specialist contractors before work can commence.	Site	PPE, lighting, and insect sting cream. Ask if there are uncontrolled animals at the site, if a bat survey has been performed and are they present and are pigeons / sea birds etc present before commencement of work. Consider whether or not to proceed at this point. Wear PPE.	1
Disturbances by the general public	Members of the public causing obstructions and interference with site teams or equipment	1	1	1	Ensure safe working zone is erected to prevent contact with the public. Ensure all tools and equipment are monitored and kept within the working zone boundaries at all time. Use appropriate signage. If required, segregation fencing can be erected prior to works commencing. Work in pairs. Try to arrange for works to be carried out at a time when the presence of the public is at a minimum	Site, public	Use of temporary boundary markers or fencing. Use of appropriate signage. Understand the purpose of the presence of the public to help predict movements (through traffic, waiting area etc)	1
Risk of violence	Presence of persons prone to violence	3	2	6	Assess the risk on arrival at site. Is the person (or persons) angry, intoxicated, under the influence of drugs or involved in criminal activities such as theft? Is the person (or persons) attempting to intimidate or threaten you in any way during the course of your work? (Note: this may include site staff/ contractors as well as members of the public).	Site	IMMEDIATELY leave site if you think you are at risk. Do not provoke the situation. Contact your line Manager for advice.	3

DRAFT PROOF

table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Climate - heat	Heat from hot climates. Remember can be amplified in confined spaces.	2	2	4	Reduce work during hottest periods of day (12pm-3pm). Carry out works during cooler hours of the day. Share work load, alternate shift patterns. Allow for regular work breaks in cooler areas. Ensure constant water supply for rehydration is available.	Site	Wear PPE. Vented hard hats. Adequate supply of cool water. Wear sunscreen as required. Use thermometers for temperature monitoring. Carry out works during appropriate times of day. Work-rest balance required. DO NOT work alone.	2
Biohazard-Weils disease (Leptospirosis)	Weil's disease bacteria gaining access to the body via open cuts and wounds can cause illness, which may be life threatening to susceptible individuals.	3	3	9	Animals known to be carriers of the bacteria include cattle, pigs, dogs and rodents, particularly rats through urine, faeces or the dead animals themselves. Exposure is also possible from freshwater sources, such as a river, lake, drain, canal, pond or flood water. Symptoms manifest 2-30 days after exposure. Mild symptoms include: a high temperature (fever) that is usually between 38 C and 40 C (100.4-104-F), chills, sudden headaches, nausea and vomiting, loss of appetite, muscle pain, particularly affecting the muscles in the calves and lower back, conjunctivitis (irritation and redness of the eyes), cough and a short-lived rash. Acute symptoms may include: jaundice, swollen ankles, feet or hands, chest pain, vomiting and seizures, shortness of breath and coughing up blood (10% of cases). Staff experiencing any of these symptoms after potential exposure to report to their GP and inform them of possible exposure. Generally avoid all contact with urine, faeces, sewage, flood and drain waters or dead animals. Basements, cellars, vacant properties are high risk areas. Be particularly vigilant where rodent droppings are present. See PPE control measures for individual protection.	Site	Gloves to be worn. Open cuts and wounds to be covered to prevent bacterium entering body. Dispose of used gloves as hazardous waste.	3

DRAFT PROPOSAL

table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Site and office-Manual handling of heavy and awkward objects, repetitive handling of smaller loads	Incorrect manual handling may result in musculoskeletal injuries or pain in the body's joints, ligaments, muscles, nerves, tendons, and structures that support limbs, neck and back. These can be long term and debilitating.	2	3	6	Manual handling training provided to all staff as part of basic training; refreshed every 2 years. Follow guidelines in HSE document INDG 143 Figure 1 for individual person lifting. For heavy or awkward loads summon assistance; do not attempt to lift solo. For large/awkward loads plan the works using the "TILE" approach (Task, Individual, Load, Environment) - see http://www.hse.gov.uk/msd/pushpull/risks.htm	Site	Wear gloves with good grip if required. Protective footwear in the event of dropped loads etc.	3
Contact with moving vehicles	Contact with moving vehicles associated with the airport environment both airside & landside	3	2	6	Wear Hi visibility clothing and protective foot wear. Ensure that you have informed all on site of your presence. Do not work behind stationary vehicles. Follow all marked out pedestrian routes where present. Section off work area where required using appropriate barriers. Erect no entry signs. Remain vigilant and follow site safety rules at all times	Site	Wear hi visibility clothing and protective footwear at all times	3
Climate - Rain & Wet Weather	Exposure to wet weather. Excessive exposure to wet weather conditions increasing the likelihood of slips trips & falls, as well as the potential for a decrease in body temperature whilst working in wet weather	2	2	4	Assess & monitor weather conditions & suspend or alter work activities to suit weather conditions (ie carry out work in indoor or sheltered areas) in the event of excessive rain fall. Take regular breaks & ensure that welfare facilities are kept warm.	Site	Welfare facility heating, waterproof clothing, thermal undergarments.	2

DRAFT PROPOSAL

table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Driving inexperience	Driving a vehicle with little or no experience of that type of vehicle	3	2	6	Ensuring all vehicle drivers hold the appropriate category of licence for the vehicle which they drive. Vehicle familiarisation during induction week. Mandatory driver awareness training provided by an external organisation.	Vehicle drivers	Driving Licence checks on induction. Regular checks throughout employment	3
Mechanical vehicle failure	Lack of maintenance, failure to carry out pre-driving checks	3	1	3	Ensure vehicle is maintained in accordance with manufacturer's stipulations. Check vehicle daily. Vehicle checks reported monthly to include condition of tyres, lights, fluids, tax etc.	Vehicle drivers	Maintenance records. Approved service centres. Replacement of company vehicles at 3 years old. Vehicle check records.	3
Roadside breakdown	Vehicle or driver hit by another vehicle	3	1	3	Leave vehicle and retreat to a safe distance behind barriers etc. Warn other road users if vehicle is stopped in a hazardous location. Ensure wheels are turned towards the kerb side.	Vehicle drivers	Ensure you are visible to other road users - wear high-vis jacket or vest. Call for help as detailed in the driver information card in each vehicle. Stand away from the vehicle.	3
Driver fatigue	Lack of sleep. Driving for long periods. Driving at night. Insufficient rest stops.	3	2	6	Regular breaks (15 minutes every 2 hours). Lift share.	Vehicle drivers	Regular breaks. Avoid night time driving. Overnight accommodation to avoid repeat journeys. Company policy. Vehicle tracking to monitor driving styles and duration.	3
Poor eyesight	Unawareness of poor eyesight	2	2	4	Regular eye tests.	Vehicle drivers	Corrective lenses	2

DRAFT PROPOSAL

table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Driving affected by medication.	Taking medication that can cause drowsiness	3	1	3	Read medication instructions. Check with doctor or pharmacist. Do not drive in medication makes you feel drowsy.	Vehicle drivers	Do not drive. Inform manager.	3
Speed	Making up for lost time. Unawareness of speed limits. Driving on unfamiliar roads.	3	2	6	Stay within National Speed Limits. Awareness of surroundings, other road users, road conditions, obeying signage.	Vehicle drivers	Vehicle telematics to monitor speed.	3
Weather conditions	Rain / Snow / Ice on roads. High winds. Bright sunlight / glare.	3	2	6	Awareness of prevailing weather conditions. Observe warning notices on roads. Reduce speed in poor conditions.	Vehicle drivers	Wear sunglasses. Vehicle telematics to monitor speed.	3
Drink/drug driving	Driving under the influence of alcohol or drugs	3	1	3	Never drink or drug drive. Awareness that alcohol may remain in your system from the previous night. You body processes approx 1 standard drink per hour (1 can of beer/1 small glass of wine).	Vehicle drivers	Employee Handbook.	3
Mobile phones	Using mobile phones whilst driving	3	2	6	Never use a mobile phone whilst driving. Pull over to a safe area to use/answer a phone.	Vehicle drivers	Read Employee Handbook for guidance. Mobile phone records can be reviewed.	3
Vehicle loading	Operating a vehicle when internal loads are not secured	2	1	2	Distribute load evenly and securely.	Vehicle drivers	Ensure loads are fastened or fixed appropriately within the vehicle by using straps or fixing systems. Use boxes and shelving to hold lose items.	2

DRAFT PROPOSAL

table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Heavy and awkward objects	Poor handling / lifting excessive weights	3	2	6	Share / reduce load. Don't lift more than 13kg in any one lift or beyond your personal capabilities. Dismantle air kit for loading into a vehicle.	Site	Lifting keys for drain covers. Adopt good manual handling techniques, do not lift loads if its suspected that they are too heavy for your capabilities. Ensure you have manual handling training	3
Asbestos fibres - transport of samples	Rendering asbestos fibre airborne	2	2	4	Double bag all samples and place in outer bag and then in sealed and labelled box for transport by road. Use post safe packs correctly.	Site	Follow HSG 264 Guidelines and TOP01.02	2
Falling objects and equipment	Falling objects from a tower scaffold have the potential to inflict fatality level injuries.	3	3	9	SOP01.16 procedures: toe boards to be present. Only equipment that is necessary for the task to be on platform. Establish an exclusion area around the scaffold base if necessary to prevent others entering falling objects risk areas.	Site and passers by	N/A	3
Noise	Noise generated during cutting, sawing, breaking etc can cause permanent hearing damage.	2	3	6	Toolbox talk training in correct operation of tools, technical operating procedures available for reference.	Site	Hearing protection to be worn at all times. Hearing protection must be compatible with any RPE or eye protection worn.	2

DRAFT PROPOSAL

table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Machine and tool injuries	An incorrectly operated machine may cause injury to the user and others if not handled or used correctly i.e: cutting blades contacting the body, incorrect posture when operating machinery may cause musculoskeltal injuries. etc	2	3	6	Technical operating procedures for tools with documented toolbox talks to train staff prior to use of equipment. All operatives have access to relevant instruction manuals. Pre-use check of all powered equipment. Correct stance to be adopted when operating, operatives not to "over reach".	All	Protective footwear to be worn. Eye and ear protection and gloves to be worn.	2
Electricity (mains and generator powered tools)	Mains and generator powered equipment have potential to cause fatal electric shocks	3	2	6	Equipment and any leads or flexes to be checked prior to use. Flexes and leads to be kept out of harms way during works. Annual PAT checks for purchased portable plug-in type equipment.	Site	N/A	3
Manual handling (loading, unloading and positioning of equipment)	Heavy items of equipment (i.e jackhammer's or breakers) may cause manual handling injuries if incorrectly handled.	2	3	6	All Lucion Group staff have manual handling training as part of basic "skills academy" training. Do not lift heavy items single handedly. If necessary get help or use suitable lifting equipment, refer to instruction manual for designated lifting points.	Site	Safety footwear during all manual handling operations.	2
Sharp tools hazards	Blades, cutting wheels, cutting cores and chisels are sharp and have potential to cause cuts and injuries during changing or adjusting.	2	2	4	Toolbox talk training included familiarisation with hazards and how to correctly change and adjust cutting tools/wheels. Instruction manuals available for each item of equipment for reference.	Site	Wear gloves when changing or adjusting cutting wheels, blades or chisels.	2

DRAFT PROPOSAL

table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Restricted access / egress - asbestos enclosures	Enclosed asbestos enclosures with only one exit and entry point, i.e 3 stage air lock not being easily exited	2	2	4	Keep route to airlock clear and free from obstructions.	Site	Wear PPE / RPE in enclosure.	2
Acetone fumes	Breathing of acetone fumes in the confines of a van and ignition of fumes	2	1	2	Ensure adequate ventilation and no sources of ignition are present when preparing slide for analysis	Site	Only very small quantities used <0.25ml - COSHH assessment 14	2
Asbestos (airborne respirable fibres)	Airborne fibres generated during non licensed works have potential to cause long term respiratory illness.	3	3	9	Job specific risk assessments and method statements prepared prior to works. Generic guidance provided by specific MPC Remediation TOPs. Works to involve fibre suppression techniques to reduce fibres at source (i.e wetting, shadow vacuuming). Minimal disturbance when carrying out works. All MPC Remediation staff have Non licensable Asbestos Remediation training. Decontamination procedures specified in method statement; generic guidance in TOP for Non Licensable works.	Site and public	P3 filter mask during removal operations. Disposable type 5/6 coveralls.	3
Asbestos (spread of contamination)	Uncontrolled spread of asbestos released during remediation works could contaminate extensive areas thereby causing a long term health hazard	3	3	9	Job specific risk assessments and method statements prepared prior to works. Generic guidance provided by specific MPC Remediation TOPs. Works to involve fibre suppression techniques to reduce fibres at source (i.e wetting, shadow vacuuming). Minimal disturbance when carrying out works. All MPC Remediation staff have Non licensable Asbestos Remediation training. Decontamination procedures specified in method statement; generic guidance in TOP for Non Licensable works. Documented waste procedures after removal.	Site and public	P3 filter mask worn during removal operations. Disposable type 5/6 coveralls.	3

DRAFT PROPOSAL

table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Underground services (electrical, gas, water, comms etc)	During trial pit investigations, bore hole investigations and hand digs contact and damage to services may occur resulting in fatal injuries from gas explosions, electric shocks etc	3	3	9	Documented TOPs for hand digs, supervision of boreholes and hand digs. CAT scanning by trained personnel in area of works. Documented emergency procedures in SOP 01.15. Site specific risk assessments and method statements for each project, based on pre works desktop studies to identify service locations as far as possible.	Site	During hand digs to expose services flame retardant coveralls should be worn	3
Overhead powerlines	Contact with live powerlines by excavators and other machinery could result in fatal in juries	3	3	9	Pre works desktop assessment includes overhead powerlines. No works allowed where there is a risk of contact or within arcing distance of overhead power cables. Preventative means to be established on site such as barriers, warning signs, bunting etc- to be specified in method statement. Documented TOPs for borehole investigation (supervision) and trial pits with excavators. Emergency procedures present in SOP 01.15.	Site		3
Collapse of trial pit or hand dig	Trial Pits or hand digs in unstable ground could collapse trapping persons resulting in fatal crushing and asphyxiation	3	3	9	Safe working procedure TOP for trial pits and hand digs- no persons allowed in pits over waist deep with a maximum limit of 1.2 m Operatives to be at safe distance from trial pit during excavation as per TOP requirement. Samples to be taken from arisings. Depth measurements to be taken from safest locations possible adjacent to pits. Where ground becomes unstable further works to cease. Trained contaminated land consultant directing works. Benching and battering of digs where potential instability identified.	Site		3
Mobile plant and machinery on site	Mobile plant and machinery impacting persons causing injuries up to fatality level	3	3	9	Documented procedures for trial pits and borehole investigation works where plant is to be used. Reversing plant to be controlled by a banksman at all times. Site specific risk assessment and method statement for each investigation. Pre works briefing to all staff on project.	Site	Hi visibility clothing, Hard hat and safety footwear to be worn.	3
Unexploded bombs and ordnance underground	Unexploded bombs and ordnance could explode if damaged resulting in fatality	3	2	6	Pre works desktop studies of high risk areas i.e: World War 2 bombing sites, former munitions factories etc used to formulate detailed Risk assessment and Method Statement. Provision of specialist subcontractors to perform surveys, watching briefs during digs if required. Controlled digging procedures as per TOPs minimise risk of detonating any items. Work to cease immediately if suspicious items are found.	Site		3

DRAFT PROPOSAL

table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Undermining of nearby structures	Deep trial pits have possibility of causing structural instability in adjacent structures resulting in collapse with fatality level injuries to persons inside building and site staff	3	2	6	Excavations should not be close to buildings, locations to be assessed at planning stages. Standard procedure in TOP for trial pits: excavation should be no closer than twice its depth to any building i.e: a 3 meter deep excavation should be no closer than 6 meters distance from a structure.	Site & public		3
Falls into trial pits and hand digs	Potential of persons to fall into pits resulting in injuries up to fatality level	3	2	6	Open trial pits not to be left unattended during works. Safe working procedures and segregation from other site staff during excavation to minimise fall risks. Completed trial pits to be backfilled or appropriate secure barriers/warning signs to be applied if left unattended for any length of time.	Site & public		3

DRAFT PROPOSAL

table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Distribution of hazardous materials during excavation	Excavated materials may contain hazardous substances such as asbestos, hydrocarbons etc that may pose health and environmental risks	2	2	4	Arisings to be keep on compact heaps at specific locations and reused to backfill excavation as per standard TOPs. Where danger of contamination is present ground protection such as visqueen sheeting or plywood to be used. Watercourses, springs etc to be segregated and protected. Where gross contamination is encountered dig to be terminated or specific protective measures applied after reassessment.	Site & public	Appropriate RPE and gloves when directly handling and sampling suspected hazardous material. RPE with P3 filter for hazardous dusts. Chemical cartridge respirators where hazardous gases, volatile organic compounds etc are present and need to be handled or sampled- will need to be specifically assessed for the particular hazardous material.	2
Refuelling plant	Refuelling plant on site has potential for health hazards (i.e burns from ignition of fuel) and environmental contamination.	2	2	4	Documented procedure in TOP for trial pits for excavator refuelling. Powered tools that use that use generators have TOPs containing guidance for refuelling. Spill kits and emergency procedures documented in SOP 01.15 to minimise contamination if a spill occurs. Fuel storage areas should be at least 10m from a watercourse and 50m from any spring, well or borehole. Fuels will also need to be secured against deliberate spillage by vandals. Fuels should also be stored in a bunded container or on a drip tray with at least 10% greater capacity than the fuel they are protecting. Where possible check with the site owner to ascertain as to whether they use a third party for refuelling on site & if possible employ them for your refuelling of plant.	Site	Gloves to be worn during refuelling.	2

DRAFT PROPOSAL

table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Biological hazards- Tetanus, Leptospirosis and Lyme disease (tick borne disease)	Exposure to and infection by Leptospirosis and Lyme disease although not life threatening in most cases can be potentially fatal to susceptible induviduals.	3	2	6	Tetanus- All site staff to have up to date tetanus vaccinations Leptospriosis- Staff should be aware of leptospirosis (Weil's disease) symptoms and report to their doctor if they suspect they have been exposed and might have it. The disease enters the body via open cuts and wounds Initial symptoms include mild flu-like symptoms, such as a headache, chills and muscle pain. In 10 % of cases the infection is more severe and can cause life-threatening problems, including organ failure and internal bleeding. Avoid potential exposure on site by avoiding contact with faeces, sewage and dead and live animals. Known animal carriers include cattle, pigs, dogs and rodents, particularly rats. Lyme disease- Carried by ticks - potential to be in any greenfield sites. If bitten personnel should see their GP if they develop the following symptoms: -a pink or red rash, often clear in the clear in the centre (a “bulls eye”) -a temperature of 38°C (100.4°F) or above -other flu-like symptoms, such as a headache or joint pain - swollen lymph nodes	Site	Leptospirosis- Wear gloves when handling/ working in areas where animal faeces and urine could be present. Ensure any exposed cuts and wounds are protected and that protective gloves are worn. Lyme disease- avoid being bitten by (i) tucking trousers into socks (ii) use of insect repellent (iii) wearing long sleeved shirts	3
Manual handling of equipment, samples etc	Incorrect manual handling may cause strains, sprains and long term disorders	2	2	4	All site investigation staff given manual handling training as part of basic skills training. Specific heavy loads to be assessed and planned using "TILE" approach Task, Individual, Load, Environment. For large or cumbersome loads use assistance.	Site	Protective gloves with firm grip to be used where required.	2

DRAFT PROPOSAL

table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Slips, trips and falls	Site investigation has potential injuries from both introduced items (i.e :equipment and supplies) and hazards specific to the actual site (i.e slippery surfaces, rubbish, tree branches etc)	2	3	6	Good housekeeping to be maintained on all sites. Arisings from excavations to be kept in dedicated heaps. Potential site trip hazards such as rubbish, tree branches etc to be removed from area of works. Staff to be vigilant of slippery surfaces particularly in sloping areas.	Site	Safety footwear with ankle support.	2
Sharp and jagged items	Sharp cutting tools have potential to cause injury. Site hazards such as broken glass, jagged metal, barbed wire etc also have potential to cause injury	2	3	6	Site staff are trained in safe use of work equipment with blades. If possible remove sharp hazards from area of work or render safe by boxing in etc. Where excessive sharp hazards are present on site a specialist subcontractor to be employed to clean up area and render safe.	Site	Gloves to be worn when working with cutting tools and handling sharp materials. Protective footwear with sole protection to be worn on all sites.	3
Airborne dust or splashes from excavation	Airborne dust or liquid splashes have potential to cause irritation or injury to eyes	2	3	6	Where dust is being generated attempt to stand upwind of the excavation.	Site	Eye protection to be worn where dust or liquid splashes are a risk.	2
Invasive plant species (Environmental)	Uncontrolled site investigation work could inadvertently assist the spread of invasive plant species causing an environmental impact.	2	3	6	Presence and extent of plant invasive species to be verified prior to works commencement. Seek information from client and other sources. Most common in UK are: Japanese knotweed, giant hog weed, Himalayan balsam, rhododendron ponticum and New Zealand pigmyweed. Wherever possible avoid work in areas where invasive species are present, demarcate if necessary to prevent accidental incursion of work activities. If work is unavoidable. If disturbance is unavoidable comply with current requirements for control and disposal, see: "https://www.gov.uk/guidance/prevent-the-spread-of-harmful-invasive-and-non-native-plants" for specific guidance and incorporate into Method Statement.	Environmental risk	N/A	2

DRAFT PROPOSALS

table continued from previous page...

Hazard	Risk Cause	Severity (A)	Probability (B)	Risk Factor (AxB)	Preventive Action	Personnel Exposed	PPE/RPE/ Control Measure Used	Residual Risk
Protected species (Environmental)	Uncontrolled site works could harm protected species causing an environmental impacct.	2	3	6	Refer to "https://www.gov.uk/protected-species-and-sites-how-to-review-planning-proposals" for current lists of protected species and current requirements, and incorporate into method statement. Consult competent ecologist if required.	Environmental risk	N/A	2
Derelict Sites (where former occupation/ production has ceased)	Numerous possibilities: unguarded drops/shafts, unstable structures, hazardous substances, exposed cables, confined spaces, illegal occupants. Potential for fatality level injuries.	3	2	6	Works on derelict sites to be assessed prior to any works and risks controlled as far a possible to render safe working conditions. Refer to section 5.24 of SOP01.16 Procedure for General Occupational Health and Safety for specific guidance.	Site	Minimum PPE for all derelict sites to be: hard hat, safety footwear with sole protection, high visibility jacket or vest. Appropriate eye protection and RPE must be used if required.	3

DRAFT PROPOSAL

Signatures

Gareth Cooper

Tuesday, 4th October, 2016

Attachment A3 – Lucion Environmental Former Grosvenor Street Residences report

Lucion Environmental
Delivering Trusted Hazard Management to the Built Environment.

Lucion Environmental Ltd
Registered in England + Wales 6495874
VAT Registration Number 208156326

Asbestos in Soils Site Investigation

Job Ref No: ***126637****, Account Ref No:* ***1169****, Contract Ref No:* ***16949***

Former Grosvenor Residences Grosvenor Street Manchester Greater Manchester M1 7HR

Title*: Mechanical Engineering Development Campus-Soil Sampling Investigation*



latlng: 53.471361,-2.233423



on site photo

Total Records	Analysed Records	No Asbestos Detected	R3	R2	R1
25	25	20	0	5	0

Head Office
7 Halifax Court, Dunston,
Gateshead, NE11 9JT
E: *info@lucion.co.uk*
T: *0345 5040 303*

Report Summary

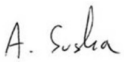
This certificate is for the attention of	**Marc McVey** **The University of Manchester** The University of Manchester Accounts Payable LG.015 John Owens Building Oxford Road Manchester M13 9PL United Kingdom
Contract Title	Mechanical Engineering Development Campus-Soil Sampling Investigation
Survey Type	Asbestos in Soils Site Investigation
Site Address	Former Grosvenor Residences Grosvenor Street Manchester Greater Manchester M1 7HR
Buildings Surveyed	Former Grosvenor Residenses, Grosvenor Street Residences
Report Comments	Soil sampling of trial pit arising's along all proposed drainage routes, see plan provided and marked indicative trial pit locations. Additional trial pits and sampling at locations where previously known stockpiles of soil removed containing asbestos too. Yellow X-follow routes of proposed drainage according to key (Blue/Brown/Orange/Red routes on key)-25 trial pits Green X- additional trial pits around previously identified stockpiles removed-approx 6. The number of trial pits and samples to be reviewed on site by Buro Four acting as PM on behalf of Univeristy of Manchester Marc McVey Project Manager Mob. 07786 111726 Surveyors to pick up containers from Oldham office, these should be delivered from Gateshead lab on Tuesday. Survey team will need a trowl to undertake soil sampling along with PPE and RPE.
Surveyor(s)	Phill Bodham, Martin Clegg
Surveyor signature(s)	
Survey Date	Friday, 5th August, 2016
Analyst(s)	Agnes Suska
Analyst signature(s)	
Analysis date	Tuesday, 23rd August, 2016
Approved signatory	Lee Kerridge

table continued from previous page...

Approved signature	
Approval date	Wednesday, 24th August, 2016
Report Rendered on	Mon 3 Oct 2016 @ 16:49:25

Report Contents

Asbestos Register and Executive Summary . . . 5
Introduction . . . 6
Site Investigation Scope . . . 7
Site Data . . . 8
Site Investigation Methodology . . . 9
Method of Sample analysis . . . 9
HSG 248 Asbestos: The Analysts' Guide for Sampling, Analysis and Clearance Procedures . . . 9
Sampling Strategy . . . 10
Results and Findings . . . 10
Initial Risk Level Assessment . . . 10
Recommendations . . . 13
Cited References and Further Reading . . . 15
Management Recommendation Detail . . . 16
Areas Excluded & Not Fully Accessed During Survey . . . 17
Survey Inspection Detail, Sample Test Report and Risk Level Assessment Report . . . 17
Annotated Plans and Other Additional Documents . . . 21
Additional Advice and Information . . . 21
Post Survey Support . . . 22
Material Test Certificate . . . 23

Asbestos Register and Executive Summary

Ordered By Building, Level and Location

Building	Level	Location	Item / Product Examined	Material Description	Risk Level (Material Score)	Initial Control Recommendation
Former Grosvenor Residenses	0	999/externals	Soil sample	Asbestos-containing Soil	R2 (10)	Remove
Former Grosvenor Residenses	0	999/externals	Soil sample	Asbestos-containing Soil	R2 (12)	Remove
Former Grosvenor Residenses	0	999/externals	Soil sample	Asbestos-containing Soil	R2 (10)	Remove
Former Grosvenor Residenses	0	999/externals	Soil sample	Asbestos-containing Soil	R2 (10)	Remove
Former Grosvenor Residenses	0	999/externals	Soil sample	Asbestos-containing Soil	R2 (10)	Remove

Introduction

This report aims to:

- Introduce pertinent legislation relating to the management of asbestos including when in made ground and soils
- Outline the sample testing and inspection methodology employed by the surveyor
- Relate the significance of the report contents to the Control of Asbestos Regulations (2012) and CIRIA guidance C733
- Detail site findings compliant with Regulation 4 of the Control of Asbestos Regulations (2012)
- Serve as a reference document to assist in making further steps towards the management of any asbestos containing materials at the site

Regulation 4 of the Control of Asbestos Regulations (2012) states the obligations that persons defined as "duty holders" have to manage asbestos containing materials in non-domestic premises. This instrument defines a duty holder as being:

> *"Every person who has, by virtue of a contract or tenancy, an obligation of any extent in relation to the maintenance or repair of non-domestic premises or any means of access thereto or egress there from; or*
>
> *In relation to any part of non-domestic premises where there is no such contract or tenancy, every person who, to any extent, has control of that part of non-domestic premises or any means of access thereto or egress there from" -* ***CAR, 2012.***

Regulation 4 also states the following:

> *"In order to enable him [sic "dutyholder"] to manage the risk from asbestos in non-domestic premises, the dutyholder shall ensure that a suitable and sufficient assessment is carried out as to whether asbestos is or is liable to be present in the premises"*

This report satisfies this requirement, unless stated otherwise, by detailing the site investigation findings by reporting the presence of asbestos containing materials in exploratory locations carried out on site.

The Hazardous Waste Regulations were implemented in England and Wales (July 2005), which replaced the Special Waste Act 1996. The regulations outline the required documentation associated with both the collection and disposal of hazardous waste. The regulations do cover asbestos as an exception from hazardous waste produced by households (domestic waste). Also, refer to technical guidance WM2 Hazardous Waste - Interpretation of the definition and classification of hazardous waste.

Health and Safety Guidance - Publication "Asbestos: The Survey Guide (HSG 264)" details asbestos surveying techniques and how assessment of materials can be categorised by risk, which relevant draw across can be made for asbestos in made ground.

Site Investigation Scope

Site Address: **Former Grosvenor Residences Grosvenor Street Manchester Greater Manchester M1 7HR**

Surveyed Area(s): **Former Grosvenor Residenses, Grosvenor Street Residences**

A limited site investigation was undertaken to characterise the site so far as was reasonably practical within the timeframe and budget agreed with the client. Methods used to carry out the investigation were agreed with the client prior to any commencement of works by way of acceptance of our contract / quotation.

This inspection was conducted in accordance with Health and Safety Guidance - Publication "Asbestos: The Survey Guide (HSG 264)" and “Asbestos: The analysts' guide for sampling, analysis and clearance procedures (HSG 248)”. Lucion Environmental Ltd cannot accept any liability for loss, injury, damage or penalty issues that arise for reasons of survey scope limitations. Lucion Environmental Ltd cannot be held responsible for any damage caused as part of this inspection carried out on your behalf.

The scope of this inspection relates to land investigation only.

Site Data

Site ID	89935
Address	Former Grosvenor Residences Grosvenor Street Manchester Greater Manchester M1 7HR
Property Type	Educational
Property Build Date	mixed construction age
Property Construction type	Mixed Constructions
Property access notes	Kevin Brooks (07790 548 708)-Connell Brothers site manager
Property access restrictions	Parking available via Grosvenor Street to Connells compound adjacent stacked portacabins
Property in Conservation area?	NO
Listed Building?	NO
Property Alterations	Property no longer exists and is rubble
Property Plant or equipment installed?	NO

Site Investigation Methodology

The inspection findings detailed in this report were gathered using documented in house inspection (TOP01.01), sampling procedures (TOP01.02) and made ground stepped approach (TOP01.08) that implement the requirements of the Health and Safety Executive Publications HSG 264 (Asbestos: The survey guide) and HSG 248 (Asbestos: The analysts' guide for sampling, analysis and clearance procedures). Individual site investigation methodologies derived from in house preliminary risk assessments or specific client requirements are implemented using available guidance documents as reference i.e. CIRIA C733, WM2 and CLR11.

Sampling of Asbestos Containing Soils (ACMs)

A representative sample of suspected bulk asbestos material is taken, along with an accompanying soil matrix, according to the "sampling strategy". An assessment (where necessary or possible) of the material's extent and condition is made. Laboratory screening analysis will determine the form and presence of any asbestos fibres (fibre type), while quantitative laboratory analysis will assess the total percentage of asbestos within a soil sample.

Method of Sample analysis

The asbestos fibre identification results detailed in this report and the appended certificate of bulk analysis were obtained using documented in house testing procedures (TOP01.03 & TOP01.03.01) that implements the requirements of Health and Safety Executive Publication HSG 248, Appendix 2 (Asbestos: The analysts' guide for sampling, analysis and clearance procedures). All samples collected during the course of this inspection are tested in accordance with these methods.

HSG 248 Asbestos: The Analysts' Guide for Sampling, Analysis and Clearance Procedures

Publication HSG 248 describes a two stage approach to the detection and subsequent identification of asbestos fibre in bulk (i.e. suspect sample) materials. Initially the microscopist will examine the material under a low power stereo light microscope. The microscopist then performs extensive optical tests using polarised light microscopy in order to confirm or refute that the material contains an asbestos mineral. This technique allows for the detection of the six common forms of asbestos fibre as follows:

Asbestos Fibre Type	Common Nomenclature
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	N/A
Fibrous Anthophyllite	N/A
Fibrous Tremolite	N/A

The results of this test are given, where appropriate, in the inspection detail report for each sample taken and are summarised in the management recommendation report. They are also separately detailed in the bulk-analysis report appended to this report. The homogeneity of asbestos containing materials can differ depending on their type.

Typcially, homogeneous materials include sprayed coatings, insulating board and asbestos cement products. Other materials are typically less homogeneous including pipe lagging (due to patch repairs, hand mixing at time of application), textured coatings (due to low concentration of asbestos fibre and hand application), composites (due to low concentration of asbestos fibre and material matrix) and debris samples (due to the potentially inconsistent ocurrences that have led to their presence). Whilst sampling frequencies / techniques and analysis methods attempt to address the issue of non-homogeneity it should be realised that sampling in accordance with HSG 264 and analysis in accordance with HSG 248 cannot always obviate the problems of determining asbestos fibre content in non-homogeneous materials. The results of sample analysis presented in this report therefore pertain to the samples analysed and so relate only to the time at which sampling took place and to the conditions prevailing during that time.

Sampling Strategy

A site and project specific sampling strategy has been developed in line the timeframe and budget agreed with the client. Ultimately, the sampling strategy adopted attempts to adequately characterise the potential presence of asbestos across the site as far as is reasonably practicable. However, following laboratory testing and data review it may be deemed more cost effective to undertake further soil sampling to further delineate the presence of asbestos at the site.

Results and Findings

The item examination and inspection findings, bulk analysis results, material assessment and initial risk level assessment are reported in the form of an asbestos inspection and testing detail register. The purpose and structure of this register are explained in the proceeding sections.

Initial Risk Level Assessment

The initial risk level assessments made within this report for those items strongly presumed, or positively proven by sampling and subsequent analysis, to contain asbestos have been made on the basis of the Material Assessment Algorithm detailed within the publications HSG 264 and HSG 227.

This assessment aims to elucidate the potential for a particular material to release hazardous fibres and expose those within the specific area to asbestos dust. The following table gives the scoring strategy for the initial risk level assessment and indicates the scoring degree of those points that are considered, namely product type, condition, surface treatment and asbestos fibre type present.

	Score	Score Category
Product Type An assessment of the inherent risk a product may pose (Product debris is assessed on the product type from which it originates)	1	**Asbestos reinforced composites** - Plastics / resins / mastics / felts / vinyl tiling / semi rigid paints / decorative finishes / asbestos cement and other such similar bound materials.
	2	**Materials of a medium asbestos content including** - Asbestos insulating board / millboard / low density insulation board / textiles / gaskets / ropes / papers / debris from asbestos containing composite material and cement.
	3	**Materials of a high asbestos content including** - Thermal insulation / sprayed asbestos / loose asbestos / packing / filled padding / all other debris.

table continued from previous page...

	Score	Score Category
Material Condition An assessment of the damage or deterioration in condition of product	0	**Undamaged** - No visible signs of damage
	1	**Minor damage** - Light material surface abrasion / abrasion to edges
	2	**Medium damage** - Evidence of loose asbestos fibre protruding from material / poor condition of material is notable
	3	**Major damage** - Significant damage to materials often resulting in the short-term production of asbestos containing debris / delamination of sprays and thermal insulation / asbestos debris

table continued from previous page...

	Score	Score Category
Surface Treatment An assessment of the level of fibre retention the surface of a material may be capable of	0	**Composite materials** - Plastics / resins / mastics / felts / vinyl tiling / semi rigid paints / decorative finishes
	1	**Sealed and enclosed materials** - Painted asbestos insulating board (with exposed face painted or encapsulated) / enclosed asbestos lagging and sprayed asbestos (as originally installed) / unsealed asbestos cement products
	2	**Unsealed and encapsulated materials** - Unsealed asbestos insulating board / asbestos lagging, sprayed asbestos and woven material encapsulated (remedially)
	3	**Unsealed friable materials** - Unsealed asbestos lagging and sprayed asbestos
Asbestos Fibre Type An assessment of asbestos fibre types propensity to cause asbestos related diseases	1	**Serpentine Asbestos** - Chrysotile
	2	**Amphibole Asbestos** - Amosite / Anthophyllite / Tremolite / Actinolite
	3	**Amphibole Asbestos** - Crocidolite

Material / Accessibility Score

Following the rating of a material using the above criteria, the resulting aggregated additive material score may be assessed in terms of accessibility to derive an assessment of initial risk level as follows:

	Very Low Risk (2-4)	Low Risk (5-6)	Medium Risk (7-9)	High Risk (10-12)
Inaccessible (1)	R3	R3	R3	R2
Periodically Accessed (2)	R3	R3	R2	R1
Frequently Accessed (3)	R3	R2	R1	R1

General Interpretation of Risk Assessment Level

Risk Assessment Level	Interpretation of the Recommended Control Action [1]
R1	immediate implementation
R2	as soon as practicable - *in interim period material should be regularly inspected and its management planned for*
R3	not immediately necessary - *material should be regularly inspected and its management planned for*

Recommendations

In addition to the risk assessment level assigned to strongly presumed and identified asbestos containing material, a management control action recommendation is also made. In the case of survey carried our prior to refurbishment or demolition works, the "normal" recommendation will be "remove" as the surveyor assumes that asbestos removal will take place prior to other works commencing (unless the surveyor has been advised otherwise in advance of the survey).

1. The risk level assessment is determined on the basis of information collated during the course of the survey. The risk assessment level needs to be reviewed periodically, (normally in line with a frequency defined in an asbestos management plan) to verify its validity and prior to any refurbishment work within the building/ site.

The current recommendations conventionally made by the surveyor may include the following:

Recommendation	Description	Notes
Air Monitoring	Sampling of air for asbestos fibre concentration. Necessary where a risk of fibre exposure is present and assessment of such exposure presence or absence is prudent.	UKAS accredited analytical laboratory should perform reassurance air testing.
Access Restriction	Restriction of access to area / location only to personnel wearing appropriate PPE / RPE.	Suitability of RPE / PPE must be carefully assessed and procedure invoked to ensure these control measures are adhered to.
Access Prohibition	Prohibition of access to area / location to all personnel.	Area should be marked clearly as being prohibited to all personnel, possibly in conjunction with asbestos warning stickers.
Environmental Clean	A cleaning process used to prevent the spread of asbestos containing contaminants.	Services of a licensed asbestos removal contractor should be engaged and all works carried out under appropriate controlled conditions. Works should also be accompanied by an appropriate air test performed by a UKAS accredited laboratory.
Material Repair	Repair of the material in such a manner as to minimise the release of asbestos fibre.	Repair of materials is recommended by the Health and Safety Executive as an alternative to removal, where reasonably safe to so.
Material Encapsulation	Encapsulation of the material in a manner that ensures the complete enclosure of any remaining asbestos fibres.	Encapsulation of materials is a possible alternative to their removal, where reasonably safe to do so. Works should also be accompanied by appropriate air test performed by a UKAS accredited laboratory.
Material Removal	Removal of the material in instances where it is remaining in situ would lead to a high residual risk level. Or removal may be necessary to permit work within the location. Removal of materials may also be carried out on a preventive basis.	Removal works should be carried out in accordance with the relevant ACOP (approved code of practice), L143
Any recommendations made within this report are made on the basis of findings collated at the time of survey. *Recommendations should undergo careful client evaluation prior to a final management decision being made.* *Lucion Environmental Ltd does not accept any responsibility for any works carried out as a result of recommendations made within this report.*		

If any remedial works need to be carried out, decide whether or not they need to be carried out by a licensed contractor. If you are unsure about this we can offer advice as to what you should do.

Cited References and Further Reading

1. Control of Asbestos Regulations (2012) ~ The Stationery Office. **ISBN 978-0111521083**
2. Construction (Design and Management) Regulations (2007) ~ The Stationery Office. **ISBN 011043845-0**
3. The Hazardous Waste (England and Wales) Regulations (2005) ~ The Stationery Office. **ISBN 011072685-5**
4. Managing and working with asbestos Control of Asbestos Regulations 2012. Approved Code of Practice & guidance L143 (second edition, 2013) ~ HSE Books. **ISBN 978-0717666188**
5. A Comprehensive Guide to Managing Asbestos in Premises (2002) ~ HSE Books. **ISBN 978-0717623815**
6. Asbestos Essentials: A task manual for building, maintenance and allied trades of non-licensed asbestos work (third edition, 2012) ~ HSE Books. **ISBN 978-0717665037**
7. Asbestos Essentials Task Sheets ~ HSE. electronic downloadable version of the above
8. Asbestos: The licensed contractors' guide HSG247 (2006) ~ HSE Books. **ISBN 978-0717628742**
9. Asbestos: The analysts' guide for sampling, analysis and clearance procedures HSG248 (2005) ~ HSE Books. ISBN **978-0717628759**
10. Asbestos: The Survey Guide HSG 264 (second edition, 2012) ~ HSE Books. **ISBN 978-0717665020**
11. The Management of Health and Safety at Work Regulations (1999) ~ The Stationery Office. **ISBN 011085625-2**
12. The Health & Safety at Work etc. Act (1974) ~ The Stationery Office.
13. CIRIA C733 Asbestos in Soil and Made Ground: A Guide to Understanding and Managing Risks (2014).
14. WM2 Hazardous Waste Technical Guidance (updated 2014).

Management Recommendation Detail

Building	Level	Location	Item / Product Examined	Sample No.	Material Description	Fibre Type	Material Score	Extent	Risk Level Assessment	Initial Control Recommendation	Photograph
Former Grosvenor Residenses	0	999/ externals	Soil sample	126637-11	Asbestos-containing Soil	Chrysotile	10	Extent Indiscernible	R2	Remove	
Former Grosvenor Residenses	0	999/ externals	Soil sample	126637-10	Asbestos-containing Soil	Crocidolite	12	Extent Indiscernible	R2	Remove	
Former Grosvenor Residenses	0	999/ externals	Soil sample	126637-14	Asbestos-containing Soil	Chrysotile	10	Extent Indiscernible	R2	Remove	

table continued from previous page...

Building	Level	Location	Item / Product Examined	Sample No.	Material Description	Fibre Type	Material Score	Extent	Risk Level Assessment	Initial Control Recommendation	Photograph
Former Grosvenor Residenses	0	999/ externals	Soil sample	126637-2	Asbestos-containing Soil	Chrysotile	10	Extent Indiscernible	R2	Remove	
Former Grosvenor Residenses	0	999/ externals	Soil sample	126637-3	Asbestos-containing Soil	Chrysotile	10	Extent Indiscernible	R2	Remove	

Areas Excluded & Not Fully Accessed During Survey

Asbestos should be presumed to be present within Locations and Items not accessed until a further assessment can be performed.

Additional surveyor comments.

Building	Level	Location	Item / Product Examined	Accessibility	Access Comments	Photograph
Nothing to report						

Survey Inspection Detail, Sample Test Report and Risk Level Assessment Report

Asbestos should be presumed to be present within Locations and Items not accessed until a further assessment can be performed.

Additional surveyor comments.

Building: Former Grosvenor Residenses **Level: 0** **Location: 999/externals**

Item / Product Examined	Material Description	Sampling Strategy	Sample No.	Extent	Product Score	Material Condition	Surface Treatment	Fibre Id.	Material Score	Accessibility Score	Risk Level Assessment
Soil sample	Soil	Sample	126637-1								 NAD
		Debris									
Soil sample	Asbestos-containing Soil	Sample	126637-2	Extent Indiscernible	3	3	3	Chrysotile	10	1	 R2
		Debris									
Soil sample	Asbestos-containing Soil	Sample	126637-3	Extent Indiscernible	3	3	3	Chrysotile	10	1	 R2
		Debris									
Soil sample	Soil	Sample	126637-4								 NAD
		Debris									
Soil sample	Soil	Sample	126637-5								 NAD
		Debris									
Soil sample	Soil	Sample	126637-6								 NAD
		Debris									
Soil sample	Soil	Sample	126637-7								 NAD
		Debris									

table continued from previous page...

Building: Former Grosvenor Residenses **Level: 0** **Location: 999/externals**

Item / Product Examined	Material Description	Sampling Strategy	Sample No.	Extent	Product Score	Material Condition	Surface Treatment	Fibre Id.	Material Score	Accessibility Score	Risk Level Assessment
Soil sample	Soil	Sample	126637-8								 NAD
		Debris									
Soil sample	Soil	Sample	126637-9								 NAD
		Debris									
Soil sample	Asbestos-containing Soil	Sample	126637-10	Extent Indiscernible	3	3	3	Crocidolite	12	1	 R2
		Debris									
Soil sample	Asbestos-containing Soil	Sample	126637-11	Extent Indiscernible	3	3	3	Chrysotile	10	1	 R2
		Debris									
Soil sample	Soil	Sample	126637-12								 NAD
		Debris									
Soil sample	Soil	Sample	126637-13								 NAD
		Debris									
Soil sample	Asbestos-containing Soil	Sample	126637-14	Extent Indiscernible	3	3	3	Chrysotile	10	1	 R2
		Debris									

table continued from previous page...

Building: Former Grosvenor Residenses Level: 0 Location: 999/externals

Item / Product Examined	Material Description	Sampling Strategy	Sample No.	Extent	Product Score	Material Condition	Surface Treatment	Fibre Id.	Material Score	Accessibility Score	Risk Level Assessment
Soil sample	Soil	Sample	126637-15								 NAD
		Debris									

Building: Grosvenor Street Residences Level: 0 Location: 999/externals

Item / Product Examined	Material Description	Sampling Strategy	Sample No.	Extent	Product Score	Material Condition	Surface Treatment	Fibre Id.	Material Score	Accessibility Score	Risk Level Assessment
Soil sample	Soil	Sample	126637-16								NAD
		Debris									
Soil sample	Soil	Sample	126637-17								NAD
		Debris									
Soil sample	Soil	Sample	126637-18								NAD
		Debris									
Soil sample	Soil	Sample	126637-19								NAD
		Debris									
Soil sample	Soil	Sample	126637-20								NAD
		Debris									
Soil sample	Soil	Sample	126637-21								NAD
		Debris									
Soil sample	Soil	Sample	126637-22								NAD
		Debris									
Soil sample	Soil	Sample	126637-23								NAD
		Debris									
Soil sample	Soil	Sample	126637-24								NAD
		Debris									
Soil sample	Soil	Sample	126637-25								NAD
		Debris									

Annotated Plans and Other Additional Documents

The following documents accompany this report and should be regarded as an integral part of this report.

They can be downloaded from http://web.lucion.co.uk/reports/126637/attachments.

- Method Statement [http://web.lucion.co.uk/method_statements/126637?s=72a31e60c77d00807610aefbca209aa4]
- Risk Assessment [http://web.lucion.co.uk/risk_assessment/126637?s=a5a86ec43af5d6c7d184151cb4cb7fd7]
- -lucion_soil_cert_126637.pdf
- A4-Plan_126637_Former-Grosvenor-Residenses.pdf

Additional Advice and Information

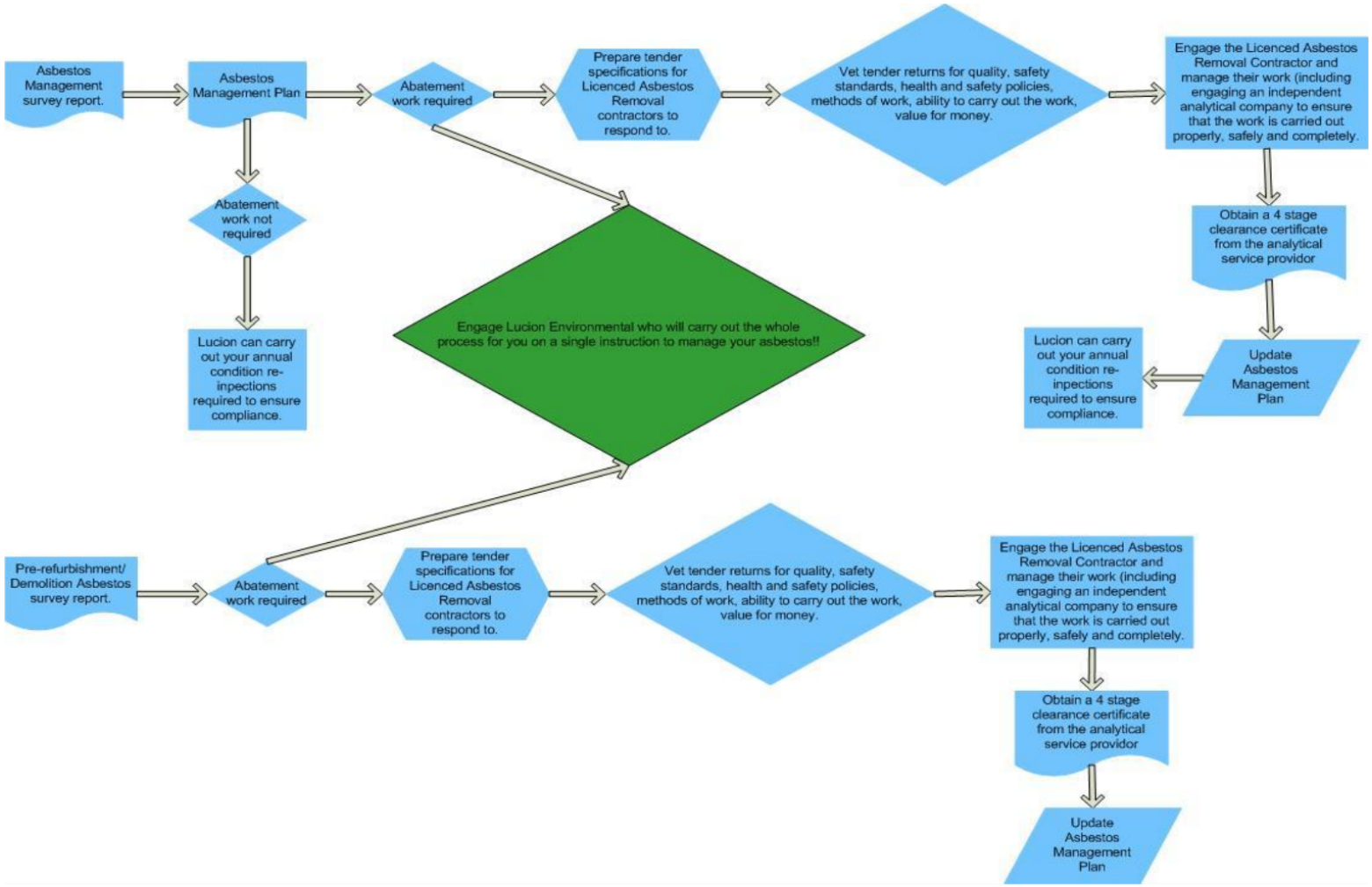
As the reader of this report you are recommended to make sure that it meets with your requirements. Publication HSG 264 Asbestos: The survey guide suggests the following:

- Check your report against our quotation or your tender
- Check for any caveats or disclaimers you are unsure of
- Check that the survey is as you requested
- Check you understand the included plans
- Check that we have accessed all the areas and rooms you wanted us to

Post Survey Support

The ultimate aim of any management plan must be the prevention of exposure to personnel working on your premises. You should therefore make this register available for consultation and keep it regularly updated. Publications relating to the Control of Asbestos Regulations (2012) suggest an annual reinspection as minimum (more frequently for higher risk materials) by a competent person.

Remember, an asbestos survey is the first step in asbestos management. Effective asbestos management often needs specialist advice; have a look at the diagram below which shows the basic steps in formulating a typical asbestos management plan. Lucion realise that you may need some assistance in drafting your management plan; please give us a call on **0191 4618999** or send an email to enquiries@lucion.co.uk or visit the lucion website [http://lucion.co.uk] for advice on any of the steps shown below:



Lucion Environmental
Delivering Trusted Hazard Management to the Built Environment.

Lucion Environmental Ltd
Registered in England + Wales 6495874
VAT Registration Number 208156326

Asbestos Fibre Identification Material Test Certificate

Job Ref No: ***126637****, Account Ref No:* ***1169****, Contract Ref No:* ***16949***

This certificate is for the attention of	**Marc McVey** **The University of Manchester** The University of Manchester Accounts Payable LG.015 John Owens Building Oxford Road Manchester M13 9PL United Kingdom
Site Address	Former Grosvenor Residences Grosvenor Street Manchester Greater Manchester M1 7HR
Sampled Buildings	Former Grosvenor Residenses, Grosvenor Street Residences
Analyst(s)	Agnes Suska
Analyst signature(s)	A. Suska
Analysis date	Tuesday, 23rd August, 2016
Approved signatory	Lee Kerridge
Approved signature	
Approval date	Wednesday, 24th August, 2016
Report Rendered on	Mon 3 Oct 2016 @ 16:49:25

Analysis method - In-house method TOP01.03 in accordance with HSG 248 - Asbestos: The Analysts' Guide For Sampling, Analysis and Clearance Procedures H.S.E. 2005. All analysis carried out at Lucion's Head Office laboratory.

Lucion bear no responsibility for sample collection or sample description related information provided by the client.

Where Lucion Environmental Ltd has not undertaken sampling; any prior sampling activity is beyond the company's responsibility. Where Lucion Environmental Ltd has sampled the test material, this has been done in accordance with in-house method TOP01.02. Any opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The results quoted in this report relate to:

1. Samples analysed in accordance with methods described above
2. Samples analysed and not necessarily to the material from which the samples were taken
3. The time during which sampling took place and to the conditions prevailing during that time

The samples referred to in this report will be retained for 6 months unless requested otherwise.

Total Samples	No Asbestos Detected	Asbestos-Containing Samples
25	**20**	**5**

Head Office
7 Halifax Court, Dunston,
Gateshead, NE11 9JT
E: *info@lucion.co.uk*
T: *0345 5040 303*

UKAS TESTING
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Fibre Identification Analysis Results

Sample No.	Building	Level	Location	Item / Product Examined	Material Description	Analyst Comments	Fibre Identification
126637-1	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-2	Former Grosvenor Residenses	0	999/ externals	Soil sample	Asbestos-containing Soil	cement fragment	Chrysotile
126637-3	Former Grosvenor Residenses	0	999/ externals	Soil sample	Asbestos-containing Soil	cement - positive	Chrysotile
126637-4	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-5	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-6	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-7	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-8	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-9	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-10	Former Grosvenor Residenses	0	999/ externals	Soil sample	Asbestos-containing Soil	cistern - positive	Crocidolite
126637-11	Former Grosvenor Residenses	0	999/ externals	Soil sample	Asbestos-containing Soil	cement fragment	Chrysotile
126637-12	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-13	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-14	Former Grosvenor Residenses	0	999/ externals	Soil sample	Asbestos-containing Soil	cement fragment	Chrysotile
126637-15	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-16	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-17	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-18	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-19	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-20	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-21	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-22	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-23	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-24	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-25	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD

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Asbestos Fibre Quantification Test Certificate

Job Ref No: ***126637****, Account Ref No:* ***1169****, Contract Ref No:* ***16949***

This certificate is for the attention of	The University of Manchester
Contract Title	Mechanical Engineering Development Campus-Soil Sampling Investigation
Site Address	Former Grosvenor Residences Grosvenor Street Manchester Greater Manchester M1 7HR
Analyst(s)	Agnes Suska
Analyst signature(s)	A. Suska
Analysis date	Tuesday, 23rd August, 2016
Approved signatory	Lee Kerridge
Approved signature	
Approval date	Wednesday, 24th August, 2016
Report rendered on	Wed 24 Aug 2016 @ 09:22:55

Samples Description* - Soil sampling of trial pit arising's along all proposed drainage routes, see plan provided and marked indicative trial pit locations. Additional trial pits and sampling at locations where previously known stockpiles of soil removed containing asbestos too. Yellow X-follow routes of proposed drainage according to key (Blue/Brown/ Orange/Red routes on key)-30 trial pits Green X- additional trial pits around previously identified stockpiles removed-approx 6. The number of trial pits and samples to be reviewed on site by Buro Four acting as PM on behalf of Univeristy of Manchester Marc McVey Project Manager Mob. 07786 111726 Surveyors to pick up containers from Oldham office, these should be delivered from Gateshead lab on Tuesday. Survey team will need a trowl to undertake soil sampling along with PPE and RPE.

Analysis requested - Qualitative and quantitative analysis of soil / loose aggregate samples for mass determination of asbestos.

Analysis method - The analysis was carried out using our in-house documented method based upon EA Blue Book Draft August 2014. Our method includes initial examination of the entire sample which should be approximately 1kg in weight. A representative sub-sample of approximately 20g is then analysed in detail using stereo microscopy. Quantification is carried out using our documented in-house procedure TOP01.03.01 by hand-picking/weighing of loose fibres and bound fibres for gravimetric analysis. Final % asbestos weight is determined based upon upper matrix asbestos % as documented in HSG264.

* Lucion bear no responsibility for sample collection or sample description related information provided by the client.

Where Lucion Environmental Ltd has not undertaken the sampling; any prior sampling activity is beyond the company's responsibility. Where Lucion Environmental Ltd has sampled the test material, this has been done in accordance with in-house methods.

Job No.	Sample No.	Sample weight (g)	% asbestos by hand picking & weighing	% asbestos by SEM fibre counting	Total % asbestos in samples	Reported Result (%)
126637	126637-2	883.78	0.3062%	0.0%	0.3062%	0.3062%
126637	126637-3	969.39	0.0998%	0.0%	0.0998%	0.0998%
126637	126637-10	1050.14	1.2683%	0.0%	1.2683%	1.2683%
126637	126637-11	1190.01	0.1677%	0.0%	0.1677%	0.1677%

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7 Halifax Court, Dunston,
Gateshead, NE11 9JT
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T: *0345 5040 303*

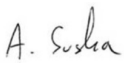
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Asbestos Fibre Identification Material Test Certificate

Job Ref No: ***126637****, Account Ref No:* ***1169****, Contract Ref No:* ***16949***

This certificate is for the attention of	**Marc McVey** **The University of Manchester** The University of Manchester Accounts Payable LG.015 John Owens Building Oxford Road Manchester M13 9PL United Kingdom
Contract Title	Mechanical Engineering Development Campus-Soil Sampling Investigation
Site Address	Former Grosvenor Residences Grosvenor Street Manchester Greater Manchester M1 7HR
Sampled Buildings	Former Grosvenor Residenses, Grosvenor Street Residences
Report Comments	Soil sampling of trial pit arising's along all proposed drainage routes, see plan provided and marked indicative trial pit locations. Additional trial pits and sampling at locations where previously known stockpiles of soil removed containing asbestos too. Yellow X-follow routes of proposed drainage according to key (Blue/ Brown/Orange/Red routes on key)-30 trial pits Green X- additional trial pits around previously identified stockpiles removed-approx 6. The number of trial pits and samples to be reviewed on site by Buro Four acting as PM on behalf of Univeristy of Manchester Marc McVey Project Manager Mob. 07786 111726 Surveyors to pick up containers from Oldham office, these should be delivered from Gateshead lab on Tuesday. Survey team will need a trowl to undertake soil sampling along with PPE and RPE.
Analyst(s)	Agnes Suska
Analyst signature(s)	
Analysis date	Tuesday, 23rd August, 2016
Approved signatory	Lee Kerridge
Approved signature	
Approval date	Wednesday, 24th August, 2016
Report Rendered on	Fri 26 Aug 2016 @ 12:36:00

Analysis method - In-house method TOP01.03 in accordance with HSG 248 - Asbestos: The Analysts' Guide For Sampling, Analysis and Clearance Procedures H.S.E. 2005. All analysis carried out at Lucion's Head Office laboratory.

Lucion bear no responsibility for sample collection or sample description related information provided by the client.

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Gateshead, NE11 9JT
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T: *0345 5040 303*

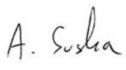
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Asbestos Fibre Quantification Test Certificate

Job Ref No: ***126637****, Account Ref No:* ***1169****, Contract Ref No:* ***16949***

This certificate is for the attention of	The University of Manchester
Contract Title	Mechanical Engineering Development Campus-Soil Sampling Investigation
Site Address	Former Grosvenor Residences Grosvenor Street Manchester Greater Manchester M1 7HR
Analyst(s)	Agnes Suska
Analyst signature(s)	
Analysis date	Tuesday, 23rd August, 2016
Approved signatory	Lee Kerridge
Approved signature	
Approval date	Wednesday, 24th August, 2016
Report rendered on	Fri 26 Aug 2016 @ 12:36:21

Samples Description* - Soil sampling of trial pit arising's along all proposed drainage routes, see plan provided and marked indicative trial pit locations. Additional trial pits and sampling at locations where previously known stockpiles of soil removed containing asbestos too. Yellow X-follow routes of proposed drainage according to key (Blue/Brown/ Orange/Red routes on key)-30 trial pits Green X- additional trial pits around previously identified stockpiles removed-approx 6. The number of trial pits and samples to be reviewed on site by Buro Four acting as PM on behalf of Univeristy of Manchester Marc McVey Project Manager Mob. 07786 111726 Surveyors to pick up containers from Oldham office, these should be delivered from Gateshead lab on Tuesday. Survey team will need a trowl to undertake soil sampling along with PPE and RPE.

Analysis requested - Qualitative and quantitative analysis of soil / loose aggregate samples for mass determination of asbestos.

Analysis method - The analysis was carried out using our in-house documented method based upon EA Blue Book Draft August 2014. Our method includes initial examination of the entire sample which should be approximately 1kg in weight. A representative sub-sample of approximately 20g is then analysed in detail using stereo microscopy. Quantification is carried out using our documented in-house procedure TOP01.03.01 by hand-picking/weighing of loose fibres and bound fibres for gravimetric analysis. Final % asbestos weight is determined based upon upper matrix asbestos % as documented in HSG264.

* Lucion bear no responsibility for sample collection or sample description related information provided by the client.

Where Lucion Environmental Ltd has not undertaken the sampling; any prior sampling activity is beyond the company's responsibility. Where Lucion Environmental Ltd has sampled the test material, this has been done in accordance with in-house methods.

Job No.	Sample No.	Sample weight (g)	% asbestos by hand picking & weighing	% asbestos by SEM fibre counting	Total % asbestos in samples	Reported Result (%)
126637	126637-2	883.78	0.3062%	0.0%	0.3062%	0.3062%
126637	126637-3	969.39	0.0998%	0.0%	0.0998%	0.0998%
126637	126637-10	1050.14	1.2683%	0.0%	1.2683%	1.2683%
126637	126637-11	1190.01	0.1677%	0.0%	0.1677%	0.1677%

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Job No.	Sample No.	Sample weight (g)	% asbestos by hand picking & weighing	% asbestos by SEM fibre counting	Total % asbestos in samples	Reported Result (%)
126637	126637-14	829.82	0.2335%	0.0%	0.2335%	0.2335%

Where Lucion Environmental Ltd has not undertaken sampling; any prior sampling activity is beyond the company's responsibility. Where Lucion Environmental Ltd has sampled the test material, this has been done in accordance with in-house method TOP01.02. Any opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The results quoted in this report relate to:

1. Samples analysed in accordance with methods described above
2. Samples analysed and not necessarily to the material from which the samples were taken
3. The time during which sampling took place and to the conditions prevailing during that time

The samples referred to in this report will be retained for 6 months unless requested otherwise.

Total Samples	No Asbestos Detected	Asbestos-Containing Samples
25	**20**	**5**

Fibre Identification Analysis Results

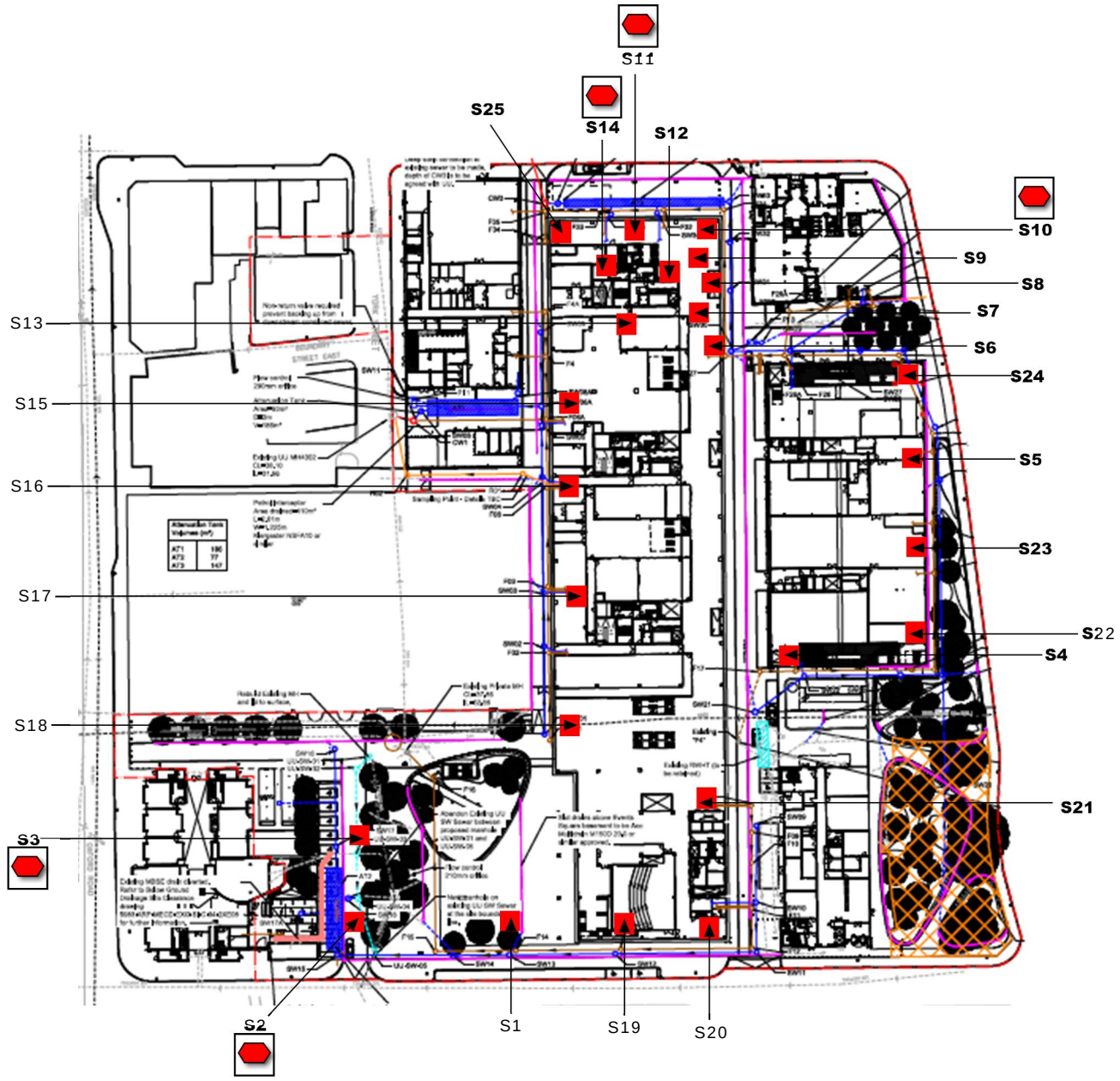
Sample No.	Building	Level	Location	Item / Product Examined	Material Description	Analyst Comments	Fibre Identification
126637-1	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-2	Former Grosvenor Residenses	0	999/ externals	Soil sample	Asbestos-containing Soil	cement fragment	Chrysotile
126637-3	Former Grosvenor Residenses	0	999/ externals	Soil sample	Asbestos-containing Soil	cement - positive	Chrysotile
126637-4	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-5	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-6	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-7	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-8	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-9	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-10	Former Grosvenor Residenses	0	999/ externals	Soil sample	Asbestos-containing Soil	cistern - positive	*Crocidolite*
126637-11	Former Grosvenor Residenses	0	999/ externals	Soil sample	Asbestos-containing Soil	cement fragment	*Chrysotile*
126637-12	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-13	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-14	Former Grosvenor Residenses	0	999/ externals	Soil sample	Asbestos-containing Soil	cement fragment	Chrysotile
126637-15	Former Grosvenor Residenses	0	999/ externals	Soil sample	Soil		NAD
126637-16	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-17	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-18	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-19	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-20	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-21	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-22	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-23	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-24	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD
126637-25	Grosvenor Street Residences	0	999/ externals	Soil sample	Soil		NAD

Attached files

These can be downloaded from http://web.lucion.co.uk/reports/126637/attachments.

- -lucion_soil_cert_126637.pdf

Job No.	Sample No.	Sample weight (g)	% asbestos by hand picking & weighing	% asbestos by SEM fibre counting	Total % asbestos in samples	Reported Result (%)
126637	126637-14	829.82	0.2335%	0.0%	0.2335%	0.2335%



Lucion Report	126637
Survey Location	Former Grosvenor Residences
Plan Location	Soil Sampling Investigation
Survey Date	05/08/2016
Surveyor(s)	P Bodham / M Clegg

Material Symbols

Asbestos containing **bituminous product**	
Asbestos containing **cement**	
Asbestos containing **composite product**	
Asbestos containing **gasket**	
Asbestos containing **insulation**	
Asbestos containing **insulating board**	
Asbestos containing **paper product**	
Asbestos containing **sprayed coating**	
Asbestos containing **textured coating**	
Asbestos containing **woven product**	
Asbestos containing **debris of unknown origin**	
No Access Area - Asbestos Presumed Present	NA
No Access Item -Asbestos Presumed Present	
Survey Area	

lucion

Please note: Asbestos containing material symbol locations are only INDICATIVE of the area of location; not the exact position of the material; refer to report register for details. Drawing NOT to scale.

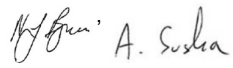
Attachments A4 – Lucion Environmental Soil Investigation Works and Air Quality Monitoring

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Asbestos Fibre Quantification Test Certificate

Job Ref No: ***138198****, Account Ref No:* ***1169****, Contract Ref No:* ***19231***

This certificate is for the attention of	The University of Manchester
Contract Title	Manchester Engineering Campus Development-Soil Investigation Works & Air Monitioring
Site Address	Manchester Engineering Campus Development Grosvenor Street Manchester Greater Manchester M1 7HR
Analyst(s)	Nichola Byron, Agnes Suska
Analyst signature(s)	
Analysis date	Monday, 24th October, 2016
Approved signatory	Gareth Cooper
Approved signature	
Approval date	Wednesday, 26th October, 2016
Report rendered on	Wed 26 Oct 2016 @ 16:29:01

Samples Description* - Soil Sampling & Strategy The site should be inspected to identify the location of building remains or rubble that may include asbestos containing materials and to look for other evidence of possible asbestos containing materials. When reinstating a trial pit no asbestos should be left on the surface. Working in conjunction with an engineering subcontractor is advised as they can take a log of the ground conditions. Lucion should note 'suspected ACMs' including any observations on form and type of asbestos encountered. Lucion staff should advise the engineering subcontractor on depths to sample and provide asbestos descriptions (if required). Information such as depth below ground level of asbestos and approximate percentage amounts of asbestos materials within the excavated soils will provide useful information. Asbestos is not confirmed on site until it has been analysed by a laboratory. Refer to the Gateshead office for arranging courier pick ups for samples sent to the Lucion Gateshead office. A key requirement for site investigation is while excavating soils for sampling or removal works should cease if there is a foreseeable risk of airborne fibre release. Before a site investigation is undertaken preparation of a tablet is advisable using the following inputs: Building name = MECD - Area 1 -North Basement Zone Location Level = 0 Location Description = TP01.01 (this is the trial pit number, followed by the zone or area number) Location Photo = A photo can be taken of the trial pit location (prior to excavation) Item Description = made ground at depth of 100mm (i.e. this must be a description of the item being inspected, not the material being sample) Material Description = soil, gravel and fragmented cement (i.e. this is a short summary of the material observed and represented within the collected sample pot) Item Photo = a photo will be needed of the made ground horizon of that particular depth Extent = full extent indiscernible Surveyors Comments = a basic summary (i.e. 2 or 3 sentences) of the made ground strata that this sample point/depth is representing. SAMPLING OF SOILS WITH SUSPECTED ACM. Sampling of any suspected soil must always be undertaken wearing the appropriate PPE / RPE (see RPE/PPE section in this document). Wet the ground to be sampled (the ground must be maintained in a damp condition throughout the sampling exercise). Collect photographs of the suspected ACMs. If pieces of potential asbestos are too large to fit into the sample container, consider double bagging (dependent on size) or consider taking a sample of the piece (following HSG 264 undertaken by a trained and competent person). In addition, photograph and record visual observations (condition, colour, type i.e. cement bound or fibrous, extent etc.). Use a clean trowel to fill the sealable sample container with the suspected ACMs and soil, which will be pre-labelled with the job reference, sample number, site location and material details. The date and the sampler's name should also be included. The sample container should be sealed, double bagged and stored in a closed secure container i.e. cool box. This ensures any contamination from the sample container does not escape if broken. Clean the trowel between samples using water/wiping. Soil samples should be sent to the Lucion in house UKAS laboratory in Gateshead for asbestos screening analysis. If further quantification analysis is required take advice from the laboratory. It is extremely important to prevent soils that may potentially contain asbestos fibre being transferred to the inside of vehicles, the home or office environment. Sampling strategies should

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7 Halifax Court, Dunston,
Gateshead, NE11 9JT
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be discussed with the client before site work commences i.e. number of samples in each exploratory location, depth of samples depending on human health requirements or tailored to the clients specifications. Generally, samples will be analysed to ascertain the presence of any fragmented bulk materials containing asbestos and / or, asbestos 'free fibre', via identification analysis in accordance with HSG248, using stereo microscopy, polarised light microscopy and dispersion staining (sent to Lucion laboratory). Any positive identification analysis of asbestos fibres in soil samples will result in a further laboratory analysis process for the quantitative analysis, using polarised light optical microscopy and dispersion staining, gravimetric analysis and fibre counting/sizing via phase contrast optical microscopy. The amount of samples required to go for quantification analysis will need to be communicated to the client (client led).

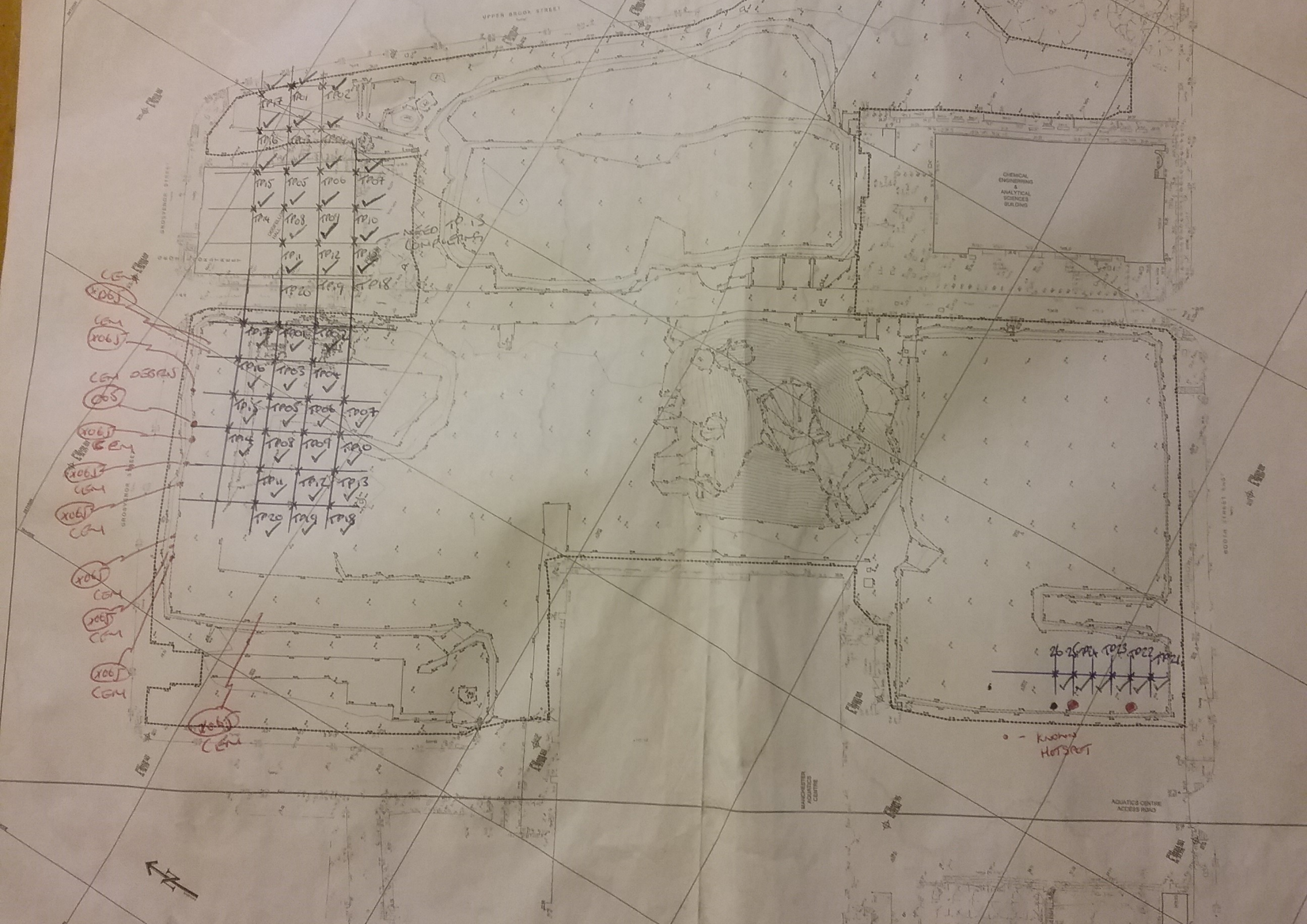
Analysis requested - Qualitative and quantitative analysis of soil / loose aggregate samples for mass determination of asbestos.

Analysis method - The analysis was carried out using our in-house documented method based upon EA Blue Book Draft August 2014. Our method includes initial examination of the entire sample which should be approximately 1kg in weight. A representative sub-sample of approximately 20g is then analysed in detail using stereo microscopy. Quantification is carried out using our documented in-house procedure TOP01.03.01 by hand-picking/weighing of loose fibres and bound fibres for gravimetric analysis. Final % asbestos weight is determined based upon upper matrix asbestos % as documented in HSG264.

* Lucion bear no responsibility for sample collection or sample description related information provided by the client.

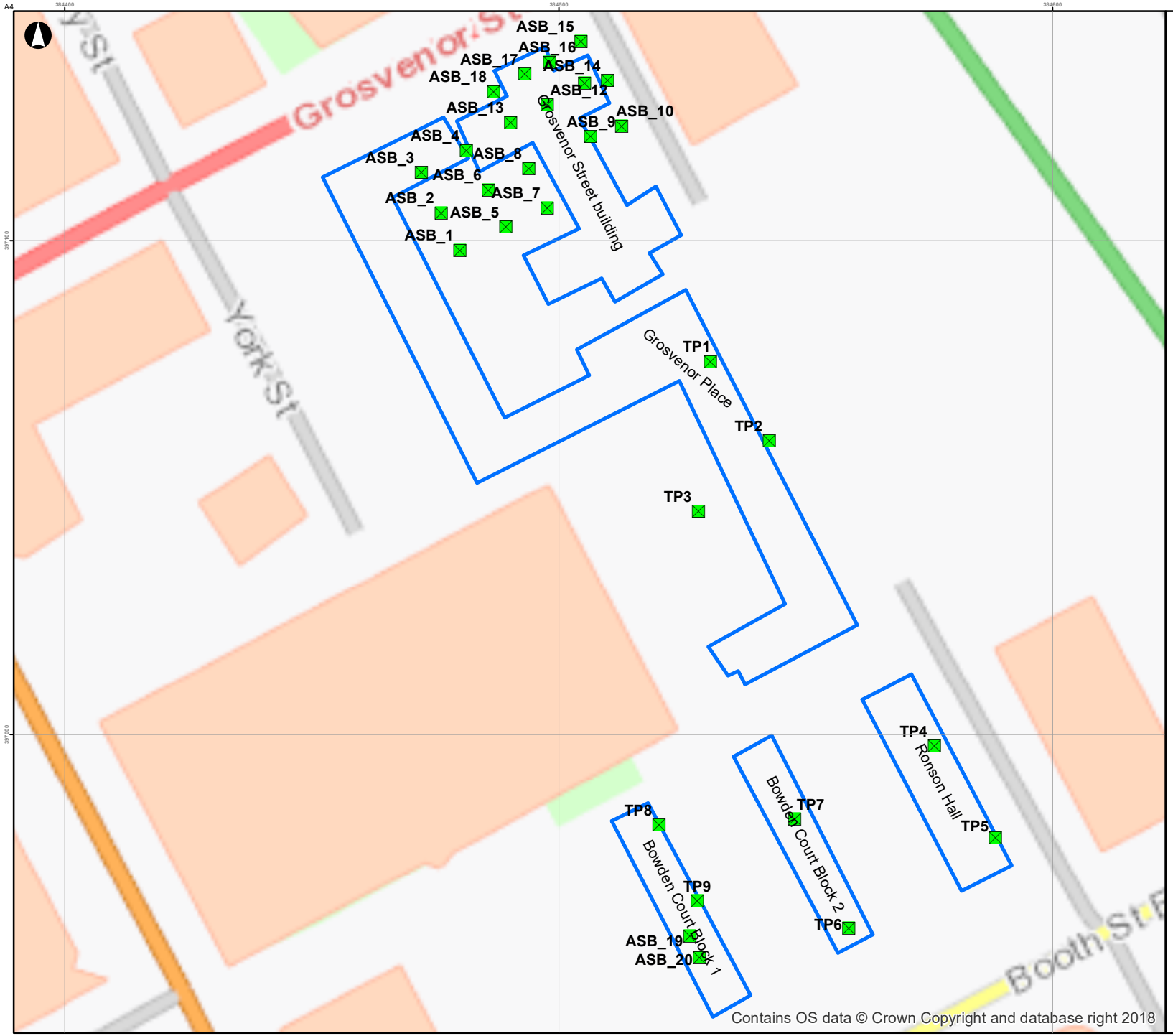
Where Lucion Environmental Ltd has not undertaken the sampling; any prior sampling activity is beyond the company's responsibility. Where Lucion Environmental Ltd has sampled the test material, this has been done in accordance with in-house methods.

Job No.	Sample No.	Sample weight (g)	% asbestos by hand picking & weighing	% asbestos by SEM fibre counting	Total % asbestos in samples	Reported Result (%)
138198	138198-46	735.69	0%	0.0%	0.0106%	0.0106%
138198	138198-73	1001.25	0.0047%	0.0%	0.0047%	0.0047%


UPPER BROOK STREET
GROSVENOR STREET
CHEMICAL ENGINEERING & ANALYTICAL SCIENCES BUILDING
MANCHESTER AQUATICS CENTRE
AQUATICS CENTRE ACCESS ROAD
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
TP13
TP14
TP15
TP16
TP17
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TP23
TP24
TP25
TP26
CEM
CEM
CEM OBSTRUCTION
CEM
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CEM
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CEM
CEM
- known HOTSPOT

Lucion trial pitting/sampling October 2016 to delineate hotspots and investigate asbestos cement near hoarding

Sample location ref	X co-ordinate	Y co-ordinate
ASB_1	384480.051	397098.021
ASB_2	384476.171	397105.514
ASB_3	384472.169	397113.703
ASB_4	384481.296	397118.240
ASB_5	384489.322	397102.776
ASB_6	384485.747	397110.212
ASB_7	384497.667	397106.580
ASB_8	384493.976	397114.579
ASB_9	384506.475	397120.981
ASB_10	384512.803	397123.125
ASB_11	384505.234	397131.825
ASB_12	384497.699	397127.403
ASB_13	384490.224	397123.855
ASB_14	384509.859	397132.357
ASB_15	384504.511	397140.264
ASB_16	384498.126	397136.033
ASB_17	384493.117	397133.677
ASB_18	384486.779	397130.121
ASB_19	384526.560	396959.247
ASB_20	384528.548	396954.905
Chemical analysis_1	384542.636	397059.359
Chemical analysis_2	384528.279	397045.111
Chemical analysis_3	384530.756	397075.507
Chemical analysis_4	384520.281	396981.659
Chemical analysis_5	384528.031	396966.302
Chemical analysis_6	384547.781	396982.901
Chemical analysis_7	384558.712	396960.801
Chemical analysis_8	384588.417	396979.204
Chemical analysis_9	384576.052	396997.712



Legend

- Churchills post-demolition investigation
- Former buildings to be investigated

©Copyright Information

Issue	Date	By	Chkd	Appd
P1	26-02-19	DH	DH	JAL

Metres
0 12.5 25 50

ARUP

9th Floor, 3 St. Pauls Place
Norfolk Street, Sheffield S1 2JE
Tel. +44(0)114 272 8247
www.arup.com

Client
Balfour Beatty

Job Title
MECD

As-built post-demolition investigation locations

Scale at A4
1:1,100

Job No	Drawing Status
258907-00	**Information**

Drawing No	Issue
APPENDIX F	**P1**

Template A4: Version 2
© Arup

Attachment A5 – Churchill Environmental trial pitting exercise

ARUP

Subject	Investigation for asbestos contamination in north of site		
Date	27 February 2019	**Job No/Ref**	MECD Remediation Validation

1 Summary of work carried out

The following documents confirm the investigation, carried out by Churchill Environmental Ltd on behalf of Balfour Beatty Construction Ltd on 30th January 2017, within the northern part of the MECD development site. The investigation involved:

- sampling existing made ground and testing for asbestos presence within an area of the site known to have been affected by surface contamination with asbestos fragments (previously investigated by Lucien). The investigation identified amosite or chrysotile asbestos in the made ground in 5 out of 13 samples tested;
- sampling an existing stockpile of soil from the same area, which had been generated as a result of excavation for a new utilities trench. The stockpile was located in the north-eastern area of the site next to the existing Oddfellow's Hall building (samples SP17-1 to SP17-4). No asbestos was detected in the stockpile samples;
- sampling in the location of a borehole installed during a previous phase of investigation (BHA1, Structural Soils 2015), where suspected asbestos was encountered at 0.7m depth. This area had been earmarked for further investigation during the enabling works period to check for asbestos. This area was investigated by Churchills during this investigation event and sample TP17-5 taken. Analysis of this sample confirmed the presence of loose Amosite fibres in the soil at that location.

The asbestos quantification analysis, together with chemical analysis of the made ground, led Churchills to conclude that the soil in this area could be disposed of as non-hazardous waste.

Del Harrison

From: Marc McVey <MMcVey@burofour.co.uk>
Sent: 08 May 2017 13:38
To: Del Harrison
Cc: Barker, Andy; Carl Lowe; phillip.scott@aecom.com; Ashley.Rogan@balfourbeatty.com; Kelly, John; Crayton, Michael
Subject: FW: Asbestos quantification results following sweet of testing submitted on Monday 30/01
Attachments: MECD results with Asb%.pdf

2/2

From: Barker, Andy [mailto:Andy.Barker@balfourbeatty.com]
Sent: 01 February 2017 12:09
To: Del Harrison; Carl Lowe; Scott, Phillip; Rupert Seldon; Marc McVey
Cc: Makinson, Andrew (01); Wood, Andrew; Cripps, Ian
Subject: Asbestos quantification results following sweet of testing submitted on Monday 30/01

All,

Further to Monday 30/01 sweet of sampling results.
Please see attached Asbestos quantification results.
Based on the findings the waste has been classified as contaminated non Hazardous
The classification represented a programme & commercial risk so the news is well received.
Regards,

Andy Barker
Agent,
BBRCEL,
Balfour Beatty CSUK
University of Manchester,
York St
Manchester.
M1 7HE.
Mobile- 07917 521128

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Marc McVey
Project Manager
Call. 020 7832 5570
Mob. 07786 111726

Amazon House, 3 Brazil Street, Manchester, M1 3PJ
Call. 0161 234 6745
Fax. 020 7832 5599
burofour.com

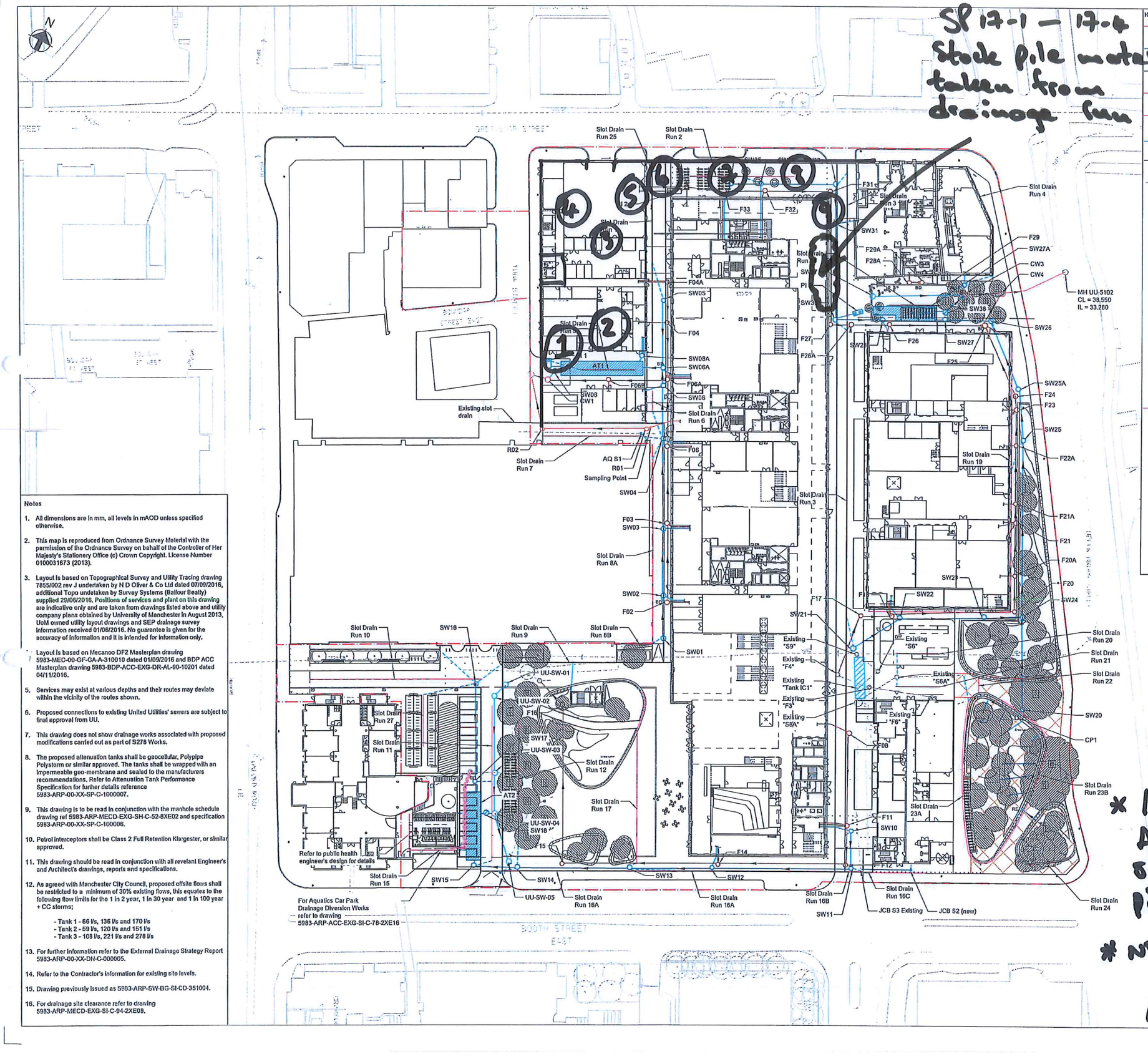
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SP 17-1 — 17-4
Stock pile material
taken from
drainage run



Key

- Planning Boundary
- Route of Proposed Surface Water Drainage
- Route of Proposed Foul Drainage
- Route of Proposed Combined Drainage
- Route of Proposed Irradiated Drainage
- Route of Proposed Replacement Sewer Diversion
- Route of Proposed French Drain
- Existing Drainage
- C.L Cover Level
- I.L Invert Level
- Attenuation Tank
- Surface Water Manhole
- Surface Water Manhole with Backdrop
- Foul Water Manhole
- Foul Water Manhole with Backdrop
- Combined Water Manhole
- UU SW Manhole
- Catchpit
- Rodding Eye
- Flow control unit
- Petrol Interceptor
- Surface Water Slot Drain (Aco Multidrain with brickslot or similar approved - refer to 5983-ARP-MECD-EXG-SI-C-2XE12 for details)
- Surface Water Connection
- Rainwater Pipe Connection
- Shallow Sewer Diversion Chamber
- Gully
- Area draining to Bio-retention Treepits
- Existing Rainwater Harvesting Tank
- MBSE drain diversion route

Notes

1. All dimensions are in mm, all levels in mAOD unless specified otherwise.
2. This map is reproduced from Ordnance Survey Material with the permission of the Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office (c) Crown Copyright. License Number 0100031673 (2013).
3. Layout is based on Topographical Survey and Utility Tracing drawing 7855/002 rev J undertaken by N D Oliver & Co Ltd dated 07/09/2016, additional Topo undetaken by Survey Systems (Balfour Beatty) supplied 29/06/2016. Positions of services and plant on this drawing are indicative only and are taken from drawings listed above and utility company plans obtained by University of Manchester in August 2013, UoM owned utility layout drawings and SEP drainage survey information received 01/06/2016. No guarantee is given for the accuracy of information and it is intended for information only.
4. Layout is based on Mecanoo DF2 Masterplan drawing 5983-MEC-00-GF-GA-A-310010 dated 01/09/2016 and BDP ACC Masterplan drawing 5983-BDP-ACC-EXG-DR-AL-90-10201 dated 04/11/2016.
5. Services may exist at various depths and their routes may deviate within the vicinity of the routes shown.
6. Proposed connections to existing United Utilities' sewers are subject to final approval from UU.
7. This drawing does not show drainage works associated with proposed modifications carried out as part of S278 Works.
8. The proposed attenuation tanks shall be geocellular, Polypipe Polystorm or similar approved. The tanks shall be wrapped with an impermeable geo-membrane and sealed to the manufacturers recommendations. Refer to Attenuation Tank Performance Specification for further details reference 5983-ARP-00-XX-SP-C-1000007.
9. This drawing is to be read in conjunction with the manhole schedule drawing ref 5983-ARP-MECD-EXG-SH-C-52-8XE02 and specification 5983-ARP-00-XX-SP-C-100008.
10. Petrol interceptors shall be Class 2 Full Retention Klargester, or similar approved.
11. This drawing should be read in conjunction with all revelant Engineer's and Architect's drawings, reports and specifications.
12. As agreed with Manchester City Council, proposed offsite flows shall be restricted to a minimum of 30% existing flows, this equates to the following flow limits for the 1 in 2 year, 1 in 30 year and 1 in 100 year + CC storms;
    - Tank 1 - 66 l/s, 136 l/s and 170 l/s
    - Tank 2 - 59 l/s, 120 l/s and 151 l/s
    - Tank 3 - 108 l/s, 221 l/s and 278 l/s
13. For further information refer to the External Drainage Strategy Report 5983-ARP-00-XX-DN-C-000005.
14. Refer to the Contractor's information for existing site levels.
15. Drawing previously issued as 5983-ARP-SW-BG-SI-CD-351004.
16. For drainage site clearance refer to drawing 5983-ARP-MECD-EXG-SI-C-94-2XE08.

The University of Manchester

Keyplan: North:

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS :-

Item	Hazard	Risk

Rev	Description	By	Date	Chkd	Auth
C3	Updated layout	RJ	17/11/16	RJ	TWS
C2	Updated Layout	AS	11/11/16	RJ	TWS
C1	Construction Issue	AS	07/09/16	RJ	TWS
T3	For Tender	TH	08/08/16	TWS	TWS
T2	For Tender	MT	30/06/16	MT	TWS
T1	For Tender	MT	16/06/16	MT	TWS

MANCHESTER 1824
The University of Manchester
Directorate of Estates and Facilities
Beyer Building
The University of Manchester
Oxford Road
Manchester
M13 9PL

ARUP 6th Floor, 3 Piccadilly Place, Manchester, M1 3BN T +44 161 228 2331, F +44 161 236 105 www.arup.com

Drawing Status: For Construction

Project: Manchester Engineering Campus Development -5983

Building Name: -

Sub Site Name: -

Name: Drainage Strategy
Proposed Foul and Surface Water Layout
General Arrangement

PM	Drawn	Checked	Authorised
-	RJ	RJ	TWS
Scale	Date	Date	Date
1:500	17/11/16	17/11/16	17/11/16

Drawing No. 5983-ARP-MECD-EXG-SI-C-52-2XE01 Revision C3

* 1-9 Asbestos sample pits
* NO 5 Existing

AB 21/12/16

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

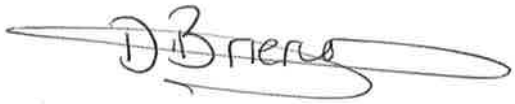
SUPPLEMENT TO TEST REPORT 17/00461/1

Envirolab Job Number: 17/00461
Issue Number: 2 **Date:** 30 January, 2017

Client:
Churchill Enviro Ltd
1 Eyebrook Road
Bowdon
Cheshire
UK
WA14 3LR

Project Manager: Terry Annis/W Maher
Project Name: MEDC, Balfour Beatty
Project Ref: Not specified
Order No: N/A
Date Samples Received: 17/01/17
Date Instructions Received: 23/01/17
Date Analysis Completed: 30/01/17

Prepared by:



Danielle Brierley
Administrative Assistant

Approved by:



John Gustafson
Director

Envirolab Job Number: 17/00461

Client Project Name: MEDC, Balfour Beatty

Client Project Ref: Not specified

Lab Sample ID	17/00461/1	17/00461/2	17/00461/3	17/00461/4	17/00461/5	17/00461/6	17/00461/7	17/00461/8	Units	Method ref
Client Sample No										
Client Sample ID	TP17-1	TP17-2	TP17-3	TP17-4	TP17-5	TP17-6	TP17-7	TP17-8		
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	4A	4AB	4A	4A	4A	6A	4AB	1A		
% Stones >10mm$_A$ #	<0.1	<0.1	<0.1	2.6	<0.1	6.6	14.2	29.3	% w/w	A-T-044
pH$_D$ M#	8.18	8.36	8.13	7.97	8.63	7.97	7.94	8.73	pH	A-T-031s
Cyanide (total)$_A$ M#	<1	<1	<1	2	<1	<1	<1	<1	mg/kg	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	A-T-050s
Total Organic Carbon$_D$ M#	3.60	0.96	3.02	1.94	18.2	4.02	6.52	0.08	% w/w	A-T-032s
Antimony$_D$	<5	6	<5	<5	<5	7	<5	<5	mg/kg	A-T-024s
Arsenic$_D$ M#	13	11	18	10	10	13	9	6	mg/kg	A-T-024s
Beryllium$_D$ #	1	1	1	1	1	1	1	1	mg/kg	A-T-024s
Boron (water soluble)$_D$ M#	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	mg/kg	A-T-027s
Cadmium$_D$ M#	1.9	1.4	1.7	1.3	1.6	1.7	1.2	1.7	mg/kg	A-T-024s
Copper$_D$ M#	80	52	58	46	24	65	32	7	mg/kg	A-T-024s
Chromium$_D$ M#	20	19	16	19	19	22	18	10	mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-040s
Lead$_D$ M#	147	317	227	240	252	387	381	12	mg/kg	A-T-024s
Mercury$_D$	0.31	5.55	0.57	0.69	0.54	0.46	0.53	<0.17	mg/kg	A-T-024s
Nickel$_D$ M#	28	17	24	18	14	24	15	14	mg/kg	A-T-024s
Selenium$_D$	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-024s
Vanadium$_D$ M#	31	24	30	22	21	32	25	13	mg/kg	A-T-024s
Zinc$_D$ M#	151	134	89	88	89	114	124	27	mg/kg	A-T-024s

Envirolab Job Number: 17/00461

Client Project Name: MEDC, Balfour Beatty

Client Project Ref: Not specified

Lab Sample ID	17/00461/1	17/00461/2	17/00461/3	17/00461/4	17/00461/5	17/00461/6	17/00461/7	17/00461/8	Units	Method ref
Client Sample No										
Client Sample ID	TP17-1	TP17-2	TP17-3	TP17-4	TP17-5	TP17-6	TP17-7	TP17-8		
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	4A	4AB	4A	4A	4A	6A	4AB	1A		
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{A}^{\#}$	Amosite	Chrysotile	Chrysotile	NAD	Amosite	NAD	NAD	NAD		A-T-045
Asbestos Matrix (microscope)$_{A}$	Loose Fibres	Loose Fibres	Loose Fibres	-	Loose Fibres	-	-	-		A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing)$_{D}$	<0.001	<0.001	<0.001	-	<0.001	-	-	-	% w/w	A-T-054

Envirolab Job Number: 17/00461

Client Project Name: MEDC, Balfour Beatty

Client Project Ref: Not specified

Lab Sample ID	17/00461/1	17/00461/2	17/00461/3	17/00461/4	17/00461/5	17/00461/6	17/00461/7	17/00461/8	Units	Method ref
Client Sample No										
Client Sample ID	TP17-1	TP17-2	TP17-3	TP17-4	TP17-5	TP17-6	TP17-7	TP17-8		
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	4A	4AB	4A	4A	4A	6A	4AB	1A		
PAH 16										
Acenaphthene$_A^{M\#}$	0.27	0.68	0.13	0.05	0.27	0.07	0.12	<0.01	mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	0.01	0.02	0.08	<0.01	0.02	<0.01	<0.01	<0.01	mg/kg	A-T-019s
Anthracene$_A^{M\#}$	0.41	1.04	0.44	0.07	0.69	0.10	0.24	<0.02	mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	1.02	1.68	1.63	0.27	1.91	0.36	0.69	<0.04	mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.83	1.26	1.38	0.23	1.58	0.33	0.60	<0.04	mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.85	1.25	1.52	0.26	1.67	0.36	0.66	<0.05	mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.54	0.71	0.84	0.17	0.97	0.23	0.41	<0.05	mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.30	0.48	0.65	0.10	0.63	0.15	0.24	<0.07	mg/kg	A-T-019s
Chrysene$_A^{M\#}$	1.14	1.70	1.79	0.31	1.91	0.42	0.80	<0.06	mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.12	0.17	0.20	<0.04	0.20	0.05	0.08	<0.04	mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	2.35	3.86	2.66	0.58	4.79	0.80	1.52	<0.08	mg/kg	A-T-019s
Fluorene$_A^{M\#}$	0.19	0.58	0.19	0.02	0.21	0.03	0.08	<0.01	mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.63	0.84	1.04	0.21	1.18	0.27	0.49	<0.03	mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	0.09	0.37	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	1.84	4.35	1.55	0.33	2.59	0.45	0.95	<0.03	mg/kg	A-T-019s
Pyrene$_A^{M\#}$	2.45	4.07	2.87	0.55	4.67	0.77	1.42	<0.07	mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	13	23	17	3.16	23.3	4.38	8.30	<0.08	mg/kg	A-T-019s

Envirolab Job Number: 17/00461

Client Project Name: MEDC, Balfour Beatty

Client Project Ref: Not specified

Lab Sample ID	17/00461/1	17/00461/2	17/00461/3	17/00461/4	17/00461/5	17/00461/6	17/00461/7	17/00461/8	Units	Method ref
Client Sample No										
Client Sample ID	TP17-1	TP17-2	TP17-3	TP17-4	TP17-5	TP17-6	TP17-7	TP17-8		
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	4A	4AB	4A	4A	4A	6A	4AB	1A		
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<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	<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	<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	<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	<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	<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	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1	<0.1	<0.1	<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	<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	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C8-C9$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C9-C10$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C10-C12$_A^{\#}$	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C12-C16$_A^{\#}$	<0.1	2.9	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C16-C21$_A^{\#}$	0.7	10.1	3.7	0.9	1.1	2.6	0.8	<0.1	mg/kg	A-T-023s
Aro >C21-C35$_A^{\#}$	4.1	26.0	10.0	8.3	3.9	6.2	1.4	<0.1	mg/kg	A-T-023s
Total Aromatics$_A$	4.8	39.4	14.4	9.2	5.0	8.8	2.2	<0.1	mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	4.8	39.4	14.4	9.2	5.0	8.8	2.2	<0.1	mg/kg	A-T-023s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<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	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s

Envirolab Job Number: 17/00461

Client Project Name: MEDC, Balfour Beatty

Client Project Ref: Not specified

Lab Sample ID	17/00461/9	17/00461/10	17/00461/11	17/00461/12	17/00461/13				Units	Method ref
Client Sample No										
Client Sample ID	TP17-9	SP17-1	SP17-2	SP17-3	SP17-4					
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil	Soil					
Sample Matrix Code	4A	4A	4A	4A	6A					
% Stones >10mm$_A^{\#}$	<0.1	38.1	25.4	8.4	21.9				% w/w	A-T-044
pH$_D^{M\#}$	8.62	10.38	10.49	9.17	7.99				pH	A-T-031s
Cyanide (total)$_A^{M\#}$	<1	<1	<1	<1	<1				mg/kg	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2	<0.2	<0.2	<0.2				mg/kg	A-T-050s
Total Organic Carbon$_D^{M\#}$	0.55	1.49	0.48	1.20	3.08				% w/w	A-T-032s
Antimony$_D$	<5	<5	<5	<5	<5				mg/kg	A-T-024s
Arsenic$_D^{M\#}$	33	3	4	9	12				mg/kg	A-T-024s
Beryllium$_D^{\#}$	1	<1	1	1	1				mg/kg	A-T-024s
Boron (water soluble)$_D^{M\#}$	<1.0	<1.0	1.1	2.7	<1.0				mg/kg	A-T-027s
Cadmium$_D^{M\#}$	1.9	0.9	0.7	1.6	1.4				mg/kg	A-T-024s
Copper$_D^{M\#}$	106	15	14	47	56				mg/kg	A-T-024s
Chromium$_D^{M\#}$	16	9	15	65	18				mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1				mg/kg	A-T-040s
Lead$_D^{M\#}$	223	67	52	122	278				mg/kg	A-T-024s
Mercury$_D$	0.40	0.29	0.28	0.67	1.73				mg/kg	A-T-024s
Nickel$_D^{M\#}$	29	9	10	16	16				mg/kg	A-T-024s
Selenium$_D$	1	<1	<1	<1	<1				mg/kg	A-T-024s
Vanadium$_D^{M\#}$	39	12	18	64	21				mg/kg	A-T-024s
Zinc$_D^{M\#}$	224	33	48	85	123				mg/kg	A-T-024s

Envirolab Job Number: 17/00461

Client Project Name: MEDC, Balfour Beatty

Client Project Ref: Not specified

Lab Sample ID	17/00461/9	17/00461/10	17/00461/11	17/00461/12	17/00461/13				Units	Method ref
Client Sample No										
Client Sample ID	TP17-9	SP17-1	SP17-2	SP17-3	SP17-4					
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil	Soil					
Sample Matrix Code	4A	4A	4A	4A	6A					
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^\#$	Chrysotile	NAD	NAD	NAD	NAD					A-T-045
Asbestos Matrix (microscope)$_A$	Loose Fibres	-	-	-	-					A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A	N/A					
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing)$_D$	0.001	-	-	-	-				% w/w	A-T-054

Envirolab Job Number: 17/00461

Client Project Name: MEDC, Balfour Beatty

Client Project Ref: Not specified

Lab Sample ID	17/00461/9	17/00461/10	17/00461/11	17/00461/12	17/00461/13				Units	Method ref
Client Sample No										
Client Sample ID	TP17-9	SP17-1	SP17-2	SP17-3	SP17-4					
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil	Soil					
Sample Matrix Code	4A	4A	4A	4A	6A					
PAH 16										
Acenaphthene$_A^{M\#}$	0.34	0.33	0.34	0.04	0.07				mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	0.02	0.01	0.02	<0.01	<0.01				mg/kg	A-T-019s
Anthracene$_A^{M\#}$	0.47	0.84	0.56	0.16	0.13				mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	2.27	3.74	0.77	0.48	0.43				mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	2.03	2.98	0.52	0.36	0.37				mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	2.22	3.15	0.53	0.39	0.37				mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	1.35	1.57	0.32	0.21	0.24				mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.81	1.35	0.20	0.15	0.18				mg/kg	A-T-019s
Chrysene$_A^{M\#}$	2.43	3.21	0.81	0.52	0.44				mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.29	0.31	0.07	0.05	0.05				mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	4.82	7.44	1.99	1.06	0.94				mg/kg	A-T-019s
Fluorene$_A^{M\#}$	0.17	0.22	0.37	0.03	0.06				mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	1.65	1.96	0.40	0.27	0.31				mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	0.18	0.10	0.96	<0.03	<0.03				mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	2.42	1.89	2.02	0.41	0.53				mg/kg	A-T-019s
Pyrene$_A^{M\#}$	4.44	7.84	1.82	1.02	0.93				mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	25.9	36.9	11.7	5.17	5.03				mg/kg	A-T-019s

Envirolab Job Number: 17/00461

Client Project Name: MEDC, Balfour Beatty

Client Project Ref: Not specified

Lab Sample ID	17/00461/9	17/00461/10	17/00461/11	17/00461/12	17/00461/13				Units	Method ref
Client Sample No										
Client Sample ID	TP17-9	SP17-1	SP17-2	SP17-3	SP17-4					
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil	Soil					
Sample Matrix Code	4A	4A	4A	4A	6A					
TPH CWG										
Ali >C5-C6$_A^\#$	<0.01	<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	<0.01				mg/kg	A-T-022s
Ali >C8-C10$_A^\#$	<0.01	<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	<0.1				mg/kg	A-T-023s
Ali >C12-C16$_A^\#$	<0.1	<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	<0.1				mg/kg	A-T-023s
Ali >C21-C35$_A^\#$	<0.1	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<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	<0.01				mg/kg	A-T-022s
Aro >C7-C8$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
Aro >C8-C9$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
Aro >C9-C10$_A^\#$	<0.01	<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	<0.1				mg/kg	A-T-023s
Aro >C12-C16$_A^\#$	2.3	1.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Aro >C16-C21$_A^\#$	16.5	14.9	1.1	4.4	2.7				mg/kg	A-T-023s
Aro >C21-C35$_A^\#$	42.2	60.9	3.9	11.7	10.0				mg/kg	A-T-023s
Total Aromatics$_A$	60.9	77.0	5.0	16.0	12.8				mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	60.9	77.0	5.0	16.0	12.8				mg/kg	A-T-023s
BTEX - Benzene$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
BTEX - Toluene$_A^\#$	<0.01	<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	<0.01				mg/kg	A-T-022s
BTEX - m & p Xylene$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
BTEX - o Xylene$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
MTBE$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s

REPORT NOTES

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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.

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: Churchill Enviro Ltd, 1 Eyebrook Road, Bowdon, Cheshire, UK, WA14 3LR

Project No: 17/00461

Date Instructions Received: 23/01/2017 (am)

Project: MEDC, Balfour Beatty

Clients Project No:

Lab Sample ID	17/00461/1	17/00461/2	17/00461/3	17/00461/4	17/00461/5	17/00461/6	17/00461/7	17/00461/8	17/00461/9	17/00461/10	17/00461/11	17/00461/12
Client Sample No												
Client Sample ID/Depth	TP17-1	TP17-2	TP17-3	TP17-4	TP17-5	TP17-6	TP17-7	TP17-8	TP17-9	SP17-1	SP17-2	SP17-3
Date Sampled												
Deviation Code												
B1 (no VPH)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
D (no glass)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
E (no date)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Lab Sample ID	17/00461/13
Client Sample No	
Client Sample ID/Depth	SP17-4
Date Sampled	
Deviation Code	
B1 (no VPH)	✓
D (no glass)	✓
E (no date)	✓

Key

B1 (no VPH)	*Separate container not supplied for VPH/BTEX analysis*
D (no glass)	*Glass container not provided for extractable organics analysis*
E (no date)	*No sampling date provided (all results affected if not provided)*

Attachment A6 – Santia Ltd signoff of asbestos removal area

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 17/05272
Issue Number: 1 **Date:** 07 August, 2017

Client:
Churchill Enviro Ltd
1 Eyebrook Road
Bowdon
Cheshire
UK
WA14 3LR

Project Manager: Terry Annis
Project Name: MEDC
Project Ref: Not specified
Order No: N/A
Date Samples Received: 02/08/17
Date Instructions Received: 03/08/17
Date Analysis Completed: 07/08/17

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:



Richard Wong
Client Manager

UKAS TESTING
1247

Envirolab Job Number: 17/05272

Client Project Name: MEDC

Client Project Ref: Not specified

Lab Sample ID	17/05272/1	17/05272/2	17/05272/3	17/05272/4	17/05272/5				Units	Method ref
Client Sample No										
Client Sample ID	C1	C2	B	L	R					
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type	Soil	Soil	Solid - Fines	Soil	Soil					
Sample Matrix Code	4A	4AB	8	4A	4A					
Asbestos in Soil (inc. matrix) ^										
Asbestos in soil$_A^{\#}$	NAD	Chrysotile & Amosite	-	Amosite	NAD					A-T-045
Asbestos Matrix (visual)$_A$	-	Loose Insulation	-	-	-					A-T-045
Asbestos Matrix (microscope)$_A$	-	-	-	Loose Fibres	-					A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	-	N/A	N/A					
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing)$_D$	-	3.166	-	<0.001	-				% w/w	A-T-054
Bulk Fibre ID (inc. matrix)										
Bulk Fibre Identification$_A^{\#}$	-	-	Amosite & Chrysotile	-	-					A-T-045
Bulk Fibre Identification Matrix (visual)$_A$	-	-	Loose Insulation	-	-					A-T-045
Bulk Fibre Identification - Suitable for Water Absorption Test?$_D$	-	-	N/A	-	-					Gravimetry
Bulk Fibre Quantification % Asbestos in ACM										
Bulk Fibre - % Asbestos in ACM (HSG264)$_D$	-	-	85	-	-				% w/w	A-T-054

REPORT NOTES

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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.

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

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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.

Alan Lee Kaefer
Andrew Makinson Balfour Beatty
Andy Barker Balfour Beatty
Raj Balfour Beatty
Terry Annis Churchill's

BB prepared a timeline of events starting from the discovery of the cast iron boiler on Monday 31st July, to the removal on Tuesday 1st August and subsequent testing and early warning raised Wednesday 2nd August.	Note
B4/Aecom apologised to the UoM asbestos team for not alerting them to the potential ACM's as soon as they were discovered on Wednesday 2nd August.	Note
The attached test results were circulated in advance of the meeting and indicated the following: Aquatics final analytical test report. C1, C2 High level stockpile - Low levels of Crysotile and Amosite B, Boiler encasement material - Amosite & Crysotile L & R Pit boiler was removed from - Amosite	Note
UoM asbestos team had reservations about the amount of testing previously undertaken and requested Ricky Wood from First Order Red was commissioned to carry out further tests to all areas, including additional testing on the plant/machine buckets used to excavate the arising's and remove the boiler.	FOR
Having previously queried why BB had not covered the boiler with monoflex, following a site visit Kaefer were in agreement that given the nature of the lagging, BB were correct in not covering the boiler but ensuring it was safely cordoned off from the rest of the site.	Note
It was agreed the three areas should be treated separately and a way forward agreed for each.	Note
Stockpile	
First Order Red to take further samples of the stockpile to determine whether the material will be removed as hazardous or contaminated non-hazardous. PMN: Following a site visit, First Order Red confirmed the stockpile of arising's should be removed as hazardous.	Note
B4 to meet with BB and Kaefer to determine who is best placed to remove the waste.	B4
Boiler	
The heras fencing surrounding the boiler is to be covered in monoflex asap.	BB
Kaefer to meet with their scaffolder this afternoon to discuss the erection of a temporary enclosure around the boiler.	Kaefer
Kaefer to issue the 14 day notification to the HSE.	Kaefer
Kaefer to prepare a logistics diagram and methodology for the works for review with BB.	Kaefer
Kaefer advised the stripping of the boiler will take approximately 4-5 days.	Note
First Order Red will need to be present for monitoring during the dismantling and removal of boiler.	FOR
Pit	
Kaefer to carry out a clean of the existing boiler pit.	Kaefer
First Order Red to test the pit following completion of the clean.	FOR
Team to meet to discuss the extent of the local removal of waste to a reasonable perimeter following confirmation of classification.	Team

First Order Red to test on completion before BB carry out further investigative works to the soft spot just north of the pit.	FOR
Kaefer to provide a watching brief during the further works.	Kaefer
UoM agreed the existing pipe should remain in situ as this currently sits below formation level in this area.	Note
First Order Red to carry out air monitoring tests this afternoon.	FOR
B4 to confirm how Kaefer and First Order Red will be appointed (direct with UoM or through BB).	B4
B4 received a call from Aquatics requesting an update on site activity as they had been made aware works had stopped due to the discovery of asbestos on site. B4 to meet with Aquatics Wednesday afternoon.	B4
B4 to liaise with BB and issue an incident report.	B4
B4 to issue an invite for a further catch up scheduled for Monday 14th August at 10:00am.	B4

Regards

Marc
Marc McVey
Project Manager
Call. 020 7832 5570
Mob. 07786 111726

Amazon House, 3 Brazil Street, Manchester, M1 3PJ
Call. 0161 234 6745
Fax. 020 7832 5599
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HANDOVER OF AREA FORM TYPE A (TO CONTRACTOR) MECD

MANCHESTER 1824
The University of Manchester

CONTRACTOR APPLICATION – HOAF 26

Contractor name:	Balfour Beatty
Applicants name:	Raj Defonseka (BB) & Alan Lee (Kaefer)
Contact for inspection name:	Raj Defonseka (BB) & Alan Lee (Kaefer)
Date and time of proposed handover: (Min 1wk notice required N/A)	08.00am 02/10/17.
Area to be handed over:	Aquatics Car Park area in full as detailed below (HOAF following completion of asbestos works)

Reason for handover:

Following receipt of the required air clearance certification from Santia and full decant of the area from Kaefer, including dismantling and removal of scaffold, this HOAF confirms Balfour Beatty have taken full possession of the Aquatics car park area of the MECD site on the above date and time.

This will conclude all Kaefer asbestos removal works in this area.

This HOAF also includes the handover of the area immediately outside of the rear fire exit at MBS East, which will form part of Balfour Beatty's construction site during the hours of 6:30pm-6:30am Mon 2nd October – Friday 6th October 17. This has been agreed with UoM Fire Safety Office Jeff Gill and MBS East Building Managers Joann Slater and Fiona Casey.

UOM AUTHORISATION

The area described above has been handed to Balfour Beatty and designated as a construction works areas controlled by Balfour Beatty.

UOM will not return into the BB or Kaefer areas for business as usual operations until formally handed back on form type B. BB will not enter Kaefer Area & vice versa until a new HOAF is agreed.

(Operations representative)
Name: Phillip Scott (HASMASC)……..

Signature: … ……

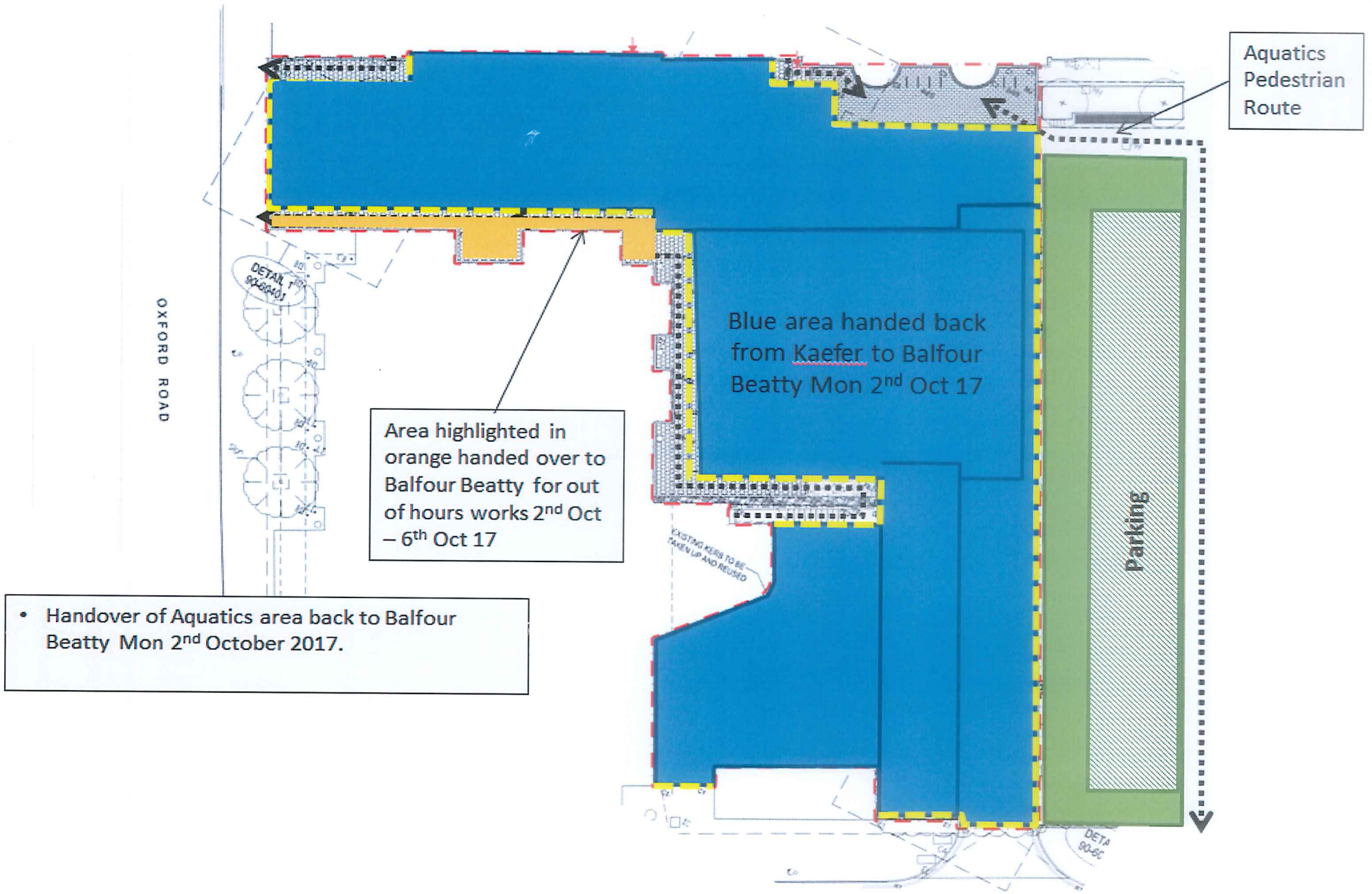
(Contractor representative)
Name: Raj Defonseka (BB) & Alan Lee (Kaefer)……..

Signature:(BB) ……Signature (K)……..……

Date and time: …~~29/09/17~~.. 02/10/17 8am

Comments: Soft spot / Hardspot – Santia/Kaefer required as watchy brief when works to boiler pit area being completed.

HOAF following completion of Asbestos works



- Handover of Aquatics area back to Balfour Beatty Mon 2nd October 2017.

UKAS TESTING
0857

CERTIFICATE OF REOCCUPATION

Certificate No.	AP001674-04	COR	2

santia
it's our business to protect
Santia Asbestos Management Limited
Axys House, Parc Nantgarw, Cardiff. CF15 7TW
T: 02920 852852

Information Summary

Client Name and Address:	Lynn Fleming, 4th Floor Beyer Building, Oxford Road, UoM, Manchester, M13 9PL
Site Address:	MECD project boiler excavation, Booth Street East, M13 9PL
Name of licensed Asbestos Removal Contractor:	Kaefer Ltd
Location on site & brief description of work:	Removal of lagged boiler and associated debris to the and contaminated soil and surrounding area.

Contractor Plan of Work Reference No.	AL/MW/NW/5044	Site Supervisor:	James Bradley

This Certificate should be used and issued in conjunction with Airborne Fibre Monitoring Test Report (ASB1) and Diagram and Comments sheet (ASB2) - report number: AP001674-04 17

Stage 1 of 4 - Preliminary Assessment of Site Condition and Job Completeness

Actual scope of work undertaken matches that described within the Plan of Work	/	Enclosures/Airlocks clean, intact and operating	/
Site supervisor has declared all asbestos has been removed as specified in the plan of work	/	Air extraction (NPU) and ducting clean, intact and operating	/
Site supervisor has undertaken visual assessment of the enclosure and declared it ready for clearance	/	Hygiene facilities clean, intact and operating	/
Work area/site compound appears free from obvious asbestos debris and asbestos waste	/	**Stage 1 Assessment**	Pass / Fail
Skip area, transit & waste routes appear free from obvious asbestos debris and asbestos waste	/	Assessed by:	T. Reilly
Viewing panels and / or CCTV are present and suitable for pre assessment of enclosure entry	/	Signature	Tony Reilly
Hygiene facilities appear free from obvious asbestos debris and asbestos waste	/	Date	Time
Enclosures/Airlocks appears free from obvious asbestos debris and asbestos waste	/	14/09/2017	13:30

Stage 2 of 4 - Thorough Visual Inspection

Airlock/baglock/enclosures are free of waste bags, materials, settled dust, debris and unnecessary equipment	/	**Stage 2 Assessment**	Pass / Fail
Enclosure is dry for inspection	X	Assessed by:	T. Reilly
ALL ACMs have been completely removed from the underlying surfaces as far as is reasonably practicable	/	Signature	Tony Reilly
Any ACMs remaining in situ are encapsulated	N/A	Date	Time
There is no evidence of the use of lock down sprays	/	15/09/2017	10:10

Comments: **See AP001674-04 A.M 17 for clearance notes.** 110 minutes

Stage 3 of 4 - Clearance Air Monitoring Inside the Enclosure

All air movers (NPUs) are off and sealed.	/	**Stage 3 Assessment**	Pass / Fail
Brush disturbance of 1.5 minutes per pump (3 minute minimum) has been completed	/	Assessed by:	T.Reilly
80% of air samples taken were <0.010f/ml and all samples were <0.015f/ml (unless 4 or fewer samples were taken in which case all were <0.010f/ml)	/	Signature	Tony Reilly
Area or volume of enclosure (m^2 / m^3)	64m2	Date	Time
Number of air samples collected	2	15/09/2017	11:50

Stage 4 of 4 - Assessment of Site for Reoccupation (after enclosure is removed)

Former enclosure area and immediate surroundings are free from obvious asbestos debris and waste sacks	/	**Stage 4 Assessment**	Pass / Fail
Transit and waste routes are free from any obvious asbestos debris, asbestos sacks and waste	/	Assessed by:	T.Reilly
All ACMs in the scope of work have been removed and any known ACMs remaining are encapsulated and intact	/	Signature	Tony Reilly
All former enclosure materials have been removed	/	Date	Time
The area can be reoccupied	/	25/09/2017	10:00 AM

Issue of Certificate of Reoccupation

The assessor has informed the contractor representative that this certificate **can not be issued** because the area has failed stage.....	
The assessor has informed the contractor representative that this certificate **can be issued** as the area has passed all four stages	/

Contractor representative name:	Signature:	Time of this acknowledgement:
James Bradley		15:00
Assessor name:	**Signature:**	**Date of this acknowledgement:**
T. Reilly	Tony Reilly	28/09/2017
Copies of this certificate and attachments ASB1 and ASB2 were issued to:	Santia/Kaefer/Balfour Beatty/UoM	

Santia Asbestos Management Limited, also trading as FIRSTORDERRED

The four stage clearance process referred to in this report was conducted in accordance with in-house methods based on guidance contained in HSE document HSG 248. Any interpretations and opinions expressed in this report are outside the scope of UKAS accreditation.

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MINOR WORKS VISUAL INSPECTION CERTIFICATE

Certificate No.	AP001674-04	MW	1

Santia Asbestos Management Limited
Axys House, Parc Nantgarw, Cardiff. CF15 7TW
T: 02920 852852

This form is to be used when regulation 3 of the Control of Asbestos Regulations 2012 does not apply. This is not a Certificate of Reoccupation following removal of notifiable products, but can be used for notifiable non-licensed work (NNLW). This inspection is outside the scope of UKAS accreditation.

Information Summary			
Name & Address of Client:	Lynn Fleming, 4th Floor Beyer Building, Oxford Road, UoM, Manchester, M13 9PL		
Site Address:	MECD project boiler excavation, Booth Street East, M13 9PL		
Name and address of Asbestos Removal Contractor:	Kaefer Ltd		
Site Supervisor:	James Bradley	**Method Statement Ref.:**	AL/MW/NW/5044
Start date of work:	29/08/2017	**End date of work:**	29/09/2017
Brief summary of scope of works, method and location:	Separation off contaminated soil to clean soil stack and removal of ACM contamination. Operatives removing soil stack by sieving through soil in orinasal half face mask and category 3 overalls. Soil is continuously wetted using a water cannon to soak the soil prior to removal. Reassurance and Personal Air Monitoring conducted during these works.		

Diagrammatic Representation of Work Area

Include details of specific areas and items visually inspected and declare below whether or not the area can be reoccupied.



Removal of contaminated soil and separation has been succeeded, contaminated soil has been identified and discarded and removed as asbestos waste within the marked out area displayed above.
Large concrete boulders/Hardcore rubble have been unable to be removed by Manuel handling methods so these have visually inspected and remain in situ.
No contamination present so area can be reoccupied.

Assessment of Work Area

/	I have checked that the asbestos was removed and I have inspected the area to make sure the area was cleaned thoroughly and there were no visible traces of dust or debris.		
/	Reassurance air testing has been carried out, as per the Client's request and the Air Monitoring report is attached:	**AP001674-04**	**AM18+**

This area CAN be reoccupied

Issue of Minor Works Certificate

Contractor representative name:	Signed:	Time of this acknowledgement:
James Bradley		09:00
Assessor name:	**Signed:**	**Date of this acknowledgement:**
Tony Reilly		29/09/2017

Santia Asbestos Management Limited, also trading as FIRSTORDERRED™

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MINOR WORKS VISUAL INSPECTION CERTIFICATE

Certificate No.	AP001674-04	MW	2

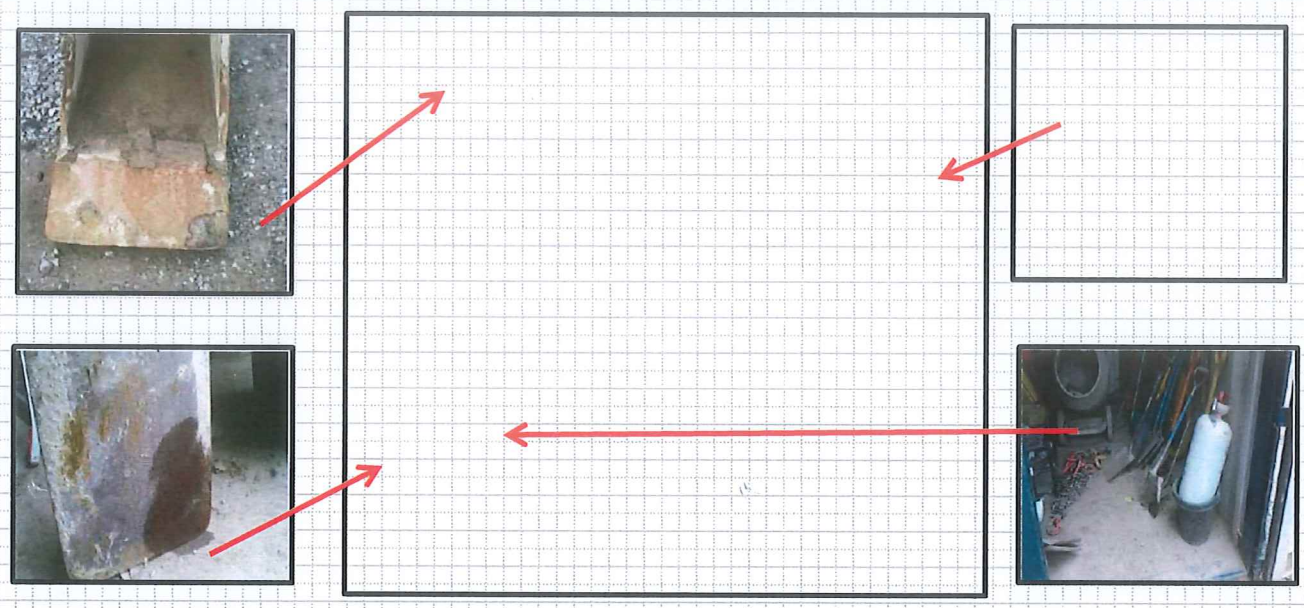
This form is to be used when regulation 3 of the Control of Asbestos Regulations 2012 does not apply. This is not a Certificate of Reoccupation following removal of notifiable products, but can be used for notifiable non-licensed work (NNLW). This inspection is outside the scope of UKAS accreditation.

Santia Asbestos Management Limited
Axys House, Parc Nantgarw, Cardiff. CF15 7TW
T: 02920 852852

Information Summary			
Name & Address of Client:	Lynn Fleming, 4th Floor Beyer Building, Oxford Road, UoM, Manchester, M13 9PL		
Site Address:	MECD project boiler excavation, Booth Street East, M13 9PL		
Name and address of Asbestos Removal Contractor:	Kaefer Ltd		
Site Supervisor:	James Bradley	**Method Statement Ref.:**	AL/MW/NW/5044
Start date of work:	29/08/2017	**End date of work:**	29/09/2017
Brief summary of scope of works, method and location:	Operatives remove ACM contamination that has been identified within Cummins Cabin, to Hand tools and excavation buckets. Reassurance Air Monitoring conducted during these works.		

Diagrammatic Representation of Work Area

Include details of specific areas and items visually inspected and declare below whether or not the area can be reoccupied.



Removal of contamination present to two excavation buckets, Cummins Cabin and associated hand tools has been carried out.
Reassurance Air Monitoring conducted during these works and a visual inspection carried out.
No contamination remaining to buckets and cabin, areas can be reoccupied.

Assessment of Work Area

/	I have checked that the asbestos was removed and I have inspected the area to make sure the area was cleaned thoroughly and there were no visible traces of dust or debris.		
/	Reassurance air testing has been carried out, as per the Client's request and the Air Monitoring report is attached:	**AP001674-04**	**AM07, 08**

This area CAN be reoccupied

Issue of Minor Works Certificate

Contractor representative name:	Signed:	Time of this acknowledgement:
James Bradley		09:00
Assessor name:	**Signed:**	**Date of this acknowledgement:**
Tony Reilly		29/09/2017

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UKAS TESTING
0857

CERTIFICATE OF REOCCUPATION

Certificate No.	AP001674-04	COR	1

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Santia Asbestos Management Limited
Axys House, Parc Nantgarw, Cardiff. CF15 7TW
T: 02920 852852

Information Summary

Client Name and Address:	Lynn Fleming, 4th Floor Beyer Building, Oxford Road, UoM, Manchester, M13 9PL
Site Address:	MECD project boiler excavation, Booth Street East, M13 9PL
Name of licensed Asbestos Removal Contractor:	Kaefer Ltd
Location on site & brief description of work:	Removal of Thermal debris from within the pit and surrounding area within enclosure where contaminated boiler was excavated.

Contractor Plan of Work Reference No.	AL/MW/NW/5044	Site Supervisor:	James Bradley

This Certificate should be used and issued in conjunction with Airborne Fibre Monitoring Test Report (ASB1) and Diagram and Comments sheet (ASB2) - report number: AP001674-04 8

Stage 1 of 4 - Preliminary Assessment of Site Condition and Job Completeness

Actual scope of work undertaken matches that described within the Plan of Work	/	Enclosures/Airlocks clean, intact and operating	/
Site supervisor has declared all asbestos has been removed as specified in the plan of work	/	Air extraction (NPU) and ducting clean, intact and operating	/
Site supervisor has undertaken visual assessment of the enclosure and declared it ready for clearance	/	Hygiene facilities clean, intact and operating	/
Work area/site compound appears free from obvious asbestos debris and asbestos waste	/	**Stage 1 Assessment**	Pass / Fail
Skip area, transit & waste routes appear free from obvious asbestos debris and asbestos waste	/	Assessed by:	T. Reilly
Viewing panels and / or CCTV are present and suitable for pre assessment of enclosure entry	/	Signature	Tony Reilly
Hygiene facilities appear free from obvious asbestos debris and asbestos waste	/	Date	Time
Enclosures/Airlocks appears free from obvious asbestos debris and asbestos waste	/	05/09/2017	09:40

Stage 2 of 4 - Thorough Visual Inspection

Airlock/baglock/enclosures are free of waste bags, materials, settled dust, debris and unnecessary equipment	/	**Stage 2 Assessment**	Pass / Fail
Enclosure is dry for inspection	X	Assessed by:	T. Reilly
ALL ACMs have been completely removed from the underlying surfaces as far as is reasonably practicable	/	Signature	Tony Reilly
Any ACMs remaining in situ are encapsulated	N/A	Date	Time
There is no evidence of the use of lock down sprays	/	05/09/2017	10:55

Comments: **See AP001674-04 A.M 08 for clearance notes.**

50 Minutes

Stage 3 of 4 - Clearance Air Monitoring Inside the Enclosure

All air movers (NPUs) are off and sealed.	/	**Stage 3 Assessment**	Pass / Fail
Brush disturbance of 1.5 minutes per pump (3 minute minimum) has been completed	/	Assessed by:	T.Reilly
80% of air samples taken were <0.010f/ml and all samples were <0.015f/ml (unless 4 or fewer samples were taken in which case all were <0.010f/ml)	/	Signature	Tony Reilly
Area or volume of enclosure (m^2 / m^3)	40m2	Date	Time
Number of air samples collected	2	05/09/2017	12:35

Stage 4 of 4 - Assessment of Site for Reoccupation (after enclosure is removed)

Former enclosure area and immediate surroundings are free from obvious asbestos debris and waste sacks	/	**Stage 4 Assessment**	Pass / Fail
Transit and waste routes are free from any obvious asbestos debris, asbestos sacks and waste	/	Assessed by:	T.Reilly
All ACMs in the scope of work have been removed and any known ACMs remaining are encapsulated and intact	/	Signature	Tony Reilly
All former enclosure materials have been removed	/	Date	Time
The area **can be reoccupied**	/	08/09/2017	3:00 PM

Issue of Certificate of Reoccupation

The assessor has informed the contractor representative that this certificate **can not be issued** because the area has failed stage.....	
The assessor has informed the contractor representative that this certificate **can be issued** as the area has passed all four stages	/

Contractor representative name:	Signature:	Time of this acknowledgement:
James Bradley		08:30
Assessor name:	**Signature:**	**Date of this acknowledgement:**
T. Reilly	Tony Reilly	11/09/2017
Copies of this certificate and attachments ASB1 and ASB2 were issued to:	Santia/Kaefer/Balfour Beatty/UoM	

Santia Asbestos Management Limited, also trading as FIRSTORDERRED

The four stage clearance process referred to in this report was conducted in accordance with in-house methods based on guidance contained in HSE document HSG 248. Any interpretations and opinions expressed in this report are outside the scope of UKAS accreditation.

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Attachment A7 – Notification of unexpected contamination to MCC Contaminated Land Team

Del Harrison

From: Del Harrison
Sent: 10 August 2017 17:20
To: 'Laura Miller'
Cc: 'Rogan, Ashley'; Kelly, John
Subject: 11758/FO/2016/C1: Notification of unexpected contamination

Hello Laura,

I hope you're well. The purpose of this email is to inform you that some unexpected asbestos contamination has been found at MECD during the earthworks in the area of the Aquatics Centre car park. It was a condition of the planning consent (Ref. 11758/FO/2016/C1) that any unexpected contamination found during construction was to be notified to MCC. Please accept this email as formal notification on behalf of the Main Contractor, Balfour Beatty.

On 31st July 2017, during general excavations in the Aquatics Centre car park, an old boiler was found buried in the ground. The boiler was removed and testing carried out for asbestos carried out. This confirmed the presence of asbestos to the boiler itself and also the stockpile of material removed from around the boiler. A specialist asbestos consultant has been brought in by the University of Manchester, who is advising on the steps to be taken to make the area safe, remove any residual contamination from the ground, and remove the boiler and excavated contaminated material from site.

Balfour Beatty is liaising with the Aquatics centre to make them aware of the issue and work has been stopped in the car park whilst the asbestos contamination is removed.

If you require any further information, please do not hesitate to contact me.

Best wishes,

Del

Delyth Harrison
Senior Scientist | Environmental Geotechnics
BSc(Hons) MSc MCIWEM C.WEM CSci

Arup
9th Floor, 3 St Paul's Place, Norfolk Street, Sheffield S1 2JE, United Kingdom
d: +44 114 283 3632 m: +44 77 8831 7936

Attachment A8 – Balfour Beatty waste transfer information, including landfill destinations

WASTE TRANSFER NOTE REFERENCES [redacted]

BALFOUR BEATTY

WTN number	Material	EWR Code	Carrier	Facility (BB Sustainability Portal ref)
WTN001	Concrete	17-01-01	Mahers	**Daniel Adamson Road – Salford Yard** (EPR/GB3930DG)
WTN002	Contam / Soil & Stones / Non-haz	17-05-04	Mahers	**CHURCHILL Fletcher Bank** (EPR/RP3098VD) WML102210
WTN003	Contam / Soil & Stones / Non-haz	17-05-04	Mahers	**Daniel Adamson Road – Salford Yard** (EPR/GB3930DG)
WTN004	Contam / Soil & Stones / Non-haz	17-05-04	Mahers	**CHURCHILL Woolston / Thelwall** (WML50470)
WTN005	Green	20-02-02	Mahers	**Ashton Old Road / A.O.R.** (WML104212)
WTN006	Concrete	17-01-01	Mahers	**Ashton Old Road / A.O.R.** (WML104212)
WTN007	Contam / Soil & Stones / Non-haz	17-05-04	Mahers	**Langley Road (WML104215)**
WTN008	Contam / Soil & Stones / Non-haz	17-05-04	Mahers	**Ashton Old Road / A.O.R.** (WML104212)

DG CUMMINS

WTN number	Material	EWR Code	Carrier	Facility (BB Sustainability Portal ref)
CMWTN001	Inert / Soil & Stones	17-05-04	**DG Cummins** CBDU 75394 Sunnycroft, Wellbank Lane, Over Peover, WA16 8TZ	**DG Cummins** WML 402829 Aggregates Yard, Plot 3, New Cheshire Business Park, Wincham Lane, Wincham, CW9 6GG

EXPANDED

WTN number	Material	EWR Code	Carrier	Facility (BB Sustainability Portal ref)
EXWTN001	Inert / Soil & Stones	17-05-04	**J O'Shea & Sons Ltd.** CBDU 90839	**J O'Shea & Sons Ltd,** WML 50093
EXWTN002	General mixed waste	17-09-04	**Kenny Waste Management** CBDU 76122	**Kenny Waste Management** WML 50155
EXWTN003	Mixed metal waste	17-04-07	**European Metal Recycling** CBDU 188448	**EMR Salford** WML 50065
EXWTN004	Mixed soils	17-05-04	**PP O'Connor Ltd** CBDU 101751	**PP O'Connor Ltd.** WML 401005

W. Maher & Sons Ltd.
Civil Engineering Contractors

W. MAHER & SONS LTD.
Soapstone Way, off Fairhills Road, Irlam, Manchester M44 6RA
T : 0161 776 2200 F : 0161 848 7357
E : enquiries@wmaherandsons.com
W : www.wmaherandsons.com

Waste Transfer Note

WTN004 -

SECTION A – DESCRIPTION OF WASTE

EWC Code *(Tick one box only)*

	17:01:01	Concrete	✓	17:05:04	Soil and stones (excl. dangerous substances)
	17:01:02	Bricks		17:09:04	Mixed construction and demolition waste
	17:01:07	Concrete, brick and tile			OTHER –Contact H.O. for correct code
Description		AS ANALYSIS PROVIDED			

How is the waste Contained

8 Wheel Tipper ☑ Other (describe) ☐ _____

SECTION B – HOLDER / PRODUCER OF THE WASTE

SIC 4 3 1 1 0

Holder / Producer: BALFOUR BEATTY

Location/address of the Collection Point: MECD, GROSVENOR ST, MANCHESTER M1 7HL

Declaration (by Holder)
I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England & Wales) Regulations 2011.

Name: T Davies. Signature: A BARLEY.

SECTION C – PERSON COLLECTING THE WASTE (CARRIER)

SIC 4 9 4 1 0

Carrier: W Maher & Sons Ltd

Carrier Address: Soapstone Way, off Fairhills Road, Irlam, Manchester M44 6RA

Carrier Registration No.: CBDU90617 Expiry Date: 25/03/2019 Issued by: Environment Agency

Date of Transfer: 3/11/16 – 31/8/17 (for multiple consignments, state duration)

Name: KF McEnaney Signature: Kevin McEnaney

SECTION D – DISPOSAL / RECOVERY FACILITY

Facility Operator: Churchill Enviro Ltd

Facilty Address: Woolston Deposit Ground, Manchester Road, Warrington

Facility Permit No.: EAWML/50470

Date of Transfer: 3/11/16 – 31/8/17 (for multiple consignments, state duration)

Name: T. Annis Signature: T. Annis

IF WASTE IS SENT DIRECTLY TO A LANDFILL SITE IN ENGLAND OR WALES THE FOLLOWING DECLARATION MUST BE SIGNED (BY CARRIER).

I/We confirm that the waste delivered by the above named company has been treated as highlighted below.

The material has gone through a physical, thermal, chemical or biological process including: sorting characteristics of the waste have been changed/volume has been reduced/ hazardous nature has been reduced/handling has been facilitated/recovery has been enhanced. (Delete as required)

Name: Signature:

DISTRIBUTION:	WHITE – HOLDER	YELLOW - OFFICE	BLUE - FACILITY OPERATOR

THIS DOCUMENT MUST BE RETAINED UNTIL 2 YEARS AFTER LAST TRANSFER DATE SHOWN IN SECTION D :



Detailed Public Register Information

'Environmental Permits (Waste Operations)' by **'PostCode Search'** - '5 km' - 'wa3 6dr'

YP3794CN/A001--Churchill Enviro Ltd

Pre – EA Permit Ref:	50470
Waste Management Licence No:	50470
Site Type:	A25
EPR Ref:	YP3794CN/A001
Site Address:	Land/premises At, Off Thelwall Lane, Thelwall, Warrington, Cheshire
Site PostCode:	WA3 6DU
Licence Holder Name:	Churchill Enviro Ltd
Trading Name:	N/A
Site Name:	Woolston Deposit Ground
NGR:	SJ6697288807
Easting:	366972
Northing:	388807
Status Description:	Issued
Issued Date:	30/04/2007
Variation Date:	N/A
Transfer Date:	N/A
Date Effective:	N/A
Surrendered Date:	N/A
Revoked Date:	N/A
Suspended Date:	N/A
Region:	North West
Area:	South

Balfour Beatty

Standard Form Waste Transfer Note

Construction Services UK

Project No: CRMA0076 **WTN No:** 002

SECTION A – DESCRIPTION OF WASTE

1. Waste Classification:- Contaminated Non Hazardous 17.05.04

2. How is the waste contained?

   Loose ✓ Sacks ☐ Skip ☐ Drum ☐ Other (describe) ☐

3. What is the quantity of waste (number of sacks, weight, etc.)

SECTION B – CURRENT HOLDER OF THE WASTE (HOLDER)

Producer of the Waste: Balfour Beatty

SIC code 41201 – Construction of commercial buildings

Location/address of the Collection: MECD Site, Grosvenor Street, Manchester M1 7HL

SECTION C – PERSON COLLECTING THE WASTE (CARRIER)

Name of Company: W Maher and Sons

Address of Company: Soapstone Way, Off Fairhills Road, Irlam, Manchester M44 6RA

Registered Carrier No: CBDU90617 Expiry Date: 25/3/19

Issued by: Environment Agency

Validity Verified by: Date:

Vehicle Identification (if not identified on carriers notes):

SECTION D – WASTE DISPOSAL SITE

1. Name and Address of Disposal Site: Churchill Enviro Limited Fletcher Bank Quarry
2. Disposal Site Licence No: EPR/RP3098VD
3. Validity Verified by: Date:
4. Date of Transfer: 5. Time of Transfer:

(for multiple consignments give "between" dates): 3rd November 2016 to August 2017

SECTION E - SIGNATURES

	Holder (Required)	Carrier (Required)	Disposal Site (Optional)
Full Name (Block Capitals):	M. CRAYTON	Paul Garside	Terry Annis
Signature:			
Date:		11 NOV 2016	11/11/16

ENGLAND AND WALES ONLY

By signing below I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011

Function Owner: Heather Bryant	Document Owner: Morwenna Vinall



Detailed Public Register Information

'Environmental Permits (Waste Operations)' by 'PostCode Search' - '5 km' - 'bl0 0dd'

RP3098VD/A001--Churchill Enviro Ltd

Pre – EA Permit Ref:	N/A
Waste Management Licence No:	102210
Site Type:	SR/08
EPR Ref:	RP3098VD/A001
Site Address:	Fletcher Bank, Ramsbottom, Bury, Lancashire
Site PostCode:	BL0 0HD
Licence Holder Name:	Churchill Enviro Ltd
Trading Name:	N/A
Site Name:	Fletcher Bank Quarry
NGR:	SD8043717085
Easting:	380437
Northing:	417085
Status Description:	Issued
Issued Date:	02/02/2011
Variation Date:	N/A
Transfer Date:	N/A
Date Effective:	N/A
Surrendered Date:	N/A
Revoked Date:	N/A
Suspended Date:	N/A
Region:	North West
Area:	South

Licence IPPC Transfer Date:	N/A
Licence IPPC Reference:	N/A
Request Documents	☐

Back Request Documents

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Author: The Environment Agency | enquiries@environment-agency.gov.uk

Last updated: 07 December 2012

Balfour Beatty

Standard Form Waste Transfer Note

Construction Services UK

Project No: CRMA0076 **WTN No:** 003

SECTION A – DESCRIPTION OF WASTE

1. Waste Classification:- Contaminated Non-Hazardous 17.05 04

2. How is the waste contained?

Loose ✓ Sacks ☐ Skip ☐ Drum ☐ Other (describe) ☐ _____

3. What is the quantity of waste (number of sacks, weight, etc.) _____

SECTION B – CURRENT HOLDER OF THE WASTE (HOLDER)

Producer of the Waste: Balfour Beatty SIC code 43110 - Demolition

Location/address of the Collection: MECD Site, Grosvenor Street, Manchester M1 7HL ☐

SECTION C – PERSON COLLECTING THE WASTE (CARRIER)

Name of Company: W Maher and Sons

Address of Company: Soapstone Way, Off Fairhills Road, Irlam, Manchester M44 6RA

Registered Carrier No: CBDU90617 Expiry Date: 25/3/19

Issued by: Environment Agency

Validity Verified by: M Clarke Date: _____

Vehicle Identification (if not identified on carriers notes): _____

SECTION D – WASTE DISPOSAL SITE

1. Name and Address of Disposal Site: Daniel Adamson Road, Salford M50 1DT
2. Disposal Site Licence No: EPR/GB3930DG
3. Validity Verified by: M Clarke Date: 12 Nov 2016
4. Date of Transfer: _____ 5. Time of Transfer: _____

(for multiple consignments give "between" dates): 3rd November 2016 to August 2017

SECTION E - SIGNATURES

	Holder (Required)	Carrier (Required)	Disposal Site (Optional)
Full Name (Block Capitals):	M. CRAYTON	Paul Garside	Paul Garside
Signature:	M Clarke	P Garside	P Garside
Date:	12 Nov 2016	11 Nov 2016	11 Nov 2016

ENGLAND AND WALES ONLY

By signing below I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011

Signed: _____ **Position:** _____ **Date:** _____

Function Owner: Heather Bryant	Document Owner: Morwenna Vinall



Detailed Public Register Information

'Environmental Permits (Waste Operations)' by **'PostCode Search'** - '5 km' - 'm50 1dt'

GB3930DG/A001--W Maher & Sons Ltd

Pre – EA Permit Ref:	N/A
Waste Management Licence No:	104213
Site Type:	SR/12
EPR Ref:	GB3930DG/A001
Site Address:	Waste Recycling Depot, Daniel Adamson Road, Salford, Lancs
Site PostCode:	M50 1DT
Licence Holder Name:	W Maher & Sons Ltd
Trading Name:	N/A
Site Name:	Waste Recycling Depot
NGR:	SJ7967798080
Easting:	379677
Northing:	398080
Status Description:	Issued
Issued Date:	10/05/2012
Variation Date:	N/A
Transfer Date:	N/A
Date Effective:	N/A
Surrendered Date:	N/A
Revoked Date:	N/A
Suspended Date:	N/A
Region:	North West
Area:	South

Licence IPPC Transfer Date:	N/A
Licence IPPC Reference:	N/A
Request Documents	☐

Back Request Documents

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Author: The Environment Agency | enquiries@environment-agency.gov.uk
Last updated: 07 December 2012

Back (https://www.wastecarriersregistration.service.gov.uk/user/56cf0826776372136cb00800/registrations?locale=en)

ertificate of Registration under the Waste ngland and Wales) Regulations 2011

gulation authority

ame	Environment Agency
ldress	National Customer Service Centre 99 Parkway Avenue Sheffield S9 4WF
lephone number	03708 506506

ıe Environment Agency certify that the following information is entered in the gister which they maintain under regulation 28 of the Waste (England and ales) Regulations 2011.

ırriers details

ame of registered carrier	W. MAHER AND SONS LTD
gistered as	an upper tier waste carrier
gistration number	CBDU90617
ldress of place of business	W. MAHER AND SONS LTD W MAHER & SONS LTD SOAPSTONE WAY IRLAM MANCHESTER M44 6RA
lephone number	01617762200
ıte of registration	Thursday 25th February 2016
piry date of registration (unless revoked)	Monday 25th March 2019

aking changes to your registration

ıur registration will last 3 years and will need to be renewed after this period. If ıy of your details change, you must notify us within 28 days of the change.

MECD Advance works - Muck away

10/03/2017	65355	Mahers	MKD	Saturated piling platform material	F.B	8 Wheeler
10/03/2017	64341	Mahers	YHF	Saturated piling platform material	F.B	8 Wheeler
10/03/2017	65354	Mahers	MKD	Saturated piling platform material	F.B	8 Wheeler
10/03/2017	67052	Mahers	XDV	Saturated piling platform material	F.B	8 Wheeler
10/03/2017	37940	Mahers	YHL	Saturated piling platform material	F.B	8 Wheeler
13/03/2017	54363	Mahers	YHF	Saturated piling platform material	F.B	8 Wheeler
13/03/2017	16162	Mahers	RHF	Saturated piling platform material	F.B	8 Wheeler
13/03/2017	10276	Mahers	XDU	Saturated piling platform material	F.B	8 Wheeler
13/03/2017	37944	Mahers	YHZ	Saturated piling platform material	F.B	8 Wheeler
13/03/2017	54361	Mahers		Saturated piling platform material	F.B	8 Wheeler
13/03/2017	16160	Mahers	RHF	Saturated piling platform material	F.B	8 Wheeler
13/03/2017	10273	Mahers	XDU	Saturated piling platform material	F.B	8 Wheeler
13/03/2017	69118	Mahers	YHB	Saturated piling platform material	F.B	8 Wheeler
13/03/2017	37942	Mahers	YHZ	Saturated piling platform material	F.B	8 Wheeler
13/03/2017	65356	Mahers	MKD	Saturated piling platform material	F.B	8 Wheeler
13/03/2017	10275	Mahers	XDU	Saturated piling platform material	F.B	8 Wheeler
13/03/2017	54362	Mahers	YHF	Saturated piling platform material	F.B	8 Wheeler
13/03/2017	16161	Mahers	RHF	Saturated piling platform material	F.B	8 Wheeler
13/03/2017	69119	Mahers	YHB	Saturated piling platform material	F.B	8 Wheeler
13/03/2017	65357	Mahers	MKD	Saturated piling platform material	F.B	8 Wheeler
13/03/2017	37943	Mahers	YHZ	Saturated piling platform material	F.B	8 Wheeler
13/03/2017	65358	Mahers	MKD	Saturated piling platform material	F.B	8 Wheeler
17/03/2017	18675	Mahers	XDU	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	19282	Mahers	YHG	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	18678	Mahers	XDU	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	19403	Mahers	RHF	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	19402	Mahers	RHF	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	17572	Mahers	ZNJ	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	18676	Mahers	XDU	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	77439	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	17571	Mahers	ZNJ	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	18679	Mahers	XDU	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	19283	Mahers	YHN	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	77442	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	77440	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	19280	Mahers	YHG	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	18677	Mahers	XDU	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	19281	Mahers	YHG	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	17573	Mahers	ZNJ	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	77441	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler
17/03/2017	19279	Mahers	YHG	South Oddfellows Piling Platform	F.B	8 Wheeler
20/03/2017	59801	Mahers	YHN	South Oddfellows Piling Platform	F.B	8 Wheeler
20/03/2017	63629	Mahers	RKU	South Oddfellows Piling Platform	F.B	8 Wheeler
20/03/2017	77444	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler
20/03/2017	64126	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler
20/03/2017	63631	Mahers	RKU	South Oddfellows Piling Platform	F.B	8 Wheeler
20/03/2017	77446	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler
20/03/2017	59804	Mahers	YHN	South Oddfellows Piling Platform	F.B	8 Wheeler
20/03/2017	16766	Mahers	YHA	South Oddfellows Piling Platform	F.B	8 Wheeler
20/03/2017	63632	Mahers	RKU	South Oddfellows Piling Platform	F.B	8 Wheeler
20/03/2017	77447	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler
20/03/2017	59805	Mahers	YHN	South Oddfellows Piling Platform	F.B	8 Wheeler
20/03/2017	16767	Mahers	YHA	South Oddfellows Piling Platform	F.B	8 Wheeler
20/03/2017	63633	Mahers	RKU	South Oddfellows Piling Platform	F.B	8 Wheeler
20/03/2017	77445	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler
20/03/2017	59803	Mahers	YHN	South Oddfellows Piling Platform	F.B	8 Wheeler
20/03/2017	16765	Mahers	YHA	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	77450	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler

21/03/2017	51522	Mahers	YHD	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	16769	Mahers		South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	11835	Mahers	ZST	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	57443	Mahers	XDH	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	16770	Mahers	YHA	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	11836	Mahers	ZST	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	57444	Mahers	XDH	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	16402	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	51524	Mahers	YHD	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	16771	Mahers	YHA	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	57445	Mahers	XDH	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	16404	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	57446	Mahers	XDH	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	11838	Mahers	ZST	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	51526	Mahers	YHD	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	16773	Mahers	YHA	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	18707	Mahers		South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	16772	Mahers	YHA	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	51525	Mahers	YHD	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	11837	Mahers	ZST	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	16403	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler
21/03/2017	51523	Mahers	YHD	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	77485	Mahers	YHC	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	64283	Mahers	YHF	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	16775	Mahers	YHA	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	64281	Mahers	YHP	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	58205	Mahers	XDH	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	77483	Mahers	YHC	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	16406	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	16774	Mahers	YHA	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	58204	Mahers	XDH	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	77482	Mahers	YHC	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	64280	Mahers	YHF	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	16407	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	16408	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	16776	Mahers	YHA	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	77484	Mahers	YHC	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	64282	Mahers	YHF	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	58206	Mahers	XDH	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	16409	Mahers	MKE	South Oddfellows Piling Platform	F.B	8 Wheeler
22/03/2017	58207	Mahers	XDH	South Oddfellows Piling Platform	F.B	8 Wheeler
23/03/2017	16103	Mahers	YHJ	MEC Hall & York St Pile Arisings	F.B	8 Wheeler
23/03/2017	16416	Mahers	XDS	MEC Hall & York St Pile Arisings	F.B	8 Wheeler
23/03/2017	25455	Mahers	YHC	MEC Hall & York St Pile Arisings	F.B	8 Wheeler
23/03/2017	58213	Mahers	XDH	MEC Hall & York St Pile Arisings	F.B	8 Wheeler
23/03/2017	64290	Mahers	MKF	MEC Hall & York St Pile Arisings	F.B	8 Wheeler
23/03/2017	16417	Mahers	XDS	MEC Hall & York St Pile Arisings	F.B	8 Wheeler
07/04/2017	25531	Mahers	RHF	MEC Hall & York St Pile Arisings	S.Y	8 Wheeler
07/04/2017	25337	Mahers	YHP	MEC Hall & York St Pile Arisings	S.Y	8 Wheeler
07/04/2017	25544	Mahers	RHF	MEC Hall & York St Pile Arisings	S.Y	8 Wheeler
07/04/2017	18502	Mahers	MKE	MEC Hall & York St Pile Arisings	S.Y	8 Wheeler
07/04/2017	25546	Mahers	RHF	MEC Hall & York St Pile Arisings	S.Y	8 Wheeler
07/04/2017	25548	Mahers	RHF	MEC Hall & York St Pile Arisings	S.Y	8 Wheeler
07/04/2017	25545	Mahers	RHF	MEC Hall & York St Pile Arisings	S.Y	8 Wheeler
07/04/2017	25547	Mahers	RHF	MEC Hall & York St Pile Arisings	S.Y	8 Wheeler
07/04/2017	25335	Mahers	YHP	MEC Hall & York St Pile Arisings	S.Y	8 Wheeler

MECD Advance works - Muck away

Date	Ticket No	Haulier	Reg	Waste from	Deposit	Vehicle type
03/11/2016	50116	Mahers	YHF	TP3, TP24	F-Bank	8 Wheeler
29/11/2016	83947	Mahers	YHA	North basement muck	S.Y	8 Wheeler
29/11/2016	48669	Mahers	RHT	away	F.B	8 Wheeler
29/11/2016	43190	Mahers	XDF		F.B	8 Wheeler
29/11/2016	38329	Mahers	XDG		F.B	8 Wheeler
29/11/2016	38328	Mahers	XDG		F.B	8 Wheeler
29/11/2016	26347	Mahers	XDP		F.B	8 Wheeler
29/11/2016	43189	Mahers	XDF		F.B	8 Wheeler
29/11/2016	48668	Mahers	RHT		F.B	8 Wheeler
29/11/2016	83942	Mahers	YHA		S.Y	8 Wheeler
29/11/2016	48667	Mahers	RHT		F.B	8 Wheeler
29/11/2016	40788	Mahers	YHC		S.Y	8 Wheeler
29/11/2016	40784	Mahers	YHC		S.Y	8 Wheeler
29/11/2016	38327	Mahers	XDG		F.B	8 Wheeler
29/11/2016	40786	Mahers	YHC		S.Y	8 Wheeler
29/11/2016	83940	Mahers	YHA		S.Y	8 Wheeler
29/11/2016	83938	Mahers	YHA		S.Y	8 Wheeler
29/11/2016	48666	Mahers	RHT		F.B	8 Wheeler
29/11/2016	83936	Mahers	YHA		S.Y	8 Wheeler
29/11/2016	40782	Mahers	YHC		S.Y	8 Wheeler
29/11/2016	38326	Mahers	XDG		F.B	8 Wheeler
29/11/2016	43184	Mahers	XDF		F.B	8 Wheeler
29/11/2016	26342	Mahers	XDP		F.B	8 Wheeler
29/11/2016	38030	Mahers	YHD		F.B	8 Wheeler
29/11/2016	38325	Mahers	XDG		F.B	8 Wheeler
29/11/2016	48665	Mahers	RHT		F.B	8 Wheeler
30/11/2016	51775	Mahers	YHJ		F.B	8 Wheeler
30/11/2016	50571	Mahers	MKD		TIP	8 Wheeler
30/11/2016	44103	Mahers	RKN		TIP	8 Wheeler
30/11/2016	21610	Mahers	YHA		S.Y	8 Wheeler
30/11/2016	38926	Mahers	YHN		T.W	8 Wheeler
30/11/2016	40591	Mahers	ZNJ		F.B	8 Wheeler
30/11/2016	50569	Mahers	MKD		S.Y	8 Wheeler
30/11/2016	52638	Mahers	XDJ		S.Y	8 Wheeler
30/11/2016	21608	Mahers	YHA		S.Y	8 Wheeler
30/11/2016	44102	Mahers	RKN		TIP	8 Wheeler
30/11/2016	50567	Mahers	MKD		S.Y	8 Wheeler
30/11/2016	53739	Mahers	YHM		F.B	8 Wheeler
30/11/2016	41040	Mahers	MKJ		F.B	8 Wheeler
30/11/2016	52634	Mahers	XDJ		S.Y	8 Wheeler
30/11/2016	50563	Mahers	MKD		S.Y	8 Wheeler
30/11/2016	52632	Mahers	XDJ		S.Y	8 Wheeler
30/11/2016	38924	Mahers	YHN		F.B	8 Wheeler
30/11/2016	52640	Mahers	XDJ		S.Y	8 Wheeler
30/11/2016	53740	Mahers	YHM		F.B	8 Wheeler
30/11/2016	52715	Mahers	XDP		S.Y	8 Wheeler
30/11/2016	52636	Mahers	XDJ		S.Y	8 Wheeler
30/11/2016	40590	Mahers	ZNJ		F.B	8 Wheeler
30/11/2016	38925	Mahers	YHN		F.B	8 Wheeler
30/11/2016	52713	Mahers	XDP		S.Y	8 Wheeler
30/11/2016	52630	Mahers	XDJ		S.Y	8 Wheeler
30/11/2016	50561	Mahers	MKD		S.Y	8 Wheeler
30/11/2016	52707	Mahers	XDP		S.Y	8 Wheeler
30/11/2016	38923	Mahers	YHN		F.B	8 Wheeler
30/11/2016	40588	Mahers	ZNJ		F.B	8 Wheeler
30/11/2016	53737	Mahers	YHM		F.B	8 Wheeler
30/11/2016	50559	Mahers	MKD		S.Y	8 Wheeler
30/11/2016	52628	Mahers	XDJ		S.Y	8 Wheeler
30/11/2016	52705	Mahers	XDP		S.Y	8 Wheeler
30/11/2016	51773	Mahers			F.B	8 Wheeler
30/11/2016	21604	Mahers	YHA		S.Y	8 Wheeler
30/11/2016	50557	Mahers	MKD		S.Y	8 Wheeler
30/11/2016	44099	Mahers	RKN		TIP	8 Wheeler
30/11/2016	38922	Mahers	YHN		F.B	8 Wheeler
30/11/2016	40587	Mahers	ZNJ		F.B	8 Wheeler
30/11/2016	53735	Mahers	YHM		F.B	8 Wheeler
30/11/2016	50555	Mahers	MKD		S.Y	8 Wheeler
30/11/2016	52703	Mahers	XDP		S.Y	8 Wheeler
30/11/2016	21602	Mahers	YHA		S.Y	8 Wheeler
30/11/2016	51772	Mahers	YHJ		F.B	8 Wheeler
30/11/2016	44100	Mahers	RKN		TIP	8 Wheeler
30/11/2016	52709	Mahers	XDP		S.Y	8 Wheeler
30/11/2016	44101	Mahers	RKN		TIP	8 Wheeler

30/11/2016	40589 Mahers	ZNJ	F.B	8 Wheeler
30/11/2016	53738 Mahers	YHM	F.B	8 Wheeler
30/11/2016	51774 Mahers	YHJ	F.B	8 Wheeler
01/12/2016	52644 Mahers	XDJ	S.Y	8 Wheeler
01/12/2016	21616 Mahers	YHA	S.Y	8 Wheeler
01/12/2016	52724 Mahers	XDP	S.Y	8 Wheeler
01/12/2016	52646 Mahers	XDJ	S.Y	8 Wheeler
01/12/2016	21619 Mahers	YHA	S.Y	8 Wheeler
01/12/2016	52648 Mahers	XDJ	S.Y	8 Wheeler
01/12/2016	52726 Mahers	XDP	S.Y	8 Wheeler
01/12/2016	21621 Mahers	YHA	S.Y	8 Wheeler
01/12/2016	50581 Mahers	MKD	S.Y	8 Wheeler
01/12/2016	52728 Mahers	XDP	S.Y	8 Wheeler
01/12/2016	52650 Mahers	XDJ	S.Y	8 Wheeler
01/12/2016	50584 Mahers	MKD	S.Y	8 Wheeler
01/12/2016	21623 Mahers	YHA	S.Y	8 Wheeler
01/12/2016	52730 Mahers	XDP	S.Y	8 Wheeler
01/12/2016	53952 Mahers	XDJ	S.Y	8 Wheeler
01/12/2016	50586 Mahers	MKD	S.Y	8 Wheeler
01/12/2016	21625 Mahers	YHA	S.Y	8 Wheeler
01/12/2016	25225 Mahers		T.W	8 Wheeler
01/12/2016	50588 Mahers	MKD	S.Y	8 Wheeler
01/12/2016	53918 Mahers	MKG	S.Y	8 Wheeler
01/12/2016	21627 Mahers	YHA	S.Y	8 Wheeler
01/12/2016	53956 Mahers	XDJ	S.Y	8 Wheeler
01/12/2016	49934 Mahers	YHO	F.B	8 Wheeler
01/12/2016	52722 Mahers	XDP	S.Y	8 Wheeler
01/12/2016	21615 Mahers	YHA	S.Y	8 Wheeler
01/12/2016	51777 Mahers	YHJ	F.B	8 Wheeler
01/12/2016	21613 Mahers	YHA	S.Y	8 Wheeler
01/12/2016	40593 Mahers	ZNJ	F.B	8 Wheeler
01/12/2016	52717 Mahers	XDP	S.Y	8 Wheeler
01/12/2016	53742 Mahers	YHM	F.B	8 Wheeler
01/12/2016	38928 Mahers	YHN	F.B	8 Wheeler
01/12/2016	50573 Mahers	MKD	S.Y	8 Wheeler
01/12/2016	52642 Mahers	XDJ	S.Y	8 Wheeler
01/12/2016	44105 Mahers	RKN	TIP	8 Wheeler
01/12/2016	52720 Mahers	XDP	S.Y	8 Wheeler
01/12/2016	53954 Mahers	XDJ	S.Y	8 Wheeler
02/12/2016	51996 Mahers	XDV	F.B	8 Wheeler
02/12/2016	37342 Mahers	YRE	F.B	8 Wheeler
02/12/2016	29445 Mahers		F.B	8 Wheeler
02/12/2016	48980 Mahers	YHB	F.B	8 Wheeler
02/12/2016	38937 Mahers	YHN	F.B	8 Wheeler
02/12/2016	56501 Mahers	MKD	F.B	8 Wheeler
02/12/2016	50004 Mahers	ZWJ	F.B	8 Wheeler
02/12/2016	51786 Mahers	YHJ	F.B	8 Wheeler
02/12/2016	38347 Mahers	XDG	F.B	8 Wheeler
02/12/2016	55101 Mahers	YHM	F.B	8 Wheeler
02/12/2016	50001 Mahers	ZNJ	F.B	8 Wheeler
02/12/2016	48977 Mahers	YHB	F.B	8 Wheeler
02/12/2016	37338 Mahers		F.B	8 Wheeler
02/12/2016	40599 Mahers	ZNJ	F.B	8 Wheeler
02/12/2016	53749 Mahers	YHM	F.B	8 Wheeler
02/12/2016	52765 Mahers	XDF	F.B	8 Wheeler
02/12/2016	37340 Mahers	YHE	F.B	8 Wheeler
02/12/2016	48979 Mahers	YHB	F.B	8 Wheeler
02/12/2016	51994 Mahers	XDV	F.B	8 Wheeler
02/12/2016	37341 Mahers	YHE	F.B	8 Wheeler
02/12/2016	27799 Mahers		F.B	8 Wheeler
02/12/2016	51784 Mahers	YHJ	F.B	8 Wheeler
02/12/2016	53750 Mahers	YHM	F.B	8 Wheeler
02/12/2016	50003 Mahers	ZNJ	F.B	8 Wheeler
02/12/2016	38936 Mahers	YHN	F.B	8 Wheeler
02/12/2016	51785 Mahers	YHJ	F.B	8 Wheeler
02/12/2016	27800 Mahers		F.B	8 Wheeler
02/12/2016	38346 Mahers	XDG	F.B	8 Wheeler
02/12/2016	51995 Mahers		F.B	8 Wheeler
02/12/2016	38935 Mahers	YHN	F.B	8 Wheeler
02/12/2016	50002 Mahers	ZNJ	F.B	8 Wheeler
02/12/2016	38345 Mahers	XDG	F.B	8 Wheeler
02/12/2016	48978 Mahers	YHB	F.B	8 Wheeler
02/12/2016	38934 Mahers	YHN	F.B	8 Wheeler
02/12/2016	51783 Mahers	YHJ	F.B	8 Wheeler
02/12/2016	27798 Mahers		F.B	8 Wheeler
02/12/2016	38344 Mahers	XDG	F.B	8 Wheeler
02/12/2016	37339 Mahers	YHE	F.B	8 Wheeler

02/12/2016	51782 Mahers	YHT	F.B	8 Wheeler
02/12/2016	27797 Mahers		F.B	8 Wheeler
02/12/2016	38933 Mahers	YHN	F.B	8 Wheeler
02/12/2016	53748 Mahers	YHM	F.B	8 Wheeler
02/12/2016	50590 Mahers	MKD	Thelwall	8 Wheeler
02/12/2016	38343 Mahers	XDG	F.B	8 Wheeler
02/12/2016	21635 Mahers	YHO	S.Y	8 Wheeler
02/12/2016	50597 Mahers	MKD	S.Y	8 Wheeler
02/12/2016	52745 Mahers	XDP	S.Y	8 Wheeler
02/12/2016	50720 Mahers	XDH	S.Y	8 Wheeler
02/12/2016	50599 Mahers	MKD	S.Y	8 Wheeler
05/12/2016	44124 Mahers	RKN	TIP	8 Wheeler
05/12/2016	45829 Mahers		F.B	8 Wheeler
05/12/2016	50805 Mahers	YHP	F.B	8 Wheeler
05/12/2016	41211 Mahers	YHF	F.B	8 Wheeler
05/12/2016	44123 Mahers	RKN	F.B	8 Wheeler
05/12/2016	50087 Mahers		F.B	8 Wheeler
05/12/2016	55107 Mahers	YHM	F.B	8 Wheeler
05/12/2016	41046 Mahers		F.B	8 Wheeler
05/12/2016	51791 Mahers	YHJ	F.B	8 Wheeler
05/12/2016	52168 Mahers		F.B	8 Wheeler
05/12/2016	50010 Mahers	ZNJ	F.B	8 Wheeler
05/12/2016	37881 Mahers	YHL	tip	8 Wheeler
05/12/2016	41047 Mahers	MKJ	F.B	8 Wheeler
05/12/2016	37419 Mahers	OCM	Thelwall	8 Wheeler
05/12/2016	42197 Mahers		F.B	8 Wheeler
05/12/2016	38950 Mahers	YHN	F.B	8 Wheeler
05/12/2016	37418 Mahers	OCM	F.B	8 Wheeler
05/12/2016	50009 Mahers	ZNJ	F.B	8 Wheeler
05/12/2016	45828 Mahers	YHC	F.B	8 Wheeler
05/12/2016	50804 Mahers	YHP	F.B	8 Wheeler
05/12/2016	44122 Mahers	RKN	F.B	8 Wheeler
05/12/2016	55106 Mahers	YHM	F.B	8 Wheeler
05/12/2016	51790 Mahers	YHJ	F.B	8 Wheeler
05/12/2016	42196 Mahers	YHH	F.B	8 Wheeler
05/12/2016	37417 Mahers		F.B	8 Wheeler
05/12/2016	41045 Mahers		F.B	8 Wheeler
05/12/2016	50008 Mahers	ZNJ	F.B	8 Wheeler
05/12/2016	45827 Mahers	YHC	F.B	8 Wheeler
05/12/2016	41210 Mahers	YHF	F.B	8 Wheeler
05/12/2016	52165 Mahers		F.B	8 Wheeler
05/12/2016	50086 Mahers		F.B	8 Wheeler
05/12/2016	38949 Mahers	YHN	F.B	8 Wheeler
05/12/2016	41209 Mahers	YHF	F.B	8 Wheeler
05/12/2016	41208 Mahers	YHF	F.B	8 Wheeler
05/12/2016	37415 Mahers		F.B	8 Wheeler
05/12/2016	48983 Mahers	YHB	F.B	8 Wheeler
05/12/2016	41044 Mahers	MKJ	F.B	8 Wheeler
05/12/2016	50007 Mahers	ZNJ	F.B	8 Wheeler
05/12/2016	42195 Mahers	YHH	F.B	8 Wheeler
05/12/2016	55105 Mahers	YHM	F.B	8 Wheeler
05/12/2016	50803 Mahers	YHP	F.B	8 Wheeler
05/12/2016	50085 Mahers		F.B	8 Wheeler
05/12/2016	44121 Mahers	RKN	F.B	8 Wheeler
05/12/2016	21642 Mahers	YHA	F.B	8 Wheeler
05/12/2016	51789 Mahers	YHJ	F.B	8 Wheeler
05/12/2016	45826 Mahers	YHC	F.B	8 Wheeler
05/12/2016	55103 Mahers	YHM	F.B	8 Wheeler
05/12/2016	50005 Mahers	ZNJ	F.B	8 Wheeler
05/12/2016	51787 Mahers	YHJ	F.B	8 Wheeler
05/12/2016	41042 Mahers	MKJ	F.B	8 Wheeler
05/12/2016	50083 Mahers		F.B	8 Wheeler
05/12/2016	53053 Mahers		F.B	8 Wheeler
05/12/2016	45825 Mahers	YHC	F.B	8 Wheeler
05/12/2016	52164 Mahers		F.B	8 Wheeler
05/12/2016	37414 Mahers	OCM	F.B	8 Wheeler
05/12/2016	41207 Mahers	YHF	F.B	8 Wheeler
05/12/2016	48982 Mahers	YHB	F.B	8 Wheeler
05/12/2016	52163 Mahers		F.B	8 Wheeler
05/12/2016	45824 Mahers	YHC	F.B	8 Wheeler
05/12/2016	42193 Mahers	YHH	F.B	8 Wheeler
05/12/2016	37413 Mahers	OCM	F.B	8 Wheeler
05/12/2016	41206 Mahers	YHF	F.B	8 Wheeler
05/12/2016	44120 Mahers	RKN	F.B	8 Wheeler
05/12/2016	53054 Mahers	MKF	F.B	8 Wheeler
05/12/2016	50084 Mahers		F.B	8 Wheeler
05/12/2016	51788 Mahers	YHJ	F.B	8 Wheeler

05/12/2016	50802 Mahers	YHP	F.B	8 Wheeler
05/12/2016	55104 Mahers	YHM	F.B	8 Wheeler
05/12/2016	50006 Mahers		F.B	8 Wheeler
05/12/2016	41043 Mahers		F.B	8 Wheeler
05/12/2016	21640 Mahers	YHA	F.B	8 Wheeler
05/12/2016	42194 Mahers	YHH	F.B	8 Wheeler
05/12/2016	44119 Mahers	RKN	F.B	8 Wheeler
06/12/2016	52555 Mahers	MKC	F.B	8 Wheeler
06/12/2016	49947 Mahers	YHO	F.B	8 Wheeler
06/12/2016	41216 Mahers	YHF	F.B	8 Wheeler
06/12/2016	37887 Mahers	YHL	F.B	8 Wheeler
06/12/2016	35594 Mahers	YHH	F.B	8 Wheeler
06/12/2016	49948 Mahers	YHO	F.B	8 Wheeler
06/12/2016	50733 Mahers	XDH	F.B	8 Wheeler
06/12/2016	53940 Mahers		F.B	8 Wheeler
06/12/2016	50015 Mahers	ZNJ	F.B	8 Wheeler
06/12/2016	44129 Mahers	RKN	F.B	8 Wheeler
06/12/2016	52174 Mahers		F.B	8 Wheeler
06/12/2016	48989 Mahers	YHB	F.B	8 Wheeler
06/12/2016	52006 Mahers	YHN	F.B	8 Wheeler
06/12/2016	24602 Mahers	MKJ	F.B	8 Wheeler
06/12/2016	45839 Mahers	YHC	F.B	8 Wheeler
06/12/2016	56454 Mahers	OLK	F.B	8 Wheeler
06/12/2016	51687 Mahers		F.B	8 Wheeler
06/12/2016	55112 Mahers	YHM	F.B	8 Wheeler
06/12/2016	42362 Mahers	OLN	F.B	8 Wheeler
06/12/2016	52554 Mahers	MKC	F.B	8 Wheeler
06/12/2016	42361 Mahers	OLN	F.B	8 Wheeler
06/12/2016	41215 Mahers	YHF	F.B	8 Wheeler
06/12/2016	52414 Mahers		F.B	8 Wheeler
06/12/2016	24601 Mahers	MKJ	F.B	8 Wheeler
06/12/2016	50732 Mahers	XDH	F.B	8 Wheeler
06/12/2016	50091 Mahers		F.B	8 Wheeler
06/12/2016	35593 Mahers	YHH	F.B	8 Wheeler
06/12/2016	53939 Mahers		F.B	8 Wheeler
06/12/2016	50014 Mahers		F.B	8 Wheeler
06/12/2016	44128 Mahers	RKN	F.B	8 Wheeler
06/12/2016	48988 Mahers	YHD	F.B	8 Wheeler
06/12/2016	44130 Mahers	RKN	F.B	8 Wheeler
06/12/2016	56455 Mahers	OLK	Thelwall	8 Wheeler
06/12/2016	45840 Mahers	YHC	Thelwall	8 Wheeler
06/12/2016	37888 Mahers	YHL	F.B	8 Wheeler
06/12/2016	52005 Mahers	YHN	F.B	8 Wheeler
06/12/2016	56453 Mahers	OLK	F.B	8 Wheeler
06/12/2016	37886 Mahers	YHL	F.B	8 Wheeler
06/12/2016	55111 Mahers	YHM	F.B	8 Wheeler
06/12/2016	52553 Mahers		F.B	8 Wheeler
06/12/2016	49946 Mahers	YHO	F.B	8 Wheeler
06/12/2016	45835 Mahers	YHC	F.B	8 Wheeler
06/12/2016	55108 Mahers	YHM	F.B	8 Wheeler
06/12/2016	51686 Mahers		F.B	8 Wheeler
06/12/2016	37350 Mahers	OLK	F.B	8 Wheeler
06/12/2016	52002 Mahers	YHN	F.B	8 Wheeler
06/12/2016	50088 Mahers		F.B	8 Wheeler
06/12/2016	41048 Mahers	MKJ	F.B	8 Wheeler
06/12/2016	41212 Mahers	YHF	F.B	8 Wheeler
06/12/2016	49943 Mahers	YHO	F.B	8 Wheeler
06/12/2016	52551 Mahers		F.B	8 Wheeler
06/12/2016	53938 Mahers		F.B	8 Wheeler
06/12/2016	44126 Mahers	RKN	F.B	8 Wheeler
06/12/2016	50731 Mahers	XDH	F.B	8 Wheeler
06/12/2016	35592 Mahers	YHH	F.B	8 Wheeler
06/12/2016	50013 Mahers	ZNJ	F.B	8 Wheeler
06/12/2016	44127 Mahers	RKN	F.B	8 Wheeler
06/12/2016	50090 Mahers		F.B	8 Wheeler
06/12/2016	48987 Mahers	YHB	F.B	8 Wheeler
06/12/2016	52004 Mahers	YHN	F.B	8 Wheeler
06/12/2016	37885 Mahers	YHL	F.B	8 Wheeler
06/12/2016	56452 Mahers	OLK	F.B	8 Wheeler
06/12/2016	52413 Mahers		F.B	8 Wheeler
06/12/2016	41050 Mahers		F.B	8 Wheeler
06/12/2016	41214 Mahers	YHF	F.B	8 Wheeler
06/12/2016	55110 Mahers	YHM	F.B	8 Wheeler
06/12/2016	52173 Mahers		F.B	8 Wheeler
06/12/2016	52552 Mahers	MKC	F.B	8 Wheeler
06/12/2016	42360 Mahers	OLN	F.B	8 Wheeler
06/12/2016	45834 Mahers	YHC	F.B	8 Wheeler

06/12/2016	49945	Mahers	YHO	F.B	8 Wheeler
06/12/2016	50730	Mahers	XDH	F.B	8 Wheeler
06/12/2016	50089	Mahers		F.B	8 Wheeler
06/12/2016	50012	Mahers		F.B	8 Wheeler
06/12/2016	42200	Mahers	YHH	F.B	8 Wheeler
06/12/2016	41049	Mahers	MKJ	F.B	8 Wheeler
06/12/2016	41213	Mahers	YHF	F.B	8 Wheeler
06/12/2016	52412	Mahers		F.B	8 Wheeler
06/12/2016	56451	Mahers	OLK	F.B	8 Wheeler
06/12/2016	52003	Mahers	YHN	F.B	8 Wheeler
06/12/2016	37884	Mahers	YHL	F.B	8 Wheeler
06/12/2016	53937	Mahers		F.B	8 Wheeler
06/12/2016	48986	Mahers	YHB	F.B	8 Wheeler
06/12/2016	55109	Mahers	YHM	F.B	8 Wheeler
06/12/2016	52600	Mahers	RHO	F.B	8 Wheeler
06/12/2016	45833	Mahers	YHC	F.B	8 Wheeler
06/12/2016	42199	Mahers	YHH	F.B	8 Wheeler
06/12/2016	50011	Mahers	ZNJ	F.B	8 Wheeler
06/12/2016	49944	Mahers	YHO	F.B	8 Wheeler
06/12/2016	42359	Mahers	OLN	F.B	8 Wheeler
06/12/2016	44125	Mahers	RKN	F.B	8 Wheeler
06/12/2016	53926	Mahers		F.B	8 Wheeler
06/12/2016	37882	Mahers	YHL	F.B	8 Wheeler
06/12/2016	48985	Mahers	YHB	F.B	8 Wheeler
06/12/2016	41217	Mahers	YHF	F.B	8 Wheeler
06/12/2016	50092	Mahers		F.B	8 Wheeler
06/12/2016	55113	Mahers		F.B	8 Wheeler
06/12/2016	52415	Mahers		F.B	8 Wheeler
07/12/2016	31714	Mahers	RHF	F.B	8 Wheeler
07/12/2016	50019	Mahers	ZNJ	F.B	8 Wheeler
07/12/2016	48994	Mahers	YHB	F.B	8 Wheeler
07/12/2016	24607	Mahers	MKJ	F.B	8 Wheeler
07/12/2016	44135	Mahers	RKN	F.B	8 Wheeler
07/12/2016	31713	Mahers	RHF	F.B	8 Wheeler
07/12/2016	55117	Mahers	YHM	F.B	8 Wheeler
07/12/2016	50020	Mahers	ZNJ	F.B	8 Wheeler
07/12/2016	50096	Mahers		F.B	8 Wheeler
07/12/2016	24606	Mahers	MKJ	F.B	8 Wheeler
07/12/2016	48993	Mahers	YHB	F.B	8 Wheeler
07/12/2016	50095	Mahers	OLG	F.B	8 Wheeler
07/12/2016	50094	Mahers	OLG	F.B	8 Wheeler
07/12/2016	48991	Mahers	YHB	F.B	8 Wheeler
07/12/2016	50093	Mahers	OLG	F.B	8 Wheeler
07/12/2016	24604	Mahers	MKJ	F.B	8 Wheeler
07/12/2016	50017	Mahers		F.B	8 Wheeler
07/12/2016	24605	Mahers	MKJ	F.B	8 Wheeler
07/12/2016	48992	Mahers	YHB	F.B	8 Wheeler
07/12/2016	31711	Mahers	RHF	F.B	8 Wheeler
07/12/2016	55115	Mahers	YHM	F.B	8 Wheeler
07/12/2016	50018	Mahers	ZNJ	F.B	8 Wheeler
07/12/2016	55116	Mahers	YHM	F.B	8 Wheeler
07/12/2016	31712	Mahers	RHF	F.B	8 Wheeler
07/12/2016	24608	Mahers	MKJ	F.B	8 Wheeler
07/12/2016	48995	Mahers	YHB	F.B	8 Wheeler
07/12/2016	50097	Mahers	OLG	F.B	8 Wheeler
07/12/2016	55114	Mahers	YHM	F.B	8 Wheeler
07/12/2016	31710	Mahers	RHF	F.B	8 Wheeler
07/12/2016	44136	Mahers	RKN	F.B	8 Wheeler
07/12/2016	42384	Mahers	YHD	F.B	8 Wheeler
07/12/2016	11310	Mahers	YHC	F.B	8 Wheeler
07/12/2016	50022	Mahers	ZNJ	F.B	8 Wheeler
07/12/2016	50098	Mahers	OLG	F.B	8 Wheeler
07/12/2016	55118	Mahers	YHM	F.B	8 Wheeler
07/12/2016	50021	Mahers	ZNJ	F.B	8 Wheeler
08/12/2016	11311	Mahers	YHC	F.B	8 Wheeler
08/12/2016	53077	Mahers	MKF	F.B	8 Wheeler
08/12/2016	11313	Mahers	YMC	F.B	8 Wheeler
08/12/2016	31718	Mahers	RHF	F.B	8 Wheeler
08/12/2016	41115	Mahers	YHL	Tip	8 Wheeler
08/12/2016	31719	Mahers		Thelwall	8 Wheeler
08/12/2016	56537	Mahers	MKD	Tip	8 Wheeler
08/12/2016	51251	Mahers	YHH	F.B	8 Wheeler
08/12/2016	41122	Mahers	YHL	Thelwall	8 Wheeler
08/12/2016	52680	Mahers	XDP	tip	8 Wheeler
08/12/2016	50027	Mahers	ZNJ	F.B	8 Wheeler
08/12/2016	56904	Mahers		F.B	8 Wheeler
08/12/2016	11314	Mahers	YHC	F.B	8 Wheeler

08/12/2016	56903 Mahers	OLG	F.B	8 Wheeler
08/12/2016	53088 Mahers		Thelwall	8 Wheeler
08/12/2016	25179 Mahers		Thelwall	8 Wheeler
08/12/2016	55124 Mahers	YHM	F.B	8 Wheeler
08/12/2016	52021 Mahers	YHN	Thelwall	8 Wheeler
08/12/2016	50823 Mahers	MKG	F.B	8 Wheeler
08/12/2016	35596 Mahers	YHH	F.B	8 Wheeler
08/12/2016	55120 Mahers	YHM	F.B	8 Wheeler
08/12/2016	55122 Mahers	YHM	F.B	8 Wheeler
08/12/2016	35598 Mahers	YHH	F.B	8 Wheeler
08/12/2016	55123 Mahers	YHM	F.B	8 Wheeler
08/12/2016	50026 Mahers	ZNJ	F.B	8 Wheeler
08/12/2016	35599 Mahers	YHH	F.B	8 Wheeler
08/12/2016	50023 Mahers	ZNJ	F.B	8 Wheeler
08/12/2016	41113 Mahers	YHL	F.B	8 Wheeler
08/12/2016	56529 Mahers		F.B	8 Wheeler
08/12/2016	11312 Mahers	YHC	F.B	8 Wheeler
08/12/2016	53078 Mahers		F.B	8 Wheeler
08/12/2016	55121 Mahers	YHM	F.B	8 Wheeler
08/12/2016	31716 Mahers	RHF	F.B	8 Wheeler
08/12/2016	35597 Mahers	YHH	F.B	8 Wheeler
08/12/2016	50024 Mahers		F.B	8 Wheeler
08/12/2016	56530 Mahers		F.B	8 Wheeler
08/12/2016	41114 Mahers	YHL	F.B	8 Wheeler
08/12/2016	56902 Mahers		F.B	8 Wheeler
08/12/2016	50025 Mahers		F.B	8 Wheeler
08/12/2016	31717 Mahers	RHF	F.B	8 Wheeler
08/12/2016	56901 Mahers	OLG	F.B	8 Wheeler
08/12/2016	41112 Mahers	YHL	F.B	8 Wheeler
08/12/2016	56528 Mahers	MKD	F.B	8 Wheeler
08/12/2016	31715 Mahers	RHF	F.B	8 Wheeler
09/12/2016	28369 Mahers	YHO	Thelwall	8 Wheeler
09/12/2016	50031 Mahers	ZNJ	F.B	8 Wheeler
09/12/2016	55188 Mahers	ZNB	Thelwall	8 Wheeler
09/12/2016	50388 Mahers		F.B	8 Wheeler
09/12/2016	54120 Mahers		F.B	8 Wheeler
09/12/2016	35511 Mahers	RHO	F.B	8 Wheeler
09/12/2016	42395 Mahers	YHD	B/Vale	8 Wheeler
09/12/2016	45484 Mahers	XDG	F.B	8 Wheeler
09/12/2016	50387 Mahers	RHU	F.B	8 Wheeler
09/12/2016	56908 Mahers	OLG	Thelwall	8 Wheeler
09/12/2016	28368 Mahers	YHO	F.B	8 Wheeler
09/12/2016	55127 Mahers	YHM	F.B	8 Wheeler
09/12/2016	35510 Mahers	RHO	F.B	8 Wheeler
09/12/2016	53999 Mahers	XDJ	F.B	8 Wheeler
09/12/2016	56472 Mahers	YHE	F.B	8 Wheeler
09/12/2016	53998 Mahers	XDJ	F.B	8 Wheeler
09/12/2016	50386 Mahers	RHU	F.B	8 Wheeler
09/12/2016	54119 Mahers		F.B	8 Wheeler
09/12/2016	55187 Mahers		F.B	8 Wheeler
09/12/2016	56907 Mahers	OLG	F.B	8 Wheeler
09/12/2016	50030 Mahers		F.B	8 Wheeler
09/12/2016	45483 Mahers	XDG	F.B	8 Wheeler
09/12/2016	11316 Mahers	YHB	F.B	8 Wheeler
09/12/2016	35509 Mahers	RHO	F.B	8 Wheeler
09/12/2016	55126 Mahers	YHM	F.B	8 Wheeler
09/12/2016	50029 Mahers		F.B	8 Wheeler
09/12/2016	31724 Mahers	RHF	Thelwall	8 Wheeler
09/12/2016	28367 Mahers	YHO	F.B	8 Wheeler
09/12/2016	55186 Mahers		F.B	8 Wheeler
09/12/2016	56471 Mahers	YHE	F.B	8 Wheeler
09/12/2016	53997 Mahers	XDJ	F.B	8 Wheeler
09/12/2016	56906 Mahers	OLG	F.B	8 Wheeler
09/12/2016	50385 Mahers	RHU	F.B	8 Wheeler
09/12/2016	55189 Mahers	ZNB	F.B	8 Wheeler
09/12/2016	35508 Mahers	RHO	F.B	8 Wheeler
09/12/2016	55125 Mahers	YHM	F.B	8 Wheeler
09/12/2016	11315 Mahers	YHC	F.B	8 Wheeler
09/12/2016	28366 Mahers	YHO	F.B	8 Wheeler
09/12/2016	56909 Mahers	OLG	F.B	8 Wheeler
09/12/2016	45482 Mahers	XDG	F.B	8 Wheeler
09/12/2016	28370 Mahers			8 Wheeler
09/12/2016	50032 Mahers	ZNJ	F.B	8 Wheeler
09/12/2016	15701 Mahers	XDJ	F.B	8 Wheeler
09/12/2016	45485 Mahers	XDG	F.B	8 Wheeler
09/12/2016	55185 Mahers	ZNB	F.B	8 Wheeler
09/12/2016	50028 Mahers	ZNJ	F.B	8 Wheeler

09/12/2016	54552 Mahers	RKN	Tip	8 Wheeler
09/12/2016	50389 Mahers	RHU	Thelwall	8 Wheeler
09/12/2016	56910 Mahers	OLG	F.B	8 Wheeler
09/12/2016	55128 Mahers		F.B	8 Wheeler
09/12/2016	54121 Mahers		F.B	8 Wheeler
09/12/2016	35512 Mahers		F.B	8 Wheeler
09/12/2016	45486 Mahers	XDG	F.B	8 Wheeler
09/12/2016	52429 Mahers		F.B	8 Wheeler
31/01/2017	59619 Mahers	YHD	Thelwall	8 Wheeler
31/01/2017	59952 Mahers	RHF	Thelwall	8 Wheeler
31/01/2017	36831 Mahers	YHH	Thelwall	8 Wheeler
31/01/2017	47273 Mahers	MKE	Thelwall	8 Wheeler
31/01/2017	53638 Mahers	YHG	Thelwall	8 Wheeler
31/01/2017	47272 Mahers	MKE	Thelwall	8 Wheeler
31/01/2017	36830 Mahers	YHH	Thelwall	8 Wheeler
31/01/2017	60857 Mahers	OLG	Thelwall	8 Wheeler
31/01/2017	59617 Mahers	YHD	Thelwall	8 Wheeler
31/01/2017	60349 Mahers	RHF	Thelwall	8 Wheeler
31/01/2017	47271 Mahers	MKE	Thelwall	8 Wheeler
31/01/2017	59616 Mahers	YHD	Thelwall	8 Wheeler
31/01/2017	60350 Mahers	RHF	Thelwall	8 Wheeler
31/01/2017	53636 Mahers		Thelwall	8 Wheeler
31/01/2017	36829 Mahers	YHH	Thelwall	8 Wheeler
31/01/2017	60856 Mahers	OLG	Thelwall	8 Wheeler
31/01/2017	49954 Mahers	YHO	Thelwall	8 Wheeler
31/01/2017	53635 Mahers	YHG	Thelwall	8 Wheeler
31/01/2017	60348 Mahers	RHF	Thelwall	8 Wheeler
31/01/2017	60855 Mahers	OLG	Thelwall	8 Wheeler
31/01/2017	47270 Mahers	MKE	Thelwall	8 Wheeler
31/01/2017	59615 Mahers	YHD	Thelwall	8 Wheeler
31/01/2017	36828 Mahers	YHH	Thelwall	8 Wheeler
31/01/2017	60860 Mahers	OLG	Thelwall	8 Wheeler
31/01/2017	47720 Mahers	YHM	Thelwall	8 Wheeler
31/01/2017	59620 Mahers	YHD	Thelwall	8 Wheeler
31/01/2017	59953 Mahers	RHF	Thelwall	8 Wheeler
31/01/2017	53464 Mahers	RKU	Thelwall	8 Wheeler
31/01/2017	53641 Mahers	YAG	Thelwall	8 Wheeler
31/01/2017	46903 Mahers	YHN	Thelwall	8 Wheeler
31/01/2017	36832 Mahers	YHH	Thelwall	8 Wheeler
31/01/2017	21372 Mahers		Thelwall	8 Wheeler
31/01/2017	59618 Mahers	YHD	Thelwall	8 Wheeler
31/01/2017	60859 Mahers	OLG	Thelwall	8 Wheeler
31/01/2017	58728 Mahers	ZNB	Thelwall	8 Wheeler
31/01/2017	53640 Mahers	YHG	Thelwall	8 Wheeler
31/01/2017	59951 Mahers	RHF	Thelwall	8 Wheeler
31/01/2017	60858 Mahers	OLG	Thelwall	8 Wheeler
31/01/2017	47274 Mahers	MKE	Thelwall	8 Wheeler
30/01/2017	45897 Mahers		F.B	8 Wheeler
30/01/2017	47323 Mahers	RHU	F.B	8 Wheeler
30/01/2017	46113 Mahers	RHY	F.B	8 Wheeler
30/01/2017	59912 Mahers	RHP	F.B	8 Wheeler
30/01/2017	47269 Mahers	MKE	F.B	8 Wheeler
30/01/2017	60608 Mahers	OLN	F.B	8 Wheeler
30/01/2017	46994 Mahers	YHN	F.B	8 Wheeler
30/01/2017	58809 Mahers		F.B	8 Wheeler
30/01/2017	46993 Mahers	YHN	F.B	8 Wheeler
30/01/2017	46112 Mahers	RHK	F.B	8 Wheeler
30/01/2017	75355 Mahers	XDY	F.B	8 Wheeler
30/01/2017	45896 Mahers		F.B	8 Wheeler
30/01/2017	46259 Mahers	YHB	F.B	8 Wheeler
30/01/2017	53634 Mahers	YHG	F.B	8 Wheeler
30/01/2017	35536 Mahers	RHO	F.B	8 Wheeler
30/01/2017	60854 Mahers	OLG	F.B	8 Wheeler
30/01/2017	47715 Mahers	YHM	F.B	8 Wheeler
30/01/2017	45895 Mahers		F.B	8 Wheeler
30/01/2017	75354 Mahers	XDV	F.B	8 Wheeler
30/01/2017	35535 Mahers	RHO	F.B	8 Wheeler
30/01/2017	47268 Mahers	MKE	F.B	8 Wheeler
30/01/2017	53633 Mahers	YHG	F.B	8 Wheeler
30/01/2017	47714 Mahers	YHM	F.B	8 Wheeler
30/01/2017	60853 Mahers	OLG	F.B	8 Wheeler
30/01/2017	60607 Mahers	OLN	F.B	8 Wheeler
30/01/2017	46258 Mahers	YHB	F.B	8 Wheeler
30/01/2017	53350 Mahers	XDP	F.B	8 Wheeler
30/01/2017	35533 Mahers	RHO	F.B	8 Wheeler
30/01/2017	47266 Mahers	MKE	F.B	8 Wheeler
30/01/2017	53631 Mahers	YHG	F.B	8 Wheeler

30/01/2017	47712 Mahers	YHM	F.B	8 Wheeler
30/01/2017	60851 Mahers	OLG	F.B	8 Wheeler
30/01/2017	48160 Mahers	RKU	F.B	8 Wheeler
30/01/2017	60605 Mahers	YHN	F.B	8 Wheeler
30/01/2017	46110 Mahers	RHK	F.B	8 Wheeler
30/01/2017	53348 Mahers	XDP	F.B	8 Wheeler
30/01/2017	58807 Mahers		F.B	8 Wheeler
30/01/2017	46256 Mahers	YHB	F.B	8 Wheeler
30/01/2017	60606 Mahers	OLN	F.B	8 Wheeler
30/01/2017	53632 Mahers	YHG	F.B	8 Wheeler
30/01/2017	47267 Mahers	MKE	F.B	8 Wheeler
30/01/2017	35534 Mahers	RHO	F.B	8 Wheeler
30/01/2017	45894 Mahers		F.B	8 Wheeler
30/01/2017	47713 Mahers	YHM	F.B	8 Wheeler
30/01/2017	60852 Mahers	OLG	F.B	8 Wheeler
30/01/2017	46992 Mahers	YHN	F.B	8 Wheeler
30/01/2017	46111 Mahers	RHY	F.B	8 Wheeler
30/01/2017	47324 Mahers	RHU	F.B	8 Wheeler
30/01/2017	53349 Mahers	XDP	F.B	8 Wheeler
30/01/2017	58808 Mahers		F.B	8 Wheeler
30/01/2017	46257 Mahers	YHB	F.B	8 Wheeler
01/02/2017	59957 Mahers	XDU	A.O.R	8 Wheeler
01/02/2017	58465 Mahers	XDF	S.Y	8 Wheeler
01/02/2017	67214 Mahers	XDP		8 Wheeler
01/02/2017	59954 Mahers	RHF	Thelwall	8 Wheeler
01/02/2017	48173 Mahers	RKU	S.Y	8 Wheeler
01/02/2017	58511 Mahers	RKN		8 Wheeler
01/02/2017	37467 Mahers	RHJ	F.B	8 Wheeler
01/02/2017	59955 Mahers	RHF	Thelwall	8 Wheeler
01/02/2017	59919 Mahers	YHP	F.B	8 Wheeler
01/02/2017	46122 Mahers	RHY	F.B	8 Wheeler
01/02/2017	60444 Mahers	RHE	F.B	8 Wheeler
01/02/2017	59956 Mahers	RHF	Thelwall	8 Wheeler
01/02/2017	36835 Mahers	YHH	F.B	8 Wheeler
07/02/2017	37496 Mahers	RHJ	F.B	8 Wheeler
07/02/2017	46515 Mahers	YHE		8 Wheeler
07/02/2017	37495 Mahers	RHJ	F.B	8 Wheeler
07/02/2017	46516 Mahers	YHE	F.B	8 Wheeler
08/02/2017	67821 Mahers	RKU		8 Wheeler
08/02/2017	59131 Mahers	MKF	Thelwall	8 Wheeler
08/02/2017	58692 Mahers	RHF		8 Wheeler
08/02/2017	60028 Mahers	YHA	F.B	8 Wheeler
08/02/2017	59130 Mahers	MKF	F.B	8 Wheeler
08/02/2017	58689 Mahers		F.B	8 Wheeler
08/02/2017	60025 Mahers	YHA	F.B	8 Wheeler
08/02/2017	58688 Mahers		F.B	8 Wheeler
08/02/2017	59128 Mahers	MKF	F.B	8 Wheeler
08/02/2017	58549 Mahers	RKN		8 Wheeler
08/02/2017	68759 Mahers	RHU	F.B	8 Wheeler
08/02/2017	67819 Mahers	RKU	F.B	8 Wheeler
08/02/2017	58548 Mahers	RKN		8 Wheeler
08/02/2017	67818 Mahers	RKU	F.B	8 Wheeler
08/02/2017	60024 Mahers	YHA	F.B	8 Wheeler
08/02/2017	58687 Mahers	RHF	F.B	8 Wheeler
08/02/2017	58547 Mahers	RKN		8 Wheeler
08/02/2017	59126 Mahers	MKF	F.B	8 Wheeler
08/02/2017	58690 Mahers	RHF	F.B	8 Wheeler
08/02/2017	60027 Mahers	YHA	F.B	8 Wheeler
08/02/2017	60026 Mahers	YHA	F.B	8 Wheeler
08/02/2017	67820 Mahers	RKU	F.B	8 Wheeler
08/02/2017	58691 Mahers	RHF	F.B	8 Wheeler
08/02/2017	67822 Mahers	RKU	F.B	8 Wheeler
08/02/2017	68229 Mahers	RHO	Thelwall	8 Wheeler
09/02/2017	68006 Mahers	YHJ	F.B	8 Wheeler
09/02/2017	35454 Mahers	RHO	F.B	8 Wheeler
09/02/2017	69010 Mahers	YHF		8 Wheeler
09/02/2017	67827 Mahers	RKU	A.O.R	8 Wheeler
09/02/2017	67828 Mahers	RKU	A.O.R	8 Wheeler
09/02/2017	69012 Mahers	YHF		8 Wheeler
09/02/2017	69013 Mahers	YHF	Thelwall	8 Wheeler
09/02/2017	68007 Mahers	YHJ	F.B	8 Wheeler
09/02/2017	67830 Mahers	RKU	Thelwall	8 Wheeler
09/02/2017	67829 Mahers	RKU	A.O.R	8 Wheeler
09/02/2017	28121 Mahers	MKE	Thelwall	8 Wheeler
09/02/2017	58784 Mahers	YHM	Thelwall	8 Wheeler
09/02/2017	69011 Mahers	YHF		8 Wheeler
09/02/2017	28120 Mahers	MKE	F.B	8 Wheeler

09/02/2017	68004 Mahers	YHJ	F.B	8 Wheeler
09/02/2017	69008 Mahers	YHF	F.B	8 Wheeler
09/02/2017	35453 Mahers	RHO	F.B	8 Wheeler
09/02/2017	58695 Mahers	RHF	F.B	8 Wheeler
09/02/2017	68005 Mahers	YHJ	F.B	8 Wheeler
09/02/2017	69009 Mahers	YHF	F.B	8 Wheeler
09/02/2017	67825 Mahers	RKU	F.B	8 Wheeler
09/02/2017	67823 Mahers	RKU	F.B	8 Wheeler
09/02/2017	58693 Mahers	RHF	F.B	8 Wheeler
09/02/2017	35451 Mahers	RHO	F.B	8 Wheeler
09/02/2017	69006 Mahers	YHF	F.B	8 Wheeler
09/02/2017	58694 Mahers	RHF	F.B	8 Wheeler
09/02/2017	67824 Mahers	RKU	F.B	8 Wheeler
09/02/2017	35452 Mahers	RHO	F.B	8 Wheeler
09/02/2017	69007 Mahers	YHF	F.B	8 Wheeler
09/02/2017	68003 Mahers	YHJ	F.B	8 Wheeler
10/02/2017	67841 Mahers	RKU	A.O.R	8 Wheeler
10/02/2017	67112 Mahers	RHF	A.O.R	8 Wheeler
10/02/2017	67842 Mahers	RKU	Thelwall	8 Wheeler
10/02/2017	67113 Mahers	RHF	F.B	8 Wheeler
10/02/2017	67834 Mahers	RKU	A.O.R	8 Wheeler
10/02/2017	67101 Mahers	RHF	A.O.R	8 Wheeler
10/02/2017	58700 Mahers		A.O.R	8 Wheeler
10/02/2017	67108 Mahers	RHF	A.O.R	8 Wheeler
10/02/2017	67835 Mahers	RKU	A.O.R	8 Wheeler
10/02/2017	58562 Mahers	YHP		8 Wheeler
10/02/2017	67105 Mahers	RHF	A.O.R	8 Wheeler
10/02/2017	59771 Mahers	YHA	A.O.R	8 Wheeler
10/02/2017	58557 Mahers	YHP		8 Wheeler
10/02/2017	58558 Mahers	YHP		8 Wheeler
10/02/2017	67102 Mahers	RHF	A.O.R	8 Wheeler
10/02/2017	67832 Mahers	RHU	A.O.R	8 Wheeler
10/02/2017	58559 Mahers	YHP		8 Wheeler
10/02/2017	67103 Mahers	RHF	A.O.R	8 Wheeler
10/02/2017	58560 Mahers	RKN		8 Wheeler
10/02/2017	67833 Mahers	RKU	A.O.R	8 Wheeler
10/02/2017	67104 Mahers	RHF	A.O.R	8 Wheeler
10/02/2017	58561 Mahers	RKN		8 Wheeler
10/02/2017	67836 Mahers	RKU	A.O.R	8 Wheeler
10/02/2017	67106 Mahers	RHF	A.O.R	8 Wheeler
10/02/2017	58563 Mahers	YHF		8 Wheeler
10/02/2017	67107 Mahers	RHF	A.O.R	8 Wheeler
10/02/2017	67837 Mahers	RKU	A.O.R	8 Wheeler
10/02/2017	58564 Mahers	YHF		8 Wheeler
10/02/2017	67838 Mahers	RKU	A.O.R	8 Wheeler
10/02/2017	58565 Mahers			8 Wheeler
10/02/2017	67109 Mahers	RHF	A.O.R	8 Wheeler
10/02/2017	67839 Mahers	KKU	A.O.R	8 Wheeler
10/02/2017	58566 Mahers	YHF		8 Wheeler
10/02/2017	67110 Mahers	RHF	A.O.R	8 Wheeler
10/02/2017	67840 Mahers	RKU	F.B	8 Wheeler
10/02/2017	67111 Mahers	RHF	A.O.R	8 Wheeler
23/03/2017	58212 Mahers	XDH	F.B	8 Wheeler
23/03/2017	64289 Mahers	MKF	F.B	8 Wheeler
23/03/2017	25454 Mahers	YHC	F.B	8 Wheeler
23/03/2017	17698 Mahers	RKN	F.B	8 Wheeler
23/03/2017	25452 Mahers	YHC	F.B	8 Wheeler
23/03/2017	16413 Mahers	MKG	F.B	8 Wheeler
23/03/2017	64285 Mahers	YHF	F.B	8 Wheeler
23/03/2017	58209 Mahers	XDH	F.B	8 Wheeler
23/03/2017	17695 Mahers	RKN	F.B	8 Wheeler
23/03/2017	25451 Mahers	YHC	F.B	8 Wheeler
23/03/2017	10150 Mahers	YHJ	F.B	8 Wheeler
23/03/2017	16414 Mahers	MKE	F.B	8 Wheeler
23/03/2017	58210 Mahers	XDA	F.B	8 Wheeler
23/03/2017	64287 Mahers	YHF	F.B	8 Wheeler
23/03/2017	17696 Mahers	RKN	F.B	8 Wheeler
23/03/2017	16101 Mahers	YHJ	F.B	8 Wheeler
23/03/2017	64288 Mahers	YHF	F.B	8 Wheeler
23/03/2017	58211 Mahers	XDH	F.B	8 Wheeler
23/03/2017	17697 Mahers	RKN	F.B	8 Wheeler
23/03/2017	25453 Mahers	YHC	F.B	8 Wheeler
23/03/2017	16415 Mahers	XDS	F.B	8 Wheeler
23/03/2017	16102 Mahers	YHJ	F.B	8 Wheeler
12/04/2017	22625 Mahers	YHP	S.Y	8 Wheeler
12/04/2017	22627 Mahers	YHP	S.Y	8 Wheeler
12/04/2017	21268 Mahers	RHF	S.Y	8 Wheeler

12/04/2017	22623	Mahers	YHP	S.Y	8 Wheeler
12/04/2017	22624	Mahers	YHP	S.Y	8 Wheeler
12/04/2017	21269	Mahers	RHF	S.Y	8 Wheeler
12/04/2017	21267	Mahers	RHF	S.Y	8 Wheeler
12/04/2017	22622	Mahers	YHP	S.Y	8 Wheeler
13/04/2017	21279	Mahers	RHF	F.B	8 Wheeler
13/04/2017	22633	Mahers	YHP	Thelwall	8 Wheeler
13/04/2017	21270	Mahers	RHF	S.Y	8 Wheeler
13/04/2017	22630	Mahers	YHP	F.B	8 Wheeler
13/04/2017	21276	Mahers	RHF	S.Y	8 Wheeler
13/04/2017	22629	Mahers	YHP	F.B	8 Wheeler
13/04/2017	21275	Mahers	RHF	S.Y	8 Wheeler

CARA CONSTRUCTION								
MATERIAL REMOVED FROM GROSVENOR STREET/YORK STREET, MANCHESTER								
DATE	**TICKET**		**MATERIAL**		**DATE**	**TICKET**		**MATERIAL**
22.06.18	CN	72205	HARDCORE		31.07.18	CN	71234	FROM PILING MAT
	CN	73257	HARDCORE			CN	71236	FROM PILING MAT
28.06.18	CN	74085	HARDCORE		01.08.18	CN	74799	FROM PILING MAT
	CN	74086	HARDCORE		02.08.18	CN	51611	FROM PILING MAT
12.07.18	CN	76408	FROM PILING MAT			CN	51612	FROM PILING MAT
	CN	76410	HARDCORE			CN	51613	FROM PILING MAT
17.07.18	CN	73092	HARDCORE			CN	51614	HARDCORE
18.07.18	CN	73151	FROM PILING MAT			CN	51616	FROM PILING MAT
	CN	73152	FROM PILING MAT			CN	51617	FROM PILING MAT
	CN	73157	HARDCORE		06.08.18	CN	28059	FROM PILING MAT
23.07.18	CN	72584	FROM PILING MAT			CN	72830	FROM PILING MAT
	CN	72585	FROM PILING MAT			CN	72831	FROM PILING MAT
	CN	72586	FROM PILING MAT			CN	72832	FROM PILING MAT
	CN	72587	FROM PILING MAT			CN	72833	FROM PILING MAT
	CN	72588	FROM PILING MAT			CN	73246	FROM PILING MAT
	CN	72589	FROM PILING MAT			CN	73248	FROM PILING MAT
	CN	72590	FROM PILING MAT			CN	73250	FROM PILING MAT
	CN	76485	FROM PILING MAT		07.08.18	CN	71037	FROM PILING MAT
	CN	76486	FROM PILING MAT			CN	71035	FROM PILING MAT
	CN	76487	FROM PILING MAT			CN	75478	FROM PILING MAT
	CN	76488	HARDCORE			CN	75477	FROM PILING MAT
	CN	76489	FROM PILING MAT			CN	75471	FROM PILING MAT
	CN	76490	FROM PILING MAT			CN	75470	FROM PILING MAT
	CN	76491	FROM PILING MAT		15.08.18	CN	76792	FROM PILING MAT
	CN	76492	FROM PILING MAT			CN	76793	FROM PILING MAT
24.07.18	CN	66082	FROM PILING MAT			CN	76794	FROM PILING MAT
	CN	66083	FROM PILING MAT			CN	76795	HARDCORE
26.07.18	CN	77664	FROM PILING MAT			CN	76796	HARDCORE
	CN	77665	FROM PILING MAT			CN	76797	FROM PILING MAT
	CN	77666	FROM PILING MAT			CN	76798	FROM PILING MAT
	CN	77667	FROM PILING MAT		24.08.18	CN	74130	CONCRETE
	CN	77668	FROM PILING MAT		20.09.18	CN	84663	HARDCORE
	CN	77669	FROM PILING MAT		25.09.18	CN	53616	SPOIL
	CN	77670	FROM PILING MAT			CN	78976	HARDCORE
	CN	77671	FROM PILING MAT			CN	83607	HARDCORE
	CN	77672	FROM PILING MAT			CN	83613	HARDCORE
	CN	77673	CONCRETE			CN	83615	HARDCORE
	CN	77674	CONCRETE			CN	88956	SPOIL
	CN	77675	FROM PILING MAT		09.10.18	CN	79817	CONCRETE
30.07.18	CN	51604	FROM PILING MAT			CN	79820	CONCRETE
	CN	51605	FROM PILING MAT			CN	79822	CONCRETE
31.07.18	CN	71224	FROM PILING MAT		15.10.18	CN		CONCRETE
	CN	71226	HARDCORE		23.10.18	CN		NO TICKET AS YET
	CN	71228	FROM PILING MAT			CN		NO TICKET AS YET
	CN	71230	FROM PILING MAT					
	CN	71232	HARDCORE			**TOTAL**		**90 LOADS**

Date	Waste Carrier	Ticker Number	EWC Code	Tonnage Removed	Diverted From Landfill (%)	Tonnage Diverted
4.7.18	UK Aggregate & Plant Ltd	17704	170504	18	100	18
18.7.18	UK Aggregate & Plant Ltd	12402	170504	18	100	18
18.7.18	UK Aggregate & Plant Ltd	12401	170504	18	100	18
18.7.18	UK Aggregate & Plant Ltd	12403	170504	18	100	18
18.7.18	UK Aggregate & Plant Ltd	12404	170504	18	100	18
24.7.18	UK Aggregate & Plant Ltd	17909	170504	18	100	18
24.7.18	UK Aggregate & Plant Ltd	17907	170504	18	100	18
24.7.18	UK Aggregate & Plant Ltd	17910	170504	18	100	18
25.7.18	UK Aggregate & Plant Ltd	17911	170504	18	100	18
25.7.18	UK Aggregate & Plant Ltd	17912	170504	18	100	18
25.7.18	UK Aggregate & Plant Ltd	17913	170504	18	100	18
26.7.18	UK Aggregate & Plant Ltd	17914	170504	18	100	18
26.7.18	UK Aggregate & Plant Ltd	17915	170504	18	100	18
26.7.18	UK Aggregate & Plant Ltd	17916	170504	18	100	18
27.7.18	UK Aggregate & Plant Ltd	17917	170504	18	100	18
30.7.18	UK Aggregate & Plant Ltd	17921	170504	18	100	18
30.7.18	UK Aggregate & Plant Ltd	17922	170504	18	100	18
30.7.18	UK Aggregate & Plant Ltd	17920	170504	18	100	18
31.7.18	UK Aggregate & Plant Ltd	17924	170504	18	100	18
31.7.18	UK Aggregate & Plant Ltd	17925	170504	18	100	18
1.8.18	UK Aggregate & Plant Ltd	17927	170504	18	100	18
1.8.18	UK Aggregate & Plant Ltd	17926	170504	18	100	18
1.8.18	UK Aggregate & Plant Ltd	17928	170504	18	100	18
2.8.18	UK Aggregate & Plant Ltd	17929	170504	18	100	18
2.8.18	UK Aggregate & Plant Ltd	17930	170504	18	100	18
2.8.18	UK Aggregate & Plant Ltd	17931	170504	18	100	18
3.8.18	UK Aggregate & Plant Ltd	17932	170504	18	100	18
3.8.18	UK Aggregate & Plant Ltd	17933	170504	18	100	18
3.8.18	UK Aggregate & Plant Ltd	17934	170504	18	100	18
6.8.18	UK Aggregate & Plant Ltd	17935	170504	18	100	18
6.8.18	UK Aggregate & Plant Ltd	17936	170504	18	100	18
7.8.18	UK Aggregate & Plant Ltd	11424	170504	18	100	18
7.8.18	UK Aggregate & Plant Ltd	11427	170504	18	100	18
7.8.18	UK Aggregate & Plant Ltd	11425	170504	18	100	18
8.8.18	UK Aggregate & Plant Ltd	11429	170504	18	100	18
8.8.18	UK Aggregate & Plant Ltd	11428	170504	18	100	18
9.8.18	UK Aggregate & Plant Ltd	11431	170504	18	100	18
9.8.18	UK Aggregate & Plant Ltd	11432	170504	18	100	18
9.8.18	UK Aggregate & Plant Ltd	11433	170504	18	100	18
10.8.18	UK Aggregate & Plant Ltd	11434	170504	18	100	18
10.8.18	UK Aggregate & Plant Ltd	11435	170504	18	100	18
10.8.18	UK Aggregate & Plant Ltd	20068	170504	18	100	18
13.8.18	UK Aggregate & Plant Ltd	17938	170504	18	100	18
13.8.18	UK Aggregate & Plant Ltd	17939	170504	18	100	18
14.8.18	UK Aggregate & Plant Ltd	11437	170504	18	100	18
14.8.18	UK Aggregate & Plant Ltd	11438	170504	18	100	18
14.8.18	UK Aggregate & Plant Ltd	11439	170504	18	100	18
15.8.18	UK Aggregate & Plant Ltd	11440	170504	18	100	18
16.8.18	UK Aggregate & Plant Ltd	20095	170504	18	100	18
21.8.18	UK Aggregate & Plant Ltd	19461	170504	18	100	18
21.8.18	UK Aggregate & Plant Ltd	19463	170504	18	100	18
22.8.18	UK Aggregate & Plant Ltd	19465	170504	18	100	18
22.8.18	UK Aggregate & Plant Ltd	19467	170504	18	100	18
24.8.18	UK Aggregate & Plant Ltd	14823	170504	18	100	18
24.8.18	UK Aggregate & Plant Ltd	19475	170504	18	100	18
30.8.18	UK Aggregate & Plant Ltd	20270	170504	18	100	18
30.8.18	UK Aggregate & Plant Ltd	17950	170504	18	100	18
30.8.18	UK Aggregate & Plant Ltd	17949	170504	18	100	18
30.8.18	UK Aggregate & Plant Ltd	20401	170504	18	100	18
30.8.18	UK Aggregate & Plant Ltd	20402	170504	18	100	18

30.8.18	UK Aggregate & Plant Ltd	20403	170504	18	100	18
30.8.18	UK Aggregate & Plant Ltd	20404	170504	18	100	18
31.8.18	UK Aggregate & Plant Ltd	20405	170504	18	100	18
31.8.18	UK Aggregate & Plant Ltd	20235	170504	18	100	18
4.9.18	UK Aggregate & Plant Ltd	20413	170504	18	100	18
4.9.18	UK Aggregate & Plant Ltd	20414	170504	18	100	18
5.9.18	UK Aggregate & Plant Ltd	20421	170504	18	100	18
5.9.18	UK Aggregate & Plant Ltd	20420	170504	18	100	18
5.9.18	UK Aggregate & Plant Ltd	20418	170504	18	100	18
6.9.18	UK Aggregate & Plant Ltd	20423	170504	18	100	18
6.9.18	UK Aggregate & Plant Ltd	20422	170504	18	100	18
6.9.18	UK Aggregate & Plant Ltd	20425	170504	18	100	18
6.9.18	UK Aggregate & Plant Ltd	20424	170504	18	100	18
7.9.18	UK Aggregate & Plant Ltd	20426	170504	18	100	18
7.9.18	UK Aggregate & Plant Ltd	20427	170504	18	100	18
10.9.18	UK Aggregate & Plant Ltd	20431	170504	18	100	18
11.9.18	UK Aggregate & Plant Ltd	20434	170504	18	100	18
11.9.18	UK Aggregate & Plant Ltd	20433	170504	18	100	18
11.9.18	UK Aggregate & Plant Ltd	20435	170504	18	100	18
11.9.18	UK Aggregate & Plant Ltd	14758	170504	18	100	18
11.9.18	UK Aggregate & Plant Ltd	14757	170504	18	100	18
21.9.18	UK Aggregate & Plant Ltd	14816	170504	18	100	18
21.9.18	UK Aggregate & Plant Ltd	20274	170504	18	100	18
21.9.18	UK Aggregate & Plant Ltd	14819	170504	18	100	18
25.9.18	UK Aggregate & Plant Ltd	20278	170504	18	100	18
25.9.18	UK Aggregate & Plant Ltd	14828	170504	18	100	18
26.9.18	UK Aggregate & Plant Ltd	14830	170504	18	100	18
27.9.18	UK Aggregate & Plant Ltd	14833	170504	18	100	18
28.9.18	UK Aggregate & Plant Ltd	14838	170504	18	100	18
28.9.18	UK Aggregate & Plant Ltd	20273	170504	18	100	18
28.9.18	UK Aggregate & Plant Ltd	14841	170504	18	100	18
1.10.18	UK Aggregate & Plant Ltd	14722	170504	18	100	18
2.10.18	UK Aggregate & Plant Ltd	14401	170504	18	100	18
2.10.18	UK Aggregate & Plant Ltd	14849	170504	18	100	18
2.10.18	UK Aggregate & Plant Ltd	14848	170504	18	100	18
2.10.18	UK Aggregate & Plant Ltd	14850	170504	18	100	18
2.10.18	UK Aggregate & Plant Ltd	14402	170504	18	100	18
3.10.18	UK Aggregate & Plant Ltd	15106	170504	18	100	18
3.10.18	UK Aggregate & Plant Ltd	14407	170504	18	100	18
3.10.18	UK Aggregate & Plant Ltd	14406	170504	18	100	18
9.10.18	UK Aggregate & Plant Ltd	15123	170504	18	100	18
9.10.18	UK Aggregate & Plant Ltd	14421	170504	18	100	18
10.10.18	UK Aggregate & Plant Ltd	15128	170504	18	100	18
11.10.18	UK Aggregate & Plant Ltd	14758	170504	18	100	18
11.10.18	UK Aggregate & Plant Ltd	15131	170504	18	100	18
11.10.18	UK Aggregate & Plant Ltd	15129	170504	18	100	18
15.10.18	UK Aggregate & Plant Ltd	14423	170504	18	100	18
15.10.18	UK Aggregate & Plant Ltd	14422	170504	18	100	18
17.10.18	UK Aggregate & Plant Ltd	14432	170504	18	100	18

Attachment A9 – W. Maher and Sons basement excavation method statement

W Maher & Sons Method Statement

1.0	**PROJECT NAME:**	MECD	**PROJECT No.:**	
1.1	**COMPANY:**	W. Maher and Sons Ltd	**WORKS PACKAGE:**	
1.2	**TITLE/TASK:**	Earthworks Basement Excavation	**REV No.:**	02
1.3	**DATE OF ISSUE:**	2/05/17	**CONTACT:**	Callum Maher

2.0	**PROPOSED START DATE:**	08/05/17	**PROPOSED WORKING HOURS:**	0700 to 1700
2.1	**EXPECTED DURATION:**	South basement 4 weeks		
2.2	**EXACT LOCATION(S) ATTACH PLAN:**			
2.3	**DOCUMENT PREPARED BY:**	A. Kirk / C. Maher		
2.4	**SCOPE/METHODOLOGY:**	**Scope-** • Excavate to Reduced levels in Contig Wall • Import and place aggregates spread Level and compact • Breakout hard materials if any encountered • Disposal of Excavated materials off site. • Plant will adhere to the speed restrictions (5 mph) directed by the site rules, and comply with all signage. • Vehicles will not encroach close to voids or other openings which may cause plant to overturn. • Any vehicle with the potential of overturning will conform to the requirements of PUWER . • All Plant will be fitted with mirrors to allow 360degree visibility. When Live services are suspected Before commencing excavation or site clearance a permit to dig must be obtained for the working area from the BB site manager detailing any live services locations and depths that may encroach into the works. Operatives to be made aware of other works being undertaken on site . Contaminated Hotspots will be marked on site and will be excavated and stockpiled under the direction of the remediation /site manager. If asbestos is encountered appropriate arrangements will be followed - subject to a separate method statement. Works will be undertaken to comply with the specifications, remediation strategy, good practice and relevant British and European standards as well as the Permit to work system. Access/egress routes on site will be agreed with Balfour Beatty as works proceed. Initial access is from access gate 6 Two 35T Excavators will strip earth and load into wagons for offsite disposal working from from the furthest point back to the loading point on until works complete near the Gate 6 Access road.		

One excavator will dig at depth and stockpile for the second excavator to load wagons from the surface.

The Surface excavator will be positioned away from the excavation face while loading wagons.

An access will be constructed from the gate 6 access road over the piled wall capping beams from sand , hardcore and road plates to provide access for wagons into the south basement area.

The access, traffic flow and egress arrangements are shown on the attached logistics plan.

WM&S Wagons will stand on level surfaces during loading .

WM&S excavator will work faces back and/or "haymake" material to the loading points which will move as required.

Reversing of vehicles will be avoided using a circular flow of vehicles.

Excavated surfaces will be sealed and left with a nominal 50mm of cover as protection to the formation to be stripped by follow on trades. Levels will be controlled using a rotating laser set up in the basement. The engineer will gain access down a sallow pedestrian ramp that will be formed each day as works proceed. Excavation will cease when the engineer is at the low level dig.

Water will be pumped to Silt buster settlement tanks prior to discharge (discharge point being arranged by BB if required)

Due to the nature of the rock strata some localised over break or overdig may occur , this will be filled with arisings and compacted if such occurs.

A 13 to 20 T excavator may be used to grade to final level.

At the end of each shift a shallow batter will be cut to dig level and a berm created at the top of the cut.

Barriers will be in place as a separate demarcation measure.

Communication
Supervisor , operatives and BB management will keep in contact by radio.

Super visor to attend daily meetings and deliver Good to Go briefing each morning.

- **Disposal of materials off site**

Disposal of materials to suitably licensed landfill facility will be undertaken by use of WM&S fleet of eight wheel wagons. Materials will be conveyed to facilities suitable receive the class of material being disposed of. In order to comply with current waste disposal regulations, Waste Transfer, and any other appropriate, documentation will be completed by WM&S in accordance with requirements of the Environmental Protection

Act .

The disposal facilities that we anticipate using for this work are Churchill Enviro Ltd's sites at Fletcher Bank (waste recovery). Ashton Old Road Recycling / waste recovery , and Woolston Deposit Ground.

- **Existing Services**
  None expected as the contiguous piled wall forms a barrier to services which will have been removed or diverted prior to its installation.

- **Unexploded Ordnance**

There is a risk that unexploded ordnance may remain buried in the site in previously unexcavated areas , if any cylindrical , butterfly or other shaped objects are found cease work immediately,
Clear the area of personnel to the Muster point (Location to be confirmed) and seek instructions from the site manager. Posters showing objects that could be ordnance will be discussed at the site inductions and displayed on notice boards.

Proposed site access routes and working areas will be agreed prior to commencement . Regular drivers will need to have a short induction.

The site will be inspected prior to commencement for determining locations of haul routes. These will be selected to minimise reversing operations. To prevent overturning of plant items, access routes and haul routes will be sufficiently levelled and maintained, taking account of the plant use. Sufficient measures will be employed to protect other users, operatives or other parties, from being struck by plant.
See logistics plan.

Competent persons
All plant operatives will be in possession of current CITB CSCS, CPCS operator's certificates.
All plant will hold current plant maintenance certificates or certificates of Newness when under 3 months old. Such certificates will be registered on site and be available for inspection.

Entry of excavations

Operatives will not be permitted to enter excavations without prior inspection and approval of their supervisor.

Fuel & Fuelling

Any fuel Storage will be in double bunded tanks in the area designated on site.
The fuel delivery mechanism will be fail safe and secured to prevent accidental or unauthorised discharge.

Fire extinguishers or sand buckets will be placed at the location where fuels are stored.

Spill kits which will be situated at the refuelling points. Refuelling will be carried out by a competent person over a protective tray

or barrier and machines must not be left unattended while re-fuelling. Non absorbent gloves must be worn in addition to standard site PPE.

Vibration

Sensitive activities are carried out in some of the nearby university buildings BB will provide vibration monitoring. Activities are to be monitored to ensure that vibrations are not likely to be transmitted to the surrounding area. The Contig pile walls should provide an adequate barrier and continuity break in strata to prevent vibration transmission outside of the working area

Noise

In the event of any uncertainty relating to noise levels, a competent person will undertake a noise assessment using a callibrated sound meter of the working area to determine the noise exposure, not only to our own operatives but also to other contractors or personnel in close proximity. The assessment will determine the action levels and control measures required.

- Utilisation of modern plant fitted with silencers , acoustic dampers and well maintained.
- In Selection of tools consider noise generated and select those that are quieter.
- Provide hearing protection zones as appropriate.

- Provide Suitable Ear protection to all personnel that could be exposed to the source of excessive noise.

Airborne Particles

Control of Dust and Airborne Contaminates

Air borne particles will be controlled in accordance with The Control of Substances Hazardous to Health Regulations 1994. An assessment will be undertaken by the site supervisor and review the materials producing airborne particles with a view to reducing the risks.

There shall be avoidance of visual particulate matter crossing the site boundary.

Wagons are fitted with automatic sheeting operated from the wagon cabs.

A hierarchy of control measures will be undertaken to reduce risk to operatives and other personnel / public. Such will include where practical:-

- Use of Personnel protective equipment
- Monitoring and review of the control measures will be undertaken by a competent person and if required additional measures employed.

Wagon Drivers must not open windows or exit the cab within the site . They may stop in a designated area to provide load tickets / documents to the site gateman.

W Maher & Sons Method Statement

3.0	**No. OF PERSONNEL / JOB TITLE (NAMES IF APPLICABLE):**	Plant operators with CPCS and site supervisor. Trained wagon drivers	
3.1	**COMPETENCES REQUIRED FOR TASK:**		
3.2	**SUPERVISOR (WITH CONTACT NO):**	**Name:**	**Callum Maher / TBC**
		Contact No.:	**07977210077**
3.3	**PLANT/EQUIPMENT TOOLS:** ***This section is purely a list of plant and equipment that it is proposed to use on site. It may be useful to include dimensions, weights etc. This box can then be referred to later when specific risk assessments are attached for the various operations/activities. Copies of Plant/Equipment will be required including competency certification for all Operative:***	**Tracked excavators x 2 at 35 T** **Tandem Bomag roller** **. Plant , Vehicles , Equipment** Plant Operators Must ensure that engines are switched off before leaving their seats to exit the cab so that clothing cannot catch on controls and move the machine. WM&S Plant used in moving the materials from the work will comply with the following:- • , lights , alarms , steering etc. and where applicable completing and recording statutory inspections for lifting appliances / excavators will be completed by an expert. • Copies of all inspections , tests and checks will be kept on site and details entered into the site registers. • All keys will be removed and brakes applied to prevent plant moving while unattended. Chocks will be used to prevent movement as necessary. • Excavators will be provided with mirrors to increase visibility at the sides and rear of the machines. • All operatives to be trained in use of Quick Hitches with logs to be retained in the cabs. All quick hitches to have safety pins fitted and be operational. • WM&S will ensure that Plant adhere to the speed restrictions (5 mph) directed by the site rules, and comply with all signage. Wheeled vehicles will not encroach close to voids or other openings which may cause plant to overturn. • Any vehicle with the potential of overturning will conform to the requirements of PUWER . • All Plant will be fitted with mirrors to allow 360degree visibility. • All Plant to be parked up close to the site offices out of hours close to the site security officer.	

W Maher & Sons Method Statement

3.4	**MATERIALS:** ***A comprehensive list of materials is to be entered here. This will highlight which COSHH Assessments and Safety Data Sheets should be attached to the Method Statement.***	**Natural quarried aggregate** **Gasoil**
3.5	**TECHNICAL INFORMATION:** ***Any information that is critical to the health and safety of the project; this may include elements of the structural engineer's reports, previous Health Safety and environmental plans, any design drawings or specifications that may be available.***	**environmental reports** **method statements and H&S plan** **Emergency procedures** **Asbestos method statement (if required for perimeter of site works)**
3.6	**WASTE REMOVAL:** ***How will waste be removed from site? Consider location of skips, provision of bins and what collection arrangements will be put in place.***	**General excavated material in sheeted 8 wheel wagons** **At permieter - Asbestos if any in sealed skips- hazardous material**
3.7	**HOUSEKEEPING / site Tidyness:** ***How will materials be stored on site.***	**Tidily**

4.0 4.1	**RISK ASSESSMENTS ATTACHED:** ***A list of identified risk throughout the task will be noted here. The full risk assessments to be attached.***	**RISK** **See risk assessment sheet**	**RISK**
4.2	**COSHH/ Safety Data Sheets:** ***Data sheets req for all materials listed in Section 3.4. Chemical and fuel spillage controls.***	**Fuel and Fuelling**- Fuel delivered by tanker to Double bunded storage tanks with auto cut off filling device/ nozzles. Filling in designated area over large drip trays. Spillage kit to be at refuelling point. Machines to carry spillage kits also. Surface to be excavated and disposed of after the works . Surface to be tested to confirm cleanliness.	
4.3	**MANUAL HANDLING:** **What activities require manual handling?**		
	Can Manual handling be avoided?	**Yes**	
	Are the operatives trained in Manual handling?		**No**
	Are the Manual handling Risk Assessments attached?		**No**
4.4	**NOISE / DUST / VIBRATION:** ***What activities will generate noise, dust or vibration*** ***Are there Risk assessments attached?***	**Working in Dry conditions** **Movement of vehicles / equipment in dry conditions** **General working creates noise , controlled to minimal**	

		levels. Spraying / dust suppressing equipment - either hand held and Tractor and bowser will also be available for large areas
4.5	**ACCESS / EGRESS:** ***Describe access, both on to site and to the workplace once on site. Reference should be made to road names, width restrictions, entry/exit points, suitability for unloading, restrictions on stopping, parking etc. On site consideration should be given to one-way circuits and the separation of pedestrians and vehicular traffic. This section could also be used to describe availability of on- and off-site parking for contractors. Consideration of movements of operatives, vehicles, waste, materials.***	Access to site is from Gate 6 . Approaching the site Access the speed limit is 10mph and all vehicles must switch on Flashing Beacons or Hazard Lights. **If Asbestos is detected a A De-contamination unit may be required.** **Decontamination unit DCU-** Operatives will enter the DCU from the clean side and change in the normal way but into two sets of overalls. Operatives will put on clean boots or use fibre preventing dust covers to their own boots , before leaving the Dcu and entering site. Or if re turning to work they can use their boots from previous day left outside the site end of the DCU. Operatives will leave the area and remove the outer overall and boots / boot covers at the entrance to the Dirty side of the DCU. They will then proceed into the DCU and decontaminate in the usual way. Used overalls to be deposited in the bags provided and sealed for disposal by the Licensed Asbestos contractor. **Parking is in Designated areas only - off site**

5.0	**PERMITS REQUIRED: Yes / No**	**Yes**
5.1	**PERMIT TYPE:**	**Permit to excavate**
5.2	**ISSUED BY:**	
5.3	**SECURITY ARRANGEMENTS:**	
5.4	**SPECIAL TRAINING:** ***Outline clearly activities requiring training that are going to take place on site. If a certain standard of training is required, then ensure it is detailed here. Operatives must be trained and competent in the use of abrasive wheels and cartridge operated tools etc (all training requirements must be fulfilled prior to operatives being set to work) and Sisk will required copies of certification.***	**Asbestos awareness training and suitable medical for all working at site permeters.** **Plant operators competency CPCS** **Safety Critical medical for plant operator** **Operatives may be required to be face fitted for FFP3 masks / respirators if working with exposed asbestos.** **All personel to have Cscs CPCS** **Supervisors to have SSSts managers smsts**

6.0	**MANDATORY SITE PPE** *(DELETE AS APPLICABLE)*:	**Hard Hat / Safety Footwear / Hi vis Clothing / Gloves (Min required 4343)/ Light Eye Protection (Min required EN 166 F1)**
6.1	**TASK SPECIFIC PPE:** **Identified as per Risk Assessment.**	

7.0	**EMERGENCY ARRANGEMENTS FOR:**	
7.1	**RESCUE:** ***This should include address, phone number and details of the nearest accident and emergency hospital. It may also show routes or directions on how to reach it. Also show on-site arrangements for first aid, including names and locations of first aiders and where the first aid kit is held. Any other rescue eg harness, man baskets, crane driver, confined spaces.***	See Balfour Beatty emergency plan
7.2	**FIRST AID (QUALIFIED PERSON):**	To be agreed

8.0	**PEDESTRIAN / TRAFFIC REROUTING ARRANGEMENTS:** ***Will your works interfere with current pedestrian / traffic arrangements.***	**No** All pedestrians are to keep out of the working area marked off by warning tape/ orange fence
8.1	**DETAILS OF PREDESTRIAN / TRAFFIC/REROUTING ARRANGEMENTS:**	Pedestrians to keep out of working areas and stay at perimeter of the site away from any haul routes
8.2	**FIRE SAFETY ARRANGEMENTS:**	See Balfour Beatty emergency plan / Notice board on site
8.3	**RESPONSIBILITY FOR TASK LIGHTING:** ***Consideration should be given to site hours; this may immediately highlight the need for artificial lighting if work starts before first light or continues after dusk. Additionally the requirement for general site lighting and specific task lighting would be inserted here***	**N/ A not required**

9.0	**TO WHOM THE INFORMATION / WILL BE COMMUNICATED AND HOW?** **(TO INCLUDE NON ENGLISH SPEAKING OPERATIVES)**	**All operatives / sub-contractor/ air testing**
		Site Managers , Supervisors , Carillion
9.1	**CONFIRMATION OF OPERATIVES BRIEFING:**	**SEE Site induction records BB**

10.0	**PERSON RESPONSIBLE FOR MONITORING SAFE SYSTEM OF WORK AND ENSURING COMPLIANCE:** **Show here who the contracts manager, site**	Callum Maher - Visiting Site Supervisor

	manager, foreman/supervisor is, what each will be responsible for, and their contact numbers.	
10.1	**REVIEW DATE / SCHEDULE:**	**Weekly / as required**
10.2	**AMENDMENTS AUTHORISED BY:**	
10.3	**AMENDMENTS COMMUNICATED TO:**	

Record of Risk Assessment / Method Statement Communication

Project:		**Project No.:**	
Date:		**Sheet No.:**	1

The following people have been instructed in the contents of the Risk / Safety Data Sheet / COSHH Assessment or Method Statement below, and agree to comply with its requirements.

Risk Assessment	Safety Data Sheet / COSHH Assessment	Method Statement

Activity: MECD Basement Dig

Name:		**Name:**	
Signature:	**Date:**	**Signature:**	**Date:**
Name:		**Name:**	
Signature:	**Date:**	**Signature:**	**Date:**
Name:		**Name:**	
Signature:	**Date:**	**Signature:**	**Date:**
Name:		**Name:**	
Signature:	**Date:**	**Signature:**	**Date:**
Name:		**Name:**	
Signature:	**Date:**	**Signature:**	**Date:**
Name:		**Name:**	
Signature:	**Date:**	**Signature:**	**Date:**
Name:		**Name:**	
Signature:	**Date:**	**Signature:**	**Date:**
Name:		**Name:**	
Signature:	**Date:**	**Signature:**	**Date:**

Attachment A10 - Asbestos removal method statement

Balfour Beatty

41

Template Form
Work Package Plan
(Method Statement) Appraisal

Construction Services UK

WORK PACKAGE DETAILS				
Project Name	MECD		Project No:	CRMA0076
Contractor Name (If applicable)	P McGuinness + Co Ltd			
Document Number	RAMS 01-2017		Rev No:	V10 (RJD011)
Description of Package	Non Licensed ACM Removal (cement Debris)			
Programme Dates	Start	30/05/17	Finish	02/06/17.

DOCUMENT APPRAISAL				
Appraised By	Name	A MACKINSON	Signed	
	Title	HSE Adviser.	Date	30/05/17.
Reviewed By (Orange/High Risk)	Name	N/A.	Signed	
	Title		Date	

Accepted	Work may proceed Only When Face Fit Certs Arrive.
Not Accepted	Work may **NOT** proceed until further control measures, as indicated, are in place.

	CONTENT	N/A	YES	NO
A	**WORK PACKAGE DETAILS**			
	Has the package of work been clearly defined to allow sufficient planning and Risk Assessment?		✓	
	Has a specific sequence of works been clearly defined in sufficient detail inc deliveries?		✓	
	Has a detailed Risk Assessment been produced?		✓	
	Have all risks in relation to the work package been identified along with suitable control measures?		✓	
	Are details and signature of the assessor included on the Risk Assessment?		✓	
	Have health and safety roles and responsibilities of Supervisors been detailed in WPP (Subcontractors) or as specified in PMP (Direct)		✓	
	Are the personnel required to complete the activities clearly identified, including supervision?		✓	
	Has the number and competence of operatives and supervisors been identified and adequate for intended works including PVMs, Slinger/Signallers etc		✓	Induction Msks Record
	Is the type of equipment to be used identified, including any specific requirements)?		✓	
	Are the materials and tools to be used identified in sufficient detail (e.g logistics, deliveries, movement on site)?		✓	
	Have any risks associated with falling tools or materials been identified and adequate control measures detailed?	✓		

Construction Services UK

	CONTENT	N/A	YES	NO
	Have the relevant COSHH assessments been provided?	✓		✓
	Is the Manufacturers' information in accordance with the COSHH assessments?	✓		
	Is the standard of PPE to be worn identified, including any non mandatory PPE?		✓	
	Have applicable drawings/sketches, etc been identified?	✓		
	Have the requirements for any permits been identified, and details of how these will be controlled and provided?	✓		
	Are the specific Installation Inspection Check Lists and Test Certificates to be completed for the work package identified?	✓	✗ ✓	Asbestos
B	**SITE DETAILS**			
	Are there specific arrangements for the movement of personnel around site and have the on-site controls been taken into consideration?		✓	
	Are the details in line with the Project PVPMP/Traffic Management Plan and has consideration been given to movement around the site?		✓	
	Has loading / unloading been considered (if applicable)?	✓		
	Have the site location and layouts specific to the work at each location been identified, including details of sufficient space for plant & vehicle operations/interfaces, relevant lay down areas, storage areas and safe places?		✓	
	Are appropriate protection and isolation measures detailed (if applicable) e.g. fencing, and the responsibility for implementing and maintaining these measures?		✓	Fencing Off ANDS
	Have clear communication routes been identified and are contact details available for all relevant parties?		✓	
	Have all foreseeable emergencies been identified and are appropriate arrangements detailed, (e.g. working at height, fire, environmental, release of gas, etc) including escape, evacuation and muster arrangements?		✓	
	Have interfaces with the public and other workers been considered?		✓	
	Have welfare arrangements been considered?		✓	
C	**BRIEFING**			
	Has the WPP (Method Statement) been broken down into Task Briefing Sheets?		✓	
	Is there detail on frequency of briefings (maximum of 2 week intervals)?	✓		
	Is there detail on how, when and who will brief operatives prior to setting them to work complete with a method of acknowledging understanding?		✓	
	Has consideration been given to the correct level of detail to be included in such briefings so that information is clear and concise for operatives to understand?		✓	Good to Go
	Have associated Work Instructions or any additional information included been reviewed for suitability as part of the work package (if applicable)?		✓	

Face Fit Cert 1/2 Mask out of Date

P McGUINNESS & Co LTD

Demolition/Asbestos Removal

Asbestos RAMS

Control of Asbestos Regulations

Non-licensed removal of asbestos cement debris as part of excavation works

at

Balfour Beatty Site, York Street, M1 7HR

Document reference and Version:	Date of Issue:	Author:	Signature:	Position:
RAMS 01-2017 Version V 10	27/5/17	R.J. Dewar **Checked By:** P. McGuinness	R. J. Dewar	Health & Safety Manager Director

Introduction

Scope of Works
This plan of work covers the hand picking of asbestos cement debris from excavated spoil. No air testing will be carried out as previous air monitoring during similar works and quantity of spoil has found fibre levels to be below acceptable levels (attached - 12).

1.0 Details of Contract

1.1 Site Address:
Balfour Beatty Site,
York Street,
M1 7HR

1.2 Client:
W. Maher and sons Ltd
Soapstone Way,
Off Fairhills Road,
Irlam.
M44 6RA

Contact: Ged Maher
Mob: 0161 776 2200

1.3 Licensed Asbestos Contractor:
P McGuinness & Co Ltd
Rondin House
Rondin Road
Ardwick
Manchester
M12 6BF

Contract Manager:	P McGuinness
Tel:	0161 273 5272
Mob:	07775 866776
Health & Safety Manager:	R.J. Dewar
Tel:	0161 273 5272
Mob:	07979 946531

1.4 Programme:

1.4.1	Start Date:	30/5/2017
1.4.2	Duration:	1 day
1.4.3	Set Up Days:	N/A
1.4.4	Operational Days:	TBA
1.4.5	Clean Up Days:	N/A
1.4.6	Completion Date:	TBA
1.4.7	Working Hours:	8.00 am to 4.00 pm

1.5 Survey Details:
Samples analysed by OHEC Ltd (attached - 11).

1.6 Services in the Working Area:
There are no live services in the area affected by the works.

1.7 Welfare Facilities:
Normal site welfare provided by client.

1.8 Transit Routes:
TBA by Balfour Beatty – dependent on other site works.

1.9 Preparation Works
Area of works to be inaccessible to other trades during excavation and picking.

2.0 Site Personnel

2.1 Supervisor:
To be on site at all times during operations.

2.1.1 Name: Paul Markwick

2.1.2 Phone No: 07926 587878

2.1.3 Duties and Responsibilities:
The supervisor will ensure that all works are carried out in accordance with the Plan of Work and current best practice.

The Supervisor may only amend the RAM with the consent of the Health and Safety Manager or Director as detailed in company Asbestos standard procedures.

The supervisor will ensure that regular checks are carried out on the equipment prior to the start of works.

The supervisor will ensure that a site diary is kept, and that it is up to date at all times.

2.2 Trained Operatives:
2 trained and certified operatives.

Completions of induction! Copy on MSite

2.3 Analysts:
(Contracted by P. McGuinness & Co Ltd)
N/A

3.0 Enclosure Information

No enclosures will be used for this work.

Barriers + Signage around work area.

4.0 Control Measures.

4.1 Enclosure Integrity Controls:

N/A

4.2 Anticipated In Air Fibre Levels:

< 0.01 f/ml (Est)

4.3 Fibre Suppressant:

4.3.1 Suppressant Type and Dilution:
Water spray from hand sprays and on site jet wash(if required).

4.3.2 Anticipated Wetting Time:
As Required

4.3.3 Indication of Saturation:
Visual inspection and assessment by the Supervisor.

4.4 Shadow Vacuuming:

N/A.

4.5 Air Monitoring Arrangements:

4.5.1 Background & Personal Monitoring:
See attached previous air monitoring.

4.5.3 DCU (modular) Clearance:
N/A

4.5.4 Four Stage Clearance Testing:
N/A

4.5.5 Other Testing:
N/A

4.6 Respiratory Protection Equipment:

4.6.1 Working adjacent to excavation and loading:
P3 disposable respirators

Medicals !? Face Fit ? Not in Date?

4.6.2 Set Up and Dismantling Enclosures and Ancillary Works:
N/A

4.7 Personal Protective Equipment:

4.7.1 Overalls:
Disposable type 5 particulate overalls with hoods
Blue – All Work

4.7.2 Boots:
Wellington type safety boots
Black – All Working

? No Riggers

4.7.3 Gloves:
EN 388-2243

4.7.4 Other PPE:
Safety Helmets/safety boots/gloves/glasses/high viz

5.0 Methods of Work.

The area of works will be restricted to only the people involved in the works.

Operatives prior to stepping into area will don disposable overalls and P3 disposable respirators.

Keeping the door and windows of the machine closed, and the heater blower turned off, the machine driver will slowly and carefully spread or excavate the material in shallow layers whilst water suppression being applied and spread on adjacent ground.

Ensure PPI Standards observed.

Operatives will sift through and pick out any asbestos cement debris placing directly into waste bags, excavator to rake through spoil as required to ensure operatives remove as much debris as possible. Operatives to utilise hand spray containing suppressant to local area whilst picking.

Once operatives have picked debris from spoil excavator to remove and stockpile prior to spreading next bucket of spoil.

Note: DG Comms Plant op to be isolated + at or Work area when ops are Picking (Exclusion Zones + Phisical Barrels)

6.0 Decontamination

Decontamination Procedure where no DCU is available (Non-Licensed Work).
Operatives should decontaminate and wash every time they leave the working area.

Removing Contaminated PPE and RPE.

- At the edge of the work area clean off boots with dampened rags
- Where 2 or more operatives are present buddy cleaning should be used.
- Pat down the overalls with rags wet with fibre suppressant to remove any loose debris or fibres.
- Then they remove them by turning them inside out onto themselves and place into an asbestos waste bag for disposal.
- Disposable RPE – Remove and discard into waste bag.
- Seal waste bag for disposal.

Personal Decontamination.

- Use designated washing facilities to thoroughly clean yourself.

7.0 Waste Disposal Information

The spoil will be carted to transfer station below.

It is disposed of in accordance with "The Hazardous Waste (England and Wales) (Amendment) Regulations 2009".
A copy of the Waste Consignment Note is provided to the client.

7.1 Waste Producer:
P. McGuinness & Co Ltd.

7.2 Waste Carrier:
P. McGuinness & Co Ltd .
Carrier Registration: CB/LP3193LD

7.3 Transfer Station:
P. McGuinness & Co Ltd, Rondin Road, Manchester M12 6BF.
Permit No: EPR/CP3294CX.

Check Licence!?

At present this is Pilsworth Landfill, Bury, but final disposal is subject to the landfill being able to accept the waste at the required time, so other sites may be used as appropriate.

8.0 Risk Assessments (inc COSHH):

Risk Assessment.

Site Ref: RJD 011-2017

Area Assessed: Manual Handling

Hazard Description:

1. Spoil contaminated with debris containing Chrysotile (White) Asbestos.
2. Operatives handling materials will be in full Asbestos Works RPE & PPE
3. Size, Shape and weight of materials to be handled

Risk Description:	**Risk Groups:**
1. Exposure to Respirable Asbestos Fibre giving rise to long term health effects.	All persons in the area.
2. Physical Injury	Persons conducting the works.
3. Slips, Trips and Falls	Persons conducting the works.

Initial Risk Rating:

Severity:	X	**Frequency:**	X	**Likelihood:**	=	**Risk Rating.**
4		5		3		60 High

Existing Control Measures:

1. All works with Asbestos will be pre-planned and conducted in accordance with "The Control of Asbestos Regulations 2012" and the RAMS prepared for the operation. This Plan of Works will consider Manual Handling Risk within the Operation and the control measures required.
2. All works with this asbestos Material will be done using suitable fibre suppressants and approved Low pressure Spray methods as detailed in the RAMS.
3. When planning works consideration has been given to the manual handling of the arising's, and arrangements made to ensure they are of manageable size and weight. This means that:
   Waste bags and sections of pipe not Exceed 20 Kg;
   When planning transit routes they are to be made as straight and level as practicable.

4. The skip/trailer should be located close to the works, and materials moved by wheel barrow or mechanical means.

Further Control Measures:

Residual Risk Rating:

Severity:	X	Frequency:	X	Likelihood:	=	Risk Rating.
3		2		1		6 Acceptable

Assessors Name: R J. Dewar Tech IOSH **Job Title:** Health & Safety Manager

Signature: R. J. Dewar **Date:** 27/5/2017

Risk Assessment

Hazard Ref: PMG 2017/602a

Reason For Assessment: Annual Review

Area Assessed: Work with Asbestos Cement/Bonded Material

Hazard Description

1. Typically contains chrysotile (white) Asbestos. (Older materials may contain other types).
2. Will give rise to emissions of dust containing asbestiform fibres when worked dry or in poorly controlled conditions.
3. Dust and fibre will contaminate surrounding areas without adequate controls.
4. Failure of PPE/RPE.

Risk Description	Risk Groups
1. Exposure to respirable asbestos fibre giving rise to long term health effects.	All persons in the area.
2. Contamination of adjoining areas	Persons in that area.

Initial Risk Rating

Severity	X	Frequency	X	Likelihood	=	Risk Rating
5		5		4		100 Very High

Existing Control Measures

1. All works with asbestos cement/bonded materials will be pre-planned, and conducted in accordance with "The Control of Asbestos Regulations 2012".
2. All works with asbestos cement will, where practicable, be done using suitable fibre suppressants and approved wetting methods.
3. Where this is not practicable a risk assessment will be undertaken to find the most suitable method for the works, and this assessment will be recorded in writing.
4. All asbestos cement works will be undertaken by trained and competent operatives whose certification and training records will be available on site for inspection by the relevant enforcing authority.
5. All works will be conducted in accordance with the method statement, and where changes are made, these will be recorded on site by the supervisor for the operation.

6. PPE and RPE as detailed in the method statement will be used by all operatives involved in the works.
7. Before commencing any asbestos works the supervisor will ensure that the decontamination facilities stated in the method statement are set up and operable for the works.
8. Throughout the works, the supervisor will ensure that all asbestos is wetted down correctly with fibre suppressant, and that ample time is allowed for the suppressant to soak through the asbestos.
9. On completion of the asbestos cement removal works, the area will be inspected to ensure that no contamination or materials remain.
10. For disposal, all asbestos waste will be double bagged or double wrapped and marked as asbestos waste. It will then be disposed of to a licensed site authorised to receive such waste.

Further Control Measures

Residual Risk Rating

Severity	X	Frequency	X	Likelihood	=	Risk Rating
4		2		1		8 Acceptable

Assessors Name: R J Dewar Tech IOSH **Job Title:** Health & Safety Manager

Signature: R. J. Dewar **Date:** 27/1/2017

9.0 Changes to Plan of Work

RAMS may be amended on site by the site supervisor in line with the standard procedures of the company.
All changes must be notified by phone to, and agreed by the Health & Safety Manager or Director and detailed below.

Date:	Details of change:	Made By:	Authorised By:

10 Operatives Confirmation of Reading:

I confirm I have been briefed on, and understood the above method of work, and the risk controls to be observed.

NAME:	TRADE:	EMPLOYER:	SIGNATURE
P. MARKWICK	ASBESTOS	P. McGUINNESS	P. Markwick
G. MAIGH	"	"	G Maigh

11 Asbestos analysis

OHEC (uk) Ltd.

- OCCUPATIONAL HYGIENE CONSULTANTS
- ASBESTOS TESTING / SURVEYS
- EXPOSURE MONITORING etc.
- NOISE SURVEYS
- LEV TESTING

OAKHILL COURT, 171, BURY NEW ROAD PRESTWICH, MANCHESTER M25 9ND : Tel 0161 773 3701 : Fax 0161 773 9914
E-mail : enquiries@ohec.co.uk : Web site : www.ohec.co.uk

Client Name : P McGuinness & Co Ltd

Client Address : Rondin House
Rondin Road
Ardwick
Manchester
M12 6HF

Date of Report : 26/05/2017

BULK SAMPLE ANALYTICAL TEST REPORT

METHODOLOGY

An Authorised Assessor examines each sample visually and under low-power magnification, in order to make a visual assessment of the sample and to inspect the different types of fibres seen in the sample as a whole. The samples are then evaluated for the six types of asbestos fibres listed below, using the method set out in OHEC (uk) Ltd.'s internal control document 058 'In-House Method For Bulk Sample Analysis' which is based upon HSG248 'Asbestos : The Analysts Guide for Sampling, Analysis and Clearance Procedures', published by the HSE.

TYPES OF ASBESTOS

CHRYSOTILE ASBESTOS	-	commonly known as White Asbestos.
AMOSITE ASBESTOS	-	commonly known as Brown Asbestos.
CROCIDOLITE ASBESTOS	-	commonly known as Blue Asbestos.

Three other types of fibrous asbestos minerals are sometimes found in bulk samples, these are **ANTHOPHYLLITE, TREMOLITE and ACTINOLITE.**

Where the sample has been analysed and no asbestos fibres have been positively identified, after the completion of the analysis of the material the following result is reported: **NAD - No Asbestos Detected** in sample.

Each type of fibre detected during the detailed examination of each sample will be reported in the 'Analysis Result' column in the following results table

Where samples are reported as having been collected by OHEC (uk) Ltd., then this has been carried out in accordance with OHEC (uk) Ltd.'s internal control document 058 'Survey & Bulk Sampling Procedures'. Where samples have been supplied to OHEC (uk) Ltd. for analysis, OHEC (uk) Ltd. cannot be held responsible for the accuracy of the sample information and/or the techniques used to collect the samples. The client should check the sample details recorded in this certificate and inform OHEC if any inaccuracies are identified or amendments are required.

When samples that have been provided for analysis by the client are described as Asbestos Insulating Board (AIB) or Asbestos Cement (AC), this description is based on the judgement of the authorised assessor(s) undertaking the analysis only. Water absorption testing, which is a method used to determine the categorisation of an ACM as detailed in HSE Publication: L143, has not been carried out unless otherwise stated.

Opinions or judgements concerning the materials that are being analysed lie outside the scope of our UKAS accreditation.

BULK SAMPLE ANALYTICAL TEST REPORT

Samples Taken By : Client

Client reference :

Number of Samples : 1

OHEC Analytical Ref No. : A-01747

Analytical Reference Number	Sample Details and Description	Analysis Result
A-01747	Balfour Beatty Site, York Street, Manchester - Cement - Cement Product	Chrysotile

Tests marked 'Not UKAS Accredited' in this report/certificate are not included in the UKAS Accreditation schedule for our company.

Analysis completed on : 26/05/2017

Analysis carried out by : Robert Bourner

Report authorised by : R. Bourner

(Authorised Assessor)

UKAS
0669

12 Previous Air Monitoring

OHEC (uk) Ltd.

- OCCUPATIONAL HYGIENE CONSULTANTS
- ASBESTOS TESTING / SURVEYS
- EXPOSURE MONITORING etc.
- NOISE SURVEYS
- LEV TESTING

OAKHILL COURT, 171, BURY NEW ROAD, PRESTWICH, MANCHESTER M25 9ND : Tel 0161 773 3701 : Fax 0161 773 9914
E-mail : enquiries@ohec.co.uk : Web site : www.ohec.co.uk

CLIENT :	P McGuinness & Co Ltd Rowton House Rowton Road Middlewich Manchester M12 6BE

ASBESTOS-IN-AIR SAMPLING TEST CERTIFICATE

Page 1 of 2

Date(s) of Air Sampling :	11 / 05 / 2017
Site(s) of Air Sampling :	Demolition Union Street, Off Broseley Lane, Stafford, ST16 2UU

Reasons for carrying out asbestos-in-air sampling and/or activities being undertaken during the air sampling period.

- Reasonable Airborne-in-Air Monitoring carried out during the Excavation of Concrete Retaining Wall General Area & Loose in one Specific Area on Site

- Personal Asbestos-in-Air Monitoring carried out on the Machine Driver the Excavation Work was in Progress

Number of appendix pages attached to this report. (e.g. air sampling results and sketch diagram(s) pages)	2
OHEC (uk) Ltd. Standard Risk Assessment was deemed to be sufficient for the work carried out at this site at the time of this monitoring	YES ~~or NO~~

If the above has been answered as NO – then a site specific risk assessment form must be completed to cover the risks that are not covered by the Standard Risk Assessment form

Report Number : A-01695

Control Document 065 - Issue UK05 - Issued December 2011

ASBESTOS-IN-AIR SAMPLING TEST CERTIFICATE

This sampling was carried out in accordance with the procedures set out in OHEC (uk) Ltd's internal control document 035 '4-Stage Clearance, Air Sampling and Fibre Counting Procedures' which is based on the recommendations given in 'HSG248' and the procedure set out by the World Health Organisation (WHO) Method. Cowled sampling heads containing 25 mm diameter, 0.8 to 1.2 micron pore-size, gridded, membrane filters were used for the sampling. The effective radius of the sample filters used by OHEC (UK) Ltd. = 11.1 mm

FIBRE COUNTING

This was carried out by Phase Contrast, Optical Microscopy using at least x500 Magnification and a Walton and Beckett Eyepiece Graticule A HSE/NPL Mk 2, Phase Contrast. Test Slide was used to check that the microscope was suitable for phase contrast work. All the "fibres", as defined in 'HSG248' were counted. The results obtained from this sampling, and other relevant information, are given on the following pages of this report. These results should be considered in conjunction with information given in the relevant Guidance notes, Approved Codes of Practice, etc., which are published by the Health and Safety Executive and the Health and Safety Commission

OHEC (uk) Ltd's current RICE classification is 'Satisfactory', (Category 1)

The minimum level of detection of the sampling method is 0.01 fibres/ml. The results of the samples with volumes of 480 litres or greater can be reported down to this level when 200 field are counted. If the sample volume is greater than 480 litre, then less fields may be counted to obtain the same detection limit. The minimum number of fields that must be counted in each case is given by :

$$\text{Number of fields} = \frac{200 \times 480}{\text{Sample volume in litres}} \text{ to the nearest field.}$$

When 200 field counts are carried out on samples that have sample volumes of less than 480 litres, then higher detection limits must be used and reported. The basic formula for calculating the reportable limit is :

$$\text{Detection Limit} = \frac{0.01 \times 480}{\text{Sample Volume in litres}}$$

The following limits are examples of those which must be used :

Sample Volume in litres	Reported Result
240 to 479	0.02
160 to 239	0.03
120 to 159	0.04
96 to 119	0.05
80 to 95	0.06

All the results are reported down to 2 decimal places only.

The air sampling and fibre counting were carried out by the person who authorised the report unless stated differently below.	
OR	
Air sampling carried out by :-	—
Fibre counting carried out by :-	—

Report Authorised by :-	ALEX SAMUELSON
SIGNATURE :	

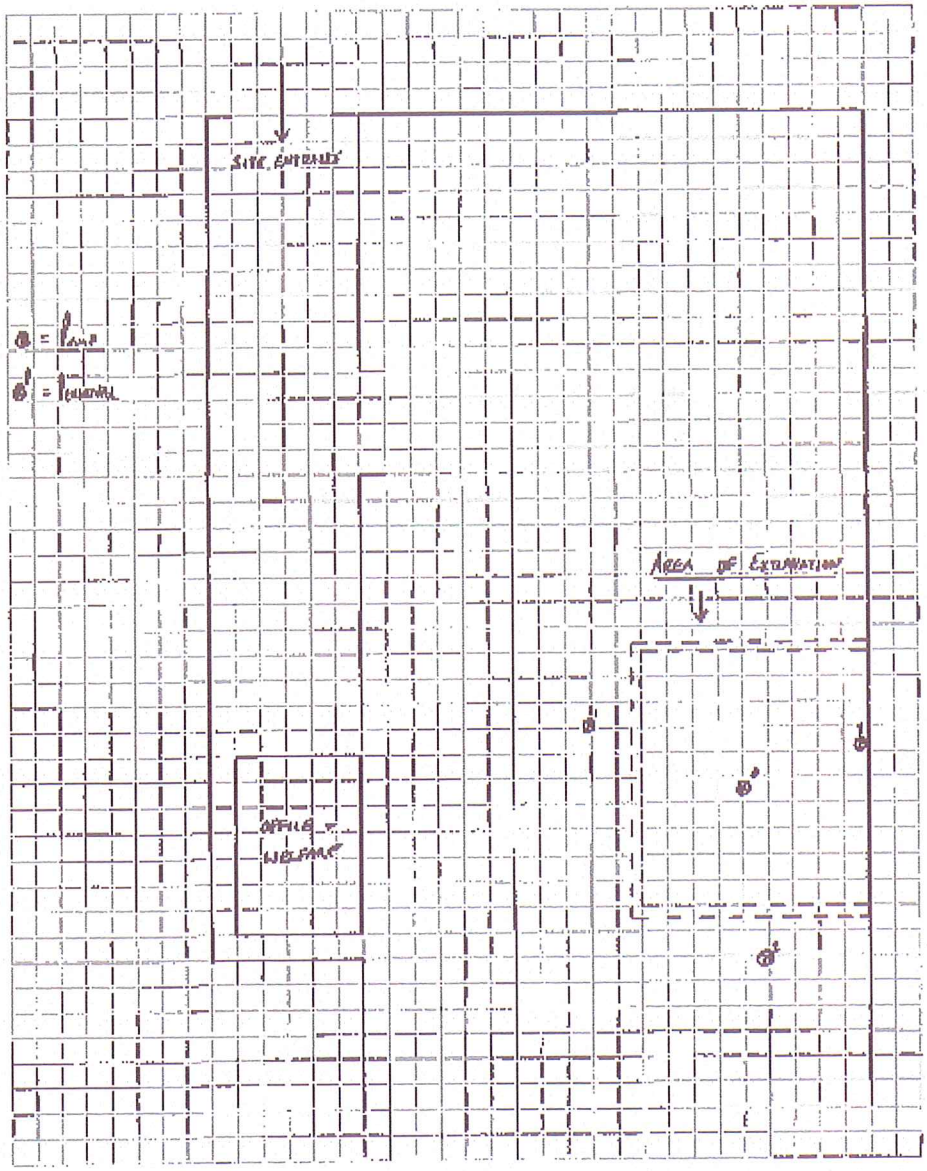
0889

Report Number : A-01645

ASBESTOS-IN-AIR SAMPLING TEST CERTIFICATE

Appendix Page 1 of 2

Positions of the Air Samplers - sketch plan showing sampler positions 1, 2, 3, etc.



THIS DIAGRAM PAGE SHOULD ALSO INCLUDE DETAILS OF THE EMERGENCY ESCAPE ROUTES EITHER AS PART OF THE DIAGRAM OR WRITTEN OUT FOR COMPLEX ROUTES.

Report Number : A-01645

Control Document 065 - Issue UK05 - Issued December 2011

ASBESTOS-IN-AIR SAMPLING TEST CERTIFICATE

Appendix Page 2 of 2

Air Sampling Results [See additional pages if more than 8 air sampling positions required]

Counter Kit	Flowmeter	Microscope	Bands visible on Test Slide	Graticule diameter	Temperature in °K Start	Temperature in °K Finish	Pressure in hPa Start	Pressure in hPa Finish
6	6	6	5	100µ	294	294	996	996

Sample Number	Position of the Air Sampler	Pump Number	Head Number	Sampling Times Start / Finish	Flow Rates in lpm Start	Check	Finish	Qs	Qc	Sample Volume in litres	Fibres Counted	Fields Counted	RESULT in fibres / ml
A-01695 - S1	Perimeter One	MF58	38	13:45:00 / 14:25:00	12.0	-	12.0	12.0	12.0	480	1½	200	<0.01
A-01695 - S2	Perimeter Two	MF54	39	13:46:00 / 14:26:00	12.0	-	12.0	12.0	12.0	480	2	200	<0.01
A-01695 - S3	Perimeter Three	MF21	21	13:47:00 / 14:27:00	12.0	-	12.0	12.0	12.0	480	1	200	<0.01
A-01695 - S4	Inside Enclosure	603	03	13:48:30 / 14:28:30	4.0	-	4.0	4.0	4.0	160	10	200	<0.03
				END OF REPORT									
A-01695 - S5	FIELD BLANK	-	32	-	-	-	-	-	-	-	-	-	-

Temperature and Pressure at the sampling location were within normal ranges and no flow rate amendments were required.

Report Number : A-01695

The above Information is Verified as Correct and Reflects an accurate copy of company records.	
Name: Robert J. Dewar Tech IOSH. **Health & Safety Manager**	Signature: R. J. Dewar Date: 10/10/2016

mantra SKILLS

CERTIFICATE OF ATTENDANCE

This is to certify that

Paul Markwick

Has attended the following course

Manual Handling

On

18/12/2012

Covering the following:

- Dangers of Careless Handling
- Principals of Laws of Motion
- Pushing and Pulling
- Mechanical Handling Equipment
- Suitable Clothing
- Weight Assessment
- Identifying Hazards

5 YEAR

Signed:

Name: Garry Whitworth

Position: Commercial Manager

Mantra Skills, Greengate, Middleton, Manchester, M24 1RU t: 0161 653 5767
Mantra Skills, Palatine Industrial Estate, Causeway Avenue, Warrington, WA4 6QQ t: 01925 658 342

HSE

Health and Safety Executive

Employment Medical Advisory Service

The Control of Asbestos Regulations 2012
Regulation 22
Certificate of Medical Examination - Licensed work

Name of employer *(see note 8 overleaf)* P MCGUINESS & COMPANY LIMITED

Address RONDIN HOUSE, RONDIN ROAD, ARDWICK, MANCHESTER, M12 6BF

Licence number 84 1 400 510

I hereby certify that I have examined *(name and address - NB: please ensure details are written over the shadow logos)*

Paul Markwick, 48 Burnley Lane, Chadderton, OL12PW

National Insurance Number WK 382325C

in accordance with Regulation 22 of the Control of Asbestos Regulations 2012

The medical examination was carried out on 09 / November / 20 15. *(Please write the date in full eg 01 January 2011)*

Signature of Medical Inspector / Appointed Doctor* DMS

Date 09/11/15

2 YEAR

Name (Block caps) DONALD MENZIES.

Address of Medical Inspector / Appointed Doctor*

DR D G MENZIES
OCCUPATIONAL HEALTH
STEPPING HILL HOSPITAL
STOCKPORT 0161 419 5491

Address stamp

DR D G MENZIES
OCCUPATIONAL HEALTH
STEPPING HILL HOSPITAL
STOCKPORT 0161 419 5491

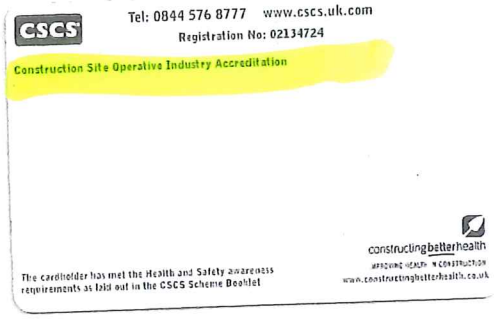
Note

- Regulation 22(4) of the Control of Asbestos Regulations 2012 requires employers to keep this certificate or a copy for at least 4 years. Information about the medical examinations required by the Regulations are shown overleaf and should be read in conjunction with this certificate.
- This is not a fitness for work examination for the specific work conditions in relation to asbestos work.

FODMS72A *(04.12)* **Delete as appropriate*

The above Information is Verified as Correct and Reflects an accurate copy of company records.		
Name: Robert J. Dewar Tech IOSH. **Health & Safety Manager**	Signature: R. J. Dewar	Date: 14/12/2015





The above Information is Verified as Correct and Reflects an accurate copy of company records.		
Name: Robert J. Dewar Tech IOSH. **Health & Safety Manager**	Signature: R. J. Dewar	Date: 27/11/2013

FIT TEST REPORT

2016-06-20

ID NUMBER	CTL		
LAST NAME	MARKWICK		
FIRST NAME	PAUL		
COMPANY	PMCGUINNESS		
LOCATION	CARRINGTON		
TEST DATE	2016-05-19 09:08	**PORTACOUNT S/N**	8030144504
DUE DATE	2017-05-19	**N95 COMPANION**	N
RESPIRATOR	SCOTT VISION 2 FULL FACE MASK [2000]	**PROTOCOL**	HSE 282/28 (UK ONLY)
MANUFACTURER	SCOTT	**PASS LEVEL**	2000
MODEL	VISION 2		
MASK STYLE	FULL FACE MASK	**Approval**	
MASK SIZE	M	**EFFICIENCY<99%**	False

EXERCISE	DURATION (sec)	FIT FACTOR	Pass
NORMAL BREATHING	80	18772	Y
DEEP BREATHING	80	3170	Y
HEAD SIDE TO SIDE	80	206190	Y
HEAD UP AND DOWN	80	266246	Y
TALK OUT LOUD	80	178794	Y
BENDING OVER	80	243181	Y
NORMAL BREATHING	80	18712	Y
OVERALL FF		15893	Y

FIT TEST OPERATOR CPEDLEY **DATE** 19/5/16

NAME Paul Markwick **DATE** 19/5/16

PAUL MARKWICK

Note:

Respirator Fit Test Card

Name: PAUL MARKWICK
ID: CTL

Test Date: 2016-05-19
Next Test Date: 2017-05-19

Respirator

Mfg: SCOTT
Model: VISION 2
Style: FULL FACE MASK
Size: M

Results

Overall FF: 15893
FF Pass Level: 2000
Pass: Y
Operator: CPEDLEY

Protocol: HSE 282/28 (UK ONLY)
Fit Test Method: QNFT using TSI PortaCount
*** Your company contact information here ***

Complete Technology

fit2fit ACCREDITED RPE Fit Test Provider

Unit 2b & 11 Roeacre Business Park, Bradsshaw Street, Heywood. OL10 1PN

Tel 01706 366355 Fax 01706 366688 e-mail info@ctl.uk.com web www.ctl.uk.com

FIT TEST REPORT

2016-06-20

ID NUMBER	CTL		
LAST NAME	MARKWICK		
FIRST NAME	PAUL		
COMPANY	PMCGUINNESS		
LOCATION	CARRINGTON		
TEST DATE	2016-05-19 09:19	**PORTACOUNT S/N**	8030144504
DUE DATE	2017-05-19	**N95 COMPANION**	N
RESPIRATOR	SUNDSTROM SR100 HALF MASK [100]	**PROTOCOL**	HSE 282/28 (UK ONLY)
MANUFACTURER	SUNDSTROM	**PASS LEVEL**	100
MODEL	SR100		
MASK STYLE	HALF MASK	**Approval**	
MASK SIZE	M/L	**EFFICIENCY<99%**	False

EXERCISE	DURATION (sec)	FIT FACTOR	Pass
NORMAL BREATHING	80	43308	Y
DEEP BREATHING	80	332201	Y
HEAD SIDE TO SIDE	80	63035	Y
HEAD UP AND DOWN	80	82751	Y
TALK OUT LOUD	80	62289	Y
BENDING OVER	80	94920	Y
NORMAL BREATHING	80	220768	Y
OVERALL FF		82191	Y

FIT TEST OPERATOR CPEDLEY **DATE** 19/5/2016

NAME Paul Markwick PAUL MARKWICK **DATE** 19/5/2016

Note:

Respirator Fit Test Card

Name: PAUL MARKWICK
ID: CTL

Test Date: 2016-05-19
Next Test Date: 2017-05-19

Respirator
Mfg: SUNDSTROM
Model: SR100
Style: HALF MASK
Size: M/L

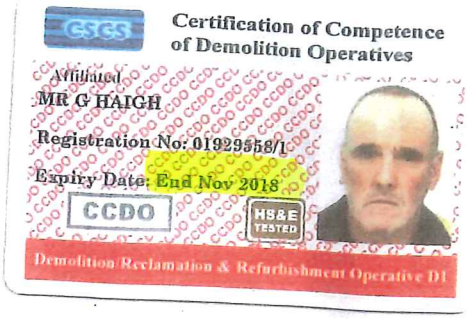
Results
Overall FF: 82191
FF Pass Level: 100
Pass: Y
Operator: CPEDLEY

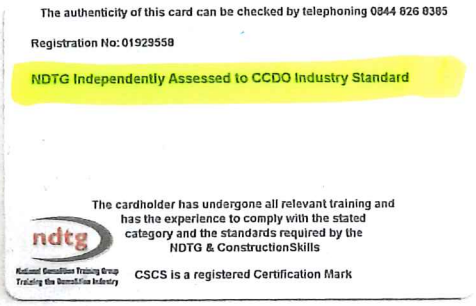
Protocol: HSE 282/28 (UK ONLY)
Fit Test Method: QNFT using TSI PortaCount
*** Your company contact information here ***

Complete Technology

Fit 2 Fit ACCREDITED RPE Fit Test Provider

Unit 2b & 11 Roeacre Business Park, Bradsshaw Street, Heywood. OL10 1PN
Tel 01706 366355 Fax 01706 366688 e-mail info@ctl.uk.com web www.ctl.uk.com





The above Information is Verified as Correct and Reflects an accurate copy of company records.		
Name: Robert J. Dewar Tech IOSH. **Health & Safety Manager**	Signature: R. J. Dewar	Date: 26/11/2013



This is to certify that **George Haigh**

P McGuinness & Co Ltd

Passed Industry Refresher for Operatives

on 02 March 2017

5807

Covering :-

Site Set Up, Maintenance and Dismantling (inc Practical)
Controlled Stripping Techniques (inc Practical)
Respiratory Protective Equipment (RPE) (inc Practical)
Personal Protective Equipment (PPE) (inc Practical)
Transit Procedures and Decontamination (inc Practical)
Cleaning and Clearance Air Testing
Emergency Procedures
Non-asbestos Hazards

arca

The leading asbestos removal contractors association dedicated to promoting safety and professionalism

Industry Refresher for Operatives

George Haigh

ID: **5807**

Expiry Date: **01/03/2018**



Training Manager: Sahota

Expiry Date: 01 March 2018

Unit 1 Stretton Business Park 2, Brunel Drive, Stretton, Burton upon Trent, Staffordshire DE13 0BY
T: 01283 505777 F: 01283 568228
W: www.arca.org.uk E: info@arca.org.uk

Allpoint Safety Limited

Unit B2 Parkside Business Park, Kirkstead Way, Golborne, Warrington, WA3 3PY

FIT TEST REPORT

2017-05-11

ID NUMBER	03		
LAST NAME	MARKWICK	SHAVEN	MUSTACHE
FIRST NAME	PAUL	SMOKER	NON SMOKER
COMPANY	P MCGUINESS	WEIGHT	NO HEALTH ISSUES
LOCATION	MANCHESTER	MASK	ALLPOINT MASK USED
TEST DATE	2017-05-11	PORTACOUNT S/N	8030151104
DUE DATE	2018-05-11	N95 COMPANION	N
RESPIRATOR	SUNDSTRUM SR100 HALF MASK [100]	PROTOCOL	HSE 282/28 (UK ONLY)
MANUFACTURER	SUNDSTRUM	PASS LEVEL	100
MODEL	SR100		
MASK STYLE	HALF MASK	APPROVAL	EN140:1998.
MASK SIZE	M/L	EFFICIENCY<99%	False

EXERCISE	DURATION (sec)	FIT FACTOR	Pass
NORMAL BREATHING	80	9033	Y
DEEP BREATHING	80	9400	Y
HEAD SIDE TO SIDE	80	4573	Y
HEAD UP AND DOWN	80	1052	Y
TALK OUT LOUD	80	1066	Y
BENDING OVER	80	6839	Y
NORMAL BREATHING	80	5469	Y
OVERALL FF		2638	Y

FIT TEST OPERATOR BS DATE 11-5-17

NAME Paul Markwick DATE 11-5-17

PAUL MARKWICK

Note: NO OTHER PPE WORN TEST CARRIED OUT AT MCGUINESS

Respirator Fit Test Card

Name: PAUL MARKWICK Test Date: 2017-05-11

ID: 03 Next Test Date: 2018-05-11

Respirator

Mfg: SUNDSTRUM

Model: SR100

Style: HALF MASK

Size: M/L

Results

Overall FF: 2638

FF Pass Level: 100

Pass: Y

Operator: BS

Protocol: HSE 282/28 (UK ONLY)

Fit Test Method: QNFT using TSI PortaCount

Allpoint Safety Ltd 01942 273444

Tel : 01942 273444 Fax: 01942 273555

HSE

Health and Safety Executive

Employment Medical Advisory Service

The Control of Asbestos Regulations 2012
Regulation 22
Certificate of Medical Examination - Licensed work

Name of employer *(see note 8 overleaf)* P McGuinness & Co Ltd

Address Rondin House, Rondin Road
Ardwick
MANCHESTER M12 6BF

Licence number 841400510

I hereby certify that I have examined *(name and address - NB: please ensure details are written over the shadow logos)*

GEORGE HAIGH

National Insurance Number YX466895D

In accordance with Regulation 22 of the Control of Asbestos Regulations 2012

The medical examination was carried out on 24 / JULY / 20 15 *(Please write the date in full eg 01 January 2011)*

Signature of Medical Inspector / Appointed Doctor*

Date 24/7/15.

Name (Block caps) DONALD MENZIES

Address of Medical Inspector / Appointed Doctor*

Dr. Donald Menzies
Consultant
Occupational Health

Address stamp

OCCUPATIONAL HEALTH
STEPPING HILL HOSPITAL
STOCKPORT SK2 7JE
Tel: 0161 419 5491

Note

- Regulation 22(4) of the Control of Asbestos Regulations 2012 requires employers to keep this certificate or a copy for at least 4 years. Information about the medical examinations required by the Regulations are shown overleaf and should be read in conjunction with this certificate.
- This is not a fitness for work examination for the specific work conditions in relation to asbestos work.

Allpoint Safety Limited

Unit B2 Parkside Business Park, Kirkstead Way, Culborne, Warrington, WA3 3PY

FIT TEST REPORT

2017-05-11

ID NUMBER	2		
LAST NAME	HAIGH	SHAVEN	CLEAN SHAVEN
FIRST NAME	GEORGE	SMOKER	NON SMOKER
COMPANY	P MCGUINESS	WEIGHT	NO HEALTH ISSUES
LOCATION	MANCHESTER	MASK	ALLPOINT MASK USED
TEST DATE	*2017-05-11*	*PORTACOUNT S/N*	*8030151104*
DUE DATE	2018 05 11	N95 COMPANION	N
RESPIRATOR	SUNDSTRUM SR100 HALF MASK [100]	PROTOCOL	HSE 282/28 (UK ONLY)
MANUFACTURER	SUNDSTRUM	PASS LEVEL	100
MODEL	SR100		
MASK STYLE	HALF MASK	APPROVAL	EN140:1998
MASK SIZE	M/L	EFFICIENCY<99%	False

EXERCISE	DURATION (sec)	FIT FACTOR	Pass
NORMAL BREATHING	80	22710	Y
DEEP BREATHING	80	32066	Y
HEAD SIDE TO SIDE	80	39961	Y
HEAD UP AND DOWN	80	34292	Y
TALK OUT LOUD	80	23570	Y
BENDING OVER	80	32623	Y
NORMAL BREATHING	80	67406	Y
OVERALL FF		32210	Y

FIT TEST OPERATOR BS DATE 11-5-17

NAME GEORGE HAIGH DATE 11-5-17

Note: NO OTHER PPE WORN, TEST CARRIED OUT AT MCGUINESS

Respirator Fit Test Card

Name: GEORGE HAIGH
ID: 2
Test Date: 2017-05-11
Next Test Date: 2018-05-11

Respirator
Mfg: SUNDSTRUM
Model: SR100
Style: HALF MASK
Size: M/L

Results
Overall FF: 32210
FF Pass Level: 100
Pass: Y
Operator: BS

Protocol: HSE 282/28 (UK ONLY)
Fit Test Method: QNFT using TSI PortaCount
Allpoint Safety Ltd 01942 273444

Tel : 01942 273444 Fax: 01942 273555

Appendix B

Evidence of Protection of Sherwood Sandstone Aquifer

B1 Evidence of protection of Sherwood Sandstone aquifer

B1.1 Use of CFA piling methods

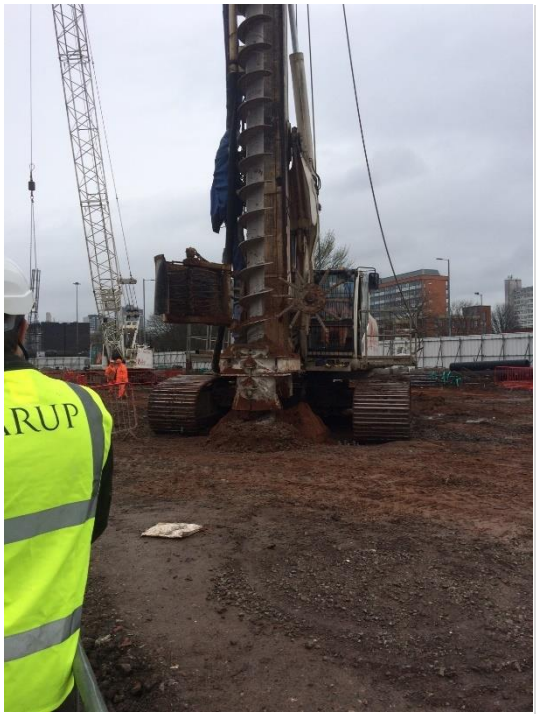
Expanded Piling's Foundation Works Risk Assessment is presented as **Attachment B1** to this appendix.

Arup's *piling and retaining wall specification* 5893-ARP-00-XX-SP-S-000001 C2 1st December 2016, specified the use of contiguous bored piles to form the MEC Hall north and south basements; cast in-situ bored piles outside basement areas including MEC Hall, York Street building, Upper Brook Street building and Oddfellows Hall extension. This specification set the requirements for Expanded Piling's contract for MECD.

Expanded Piling prepared a design report for the piles required at MECD: Expanded Piling, Project Reference: 5983-EXP-MECD-B-X-CA-00001/P05 Contract Design – Contiguous piled embedded wall and bearing piles, Document No. Y3483/Contract Design/rev C05 dated 21st February 2017. This document confirms that CFA piling was to be used at the site (see also **Appendix D, Attachment D2**).

Expanded prepared a handover pack containing all as-built piling information: Expanded Piling, ITP No. and Revision: 5983-EXP-MECD-B-QP-Y-00027 AB01, MECD Piling Handover Pack. Works: CFA and Rotary Piles. This document confirms that CFA piles were installed at the site (see also **Appendix D, Attachment D3**).

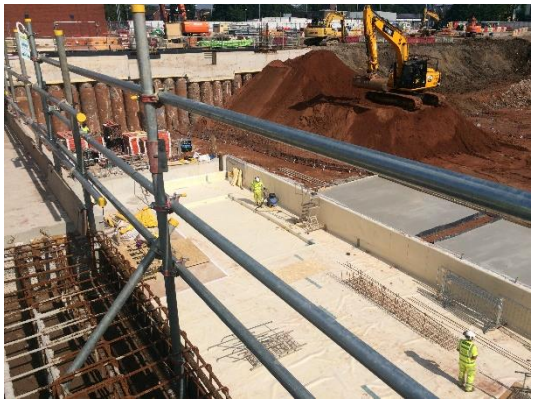
The following photographs show the use of the CFA piling rig at MECD:



CFA piling rig on site at MECD 29th March 2017



MEC Hall south basement showing contiguous piled wall exposed on sides of basement and exposed red sandstone in base of excavation. Note heap of excavated spoil in top left corner of photograph (taken 26th July 2017)



MEC Hall south basement showing heap of excavated spoil being collected and removed from basement for offsite disposal. Piled wall structure visible behind spoil heap (taken 26th July 2017)



MEC Hall north basement showing excavations through sandstone and removal of spoil from excavation. Piled walls visible in sides of basement (taken 6th November 2017)

B1.2 Treatment of existing standpipes/wells

Existing monitoring wells and areas where historical abstraction wells could be encountered are shown on Drawing 5983-ARP-MECD-G-SI-C-00-2XE02, which is presented as **Attachment B2** to this appendix.

All historical monitoring wells which penetrated the sandstone bedrock (installed for ground investigation purposes) were either excavated as part of the basement dig, or located beneath new buildings:

Monitoring Well Ref.	Location	Treatment
BHG2	Within MEC Hall south basement excavation.	All historical monitoring wells were removed during excavation of MEC Hall south basement, which extended into the sandstone bedrock.
BHG3		
BHG1		
BH104		
BHV1A		
BHV4AB		
BH103	Within MEC Hall north basement excavation.	All historical monitoring wells were removed during excavation of MEC Hall south basement, which extended into the sandstone bedrock.
BHA2		

BHA1A	Within footprint of York Street building.	Removed during excavation of foundations for York Street building.
BHA3	Beneath new drainage attenuation tank to south of Oddfellows Hall	Removed during excavation works to install the attenuation tank.
RBH101	Within footprint of Oddfellows Hall extension.	Removed during construction of foundations for Oddfellows Hall extension.
WS101	Within footprint of new Upper Brook Street building	Removed during excavation of foundations for Upper Brook Street building.

B1.3 Treatment of water well identified during construction

In September 2017, a suspected old infilled water well approximately 1m diameter was found in the area of the MEC Hall north basement, immediately adjacent to a proposed lift pit. The well was within the Sherwood Sandstone. Advice was also sought from Arup, in case the materials used to infill the well were contaminated.

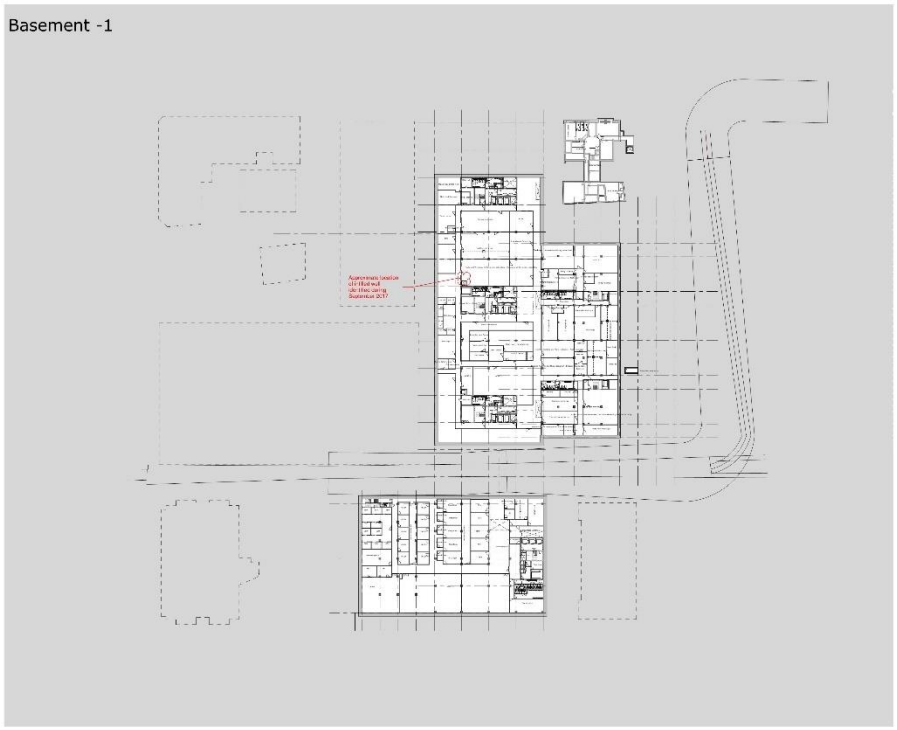
Expanded Piling Ltd contracted ESG Ltd to investigate the well. ESG drilled three boreholes using dynamic windowless sampling methods to depths of up to 6.9m bgl through the well infill material. The well was found to be infilled with brown made ground of gravel with brick and ash. No visual or olfactory evidence of contamination was noted. Intact sandstone bedrock was proven at the base of the boreholes, confirming the depth of the well.

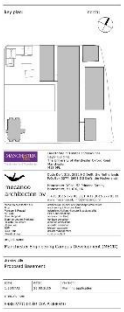
Samples of the well infill were taken for analysis by ESG. ESG's factual report on the investigation is presented as **Attachment B3** to this appendix. The chemical testing identified elevated concentrations of lead, but within the range detected in the made ground at the MECD site during previous ground investigations. No contamination with Polynuclear Aromatic Hydrocarbons (PAH) or petroleum hydrocarbons (TPH) was identified and no asbestos was detected in the samples taken. The infill material was found to be dry and no groundwater seepages were noted.

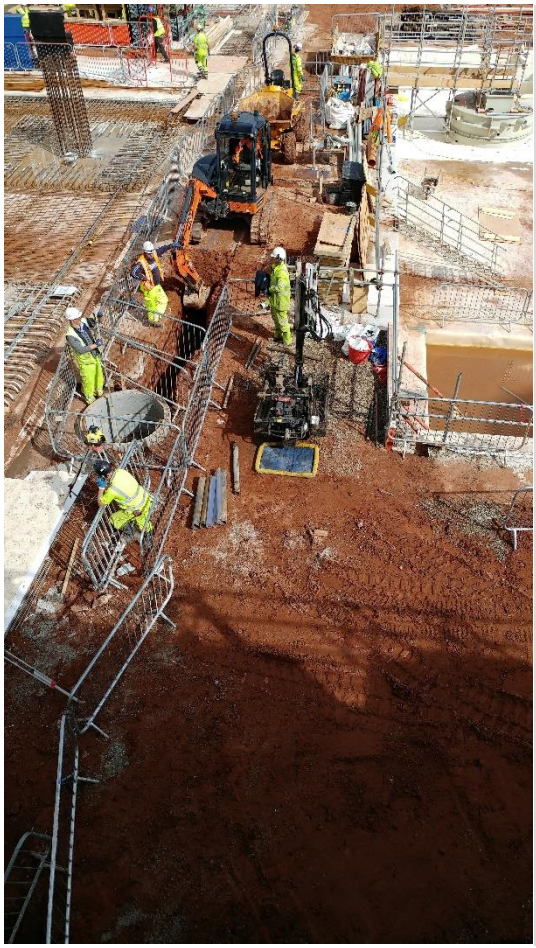
Arup did not request the infill material to be removed, as it was felt that the material posed a low risk to groundwater quality, being dry and above the water table. It was proposed to grout the well in order to stabilise the ground as significant voiding had been noted in the infill material. Grouting was carried out by ESG on 14th September 2017 using the boreholes drilled through the well infill. Grout take was recorded on the borehole logs.



Location of infilled well within MEC Hall North construction area (in foreground of photograph, where dynamic sampling rig is located)







View of infilled well feature within MEC Hall North basement. The well is located a few metres to the right of the concrete ring where the dynamic sampler is located (taken 14th September 2017)



Drilling of boreholes through well infill material. Plastic casing was inserted in the boreholes to allow grouting to be completed after drilling.

Attachment B1 – Foundation Works Risk Assessment

Planning condition comment:

"Piling or any other foundation designs using penetrative methods shall not be permitted other than with the express written consent of the Local Planning Authority, which may be given for those parts of the site where it has been demonstrated that there is no resultant unacceptable risk to groundwater. The development shall be carried out in accordance with the approved details."

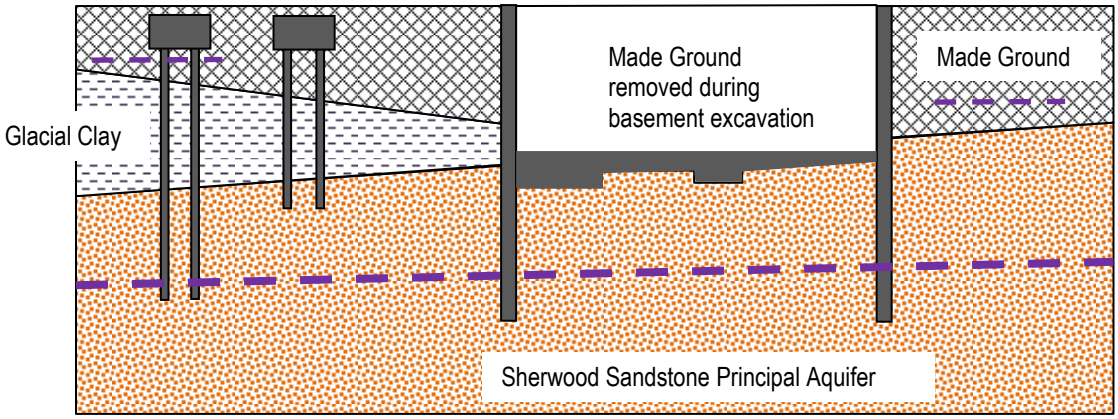
1. **Introduction**
2. Following a request from Balfour Beatty, this note considers the above planning condition on the MECD project in relation to the construction of piled foundations at the site.

3. **Proposed piling scope**
4. Piled foundations are proposed in the following areas:
    a. MEC Hall north – Construction of 900mm diameter contiguous embedded piles to form a basement wall of approximately 365m perimeter length;
    b. MEC Hall north (outside basement) – Construction of 45No. 600mm diameter bearing piles to support superstructure loading;
    c. MEC Hall south – Construction of 900mm diameter contiguous embedded piles to form a basement wall of approximately 246m perimeter length;
    d. York Street building – Construction of 103No. 600mm diameter bearing piles to support superstructure loading;
    e. Upper Brooke Street building (outside basement) – Construction of 92No. 600mm diameter bearing piles to support superstructure loading;
    f. Oddfellows Hall extension – Construction of 46No. 600mm diameter bearing piles and 26m of contiguous bored pile wall to form a small basement area.

5. All of the piling is to be undertaken using continuous flight auger (CFA) piling techniques.

6. **Conceptual ground model**
7. The conceptual ground model is summarised in the sketch below.
8. The sketch shows the following:
    a. Made Ground layer with occasional coarse-grained drift deposits. This layer contains localised pockets of perched groundwater.
    b. Fine-grained glacial clay layer, which is up to 3.5m thick in the north of the site and is not present in the southern half of the site.
    c. The site is underlain by the Sherwood Sandstone which is a principal aquifer. Groundwater levels within the sandstone are approximately 8m to 9m below existing ground levels.

Figure 1 Conceptual ground model sketch



10. All of the proposed piles are designed to extend into the Sherwood Sandstone.
11. Proposed pile lengths are in the range of 7m to 15m and extended into the sandstone by lengths ranging from 1m to 12.5m.
12. In the southern half of the site the Made Ground currently rests directly upon the top of the Sherwood Sandstone.

13. Potentially contaminated ground

14. The Interpretative Ground Investigation report produced by White Young Green (July 2014) is summarised in the Work Stage 3 report as follows 'a refined contamination risk assessment, using a source-pathway-receptor model and the findings of the site specific ground investigation' was undertaken. 'The key conclusion of the assessment is that contamination risks posed by the site are considered to be low for all receptors with the exception of a low to moderate risk of ground gas to future site users and buildings.'
15. The Work Stage 3 report further states 'During Work Stage 3 contamination risk assessments have been completed by Arup using the data collected during the 2014 and 2015 ground investigations. The key conclusion of the contamination assessments is that contamination risks posed by the site are considered to be low for all receptors, and no specific remediation measures are required.' Further detail on the findings is presented in the Work Stage 3 report for the project.

16. Choice of foundations

17. Embedded contiguous piles have been selected to form the basement walls as this type of construction is ideally suited to the construction of basements in urban environments. This method allows basements to be constructed in close proximity to neighbouring properties whilst maintaining support to those properties. Alternative, open dig techniques are considered to be unsuitable as the basement size would have had to be significantly reduced in size.
18. Foundations within the basement sub-structure are supported on pad foundations within the top of the Sherwood Sandstone.
19. Foundations to support superstructure loadings outside of the basement area are proposed to be supported on bearing piles. The existing near surface soils are unsuitable to support the superstructures whilst maintaining appropriate building settlement control. The super structure loads exceed those that could be carried on

shallow ground improvement methods. The use of shallow foundations and rafts to support the superstructures is therefore considered to be unsuitable.

20. Potential adverse impacts caused by piling

21. The site is underlain by a principal aquifer and a clay layer is present over part of the site which separates the Made Ground from the underying aquifer. The proposed piles will penetrate this clay layer. It is possible that the penetration of the clay layer during pile installation could provide new pathways linking the Made Ground to the aquifer which previously did not exist.

22. Site specific risk assessment

23. The contamination risk within the Made Ground has previously been assessed by others as low. Furthermore, the extent of the any contamination within the Made Ground will be reduced during the removal of significant volumes of Made Ground soils during the construction of the basements associated with the development.
24. In the southern area of the site, Made Ground currently rests directly upon the sandstone aquifer. A direct pathway therefore exists between any potential contamination within the Made Ground and the underlying aquifer. The clay layer that separates the Made Ground from the Sandstone is present in the northern half of the site. It is noted that the majority of the bearing piles will be constructed in the northern area of the site where the clay separator layer is present.
25. The proposed piling construction technique of contiguous flight auger (CFA), are considered to 'probably pose the least risk of groundwater pollution' (Westcott et al 2001). This is because soil is transported upwards and not downwards during construction and that concrete is placed under pressure to ensure good contact between the pile and the ground. This construction methods results in the minimisation of pathways. In addition, ground water is low at the site and is not expected to have a significant effect on pile construction.
26. On the basis of the above, properly constructed CFA piles are considered to be suitable at the above site.

27. Summary and recommendations

28. The construction of CFA bearing piles and embedded wall piles is considered to be suitable at the site. This is based on the following:
29. The risk of contamination has previously been assessed as low.
30. The clay separator layer at the site is present over approximately half of the site. The potential for additional pollution linkages to be created by the undertaking of CFA piling is considered to be low.
31. The risk of contamination will be reduced during the removal of significant volumes of Made Ground during basement excavations.
32. We recommended that piles are installed in accordance with current good practice as outlined in the Institution of Civil Engineer's specification for piling and embedded retaining walls and the accompanying Client's particular specification. Expanded piling will confirm their piling methodology in their method statements and risk assessments which will be submitted in advance of the works.
33. In accordance with the recommendations of the Stage 3 report, a watching brief during the works should be maintained to identify any potentially contaminated soils during the pile construction.

34. References

35. Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention, F J Westcott, C M B Lean & M L Cunningham May 2001 Published by the Environment Agency
36. MECD workstage 3 report, volume 3: civil and structural engineering by Mecanoo, Arup, Aecom, Penoyre & Prasad, Buro Happold, Deloitee Real Estate and Hoare Lea Sweett Group.
37. Preliminary Ground Investigation Interpretative Report by WYG dated July 2014.

Attachment B2 - Drawing 5983-ARP-MECD-G-SI-C-00-2XE02 existing monitoring wells



Borehole Ref	Maximum depth of standpipe (m bgl)	Standpipe diameter (mm)	Eastings	Northings
BHA1A	6.8m 12m	50 35	384456.6	397093
BHA2	16m	50	384495.9	397074.6
BHA3	12.5m 8.5m	50 35	384548.9	397120.5
BHG1	12m	100	384538.7	396959.9
BHG2	12m	100	384537.1	396962.9
BHG3	12m	100	384540.6	396964.8
BHV1A	6m	50	384540.1	396952.2
BHV4AB	6m	50	384569.9	396970.1
BH103	4m	50	384518.6	397031.7
BH104	3m	50	384539.6	396957.2
RBH101	12m	50	384547.2	397147.3
WS101	1.28m	50	384599.3	397062
WS106	1m	50	384508.4	397045.3

Table of monitoring wells to be decommissioned

Key

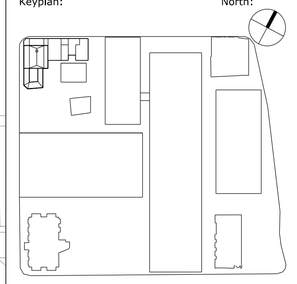
- Site Planning Boundary
- Location of former buildings where formation inspection is required after demolition to check for contamination, in accordance with the Outline Remediation Strategy
- RBH101 — Monitoring wells to be decommissioned in accordance with the Outline Remediation Strategy
- Area where water wells may be present associated with historical water works. Vigilance required during earthworks in this area. If old wells are identified, these should be decommissioned in accordance with the Outline Remediation Strategy

The University of Manchester

Notes

1. The information shown on this drawing (which forms part of the Work Stage 4 design submission), is based on the model, proposed ground levels and drawings issued by the Landscape Architect Mecanoo on 1st September 2016.
2. This drawing should be read in conjunction with Outline Remediation Strategy Report.
4. All dimensions are in mm, all levels in mAOD unless specified otherwise.
5. Background OS map is reproduced from Ordnance Survey Material with the permission of the Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office (c) Crown Copyright. License Number 0100031673 (2013).

Keyplan: North:



IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS :-

Item	Hazard	Risk

Rev	Description	By	Date	Chk'd	Auth
C1	Contruction Issue	AS	07/09/16	SM	DH

MANCHESTER 1824
The University of Manchester

Directorate of Estates and Facilities
Beyer Building
The University of Manchester
Oxford Road
Manchester
M13 9PL

ARUP
6th Floor, 3 Piccadilly Place, Manchester. M1 3BN
T +44 161 228 2331, F +44 161 236 105
www.arup.com

Drawing Status: For Construction

Project: Manchester Engineering Campus Development -5983

Building Name: -

Sub Site Name: -

Site Name: MECD

Drawing Title: Remediation Strategy Constraints Plan

PM	Drawn	Checked	Authorised
-	APS	DH	JAC
Scale	Date	Date	Date
1:500	07/09/16	07/09/16	07/09/16

Drawing No.: 5983-ARP-MECD-G-SI-C-00-2XE02

Revision: C1

Appendix C

Evidence of Validation of Soft Landscaping

C1 Evidence of Validation of Soft Landscaping

C1.1 Aquatics Centre car park area

The following documents are attached to this appendix, as evidence of soft landscaping validation within the Aquatics Car Park area:

Attachment C1 Topsoil source check;

Attachment C2 Topsoil sampling and placement validation, and

Attachment C3 Topsoil test results

Arup reviewed the topsoil testing results and confirmed to Balfour Beatty that the topsoil validation testing complied with the requirements of the Outline Remediation Strategy.



New soft landscaping alongside Aquatics Centre. Tree pits and soil validated June 2018

It should be noted that during the placement of topsoil in the Aquatics Centre Car Park, a small quantity of surplus topsoil was placed on a small area of landscaping adjacent to the new Active Travel Hub building. Although the topsoil is chemically suitable for use, the thickness was not verified by Arup at the time of placement. This area is very small and has been planted with dense shrubbery, as shown in the photograph below. No further validation has been carried out in this area.



Small area of topsoil placement with dense shrub planting adjacent to Active Travel Hub

Furthermore, there is a line of existing mature trees within the Aquatics Centre car park which have been retained. The soil surrounding these trees was not disturbed as part of the construction of the car park, no new soil has been placed around these trees and therefore the soil in that area has not been validated by Arup.



Line of existing trees within Aquatics Centre car park, not disturbed as part of MECD construction

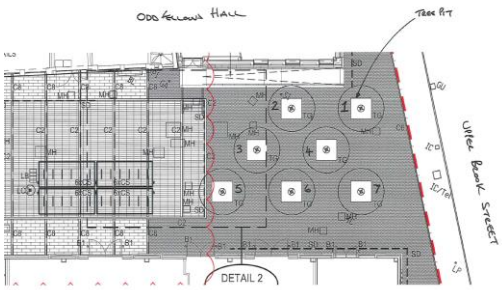
C1.2 Tree pits to south of Oddfellows Hall

The following documents are attached to this appendix, as evidence of validation to seven tree pits installed to the east of Oddfellows Hall:

Attachment C4 Topsoil source check;

Attachment C5 Topsoil sampling and placement validation, and

Attachment C6 Topsoil test results



Location of tree pits to east of existing Oddfellows Hall. Upper Brook Street is located to the east of the tree pits.

The tree pits were constructed in two stages. The first stage was carried out on 1st April 2019. During this stage, the tree pits were dug and the proprietary plastic tree root system was installed. Arup was not present for this stage of the works. Balfour Beatty confirmed that the source of topsoil placed in the tree cells was the same as used for the Aquatics Centre Car Park in **Attachment C1**. A statement to this effect is presented in **Attachment C4** but no validation samples were taken at the time. The tree cells were then covered over with hardstanding as they were located in an area of the site being used as a temporary site access for vehicles.

The tree pit locations were uncovered in March 2020 for planting and some of the topsoil that had been placed in April 2019 was dug out, as shown in the photographs in **Attachment C5**. At the time, Arup was not able to be present on the site due to restrictions on site visits as a result of the COVID-19 outbreak. Samples of the imported topsoil placed in the tree pits were taken by Balfour Beatty for testing in line with the remediation strategy (see **Attachment C6**). As the soil placed in March 2020 was from a new source, a minimum of three samples was required to be taken. However, only two samples were taken at the time, meaning that a third verification sample needed to be taken before validation can be closed out in this area.

Balfour Beatty took the third sample in May 2021 (sample ref. OFH-1-0-ES-0.70 result in **Attachment C8**). Arup reviewed the topsoil testing results provided and confirmed to Balfour Beatty that the topsoil validation testing complied with the requirements of the Outline Remediation Strategy.

C1.3 Upper Brook Street and Podium landscaping (November 2020)

Topsoil was imported and laid in these areas in November 2020 and sampled by Socotec in February 2021. Balfour Beatty confirmed that the source of this soil was the Miller Homes site at Congleton. A ground investigation report was provided to Arup for review, which confirmed that the site had been agricultural land that was now being redeveloped for housing, it was deemed that the site met the requirement for greenfield land (see **Attachment C10**). A sample of soil from this site was tested prior to import by Tim O'Hare Associates, which showed that the material met the requirements of the specification. Thirteen samples of topsoil were taken from the Upper Brook Street landscaping and the planters on the podium area (see plan in **Attachment C9**) by Socotec, all of which met the requirements of the Outline Remediation Strategy.

C1.4 Upper Brook Street and Podium landscaping

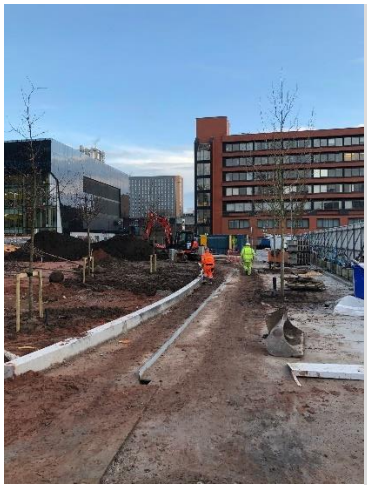
Topsoil to these areas was imported and laid in January and February 2021 using topsoil sourced from the Miller Homes site, Congleton (previous source of topsoil checked and confirmed as being greenfield, see **Attachment C10**).

Analysis of five topsoil samples taken by Socotec from the various tree pits and planters (see location drawing in **Attachment C8**) demonstrated that the topsoil met the requirements of the Outline Remediation Strategy with the exception of one sample (P5 AQ-1-0-ES-0.70) which was taken from a rectangular planter to the south of the Aquatics Centre. This sample contained lead in excess of the required limit in the Outline Remediation Strategy (839mg/kg compared with the screening value of 300mg/kg).

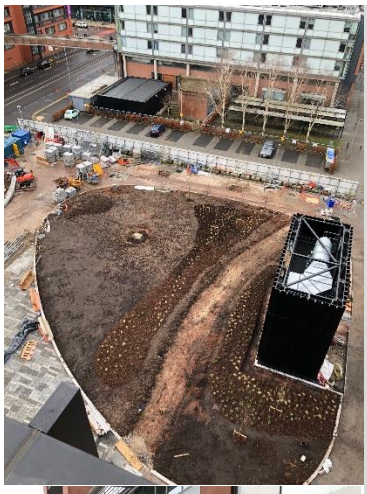
Balfour Beatty confirmed that this soil was from the Miller Homes site which had been screened and confirmed to be greenfield. In addition, analysis was carried out prior to import by Tim O'Hare Associates in January 2020 (see **Attachment C8**) which did not show any indication of elevated lead concentration. All other samples from the same batch met the quality requirements, therefore this sample was not considered to be representative of topsoil sourced from the Miller Homes site generally and is not considered to represent a significant risk to health of future site users.

Subsoil was imported for use in the Upper Brook Street and Podium areas comprising quarried red sandstone from Bold Heath Quarry (see **Attachment C7**). No chemical testing was carried out on this material.

For all areas of topsoil laid from 2020 onwards during the Coronavirus pandemic, Balfour Beatty confirmed that the material was laid to the depths required in the Outline Remediation Strategy, see **Attachment C11.**



Planter 1 on podium topsoil and subsoil placement February 2021



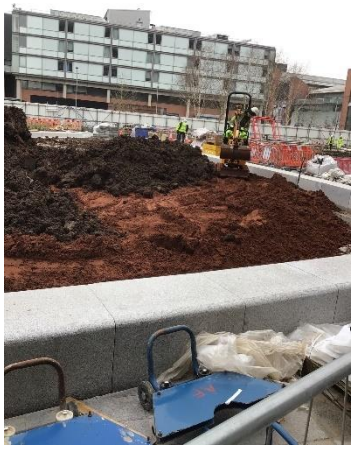
Planter on podium topsoil and subsoil placement February 2021



Rectangular planter by Aquatics Centre February 2021. Material in planter is subsoil (quarried sand from Bold Heath quarry)



Soil placed in Planter 2 podium February 2021



Topsoil placement to Planter 2 podium February 2021

Attachment C1 Topsoil source check for Aquatics Car Park

ARUP

Subject MECD Topsoil Source check

Date 7 June 2018 **Job No/Ref** 235779

1 Topsoil Source Check

Balfour Beatty's landscaping contractor, Ashlea Landscaping, is proposing to import topsoil to be placed within the Aquatics Centre car park for tree and shrub planting during the week commencing 11th June 2018.

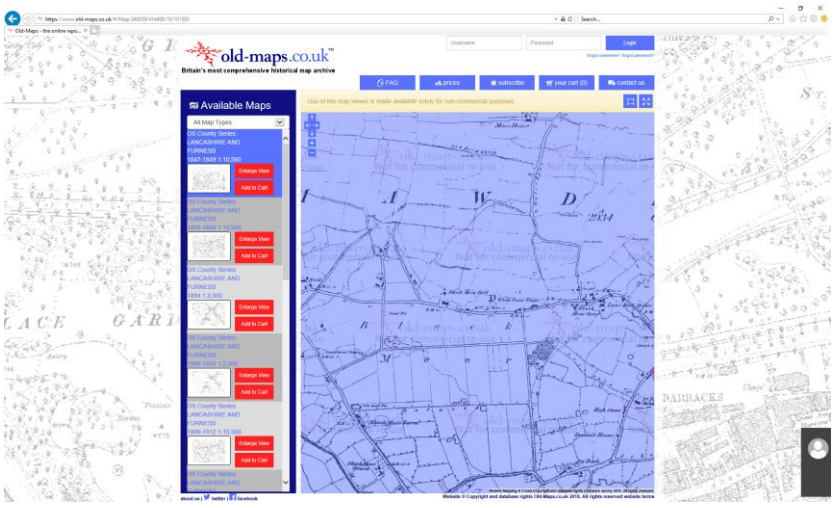
The proposed topsoil source is: Quantil Seeds, off Black Moor Road, Mawdesley, Lancashire. The approximate grid reference of the source site is: 348056, 414961.

Current aerial imagery provided by Balfour Beatty shows that the site is an arable field. Historical OS mapping viewed online confirms that the site has been used for agriculture since the earliest mapping dated 1847-1849. There is no evidence of past contaminative use of the proposed source site.

The landscaping contractor has confirmed that the soil will be blended with a small amount of sand. A soil quality report provided by the landscaping contractor (dated May 2017) confirms that the soil should meet the requirements of the remediation strategy, subject to further validation testing on site.

The proposed source soil is deemed to be suitable for use at MECD.

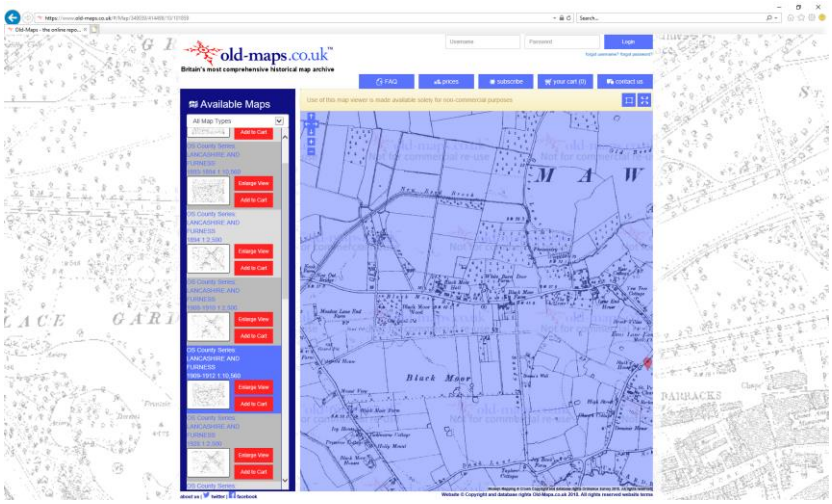
Historical OS maps viewed online:
1847-1849



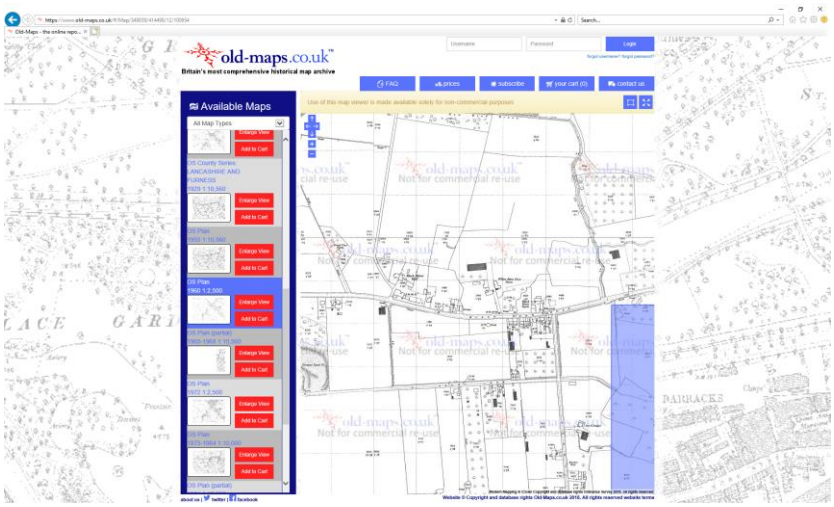
Subject MECD Topsoil Source check

Date 7 June 2018 **Job No/Ref** 235779

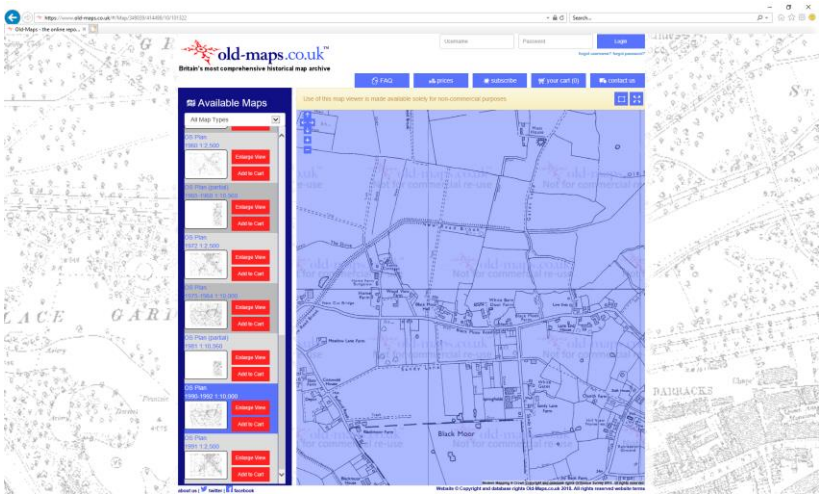
1909-1912



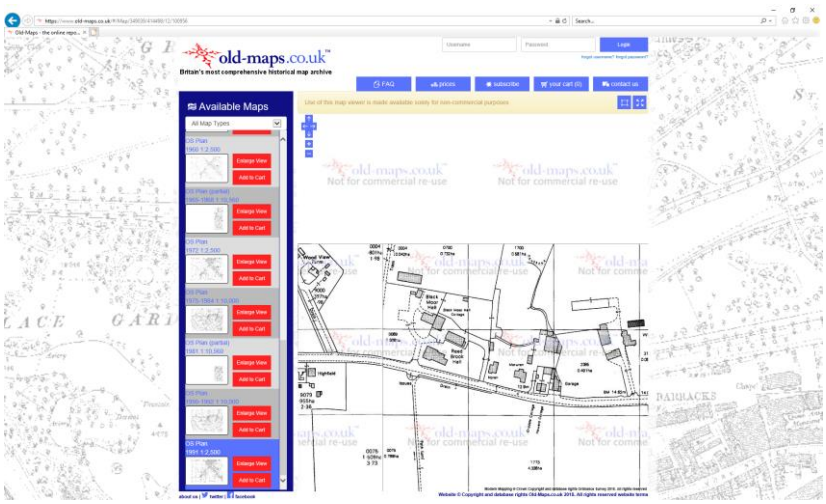
1960



1975



1992



Google Maps



Imagery ©2018 Google, Map data ©2018 Google 20 m

Quantil seeds
off Blackmoor rd
Mawdsley.

TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Alan Draper
R. Draper Ltd
Barrow Nook Lane
Bickerstaffe
Nr. Ormskirk
Lancashire
L39 0ET

26th May 2017
Our Ref: TOHA/17/7160/SS
Your Ref: as below

Dear Sirs

Topsoil Analysis Report – Grade 1 Topsoil

We have completed the analysis of the topsoil sample recently submitted, referenced *Grade 1 Topsoil,* and have pleasure reporting our findings.

The purpose of the analysis was to determine the suitability of the topsoil sample for general landscape purposes (trees, shrubs, amenity grass). In addition, this sample has been assessed to determine its compliance with the requirements of the British Standard for Topsoil *(BS3882:2015 Specification for Topsoil – Multipurpose Topsoil)*.

This report presents the results of analysis for the sample submitted to our office, and it should be considered 'indicative' of the topsoil source. The report and results should therefore not be used by third parties as a means of verification or validation testing or waste designation purposes, especially after the topsoil has left the R Draper Ltd site.

SAMPLE EXAMINATION

The sample was described as a very dark greyish brown (Munsell Colour 10YR 3/2) slightly moist, friable LOAMY SAND with a weakly developed, fine to medium granular structure*. The sample was virtually stone-free and contained frequent organic fines and woody fragments. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

*This appraisal of soil structure was made from examination of disturbed sample(s). Structure is a key soil characteristic that may only be accurately assessed by examination in an in-situ state.

Tim O'Hare Associates LLP
Howbery Park Wallingford Oxfordshire OX10 8BA
T:01491 822653 E:info@toha.co.uk
www.toha.co.uk

Registered in England No. OC324049 Registered Office: The Innovation Centre, Howbery Park, Wallingford, Oxfordshire OX10 8BA

ANALYTICAL SCHEDULE

The sample was submitted to a UKAS and MCERTS accredited laboratory for a range of physical and chemical tests to confirm the composition and fertility of the soil, and the concentration of selected potential contaminants. The following parameters were determined:

- particle size analysis (sand, silt, clay);
- stone content (2-20mm, 20-50mm, >50mm);
- pH and electrical conductivity values;
- exchangeable sodium percentage;
- major plant nutrients (N, P, K, Mg);
- organic matter content;
- C:N ratio;
- heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn, B);
- total cyanide and total (mono) phenols;
- speciated PAHs (US EPA16 suite);
- aromatic and aliphatic TPH (C5-C35 banding);
- benzene, toluene, ethylbenzene, xylene (BTEX);
- asbestos screen.

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

RESULTS OF ANALYSIS

Particle Size Analysis and Stone Content

The sample fell into the *loamy sand* texture class, which is usually considered suitable for general landscape applications provided the soil's physical condition is satisfactory.

The sample was virtually stone-free and, as such, stones should not restrict the use of the soil for general landscape purposes.

pH and Electrical Conductivity Values

The sample was slightly acid in reaction (pH 6.9), with a pH value that would be considered ideal for general landscape purposes.

The electrical conductivity (salinity) value (water extract) was low, which indicates that soluble salts were not present at levels that would be harmful to plants.

The electrical conductivity value by $CaSO_4$ extract (*BS3882* requirement) fell below the maximum specified value (3300 µS/cm) given in *BS3882:2015 – Table 1*.

Organic Matter and Fertility Status

The sample was adequately supplied with organic matter, extractable phosphorus and extractable magnesium.

The recorded levels of total nitrogen (0.13%) and extractable potassium (99 mg/l) fell below the minimum requirements of the *BS3882:2015 – Table 1* (0.15% and 121 mg/l respectively). These deficiencies can be remedied by a routine fertiliser application.

The C:N ratio (24:1) exceeded the maximum upper limit set by *BS3882:2015 - Table 1* (20:1). This could cause 'nitrogen lock up' and result in growth restriction in sensitive plants in particular. This C:N ratio can be reduced by a suitable nitrogen fertiliser application.

R Draper Ltd

Potential Contaminants

With reference to *BS3882:2015 - Table 1*: Notes 3 and 4, there is a recommendation to confirm levels of potential contaminants in relation to the topsoil's proposed end use. This includes human health, environmental protection and metals considered toxic to plants. In the absence of site-specific assessment criteria, the concentrations that affect human health have been compared with the *residential with home grown produce* land use in the Suitable For Use Levels (S4ULs) presented in *The LQM/CIEH S4ULs for Human Health Risk Assessment* (2015) and the DEFRA SP1010: *Development of Category 4 Screening Levels* (C4SLs) *for Assessment of Land Affected by Contamination – Policy Companion Document* (2014).

Of the potential contaminants determined, none was found at levels that exceeded their guideline values.

Phytotoxic Contaminants

Of the phytotoxic (toxic to plants) contaminants determined (copper, nickel, zinc), none was found at levels that exceeded the maximum permissible levels specified in *BS3882:2015 – Table 1*.

CONCLUSION

The purpose of the analysis was to determine the suitability of the topsoil sample for general landscape purposes (trees, shrubs, amenity grass). In addition, this sample has been assessed to determine compliance with the requirements of the British Standard for Topsoil *(BS3882:2015 Specification for Topsoil – Multipurpose Topsoil)*.

From the soil examination and laboratory analysis, the sample was described as a slightly acid, virtually stone-free, non-saline, slightly calcareous loamy sand with a weak structure. The organic matter content and fertility status were moderate to low, with deficiencies in total nitrogen and extractable potassium. The C:N ratio of the sample was slightly high. Of the potential contaminants determined, none exceeded their respective guideline values.

To conclude, based on our findings, the topsoil represented by this sample would be considered suitable for general landscape purposes (trees, shrubs and amenity grass), provided the total nitrogen and extractable potassium deficiencies and high C:N ratio are addressed, and the physical condition of the soil is satisfactory.

The topsoil was largely compliant with the requirements of the British Standard for Topsoil *(BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil)* with the exception of deficiencies in total nitrogen and extractable potassium, and the C:N ratio.

On this occasion, these non-compliances are considered minor when reviewed in the context of all the other results, provided the nutrient deficiencies are addressed and the C:N ratio reduced with a routine fertiliser application.

RECOMMENDATIONS

Fertiliser for Planting

To address the nutrient deficiencies and to help promote effective plant establishment, we recommend applying and incorporating the compound, slow release fertiliser *ICL Agroblen (*15%N:8%P:16%K+5%MgO) at a rate of 70g/m^2 and to a depth of 200mm. This application should also reduce the C:N ratio.

Fertiliser for Amenity Grass Establishment

To help promote effective grass establishment, we recommend applying and incorporating the pre-seeding grass fertiliser *ICL Sportsmaster Pre-seeder* (8%N:12%P_2O_5:8%K_2O+3%MgO) prior to seeding or turfing at a rate of 35 g/m^2 and to a depth of 100mm.

Soil Handling Recommendations

It is important to maintain the physical condition of the soil and avoid structural damage during all phases of soil handling (e.g. stockpiling, respreading, cultivating, planting, seeding or turfing). As a consequence, soil handling operations should be carried out when soil is reasonably dry and non-plastic (friable) in consistency.

It is important to ensure that the soil is not unnecessarily compacted by trampling or trafficking by site machinery, and soil handling should be stopped during and after heavy rainfall and not continued until the soil is friable in consistency. If the soil is structurally damaged and compacted at any stage during the course of soiling or landscaping works, it should be cultivated appropriately to relieve the compaction and to restore the soil's structure prior to any planting, turfing or seeding.

Further details on soil handling are provided in Annex A of *BS3882:2015.*

Further guidance on the management, preparation and handling of soils is provided in the DEFRA publication *Construction code of practice for the sustainable use of soils on construction sites*, 2009.

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if we can be of further assistance.

Yours faithfully

Rebecca Hollands
BSc MSc AMIAgrE
Soil Scientist

Tim White
BSc MSc MISoilSci CSci
Senior Associate

For & on behalf of Tim O'Hare Associates LLP

R Draper Ltd

TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Client:	**R Draper Ltd**
Project	**Grade 1 Topsoil**
Job:	**Topsoil Analysis - BS3882:2015**
Date:	**26/05/2017**
Job Ref No:	**TOHA/17/7160/SS**

Sample Reference			**Grade 1 Topsoil**
		Acreditation	
Clay (<0.002mm)	%	UKAS	7
Silt (0.002-0.063mm)	%	UKAS	11
Sand (0.063-2.0mm)	%	UKAS	82
Texture Class (UK Classification)	--	UKAS	LS
Stones (2-20mm)	% DW	GLP	1
Stones (20-50mm)	% DW	GLP	0
Stones (>50mm)	% DW	GLP	0
pH Value (1:2.5 water extract)	units	UKAS	6.9
Electrical Conductivity (1:2.5 water extract)	uS/cm	UKAS	259
Electrical Conductivity (1:2 $CaSO_4$ extract)	uS/cm	UKAS	2123
Exchangeable Sodium Percentage	%	UKAS	1.3
Organic Matter (LOI)	%	UKAS	5.4
Total Nitrogen (Dumas)	%	UKAS	0.13
C : N Ratio	ratio	UKAS	24
Extractable Phosphorus	mg/l	UKAS	27
Extractable Potassium	mg/l	UKAS	99
Extractable Magnesium	mg/l	UKAS	92
Total Arsenic (As)	mg/kg	MCERTS	8
Total Cadmium (Cd)	mg/kg	MCERTS	< 0.2
Total Chromium (Cr)	mg/kg	MCERTS	12
Hexavalent Chromium (Cr VI)	mg/kg	MCERTS	< 4.0
Total Copper (Cu)	mg/kg	MCERTS	26
Total Lead (Pb)	mg/kg	MCERTS	41
Total Mercury (Hg)	mg/kg	MCERTS	< 0.3
Total Nickel (Ni)	mg/kg	MCERTS	11
Total Selenium (Se)	mg/kg	MCERTS	< 1.0
Total Zinc (Zn)	mg/kg	MCERTS	45
Water Soluble Boron (B)	mg/kg	MCERTS	0.6
Total Cyanide (CN)	mg/kg	MCERTS	< 1.0
Total (mono) Phenols	mg/kg	MCERTS	< 1.0
Naphthalene	mg/kg	MCERTS	< 0.05
Acenaphthylene	mg/kg	MCERTS	< 0.05
Acenaphthene	mg/kg	MCERTS	< 0.05
Fluorene	mg/kg	MCERTS	< 0.05
Phenanthrene	mg/kg	MCERTS	0.20
Anthracene	mg/kg	MCERTS	< 0.05
Fluoranthene	mg/kg	MCERTS	0.34
Pyrene	mg/kg	MCERTS	0.33
Benzo(a)anthracene	mg/kg	MCERTS	0.16
Chrysene	mg/kg	MCERTS	0.25
Benzo(b)fluoranthene	mg/kg	MCERTS	0.20
Benzo(k)fluoranthene	mg/kg	MCERTS	0.15
Benzo(a)pyrene	mg/kg	MCERTS	0.21
Indeno(1,2,3-cd)pyrene	mg/kg	MCERTS	< 0.05
Dibenzo(a,h)anthracene	mg/kg	MCERTS	< 0.05
Benzo(g,h,i)perylene	mg/kg	MCERTS	< 0.05
Total PAHs (sum USEPA16)	mg/kg	MCERTS	1.84
Aliphatic TPH >C5 - C6	mg/kg	MCERTS	< 0.001
Aliphatic TPH >C6 - C8	mg/kg	MCERTS	< 0.001
Aliphatic TPH >C8 - C10	mg/kg	MCERTS	< 0.001
Aliphatic TPH >C10 - C12	mg/kg	MCERTS	< 1.0
Aliphatic TPH >C12 - C16	mg/kg	MCERTS	< 2.0
Aliphatic TPH >C16 - C21	mg/kg	MCERTS	< 8.0
Aliphatic TPH >C21 - C35	mg/kg	MCERTS	< 8.0
Aliphatic TPH (C5 - C35)	mg/kg	MCERTS	< 10
Aromatic TPH >C5 - C7	mg/kg	MCERTS	< 0.001
Aromatic TPH >C7 - C8	mg/kg	MCERTS	< 0.001
Aromatic TPH >C8 - C10	mg/kg	MCERTS	< 0.001
Aromatic TPH >C10 - C12	mg/kg	MCERTS	< 1.0
Aromatic TPH >C12 - C16	mg/kg	MCERTS	4.2
Aromatic TPH >C16 - C21	mg/kg	MCERTS	< 10
Aromatic TPH >C21 - C35	mg/kg	MCERTS	37
Aromatic TPH (C5 - C35)	mg/kg	MCERTS	48
Benzene	mg/kg	MCERTS	< 0.001
Toluene	mg/kg	MCERTS	< 0.001
Ethylbenzene	mg/kg	MCERTS	< 0.001
Xylene	mg/kg	MCERTS	< 0.001
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	MCERTS	< 0.001
Asbestos Screen	N/ND	ISO 17025	Not-detected

LS = LOAMY SAND

Visual Examination

The sample was described as a very dark greyish brown (Munsell Colour 10YR 3/2) slightly moist, friable LOAMY SAND with a weakly developed, fine to medium granular structure. The sample was virtually stone-free and contained frequent organic fines and woody fragments. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.



Rebecca Hollands
BSc MSc AMIAgrE
Soil Scientist

Results of analysis should be read in conjunction with the report they were issued with.

The contents of this certificate shall not be reproduced without the express written permission of Tim O'Hare Associates LLP

Attachment C2 Topsoil sampling and placement validation, Aquatics Car Park

Daily Site Record

ARUP

Project title	MECD			Job number	258907
Weather	Warm and overcast	Date	12/06/2018	Initials	SLG

WORK IN PROGRESS

Contractor's work for the day

Place clean topsoil material within the

Contractor's equipment/plant on site

Soil wagons, hand digging equipment.

Contractor's management staff

Michael Crayton

Contractor's labour on site

4 No. labourers and a delivery driver.

Sub-Contractors on site

Mobilisations/Demobilisations

Major activities

Deliveries to site

3 No. wagons of topsoil

ENGINEER'S RECORD

When you started work.

Arrived on site at 8.00am

When you finished work.

4.45pm

Daily Site Record

Project title	MECD			Job number	258907
Weather	Warm and overcast	Date	12/06/2018	Initials	SLG

Activities:
The purpose of this note is to describe the site visit to validate the placement of clean soil in two trenches adjacent to the aquatics centre as part of the MECD project.

Arup arrived on site at 8am and met Michael Crayton. No induction was given as will be escorted on site at all times.

The design of the trench had changed to those indicated on the original plan. The trench had been split into two, with a shorter one located to the east and a much longer running along the rest of the building. The trenches had been excavated to approximately 2-300mm with a metal edging detail protruding 200mm uniformly above the trenches. A further 700mm excavated in 5 locations locally to enable later placement of trees. The locally deep excavations were lined with a geotextile fabric. The remainder of the trenches was unlined. When Arup arrived on site, all excavation had taken place and a 100mm layer of topsoil had been placed within the base of the locally deep excavations.

The topsoil material arrived in three wagons throughout the day and was placed incrementally starting to the west of the trench and finishing with the smaller trench in the north at lifts of approximately 200mm.

The material is described as dark brown fine sandy SILT with occasional rootlets and fine subrounded gravel with a slight compost odour.

Socotec arrived on site following the placement of the first wagon of material with the incorrect sample containers so Arup provided the testing suites required and indicated the correct sample containers to enable this testing. Socotec then returned during the placement of the second wagon with the correct sample containers and took samples from the three different wagon deliveries as follows:

- Sample 1 from wagon load 1.
- Samples 2 & 3 from wagon load 2
- Sample 4 from wagon load 3.

The indicative sample locations are shown on the site plan, along with a sketch of the current site condition.

Surplus material from wagon 3 was placed on a devegetated embankment adjacent to the Active Travel Hub (ATH) building.

The photos below show the condition of the trench pre-placement, placement and the trenches post placement.

Michael Crayton is to pass on all the certificates of testing and test results from Socotec to Del Harrison of Ove Arup and Partners when Balfour Beatty receive them.

Health & Safety issues noted	Environmental issues noted
None	
Visitors to site;	Delays due to weather
None	None
Delays due to Contractor Issues	Delays due to Arup Instruction

Daily Site Record

Project title	MECD			Job number	258907
Weather	Warm and overcast	Date	12/06/2018	Initials	SLG

	Requested that different sample containers were delivered to site.
Any other notes	

PHOTO RECORD



Eastern trench pre-placement



Western trench local excavation



Depth of western trench



Western end of western trench



Placement within locally deep tree excavation



Southern trench during placement of the 1st wagon

Daily Site Record

Project title	MECD			Job number	258907
Weather	Warm and overcast	Date	12/06/2018	Initials	SLG



Southern trench during placement of the 1st wagon



Two locally deep excavations



Locally deep tree excavation



Eastern trench pre material placement



Depth of locally deep excavation in western trench



Locally deep excavation in western trench



Depth of locally deep excavation in western trench



Locally deep excavation in western trench

Daily Site Record

Project title	MECD			Job number	258907
Weather	Warm and overcast	Date	12/06/2018	Initials	SLG



Depth of western trench



Depth of western trench



Depth of locally deep excavation in eastern trench



Depth of eastern trench



Eastern trench placement



Eastern trench during placement



Western trench during placement



Western trench during placement of material

Daily Site Record

Project title	MECD			Job number	258907
Weather	Warm and overcast	Date	12/06/2018	Initials	SLG



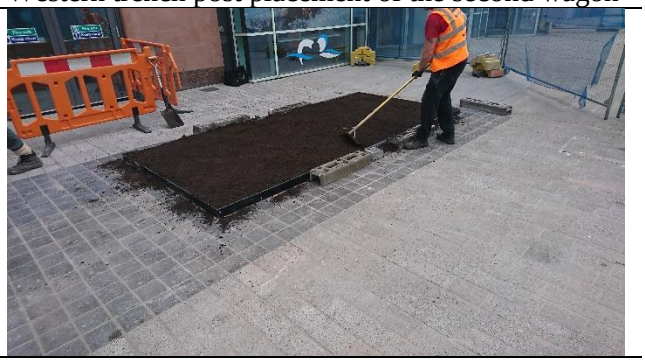
Western trench post placement from the east



Western trench post placement of the second wagon



Eastern trench post placement



Eastern trench during placement



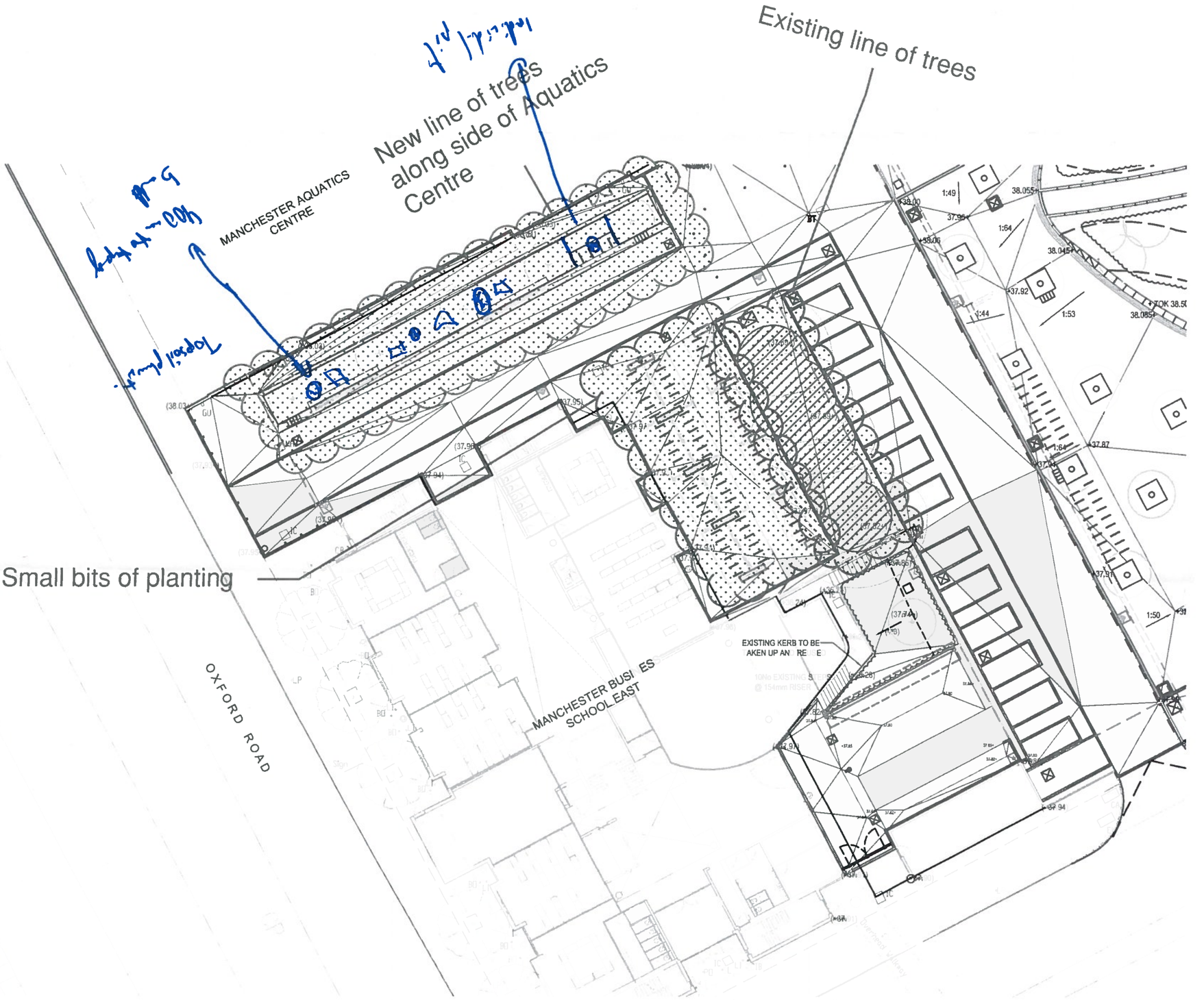
Western trench post placement from the west



Western trench during placement

□ = tree pits

= shrub



- On site 8.15am
- Souths not myty yet.

Attachment C3 Topsoil test results Aquatics Car Park

Our Ref: EFS/187837M (Ver. 1)
Your Ref: WAM0011192

July 27, 2018

Environmental Chemistry
SOCOTEC UK Limited
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

Michael Crayton
Balfour Beatty Construction Limited
Accounting Services
Quorum 14
Quorum Business Park
Brenton Lane
Newcastle-Upon-Tyne
NE12 8BU

For the attention of Michael Crayton

Dear Michael Crayton

Sample Analysis - Manchester University Aquatic Centre

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 28/08/18 when they will be discarded. Please call 01283 554649 for an extension of this date.
Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with SOCOTEC UK Limited (Laboratory and Analytical) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for SOCOTEC UK Limited

P Williams
Project Co-ordinator
01283 554649

Environmental Chemistry, SOCOTEC UK Limited, P.O. Box 100, Burton-upon-trent, DE15 0XD Tel: 01283 554400 Fax: 01283 554422
SOCOTEC UK Limited.
Registered No: 2880501

TEST REPORT

1252

Report No. EFS/187837M (Ver. 1)

Balfour Beatty Construction Limited
Accounting Services
Quorum 14
Quorum Business Park
Brenton Lane
Newcastle-Upon-Tyne
NE12 8BU

Site: Manchester University Aquatic Centre

The 4 samples described in this report were registered for analysis by SOCOTEC UK Limited on 17-Jul-2018. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 27-Jul-2018

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited.
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by SOCOTEC UK Limited.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of Asbestos Screening Results (Page 5)
Analytical and Deviating Sample Overview (Pages 6 to 7)
Table of Additional Report Notes (Page 8)
Table of Method Descriptions (Page 9)
Table of Report Notes (Page 10)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
SOCOTEC UK Lim
Tim Barnes Operations Director
Energy & Waste Services

Date of Issue: 27-Jul-2018

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)
SOCOTEC UK Limited accepts no responsibility for any sampling not carried out by our personnel.

Units :			µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Method Codes :			BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	GROHSA	GROHSA	GROHSA	GROHSA	GROHSA	GROHSA	GROHSA	GROHSA	GROHSA	ICPMSS
Method Reporting Limits :			10	10	20	10	10	30	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
Accreditation Code:			UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Benzene**	**Ethyl Benzene**	**m/p Xylenes**	**o Xylene**	**Toluene**	**Xylenes**	**GRO**	**GRO (>C5 - C6)**	**GRO (>C7 - C8)**	**GRO (>C8 - C10)**	**GRO (C5-C6 Aliphatic)**	**GRO (C6-C7 Aliphatic)**	**GRO (C6-C7)**	**GRO (C7-C8 Aliphatic)**	**GRO (C8-C10 Aliphatic)**	**Arsenic (MS)**
1914424	Top Soil 1 55038826	13-Jul-18	<32.4	<32.4	<64.8	<32.4	<32.4	<97.2	<0.648	<0.648	<0.648	<0.648	<0.259	<0.259	<0.648	<0.259	<0.259	6.6
1914425	Top Soil 2 55038827	13-Jul-18	<28.0	<28.0	<55.9	<28.0	<28.0	<83.9	<0.559	<0.559	<0.559	<0.559	<0.224	<0.224	<0.559	<0.224	<0.224	6.8
1914426	Top Soil 3 55038828	13-Jul-18	<12.9	<12.9	<25.7	<12.9	<12.9	<38.6	<0.257	<0.257	<0.257	<0.257	<0.257	<0.257	<0.257	<0.257	<0.257	6
1914427	Top Soil 4 55038829	13-Jul-18	<11.3	<11.3	<22.7	<11.3	<11.3	<34.0	<0.227	<0.227	<0.227	<0.227	<0.227	<0.227	<0.227	<0.227	<0.227	6.3

SOCOTEC

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name Balfour Beatty Construction Limited

Contact Michael Crayton

Manchester University Aquatic Centre

Sample Analysis

Date Printed	**27-Jul-2018**
Report Number	**EFS/187837M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Units :			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Method Codes :			ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	SFAPI	Sub002	TMSS	TPHUSSI	TPHUSSI	TPHUSSI	TPHUSSI	TPHUSSI
Method Reporting Limits :			0.2	1.2	1.6	0.7	0.5	2	0.5	16	0.5		0.1	4	4	4	8.75	4
Accreditation Code:			UM	UM	UM	UM	UM	UM	UM	UM	UM	U	U	U	U	U	U	U
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Cadmium (MS)**	**Chromium (MS)**	**Copper (MS)**	**Lead (MS)**	**Mercury (MS)**	**Nickel (MS)**	**Selenium (MS)**	**Zinc (MS)**	**Cyanide(Total) (AR)**	**^Asbestos ID and Quant (1 & 2)**	**Tot.Moisture @ 105C**	**TPH All Band >C10-C12**	**TPH All Band >C12-C16**	**TPH All Band >C16-C21**	**TPH All Band >C21-C35**	**TPH All Band >C8-C10**
1914424	Top Soil 1 55038826	13-Jul-18	0.22	10.2	31.8	38.7	<0.53	7.6	<0.5	65.4	<0.6	NADIS	22.8	<5.26	<5.26	<5.26	22.5	<5.26
1914425	Top Soil 2 55038827	13-Jul-18	<0.20	9.4	22.9	39.1	<0.5	7.8	0.5	52.4	<0.6	NADIS	10.6	<4.56	<4.56	<4.56	21.6	<4.56
1914426	Top Soil 3 55038828	13-Jul-18	<0.21	9.5	23.4	43.1	<0.52	7.8	<0.5	49	<0.6	NADIS	22.2	<5.17	<5.17	<5.17	34.4	<5.17
1914427	Top Soil 4 55038829	13-Jul-18	<0.20	9.8	22.8	38.6	<0.50	8.3	<0.5	48.7	<0.6	NADIS	11.7	<4.58	4.79	<4.58	27.3	<4.58

SOCOTEC

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name Balfour Beatty Construction Limited

Contact Michael Crayton

Manchester University Aquatic Centre

Sample Analysis

Date Printed	**27-Jul-2018**
Report Number	**EFS/187837M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Units :			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg									
Method Codes :			TPHUSSI	TPHUSSI	TPHUSSI	TPHUSSI	TPHUSSI	TPHUSSI	TPHUSSI									
Method Reporting Limits :			20	4	4	4	8.75	4	20									
Accreditation Code:			U	U	U	U	U	U	U									
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**TPH Ali Band >C8-C40**	**TPH Aro Band >C10-C12**	**TPH Aro Band >C12-C16**	**TPH Aro Band >C16-C21**	**TPH Aro Band >C21-C35**	**TPH Aro Band >C8-C10**	**TPH Aro Band >C8-C40**									
1914424	Top Soil 1 55038826	13-Jul-18	30.4	<5.18	<5.18	<5.18	29.8	<5.18	51.3									
1914425	Top Soil 2 55038827	13-Jul-18	26.1	<4.47	<4.47	5.21	35.7	10.75	65.0									
1914426	Top Soil 3 55038828	13-Jul-18	43.8	<5.14	9.40	5.53	46.4	12.84	87.9									
1914427	Top Soil 4 55038829	13-Jul-18	45.5	<4.53	6.46	<4.53	35.3	15.3	73.0									

SOCOTEC

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name Balfour Beatty Construction Limited

Contact Michael Crayton

Manchester University Aquatic Centre

Sample Analysis

Date Printed	**27-Jul-2018**
Report Number	**EFS/187837M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

ASBESTOS ANALYSIS RESULTS

SOCOTEC Asbestos Limited Certificate of Analysis for Asbestos in Soils, Sediments and Aggregates

UKAS TESTING 1089

Detection limit of Method SCI-ASB-020 is 0.001%

Sampling has been carried out by a third party

SOCOTEC

Client:	SOCOTEC Environmental Chemistry	**Page 1 of 1**	
Address:	Etwall House, Bretby Business Park, Ashby Road, Burton upon Trent	**Report No:**	ANO-0503-18971
For the attention of:	Balfour Beatty Construction Limited	**Report Date:**	25/07/2018
Site Address:	Manchester University Aquatic Centre	**Project Number:**	S187837

Sample Number	Sample Date	Sample Location & Matrix	Test Date	Total Sample Dry Weight (g)	Weight of <10mm Fraction (g)	Asbestos(g) in >10mm	Asbestos(g) in < 10mm	% Asbestos by weight of Total Dried Sample	Moisture Content	Asbestos Fibre Types Identified
CL/1914424	13/07/18	Top Soil 1 55038826 Soils	25/07/2018	817.9	817.9		0.0000			NADIS
CL/1914425	13/07/18	Top Soil 2 55038827 Soils	25/07/2018	1013.7	1013.7		0.0000			NADIS
CL/1914426	13/07/18	Top Soil 3 55038828 Soils	25/07/2018	1074.6	1074.6		0.0000			NADIS
CL/1914427	13/07/18	Top Soil 4 55038829 Soils	25/07/2018	1184.0	1184.0		0.0000			NADIS

Keys

NAACR = Not Analysed at Clients Request

NAIIS = No Asbestos Identified in Sample (Identification Only)

* visible to naked eye

NADIS = No Asbestos Detected in Sample (ID & Quant Only)

Name: Tom Pratt

Position: Lab Coordinator

Authorised Signatory:

The sample analysis for the above results was carried out using the procedures detailed in SOCOTEC Asbestos Limited in house method (SCI-ASB-020) based on EA document Quantification of asbestos in soil and associated materials - Draft 2017. Fibre identification was carried out using SOCOTEC Asbestos Limited in house method of transmitted/polarised light microscopy and centre stop dispersion staining (SCI-ASB-007), based on HSE's HSG 248. The analysis of the < 10mm fraction for asbestos content only includes ACMs and fibres and does not discriminate non-asbestos fibres. All fibres are assumed, unless specified, to be amphiboles. All tests were carried out at SOCOTEC Asbestos Laboratory, Ashbourne House, Bretby Business Park, Ashby Road, Burton-upon-Trent, Staffordshire. DE15 0YZ, UKAS Laboratory Number 1089.

Where individual results are flagged see report notes for status.

Analytical and Deviating Sample Overview

Customer Balfour Beatty Construction Limited
Site Manchester University Aquatic Centre
Report No S187837M

Consignment No S76398
Date Logged 17-Jul-2018
In-House Report Due 24-Jul-2018

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	MethodID	CustServ	GROHSA	ICPMSS									MCertS	SFAPI	Sub002	TMSS	TPHUSSI								
		Sampled	REPORT A	GRO (AA) by HSA GC-FID	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	MCertS Analysis	Cyanide(Total) (AR)	^Asbestos ID and Quant (1 & 2)	Tot.Moisture @ 105C	TPH Ali Band >C10-C12	TPH Ali Band >C12-C16	TPH Ali Band >C16-C21	TPH Ali Band >C21-C35	TPH Ali Band >C8-C10	TPH Ali Band >C8-C40	TPH Aro Band >C10-C12	TPH Aro Band >C12-C16	TPH Aro Band >C16-C21	TPH Aro Band >C21-C35
				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CL/1914424	Top Soil 1 55038826	13/07/18																									
CL/1914425	Top Soil 2 55038827	13/07/18																									
CL/1914426	Top Soil 3 55038828	13/07/18																									
CL/1914427	Top Soil 4 55038829	13/07/18																									

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.
The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Analytical and Deviating Sample Overview

Customer Balfour Beatty Construction Limited
Site Manchester University Aquatic Centre
Report No S187837M

Consignment No S76398
Date Logged 17-Jul-2018
In-House Report Due 24-Jul-2018

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	Sampled	MethodID	TPHUSSI		
				TPH Aro Band >C8-C10	TPH Aro Band >C8-C40	TPH by GCFID (AR/Si)
				✓	✓	✓
CL/1914424	Top Soil 1 55038826	13/07/18				
CL/1914425	Top Soil 2 55038827	13/07/18				
CL/1914426	Top Soil 3 55038828	13/07/18				
CL/1914427	Top Soil 4 55038829	13/07/18				

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.
The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Report Number : EFS/187837

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
GROHSA	CL1914424 CL1914425	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.
BTEXHSA	CL1914424 CL1914425	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in Marine Sediments and Soil samples by aqua regia digestion followed by ICPMS detection
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105ºC by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHUSSI	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection including quantitation of Aromatic and Aliphatic fractions.

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : Balfour Beatty Construction Limited

Site : Manchester University Aquatic Centre

Report Number : S18_7837

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1914424	Top Soil 1 55038826	Brown SOIL
CL/1914425	Top Soil 2 55038827	Brown SOIL
CL/1914426	Top Soil 3 55038828	Brown SOIL
CL/1914427	Top Soil 4 55038829	Brown SOIL

Our Ref: EFS/186921M (Ver. 1)
Your Ref:

July 4, 2018

Environmental Chemistry
SOCOTEC UK Limited
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

Balfour Beatty Construction Services UK
Accounting Services
Quorum 14
Quorum Business Park
Brenton Lane
Newcastle-Upon-Tyne
NE12 8BU

Dear Sirs

Sample Analysis - Manchester University Aquatic Centre

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 01/08/18 when they will be discarded. Please call 01283 554649 for an extension of this date.
Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with SOCOTEC UK Limited (Laboratory and Analytical) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for SOCOTEC UK Limited

P Williams
Project Co-ordinator
01283 554649

Environmental Chemistry, SOCOTEC UK Limited, P.O. Box 100, Burton-upon-trent, DE15 0XD Tel: 01283 554400 Fax: 01283 554422
SOCOTEC UK Limited.
Registered No: 2880501

TEST REPORT

1252

Report No. EFS/186921M (Ver. 1)

Balfour Beatty Construction Services UK
Accounting Services
Quorum 14
Quorum Business Park
Brenton Lane
Newcastle-Upon-Tyne
NE12 8BU

Site: Manchester University Aquatic Centre

The 4 samples described in this report were registered for analysis by SOCOTEC UK Limited on 20-Jun-2018. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 04-Jul-2018

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited. Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by SOCOTEC UK Limited.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of WAC Analysis Results (Pages 5 to 8)
Analytical and Deviating Sample Overview (Page 9)
Table of Additional Report Notes (Page 10)
Table of Method Descriptions (Page 11)
Table of Report Notes (Page 12)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
SOCOTEC UK Lim
Tim Barnes Operations Director
Energy & Waste Services

Date of Issue: 04-Jul-2018

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)
SOCOTEC UK Limited accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

Units :			Mol/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Method Codes :			ANC	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	LOI(%MM)	PAHMSUS	PAHMSUS	PAHMSUS	PAHMSUS	PAHMSUS	PAHMSUS	PAHMSUS
Method Reporting Limits :			0.04	10	10	20	20	10	10	30	0.2	0.08	0.08	0.08	0.08	0.08	0.08	0.08
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Acid Neut. Capacity**	**Benzene**	**Ethyl Benzene**	**m/p Xylenes**	**MTBE**	**o Xylene**	**Toluene**	**Xylenes**	**L.O.I. % @ 450C**	**Acenaphthene**	**Acenaphthylene**	**Anthracene**	**Benzo(a)anthracene**	**Benzo(a)pyrene**	**Benzo(b)fluoranthene**	**Benzo(ghi)perylene**
1910166	TopSoil 1 55037661 (NVM)	12-Jun-18	0.32	<11.7	<11.7	<23.4	<23.4*	<11.7	<11.7	<35	5.4	<0.09	<0.09	0.09	0.32	0.32	0.40	0.21
1910167	TopSoil 2 55037662 (NVM)	12-Jun-18	1.21	<11.5	<11.5	<23.1	<23.1*	<11.5	<11.5	<35	5.1	0.10	<0.09	<0.09	0.28	0.27	0.36	0.17
1910168	TopSoil 3 55037663 (NVM)	12-Jun-18	0.24	<11.5	<11.5	<23.0	<23.0*	<11.5	<11.5	<35	4.6	<0.09	<0.09	<0.09	0.20	0.58	0.46	0.55
1910169	TopSoil 4 55037664 (NVM)	12-Jun-18	0.32	<11.9	<11.9	<23.8	<23.8*	<11.9	<11.9	<36	5.7	<0.10	<0.10	<0.10	0.25	0.23	0.31	0.15

SOCOTEC

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name Balfour Beatty Construction Services UK

Contact

Manchester University Aquatic Centre

Sample Analysis

Date Printed	**04-Jul-2018**
Report Number	**EFS/186921M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Units :			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Method Codes :			PAHMSUS	PAHMSUS	PAHMSUS	PAHMSUS	PAHMSUS	PAHMSUS	PAHMSUS	PAHMSUS	PAHMSUS	PAHMSUS	PAHMSUS	PCBECD	PCBECD	PCBECD	PCBECD	PCBECD
Method Reporting Limits :			0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	1.28	5	5	5	5	5
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Benzo(k)fluoranthene**	**Chrysene**	**Coronene**	**Dibenzo(ah)anthracene**	**Fluoranthene**	**Fluorene**	**Indeno(123-cd)pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**Total PAH (Sum of USEPA 16)**	**PCB 101**	**PCB 118**	**PCB 138**	**PCB 153**	**PCB 180**
1910166	TopSoil 1 55037661 (NVM)	12-Jun-18	0.15	0.40	<0.09	<0.09*	0.53	<0.09	0.19	<0.09	0.48	0.49	<4.03*	<5.84	<5.84	<5.84	<5.84	<5.84
1910167	TopSoil 2 55037662 (NVM)	12-Jun-18	0.10	0.33	<0.09	<0.09*	0.43	<0.09	0.15	<0.09	0.39	0.39	<3.43*	<5.77	<5.77	<5.77	<5.77	<5.77
1910168	TopSoil 3 55037663 (NVM)	12-Jun-18	0.14	0.21	0.14	0.10*	0.29	<0.09	0.50	<0.09	0.21	0.28	<3.96*	<5.76	<5.76	<5.76	<5.76	<5.76
1910169	TopSoil 4 55037664 (NVM)	12-Jun-18	0.10	0.24	<0.10	<0.10*	0.38	<0.10	0.13	<0.10	0.37	0.35	<3.07*	<5.95	<5.95	<5.95	<5.95	<5.95

SOCOTEC

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name Balfour Beatty Construction Services UK

Contact

Manchester University Aquatic Centre

Sample Analysis

Date Printed	04-Jul-2018
Report Number	EFS/186921M
Table Number	1

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Units :			µg/kg	µg/kg	pH Units	%	mg/kg	mg/kg	% M/M									
Method Codes :			PCBECD	PCBECD	PHSOIL	TMSS	TPHFIDUS	TPHFIDUS	WSLM59									
Method Reporting Limits :			5	5		0.1	10	10	0.02									
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**PCB 28**	**PCB 52**	**pH units (AR)**	**Tot.Moisture @ 105C**	**TPH Band (>C10-C40)**	**TPH by GCFID (AR)**	**Total Organic Carbon**									
1910166	TopSoil 1 55037661 (NVM)	12-Jun-18	<5.84	<5.84	8.1	14.4	78.4	78.5	2.37									
1910167	TopSoil 2 55037662 (NVM)	12-Jun-18	<5.77	<5.77	8	13.4	63.5	63.6	2.23									
1910168	TopSoil 3 55037663 (NVM)	12-Jun-18	<5.76	<5.76	8	13.2	78.7	78.7	2.02									
1910169	TopSoil 4 55037664 (NVM)	12-Jun-18	<5.95	<5.95	7.9	16.0	84.9	84.9	2.63									

SOCOTEC

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name **Balfour Beatty Construction Services UK**

Contact

Manchester University Aquatic Centre

Sample Analysis

Date Printed	**04-Jul-2018**
Report Number	**EFS/186921M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

Client	Balfour Beatty Construction Services UK				**Leaching Data**	
					Weight of sample (kg)	0.259
Contact					Moisture content @ 105°C (% of Wet Weight)	14.4
					Equivalent Weight based on drying at 105°C (kg)	0.225
Site	Manchester University Aquatic Centre				Volume of water required to carry out 2:1 stage (litres)	0.416
					Fraction of sample above 4 mm %	0.000
Sample Description		**Report No**	**Sample No**	**Issue Date**	Fraction of non-crushable material %	0.000
TopSoil 1 55037661		S18_6921M	CL/1910166	04-Jul-18	Volume to undertake analysis (2:1 Stage) (litres)	0.300
					Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	2.37	3	5	6
N	LOI450	Loss on Ignition (%)	5.4			10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.0702	6		
U	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.042	1		
N	TPHFIDUS	Mineral Oil (mg/kg)	78.4	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	<4.12	100		
N	PHSOIL	pH (pH units)	8.1		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	0.32		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except oo		mg/kg (dry weight)				
U	WSLM3	pH (pH units) oo	7.6	7.5	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) oo	445	172					
U	ICPMSW	Arsenic	0.005	0.008	0.01	0.08	0.5	2	25
U	ICPWATVAR	Barium	0.07	0.02	0.14	0.3	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	0.002	0.001	0.004	0.01	0.5	10	70
U	ICPMSW	Copper	0.012	0.006	0.024	0.07	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.01	0.003	0.02	0.04	0.5	10	30
U	ICPMSW	Nickel	0.003	0.003	0.006	0.03	0.4	10	40
U	ICPMSW	Lead	0.009	0.002	0.018	0.03	0.5	10	50
U	ICPMSW	Antimony	0.006	0.002	0.012	0.03	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.008	0.122	0.016	1.07	4	50	200
U	KONENS	Chloride	10	4	20	48	800	15000	25000
U	ISEF	Fluoride	0.7	0.8	1.4	8	10	150	500
U	ICPWATVAR	Sulphate as SO4	66	9	132	166	1000	20000	50000
N	WSLM27	Total Dissolved Solids	347	134	694	1624	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	18	12	36	128	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

Client	Balfour Beatty Construction Services UK				**Leaching Data**	
					Weight of sample (kg)	0.259
Contact					Moisture content @ 105°C (% of Wet Weight)	13.4
					Equivalent Weight based on drying at 105°C (kg)	0.225
Site	Manchester University Aquatic Centre				Volume of water required to carry out 2:1 stage (litres)	0.416
					Fraction of sample above 4 mm %	0.000
Sample Description		**Report No**	**Sample No**	**Issue Date**	Fraction of non-crushable material %	0.000
TopSoil 2 55037662		S18_6921M	CL/1910167	04-Jul-18	Volume to undertake analysis (2:1 Stage) (litres)	0.300
					Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	2.23	3	5	6
N	LOI450	Loss on Ignition (%)	5.1			10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.0691	6		
U	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.042	1		
N	TPHFIDUS	Mineral Oil (mg/kg)	63.5	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	<3.52	100		
N	PHSOIL	pH (pH units)	8		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	1.21		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except oo		mg/kg (dry weight)				
U	WSLM3	pH (pH units) oo	7.4	7.5	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) oo	420	186					
U	ICPMSW	Arsenic	0.005	0.008	0.01	0.08	0.5	2	25
U	ICPWATVAR	Barium	0.06	0.02	0.12	0.3	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	0.001	0.001	0.002	0.01	0.5	10	70
U	ICPMSW	Copper	0.013	0.009	0.026	0.1	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.008	0.003	0.016	0.04	0.5	10	30
U	ICPMSW	Nickel	0.003	0.007	0.006	0.06	0.4	10	40
U	ICPMSW	Lead	0.01	0.003	0.02	0.04	0.5	10	50
U	ICPMSW	Antimony	0.005	0.002	0.01	0.02	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.009	0.069	0.018	0.61	4	50	200
U	KONENS	Chloride	9	5	18	55	800	15000	25000
U	ISEF	Fluoride	0.5	0.7	1	7	10	150	500
U	ICPWATVAR	Sulphate as SO4	59	15	118	209	1000	20000	50000
N	WSLM27	Total Dissolved Solids	328	145	656	1694	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	16	13	32	134	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

Client	Balfour Beatty Construction Services UK				**Leaching Data**	
					Weight of sample (kg)	0.259
Contact					Moisture content @ 105°C (% of Wet Weight)	13.2
					Equivalent Weight based on drying at 105°C (kg)	0.225
Site	Manchester University Aquatic Centre				Volume of water required to carry out 2:1 stage (litres)	0.416
					Fraction of sample above 4 mm %	0.000
Sample Description		**Report No**	**Sample No**	**Issue Date**	Fraction of non-crushable material %	0.000
TopSoil 3 55037663		S18_6921M	CL/1910168	04-Jul-18	Volume to undertake analysis (2:1 Stage) (litres)	0.300
					Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	2.02	3	5	6
N	LOI450	Loss on Ignition (%)	4.6			10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.069	6		
U	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.042	1		
N	TPHFIDUS	Mineral Oil (mg/kg)	78.7	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	<4.10	100		
N	PHSOIL	pH (pH units)	8		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	0.24		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except oo		mg/kg (dry weight)				
U	WSLM3	pH (pH units) oo	7.4	7.4	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) oo	391	153					
U	ICPMSW	Arsenic	0.006	0.008	0.012	0.08	0.5	2	25
U	ICPWATVAR	Barium	0.06	0.02	0.12	0.3	20	100	300
U	ICPMSW	Cadmium	0.0001	<0.0001	0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	0.002	0.001	0.004	0.01	0.5	10	70
U	ICPMSW	Copper	0.015	0.008	0.03	0.09	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.008	0.003	0.016	0.04	0.5	10	30
U	ICPMSW	Nickel	0.003	0.003	0.006	0.03	0.4	10	40
U	ICPMSW	Lead	0.015	0.004	0.03	0.05	0.5	10	50
U	ICPMSW	Antimony	0.005	0.002	0.01	0.02	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.013	0.063	0.026	0.56	4	50	200
U	KONENS	Chloride	9	3	18	38	800	15000	25000
U	ISEF	Fluoride	0.6	0.7	1.2	7	10	150	500
U	ICPWATVAR	Sulphate as SO4	56	7	112	135	1000	20000	50000
N	WSLM27	Total Dissolved Solids	305	120	610	1447	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	19	12	38	129	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

Client	Balfour Beatty Construction Services UK				**Leaching Data**	
					Weight of sample (kg)	0.268
Contact					Moisture content @ 105°C (% of Wet Weight)	16.0
					Equivalent Weight based on drying at 105°C (kg)	0.225
Site	Manchester University Aquatic Centre				Volume of water required to carry out 2:1 stage (litres)	0.407
					Fraction of sample above 4 mm %	0.000
Sample Description		**Report No**	**Sample No**	**Issue Date**	Fraction of non-crushable material %	0.000
TopSoil 4 55037664		S18_6921M	CL/1910169	04-Jul-18	Volume to undertake analysis (2:1 Stage) (litres)	0.300
					Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	2.63	3	5	6
N	LOI450	Loss on Ignition (%)	5.7			10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.0714	6		
U	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.042	1		
N	TPHFIDUS	Mineral Oil (mg/kg)	84.9	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	<3.17	100		
N	PHSOIL	pH (pH units)	7.9		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	0.32		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except oo		mg/kg (dry weight)				
U	WSLM3	pH (pH units) oo	7.4	7.4	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) oo	396	155					
U	ICPMSW	Arsenic	0.005	0.008	0.01	0.08	0.5	2	25
U	ICPWATVAR	Barium	0.06	0.03	0.12	0.3	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	0.002	0.002	0.004	0.02	0.5	10	70
U	ICPMSW	Copper	0.014	0.01	0.028	0.11	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.009	0.003	0.018	0.04	0.5	10	30
U	ICPMSW	Nickel	0.003	0.007	0.006	0.06	0.4	10	40
U	ICPMSW	Lead	0.013	0.011	0.026	0.11	0.5	10	50
U	ICPMSW	Antimony	0.005	0.002	0.01	0.02	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.013	0.072	0.026	0.64	4	50	200
U	KONENS	Chloride	12	4	24	51	800	15000	25000
U	ISEF	Fluoride	0.5	0.7	1	7	10	150	500
U	ICPWATVAR	Sulphate as SO4	57	9	114	154	1000	20000	50000
N	WSLM27	Total Dissolved Solids	309	121	618	1461	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	19	20	38	199	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

SOCOTEC UK Ltd Environmental Chemistry
Analytical and Deviating Sample Overview

Customer Balfour Beatty Construction Services UK
Site Manchester University Aquatic Centre
Report No S186921M

Consignment No S75567
Date Logged 20-Jun-2018
In-House Report Due 27-Jun-2018

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	MethodID	ANC	BTEXHSA		CEN Leachate		CustServ	LOI(%MM)	MCertS	PAHMSUS	PCBECD	PHSOIL	TMSS	TPHFIDUS		WSLM59
		Sampled	Acid Neut. Capacity	BTEX-HSA + MTBE analysis	MTBE (µg/kg)	CEN Leac(P)1	CEN Leac(P)2	REPORT A	L.O.I. % @ 450C	MCertS Analysis	PAH (17) by GCMS	PCB-7 Congeners Analysis	pH units (AR)	Tot.Moisture @ 105C	TPH Band (>C10-C40)	TPH by GCFID (AR)	Total Organic Carbon
				✓	✓					✓	✓	✓	✓	✓	✓	✓	✓
CL/1910166	TopSoil 1 55037661	12/06/18		E	E								E				
CL/1910167	TopSoil 2 55037662	12/06/18		E	E								E				
CL/1910168	TopSoil 3 55037663	12/06/18		E	E								E				
CL/1910169	TopSoil 4 55037664	12/06/18		E	E								E				

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.
The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Report Number : EFS/186921

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
BTEXHSA	CL1910166 TO CL1910169	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However the remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation from the affected analytes (MTBE) . These circumstances should be taken into consideration when utilising the data"
PAHMSUS	CL1910166 TO CL1910169	The Secondary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However the remaining data gives the Laboratory confidence that the test has performed satisfactorily (including the Primary Process Control) and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation , where applicable, from the affected analytes (Dibenzo[a,h]anthracene) . These circumstances should be taken into consideration when utilising the data.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	ANC	Oven Dried @ < 35°C	Quantitative digestion with Hydrochloric Acid back titration with 1M Sodium Hydroxide to pH 7
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	LOI(%MM)	Oven Dried @ < 35°C	Determination of loss on ignition for soil samples at specified temperature by gravimetry
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PCBECD	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners/aroclors by hexane/acetone extraction followed by GCECD detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105ºC by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : Balfour Beatty Construction Services UK

Site : Manchester University Aquatic Centre

Report Number : S18_6921

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1910166	TopSoil 1 55037661 (NVM)	Brown OTHER
CL/1910167	TopSoil 2 55037662 (NVM)	Brown OTHER
CL/1910168	TopSoil 3 55037663 (NVM)	Brown OTHER
CL/1910169	TopSoil 4 55037664 (NVM)	Brown OTHER

Attachment C4 Topsoil source check Oddfellows Tree Pits

Del Harrison

From: Crayton, Michael <Michael.Crayton@balfourbeatty.com>
Sent: 23 March 2020 16:35
To: Mark Griffiths
Subject: [External] [WARNING: MESSAGE ENCRYPTED]FW: Topsoil delivery
Attachments: 20-9350-SS - Ashlea Lanscaping - Topsoil Analysis Report - Jan 20.pdf; SKMBT_C36419121115190.pdf; IMG_3904.jpg; IMG_3901.jpg; IMG_3899.jpg

Mark

Ahead of the validation, please see attached information of the soil from source.

Thanks

Michael Crayton
Site Agent | Balfour Beatty | Regional
M: +44 (0)7779428883 | **E:** michael.crayton@balfourbeatty.com
MECD, University of Manchester, Balfour Beatty Site Offices, Booth Street East, Manchester. M13 9SS
www.balfourbeatty.com | follow us @balfourbeatty |

From: Andrew Barrow <Andrew.Barrow@ashlea-landscaping.co.uk>
Sent: 23 March 2020 16:22
To: Crayton, Michael <Michael.Crayton@balfourbeatty.com>
Cc: Bruce Tyrer <Bruce.Tyrer@ashlea-landscaping.co.uk>; Edwards, Cameron <Cameron.Edwards@balfourbeatty.com>; Andrew, David <David.Andrew2@balfourbeatty.com>; Arthur, Jez <Jez.Arthur@balfourbeatty.com>
Subject: RE: Topsoil delivery

CAUTION: This email originated from outside of **Balfour Beatty**. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Good afternoon Michael,

We confirm that the source is a greenfield site, and attach the relevant documents for your reference.

Any issues, please advise.

Regards

Andrew Barrow

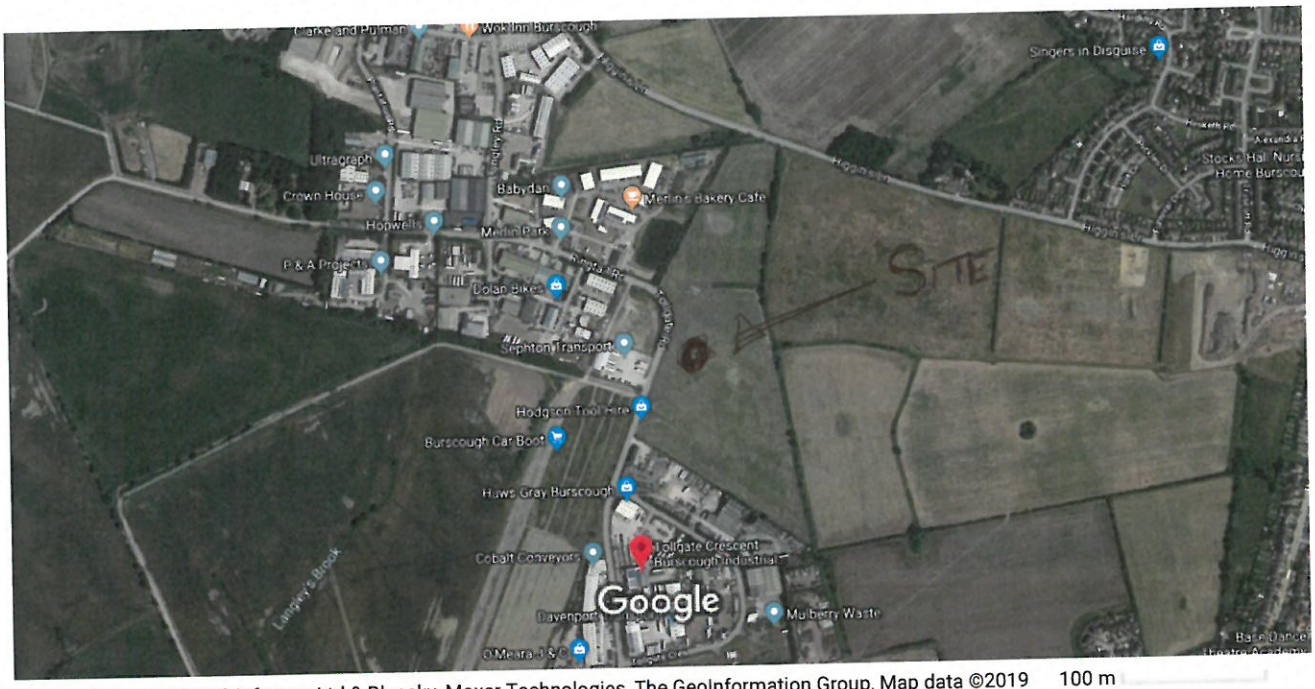
Quantity Surveyor

COVID-19
Please note that given the current situation that we are all finding ourselves in, Ashlea Ltd are asking all office staff to work from home as far as practicable.
Offices are being manned with skeleton staff and we respectfully ask contact to be made via email and wherever possible refrain from calling the offices.

Google Maps

Tollgate Crescent Burscough Industrial Estate

Location of Topsoil source for Kier Merseycare Project Maghull



Imagery ©2019 Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group, Map data ©2019 100 m



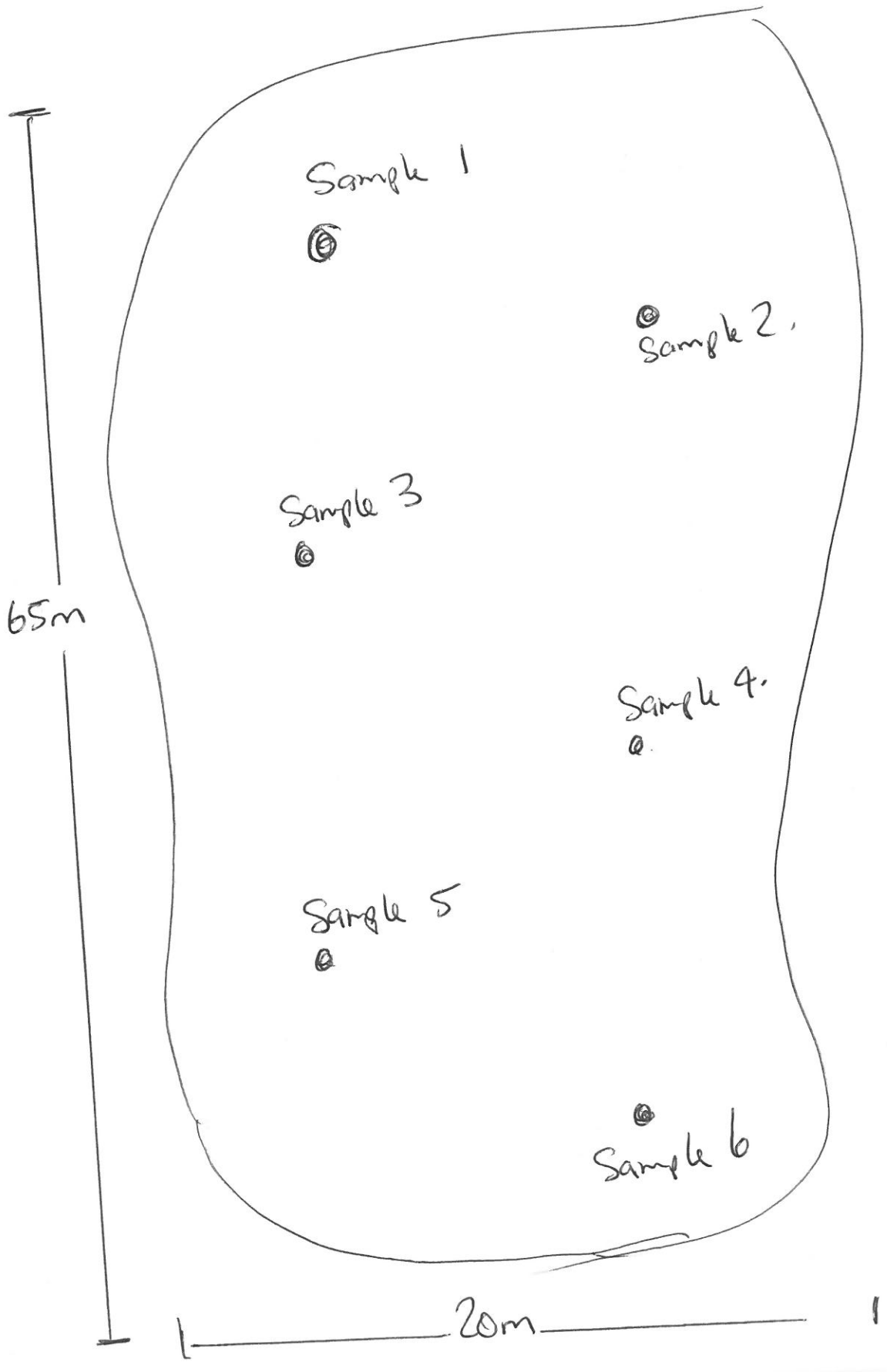
Tollgate Crescent Burscough Industrial Estate

Tollgate Cres
Burscough
Ormskirk
L40 8LT

Directions Save Nearby Send to your phone Share

H4VQ+C3 Burscough

TOPSOIL SAMPLE LOCATION PLAN
BURSCOUGH TOLLGATE LANE



TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Ashlea Limited

Mr Bruce Tyrer
Ashlea Limited
Scotland Road
Carnforth
Lancashire LA5 9RE

2nd January 2020
Our Ref: TOHA/20/9350/SS
Your Ref: K14566-BJT-001

Dear Sirs

Topsoil Analysis Report: Kier MNA Merseyside Maghull

We have completed the analysis of the soil samples recently submitted, referenced *Sample 1, Sample 4* and *Sample 6,* and have pleasure reporting our findings.

The purpose of the analysis was to determine the suitability of the samples for general landscape purposes (trees, shrubs, amenity grass). In addition, these samples have been assessed to determine their compliance with the requirements of the British Standard for Topsoil *(BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil).*

This report presents the results of analysis for the samples submitted to our office, and it should be considered 'indicative' of the topsoil source. The report and results should therefore not be used by third parties as a means of verification testing, validation testing or waste designation purposes.

SAMPLE EXAMINATION

The samples were consistent in appearance and were described as very dark greyish brown (Munsell Colour 10YR 3/2), moist, non-plastic, very slightly calcareous LOAMY SAND or SAND, with single grain and weakly developed, fine to medium granular to sub-angular blocky structures*. The samples were virtually stone-free. *Sample 1* contained one ceramic shard (<10mm). No other deleterious materials, unusual odours, roots or rhizomes of pernicious weeds were observed.

*This appraisal of soil structure was made from examination of a disturbed sample(s). Structure is a key soil characteristic that may only be accurately assessed by examination in an in-situ state.

Tim O'Hare Associates LLP
Howbery Park Wallingford Oxfordshire OX10 8BA
T:01491 822653 E:info@toha.co.uk
www.toha.co.uk

Registered in England No. OC324049 Registered Office: The Innovation Centre, Howbery Park, Wallingford, Oxfordshire OX10 8BA

ANALYTICAL SCHEDULE

The samples were submitted to a UKAS and MCERTS accredited laboratory for a range of physical and chemical tests to confirm the composition and fertility of the soil, and the concentration of selected potential contaminants. The following parameters were determined:

- particle size analysis (sand, silt, clay);
- stone content (2-20mm, 20-50mm, >50mm);
- pH and electrical conductivity values;
- exchangeable sodium percentage;
- major plant nutrients (N, P, K, Mg);
- organic matter content;
- C:N ratio;
- heavy metals (As, B, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn);
- total cyanide and total (mono) phenols;
- speciated PAHs (US EPA16 suite);
- aromatic and aliphatic TPH (C5-C35 banding);
- benzene, toluene, ethylbenzene, xylene (BTEX).

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

RESULTS OF ANALYSIS

Particle Size Analysis and Stone Content

The samples fell into the *loamy sand* and *sand* texture classes and would be described as very light in texture. Such soils typically have good aeration and drainage properties, but can possess poor water and nutrient retention capacities. As a consequence they often have a greater risk of excessive leaching and drought, particularly during prolonged dry periods. For general landscape purposes, it may be prudent to improve the soil's water and nutrient retention capacities by incorporating a bulky organic ameliorant, such as green compost.

The samples were virtually stone-free and as such, stones should not restrict the use of the soil for general landscape purposes.

Sample 1 contained a fragment of ceramic, considered as 'sharps', which could make this soil unsuitable for use where end-users may come into contact with the soil (e.g. domestic gardens or sports pitches). The presence of sharps also indicates non-compliance with *BS3882:2015 – Table 1* in this respect. Further assessment should be undertaken to investigate the extent of the ceramic fragments within the soil.

pH and Electrical Conductivity Values

The samples were slightly acid to acid in reaction (pH 5.8 – 6.2), with a pH range that would be suitable for general landscape purposes, and in particular acid-loving species (calcifuges).

The electrical conductivity (salinity) values (water extract) were very low. The very low salinity itself would not present any growth restrictions on plants; however, the low levels of salts in solution may suggest possible deficiencies in available plant nutrients (as confirmed in the nutrient analysis – see 'Organic Matter and Fertility Status' below).

The electrical conductivity values by $CaSO_4$ extract (*BS3882* requirement) fell below the maximum specified value (3300 µS/cm) given in *BS3882:2015 – Table 1*.

Organic Matter and Fertility Status

The samples were adequately supplied with extractable phosphorus, but were deficient in organic matter, total nitrogen, extractable potassium and extractable magnesium. These deficiencies can be remedied by appropriate compost and fertiliser applications.

The C:N ratios of the samples were acceptable for general landscape purposes.

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Potential Contaminants

With reference to *BS3882:2015 - Table 1*: Notes 3 and 4, there is a requirement to confirm levels of potential contaminants in relation to the topsoil's proposed end use. This includes human health, environmental protection and metals considered toxic to plants. In the absence of site-specific assessment criteria, the concentrations that affect human health have been compared with the *residential with homegrown produce* land use in the Suitable For Use Levels (S4ULs) presented in *The LQM/CIEH S4ULs for Human Health Risk Assessment* (2015) and the DEFRA SP1010: *Development of Category 4 Screening Levels* (C4SLs) *for Assessment of Land Affected by Contamination – Policy Companion Document* (2014).

Of the potential contaminants determined, none was found at levels that exceeded their guideline values.

Phytotoxic Contaminants

Of the phytotoxic (toxic to plants) contaminants determined (copper, nickel, zinc), none was found at levels that exceeded the maximum permissible levels specified in *BS3882:2015 – Table 1*.

CONCLUSION

The purpose of the analysis was to determine the suitability of the soil samples for general landscape purposes. The analysis has also been undertaken to determine the samples' compliance with the requirements of the British Standard for Topsoil *(BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil).*

From the soil examination and subsequent laboratory analysis, the samples were described as a slightly acid to acid, non-saline, virtually stone-free loamy sand or sand with weakly developed structures. The samples were adequately supplied with extractable phosphorus but were deficient in organic matter and most major plant nutrients. Of the potential contaminants determined, none exceeded their respective guideline values.

Sample 1 contained a ceramic fragment (10mm across) which would be considered to be 'sharps'. Depending on the use of this soil, the presence of such material at the surface could present a health and safety risk for end-users. Further assessment should be undertaken to investigate the extent of the ceramic fragments within the soil.

To conclude, provided the level of risk from 'sharps' is deemed acceptable for the proposed end-use, the topsoil represented by these samples would be considered suitable for general landscape purposes (trees, shrubs and amenity grass), on the proviso that:

- the organic matter and nutrient deficiencies are remedied, and the water and nutrient retention capabilities of the soil are improved through an appropriate compost application;
- the physical condition of the soil is satisfactory.

The topsoil was largely compliant with the requirements of the British Standard for Topsoil *(BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil),* with the exception of the low organic matter and nutrient contents, and the presence of 'sharps' (*Sample 1* only). On this occasion, provided the level of risk from 'sharps' is deemed acceptable for the proposed end-use, these would be considered minor non-compliances, provided the organic matter and nutrient deficiencies are remedied by an appropriate compost and fertiliser applications.

RECOMMENDATIONS

Compost Application

We recommend applying and incorporating suitable compost (e.g. PAS100:2011 /Landscape Institute/WRAP grade (10mm screened) green compost) into the topsoil to improve its water and nutrient retention capacities. An application rate of **25%** by volume is recommended. This application would also address the organic matter and nutrient deficiencies.

For planting purposes, the compost should be incorporated to a depth of 200mm and for grass areas the compost should be worked into the upper 100mm.

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Fertiliser for Planting

To help promote effective plant establishment, we recommend applying and incorporating the compound, controlled release fertiliser *ICL Osmocote PrePlant* (17%N:9%P_2O_5:10%K_2O:2%MgO+TE) at a rate of 70 g/m^2 for planting beds and/or 180 g/tree pit, and to a depth of 200mm.

Fertiliser for Amenity Grass Establishment

To aid effective grass establishment, we recommend applying and incorporating the pre-seeding grass fertiliser *ICL Sportsmaster Pre-seeder* (8%N:12%P_2O_5:8%K_2O+3%MgO) prior to seeding or turfing at a rate of 35 g/m^2 and to a depth of 100mm.

Soil Handling Recommendations

It is important to maintain the physical condition of the soil and avoid structural damage during all phases of soil handling (e.g. stockpiling, respreading, cultivating, planting, seeding or turfing). As a consequence, soil handling operations should be carried out when soil is reasonably dry and non-plastic (friable) in consistency.

It is important to ensure that the soil is not unnecessarily compacted by trampling or trafficking by site machinery, and soil handling should be stopped during and after heavy rainfall and not continued until the soil is friable in consistency. If the soil is structurally damaged and compacted at any stage during the course of soiling or landscaping works, it should be cultivated appropriately to relieve the compaction and to restore the soil's structure prior to any planting, turfing or seeding.

Further details on soil handling are provided in Annex A of *BS3882:2015.*

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if we can be of further assistance.

Yours faithfully

Aaron Cross
BSc MSc
Graduate Soil Scientist

Ceri Spears
BSc MSc MISoilSci
Senior Associate

For & on behalf of Tim O'Hare Associates LLP

Ashlea Limited

TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Client:	**Ashlea Limited**
Project:	**Kier Merseycare Maghull**
Job:	**Topsoil Analysis (BS3882:2015)**
Date:	**02/01/2020**
Job Ref No:	**TOHA/20/9350/SS**

Sample Reference			**Sample 1**	**Sample 4**	**Sample 6**
		Accreditation			
Clay (<0.002mm)	%	UKAS	7	6	6
Silt (0.002-0.063mm)	%	UKAS	8	6	6
Sand (0.063-2.0mm)	%	UKAS	85	88	88
Texture Class (UK Classification)	--	UKAS	LS	S	S
Stones (2-20mm)	% DW	GLP	1	0	0
Stones (20-50mm)	% DW	GLP	0	0	1
Stones (>50mm)	% DW	GLP	0	0	0
pH Value (1:2.5 water extract)	units	UKAS	6.2	6.0	5.8
Electrical Conductivity (1:2.5 water extract)	uS/cm	UKAS	73	62	61
Electrical Conductivity (1:2 $CaSO_4$ extract)	uS/cm	UKAS	2090	2088	2045
Exchangeable Sodium Percentage	%	UKAS	1.1	1.2	1.2
Organic Matter (LOI)	%	UKAS	1.6	1.9	1.5
Total Nitrogen (Dumas)	%	UKAS	0.06	0.07	0.05
C : N Ratio	ratio	UKAS	16	16	17
Extractable Phosphorus	mg/l	UKAS	26	37	33
Extractable Potassium	mg/l	UKAS	28	30	23
Extractable Magnesium	mg/l	UKAS	46	32	26
Total Arsenic (As)	mg/kg	MCERTS	5.5	5.3	4.7
Total Cadmium (Cd)	mg/kg	MCERTS	< 0.2	< 0.2	< 0.2
Total Chromium (Cr)	mg/kg	MCERTS	13	13	11
Hexavalent Chromium (Cr VI)	mg/kg	MCERTS	< 4.0	< 4.0	< 4.0
Total Copper (Cu)	mg/kg	MCERTS	24	29	21
Total Lead (Pb)	mg/kg	MCERTS	45	58	42
Total Mercury (Hg)	mg/kg	MCERTS	< 0.3	< 0.3	< 0.3
Total Nickel (Ni)	mg/kg	MCERTS	11	10	8.7
Total Selenium (Se)	mg/kg	MCERTS	< 1.0	< 1.0	< 1.0
Total Zinc (Zn)	mg/kg	MCERTS	32	38	26
Water Soluble Boron (B)	mg/kg	MCERTS	0.4	0.6	0.4
Total Cyanide (CN)	mg/kg	MCERTS	< 1	< 1	< 1
Total (mono) Phenols	mg/kg	MCERTS	< 1.0	< 1.0	< 1.0
Naphthalene	mg/kg	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	MCERTS	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	MCERTS	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	MCERTS	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	MCERTS	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	MCERTS	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	MCERTS	< 0.05	< 0.05	< 0.05
Benz(a)anthracene	mg/kg	MCERTS	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	MCERTS	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	MCERTS	< 0.05	< 0.05	< 0.05
Dibenzo(a,h)anthracene	mg/kg	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(g,h,i)perylene	mg/kg	MCERTS	< 0.05	< 0.05	< 0.05
Total PAHs (sum USEPA16)	mg/kg	MCERTS	< 0.80	< 0.80	< 0.80
Aliphatic TPH >C5 - C6	mg/kg	MCERTS	< 0.001	< 0.001	< 0.001
Aliphatic TPH >C6 - C8	mg/kg	MCERTS	< 0.001	< 0.001	< 0.001
Aliphatic TPH >C8 - C10	mg/kg	MCERTS	< 0.001	< 0.001	< 0.001
Aliphatic TPH >C10 - C12	mg/kg	MCERTS	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12 - C16	mg/kg	MCERTS	< 2.0	< 2.0	< 2.0
Aliphatic TPH >C16 - C21	mg/kg	MCERTS	< 8.0	< 8.0	< 8.0
Aliphatic TPH >C21 - C35	mg/kg	MCERTS	< 8.0	< 8.0	< 8.0
Aliphatic TPH (C5 - C35)	mg/kg	MCERTS	< 10	< 10	< 10
Aromatic TPH >C5 - C7	mg/kg	MCERTS	< 0.001	< 0.001	< 0.001
Aromatic TPH >C7 - C8	mg/kg	MCERTS	< 0.001	< 0.001	< 0.001
Aromatic TPH >C8 - C10	mg/kg	MCERTS	< 0.001	< 0.001	< 0.001
Aromatic TPH >C10 - C12	mg/kg	MCERTS	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12 - C16	mg/kg	MCERTS	< 2.0	< 2.0	< 2.0
Aromatic TPH >C16 - C21	mg/kg	MCERTS	< 10	< 10	< 10
Aromatic TPH >C21 - C35	mg/kg	MCERTS	< 10	< 10	< 10
Aromatic TPH (C5 - C35)	mg/kg	MCERTS	< 10	< 10	< 10
Benzene	mg/kg	MCERTS	< 0.001	< 0.001	< 0.001
Toluene	mg/kg	MCERTS	< 0.001	< 0.001	< 0.001
Ethylbenzene	mg/kg	MCERTS	< 0.001	< 0.001	< 0.001
p & m-xylene	mg/kg	MCERTS	< 0.001	< 0.001	< 0.001
o-xylene	mg/kg	MCERTS	< 0.001	< 0.001	< 0.001
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	MCERTS	< 0.001	< 0.001	< 0.001

LS = LOAMY SAND
S = SAND

Visual Examination

The samples were consistent in appearance and were described as very dark greyish brown (Munsell Colour 10YR 3/2), moist, non-plastic, very slightly calcareous LOAMY SANDS and SANDS with weakly developed, fine to medium granular to sub-angular blocky structures. The samples were virtually stone-free. Sample 1 contained one ceramic shard (<10mm). No other deleterious materials, unusual odours, roots or rhizomes of pernicious weeds were observed.

Aaron Cross
BSc MSc
Graduate Soil Scientist

Results of analysis should be read in conjunction with the report they were issued with

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Photos provided by Balfour Beatty of proposed topsoil source location 23rd March 2020



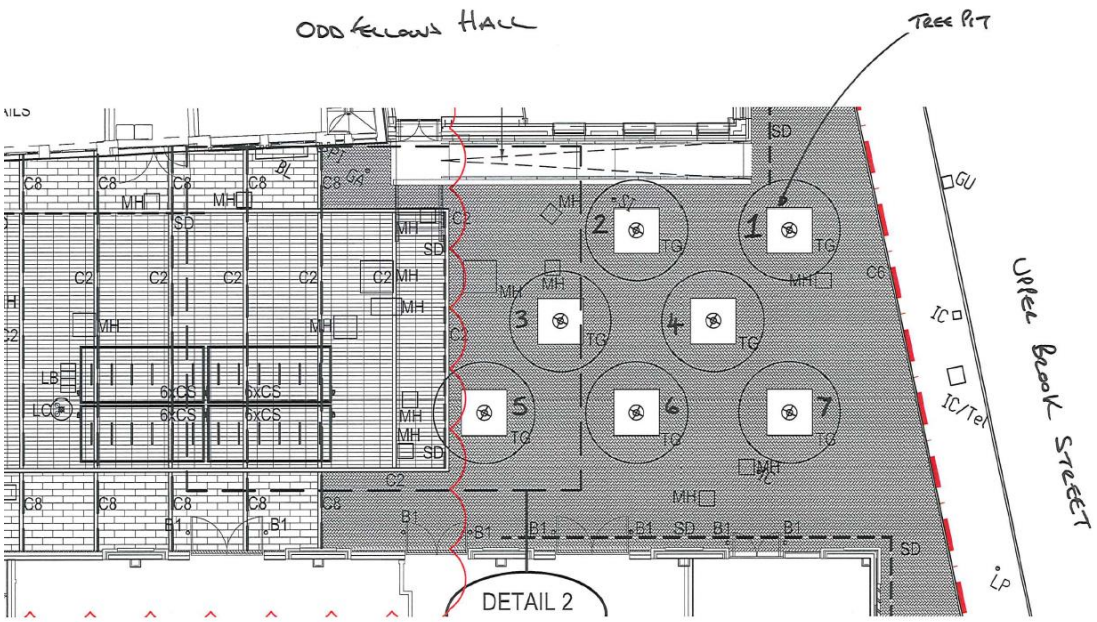




Attachment C5 Topsoil sampling and placement validation, Oddfellows Hall tree pits

Installation of seven tree pits to east of Oddfellows Hall.

Tree pit location, in north-east of MECD site and pit numbering:



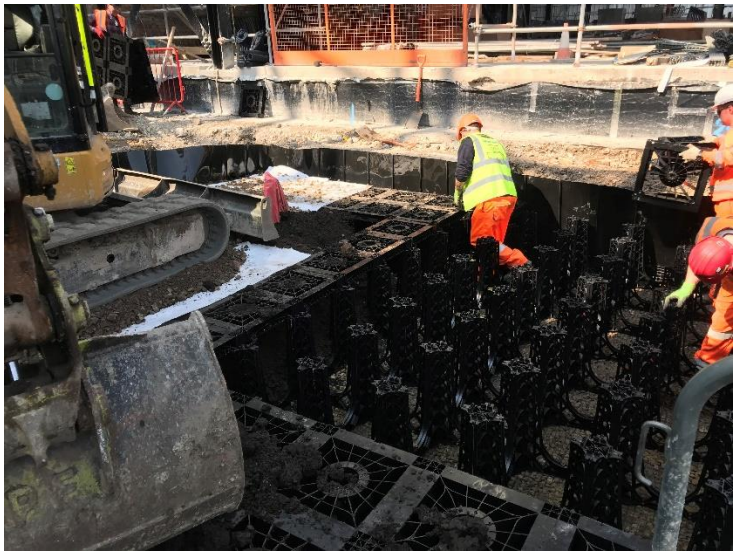
Photographs taken by Balfour Beatty during proprietary GreenBlue Urban root cell system installation on 1st April 2020















Photographs taken by Balfour Beatty during final tree pit infilling on 27th March 2020.

Tree pit No. 1





Tree pit No. 2





Tree pit No. 3





Tree pit No. 4





Tree pit No. 5





Tree pit No. 6





Tree pit No. 7





Del Harrison

From: Crayton, Michael <Michael.Crayton@balfourbeatty.com>
Sent: 02 April 2020 12:31
To: Tom Hartley
Subject: [External] FW: MECD Tree Cell installation

Tom

Please see below statement from the manufacturer of the root cell system (GreenBlue Urban) to say he witnessed the commencement of the installation and it was installed in accordance with their guidance.

Thanks

Michael Crayton
Site Agent | Balfour Beatty | Regional
M: +44 (0)7779428883 | **E:** michael.crayton@balfourbeatty.com
MECD, University of Manchester, Balfour Beatty Site Offices, Booth Street East, Manchester. M13 9SS
www.balfourbeatty.com | follow us @balfourbeatty |

From: Adrian Paynter | GreenBlue Urban <adrian.paynter@greenblue.com>
Sent: 10 May 2019 07:20
To: Crayton, Michael <Michael.Crayton@balfourbeatty.com>
Subject: RE: MECD Tree Cell installation

CAUTION: This email originated from outside of **Balfour Beatty**. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Good morning Michael,

Sure, no problem.

I can confirm that I attended the MECD site on Monday 1st April 2019 to assist and advise the Balfour Beatty team with the installation of the first tree pit in hard landscape. This tree pit was built using the GreenBlue Urban tree pit system which includes the RootSpace soil cells, root barrier, aeration etc. The cells were filled with a sandy loam topsoil to BS3882.

Please come back to me should you require anything further.

Kind regards
Adrian

GreenBlue URBAN
Establishing the future urban landscape

Adrian Paynter | GreenBlue Urban
Sales Manager

GreenBlue Urban Limited, Northpoint, Compass Park, TN32 5BS

t: 01580 830800
e: adrian.paynter@greenblue.com **www.greenblue.com**

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Attachment C6 Topsoil test results, Oddfellows Hall tree pits

Environmental Chemistry
SOCOTEC UK
Ashby Rd, Bretby,
Burton-on-Trent, UK
DE15 0YZ

Certificate of Analysis

Project No: 20040061

Client: SOCOTEC Materials Testing

Quote Number: BEC20037414

Project Reference: WAM0017893

Site Name: University Of Manchester - MECD PCSA

Contact: Ryan Hobson

Address: 29 Rufford Court
Woolston
Warrington
Cheshire

Post Code: WA1 4RF

E-Mail: Ryan.Hobson@socotec.com

Phone No: 07866578048

Number of Samples Received: 2

Date Received: 06/04/2020

Analysis Date: 15/04/2020

Date Issued: 17/04/2020

Job Status: Complete

Account Manager

Laura Moore

Authorised by the Operations Manager
Becky Batham

Client: SOCOTEC Materials Testing

Project Name: University Of Manchester - MECD PCSA

Project No: 20040061

Date Issued: 17/04/2020

Samples Analysed

Sample Reference	Text ID	Sample Date	Sample Type
Sample 1 - 55064059	20040061-001	31/03/2020 11:23:34	SOLID
Sample 2 - 55064060	20040061-002	31/03/2020 11:23:34	SOLID

Client: SOCOTEC Materials Testing

Project Name: University Of Manchester - MECD PCSA

Project No: 20040061

Date Issued: 17/04/2020

Analysis Results

				Project ID	20040061	
				Sample ID	001	002
				Customer ID	Sample 1 - 55064059	Sample 2 - 55064060
				Sample Type	SOLID	SOLID
				Sampling Date	31/03/2020	31/03/2020
Analysis	Method Code	MDL	Units	Accred		
>C6-C7 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.253	<0.256
>C7-C8 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.253	<0.256
>C7-C8 Aromatic	GROHSA/BTEXHSA	0.01	mg/kg^	UM	<0.013	<0.013
>C8-C10 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.253	<0.256
>C8-C10 Aromatic	GROHSA/BTEXHSA	0.04	mg/kg^	UM	<0.051	<0.052
C5-C6 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.253	<0.256
C5-C7 Aromatic	GROHSA/BTEXHSA	0.01	mg/kg^	UM	<0.013	<0.013
Total GRO	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.253	<0.256
Chromium (VI) as Cr	KONENS	0.1	mg/kg	N	<0.1	<0.1
Total Cyanide	SFAPI	0.5	mg/kg^	UM	<0.6	<0.6
Arsenic as As	ICPMSS	0.3	mg/kg^	UM	5.9	5.7
Cadmium as Cd	ICPMSS	0.2	mg/kg^	UM	<0.2	<0.2
Copper as Cu	ICPMSS	1.6	mg/kg^	UM	16.2	15.2
Lead as Pb	ICPMSS	0.7	mg/kg^	UM	27.0	24.8
Mercury as Hg	ICPMSS	0.5	mg/kg^	UM	<0.5	<0.5
Nickel as Ni	ICPMSS	2	mg/kg^	UM	9.9	9.5
Selenium as Se	ICPMSS	0.5	mg/kg^	UM	<0.5	<0.5

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Client: SOCOTEC Materials Testing

Project Name: University Of Manchester - MECD PCSA

Project No: 20040061

Date Issued: 17/04/2020

Analysis Results

				Project ID	20040061	
				Sample ID	001	002
				Customer ID	Sample 1 - 55064059	Sample 2 - 55064060
				Sample Type	SOLID	SOLID
				Sampling Date	31/03/2020	31/03/2020
Analysis	Method Code	MDL	Units	Accred		
Total Chromium as Cr	ICPMSS	1.2	mg/kg^	UM	55.0	51.3
Zinc as Zn	ICPMSS	16	mg/kg^	UM	47.5	46.9
Benzene	BTEXHSA	10	µg/kg^	UM	<13	<13
Ethylbenzene	BTEXHSA	10	µg/kg^	UM	<13	<13
m/p-Xylene	BTEXHSA	20	µg/kg^	UM	<25	<26
o-Xylene	BTEXHSA	10	µg/kg^	UM	<13	<13
Toluene	BTEXHSA	10	µg/kg^	UM	<13	<13
Acenaphthene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10
Acenaphthylene	PAHMSUS	0.08	mg/kg^	U	<0.10	<0.10
Anthracene	PAHMSUS	0.08	mg/kg^	U	<0.10	<0.10
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10
Chrysene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10
Dibenzo[a,h]anthracene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Client: SOCOTEC Materials Testing

Project Name: University Of Manchester - MECD PCSA

Project No: 20040061

Date Issued: 17/04/2020

Analysis Results

				Project ID	20040061	
				Sample ID	001	002
				Customer ID	Sample 1 - 55064059	Sample 2 - 55064060
				Sample Type	SOLID	SOLID
				Sampling Date	31/03/2020	31/03/2020
Analysis	Method Code	MDL	Units	Accred		
Fluoranthene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10
Fluorene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10
Indeno[1,2,3-cd]pyrene	PAHMSUS	0.08	mg/kg^	UM	<0.10*	<0.10*
Naphthalene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10
Phenanthrene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10
Pyrene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10
Total PAH 16	PAHMSUS	1.28	mg/kg^	U	<1.62	<1.64
>C10-C12 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	<5.06	<5.12
>C12-C16 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	<5.06	<5.12
>C16-C21 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	<5.06	<5.12
>C21-C35 (Aliphatic)	TPHFIDUS (Aliphatic)	10	mg/kg^	U	<12.7	<12.8
>C8-C10 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	<5.06	<5.12
Total TPH (Aliphatic)	TPHFIDUS (Aliphatic)	20	mg/kg^	U	<25.3	<25.6
>C10-C12 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	<5.06	<5.12
>C12-C16 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	<5.06	<5.12
>C16-C21 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	<5.06	<5.12
>C21-C35 (Aromatic)	TPHFIDUS (Aromatic)	10	mg/kg^	U	<12.7	<12.8

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Client: SOCOTEC Materials Testing

Project Name: University Of Manchester - MECD PCSA

Project No: 20040061

Date Issued: 17/04/2020

Analysis Results

				Project ID	20040061	
				Sample ID	001	002
				Customer ID	Sample 1 - 55064059	Sample 2 - 55064060
				Sample Type	SOLID	SOLID
				Sampling Date	31/03/2020	31/03/2020
Analysis	**Method Code**	**MDL**	**Units**	**Accred**		
Total TPH (Aromatic)	TPHFIDUS (Aromatic)	20	mg/kg^	U	<25.3	<25.6
Total Moisture at 105°C	TMSS	0.1	%	U	21.0	21.8
Total Moisture at 35°C	CLANDPREP	0.1	%	N	20.4	21.6
Colour of Material	CLANDPREP		-	N	Brown	Brown
Major Constituents	CLANDPREP		-	N	SILT	SILT
Minor Constituents	CLANDPREP		-	N	Sand	Sand
Miscellaneous Constituents	CLANDPREP		-	N	Gravel	Gravel
Asbestos Identification	SUB020		-	N	NAIIS	NAIIS

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

CONTRACT NO: S12171-2
DATE OF ISSUE: 14.04.20

RESULTS: (cont.)

Table 1: Qualitative Results

SOCOTEC Job I.D: 20040061 – University of Manchester - MEC

IOM sample number	Client sample number	ACM type detected	PLM result
S72336	20040061-001-9	-	No Asbestos Detected
S72337	20040061-002-9	-	No Asbestos Detected

Our detection limit for this method is 0.001%.

COMMENTS:

IOM Consulting cannot accept responsibility for samples that have been incorrectly collected or despatched by external clients.

Any opinions and interpretations expressed herein are out with the scope of our UKAS accreditation.

K. Parsons-Hewes

AUTHORISED BY: .....
K Parsons-Hewes
Senior Scientific Technician

CERTIFICATE OF ANALYSIS

ANALYSIS REQUESTED BY: SOCOTEC UK Ltd
Environmental Chemistry
PO Box 100
Burton upon Trent
Staffordshire
DE15 0XD

CONTRACT NO: S12171-2

DATE OF ISSUE: 14.04.20

DATE SAMPLE RECEIVED: 08.04.20

DATE ANALYSIS COMPLETED: 14.04.20

DESCRIPTION: Two soil/loose aggregate samples each weighing approximately 0.9-1.0kg.

ANALYSIS REQUESTED: Qualitative and quantitative analysis of soil/loose aggregate samples for mass determination of asbestos.

METHODS:

Qualitative - The samples were analysed qualitatively for asbestos by polarised light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative - The analysis was carried out using our documented in-house method based on HSE Contract Research Report No. 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies *et al*, 1996) and HSG 248. Our method includes initial examination of the entire sample, detailed analysis of a representative sub-sample and quantification by hand picking/weighing and/or fibre counting/sizing as appropriate.

RESULTS:

Initial Screening

No asbestos was detected in either of the soil samples by stereo-binocular and polarised light microscopy.

A summary of the results is given in Table 1.

www.iom-world.org
Registered Address: Research Avenue North, Riccarton, Edinburgh, EH14 4AP, United Kingdom
Tel: 0131 449 8000 Fax: 0131 449 8084 Email: iom@iom-world.org
IOM CONSULTING LIMITED registered in Scotland No. SC266570

UKAS TESTING
0374

Report Number : **20040061**

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
PAHMSUS	20040061-001 20040061-002	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However the remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (Indeno[1,2,3-cd]pyrene) . These circumstances should be taken into consideration when utilising the data.

LIMS-F002 - Report Notes

Client: SOCOTEC Materials Testing

Project Name: University Of Manchester - MECD PC

Project No: 20040061

Date Issued: 17/04/2020

All samples received in an appropriate condition with no deviancies noted with the samples.

Analysis Basis

Analysis	Analysis Type	Analysis Basis
BTEXHSA	ORGANIC	As Received
CLANDPREP	PHYS	As Received
GROHSA	ORGANIC	As Received
ICPMSS	METALS	Air Dried & Ground
KONENS	INORGANIC	Air Dried & Ground
PAHMSUS	ORGANIC	As Received
SFAPI	INORGANIC	As Received
SUB020	SUBCON	
TMSS	PHYS	As Received
TPHFIDUS (Aliphatic)	ORGANIC	As Received
TPHFIDUS (Aromatic)	ORGANIC	As Received

Additional Information

This report refers to samples as received, and SOCOTEC Uk Ltd takes no responsibility for accuracy or competence of sampling by others.

Results within this report relate only to the samples tested.

In the accreditation column of analysis report the codes are as follows:

U = UKAS accredited analysis
M = MCERT accredited analysis
N = Unaccredited analysis

Any units marked with ^ signify results are reported on a dry weight basis of 105° C

All Air Dried and Ground Samples (ADG) are oven dried at less than 35° C.

This report shall not be reproduced except in full and with approval from the laboratory.

Opinions and interpretations given are outside the scope of our UKAS accreditation.

Any samples marked with * are not covered by our scope of UKAS accreditation, if applicable further report notes have been added.

Any solid samples where the Major Constituents are not one of the following (Sand, Silt, Clay, Made Ground) are not one of our accredited matrix types.

Any samples marked with ‡ have had MCERTS accreditation removed for this result

Any samples marked with a tick in the deviant table is deviant for the specific reason.

Any samples reported as IS, NA, ND mean the following:

IS = Insufficient Sample to complete analysis
NA = Sample is not amenable for the required analysis
ND = Results cannot be determined

End of Certificate of Analysis

Attachment C7 Subsoil test results, Bold Heath Quarry source

MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

TEST REPORT

Client D Morgan Plc

Address New Hey
Chester Road
Great Sutton
Ellesmere Port
Cheshire CH66 2LS

Contract Bold Heath Quarry,
Widnes

Job Number MRN 3887/2
Date of Issue 20 February 2020

Approved Signatories

S J Hutchings, O P Davies

Notes

1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.

2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.

3 Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation

4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted. This does not, however, guarantee the balance of the materials from which the tested samples have been taken to be of equal quality.

Andrew House, Hadfield Street, Dukinfield, Cheshire SK16 4QX Tel: 0161 475 0870
Email: enquiries@murrayrix.com Website: www.murrayrix.com
Also at: London: 020 8523 1999
Murray Rix is the trading name of Murray Rix (Northern) Limited. Registered in England 2878361

UKAS TESTING 1580

MURRAY RIX
ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING
1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN 933-1 : 2012 (Washing & Sieving Method)

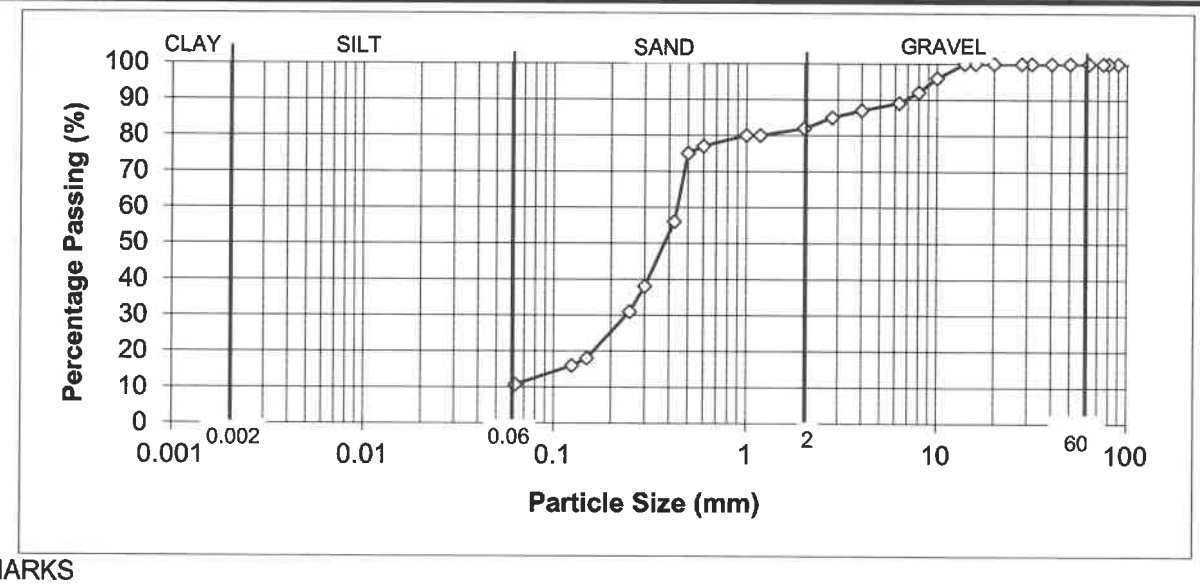
Determination of water content in accordance with BS EN 1097-5:2008

CLIENT	D Morgan Plc
SITE	Bold Heath Quarry, Widnes
JOB NUMBER	MRN 3887/2

SAMPLE LABEL	5mm Sand	DATE SAMPLED	05-Feb-20
LAB SAMPLE No	87822	DATE RECEIVED	05-Feb-20
DATE TESTED	10-Feb-20	SAMPLED BY	Client

MATERIAL	Sand
ADVISED SOURCE	As client and site above

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		6.3	89	
90	100		4	87	
80	100		2.8	85	
75	100		2	82	
63	100		1.18	80	
50	100		1	80	
40	100		0.6	77	
31.5	100		0.5	75	
28	100		0.425	56	
20	100		0.3	38	
16	100		0.25	31	
14	100		0.15	18	
10	96		0.125	16	
8	92		0.063	10.7	



REMARKS

As received moisture content = 11%

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 20-Feb-20

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING
1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN 933-1 : 2012 (Washing & Sieving Method)

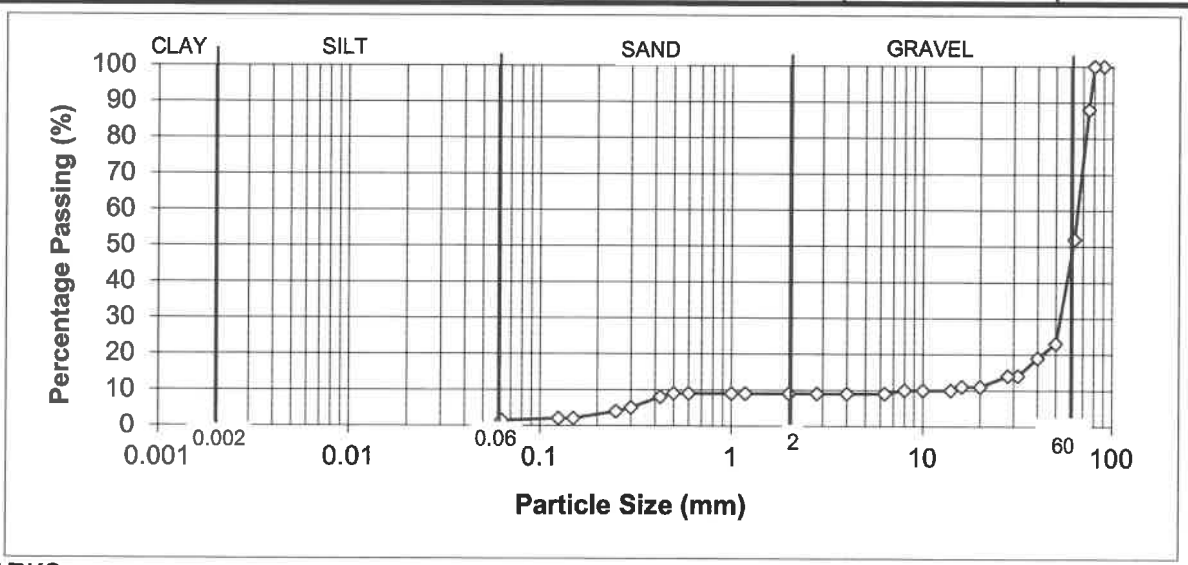
Determination of water content in accordance with BS EN 1097-5:2008

CLIENT	D Morgan Plc
SITE	Bold Heath Quarry, Widnes
JOB NUMBER	MRN 3887/2

SAMPLE LABEL	75mm Sand	DATE SAMPLED	05-Feb-20
LAB SAMPLE No	87823	DATE RECEIVED	05-Feb-20
DATE TESTED	10-Feb-20	SAMPLED BY	Client

MATERIAL	Sandy GRAVEL
ADVISED SOURCE	As client and site above

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		6.3	9	
90	100		4	9	
80	100		2.8	9	
75	88		2	9	
63	52		1.18	9	
50	23		1	9	
40	19		0.6	9	
31.5	14		0.5	9	
28	14		0.425	8	
20	11		0.3	5	
16	11		0.25	4	
14	10		0.15	2	
10	10		0.125	2	
8	10		0.063	1.4	



REMARKS

As received moisture content = 7.4%

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 20-Feb-20

celtest
INDEPENDENT MATERIALS TESTING I DIAMOND DRILLING & SAWING

T.D Construction Testing Ltd,
Gerard Hall
40 Lord Street
St Helens
Merseyside
WA10 2SD

Date: 14 July 2020
Test Report Ref: TR 739171

Order No: TD.PO/20/027

Contract: D.Morgan - Bold Heath

LABORATORY TEST REPORT

TEST REQUIREMENTS: Determination of Thermal Conductivity / Resistivity by Thermal Needle Probe tested in accordance with **ASTM D5334-14**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S88373**
Client Ref. No:	**Lab 20/888**
Date and Time of Sampling:	**24/05/2020**
Date of Receipt at Lab:	**26/06/2020**
Date of Start of Test:	**13/07/2020**
Sampling Location:	**Stockpile**
Name of Source:	**Site**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Tested By:	**IJ**
Material Description:	**Red Sandstone**
Target Specification:	**ENA Technical Specification 97-1: Selected Sand Backfill: ≤2.70°C●m/W**

RESULTS:

Test	Units	Result
Thermal Conductivity	W/m●K	**0.997**
Thermal Resistivity	°C●Cm/W	**73.72**
Thermal Resistivity	°C●m/W	**0.74**
Moisture Content of Test Specimen	%	**0**
Method of Compaction		**2.5Kg Rammer**
Compacted at		Natural moisture

This test report shall not be reproduced, except in full, without the written approval of Celtest Company Limited.

These results relate only to the items tested.

Comments:
Material complies with ENA TS 97-1 Backfill Sand Thermal Resistivity requirements

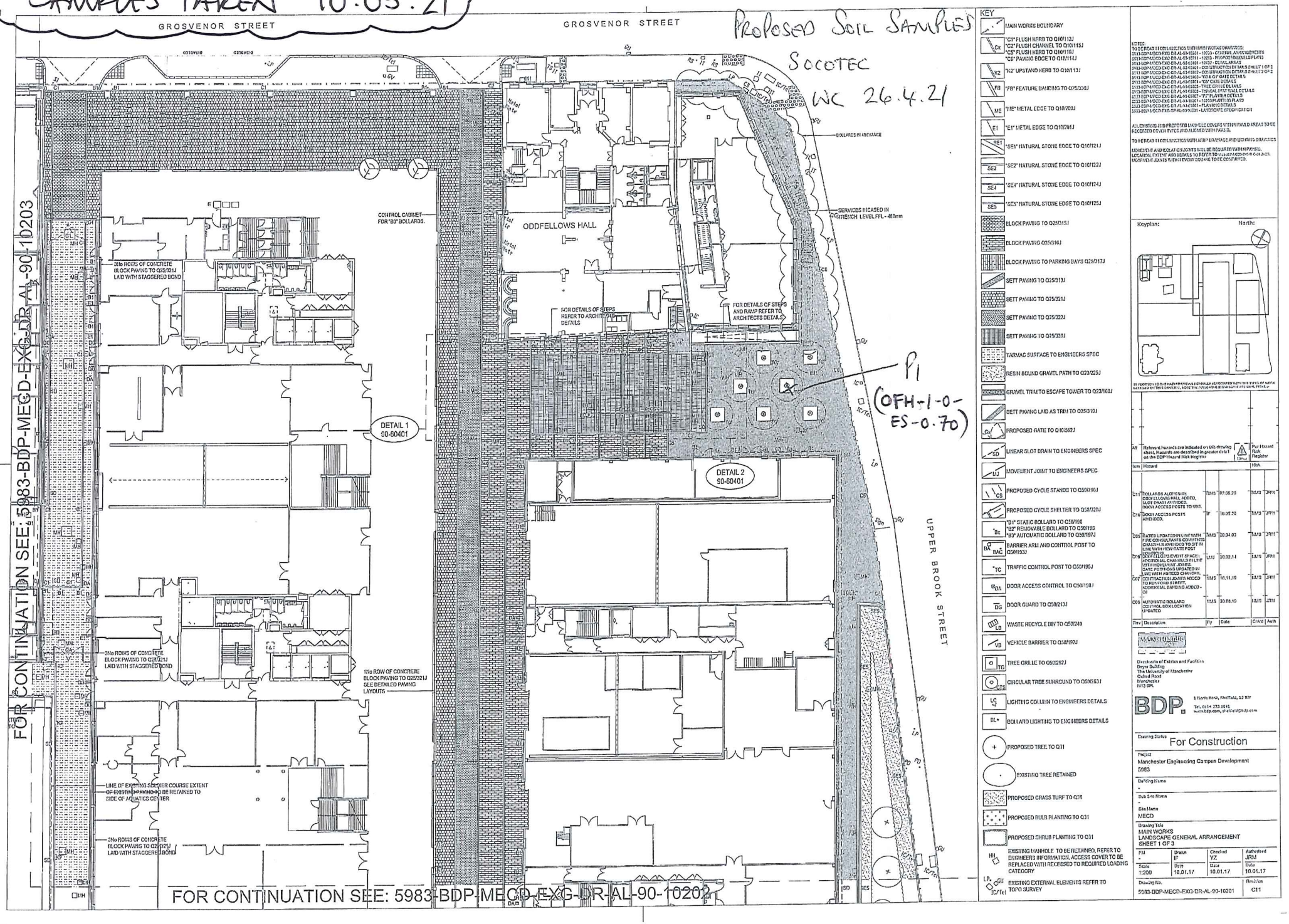
Report checked and approved by:

Meical Owen
Soils Team Manager

Attachment C8 Topsoil test results, Upper Brook Street and podium landscaping (Jan/Feb 2021)

SAMPLES TAKEN 10.05.21

PAGE 1



KEY

- MAIN WORKS BOUNDARY
- "C1" FLUSH KERB TO Q10/112J
- "C2" FLUSH CHANNEL TO Q10/115J
- "C5" FLUSH KERB TO Q10/116J
- "C6" PAVING EDGE TO Q10/114J
- "K2" UPSTAND KERB TO Q10/113J
- "FB" FEATURE BANDING TO Q25/330J
- "ME" METAL EDGE TO Q10/208J
- "E1" METAL EDGE TO Q10/201J
- "SE1" NATURAL STONE EDGE TO Q10/121J
- "SE2" NATURAL STONE EDGE TO Q10/122J
- "SE4" NATURAL STONE EDGE TO Q10/124J
- "SE5" NATURAL STONE EDGE TO Q10/125J
- BLOCK PAVING TO Q25/315J
- BLOCK PAVING Q25/316J
- BLOCK PAVING TO PARKING BAYS Q25/317J
- SETT PAVING TO Q25/319J
- SETT PAVING TO Q25/321J
- SETT PAVING TO Q25/322J
- SETT PAVING TO Q25/330J
- TARMAC SURFACE TO ENGINEERS SPEC
- RESIN BOUND GRAVEL PATH TO Q23/225J
- GRAVEL TRIM TO ESCAPE TOWER TO Q23/108J
- SETT PAVING LAID AS TRIM TO Q25/310J
- PROPOSED GATE TO Q10/562J
- LINEAR SLOT DRAIN TO ENGINEERS SPEC
- MOVEMENT JOINT TO ENGINEERS SPEC
- PROPOSED CYCLE STANDS TO Q50/210J
- PROPOSED CYCLE SHELTER TO Q50/320J
- "B1" STATIC BOLLARD TO Q50/160
- "B2" REMOVABLE BOLLARD TO Q50/195
- "B3" AUTOMATIC BOLLARD TO Q50/197J
- BARRIER ARM AND CONTROL POST TO Q50/193J
- TRAFFIC CONTROL POST TO Q50/195J
- DOOR ACCESS CONTROL TO Q50/198J
- DOOR GUARD TO Q50/213J
- WASTE RECYCLE BIN TO Q50/240
- VEHICLE BARRIER TO Q50/192J
- TREE GRILLE TO Q50/262J
- CIRCULAR TREE SURROUND TO Q50/263J
- LIGHTING COLUMN TO ENGINEERS DETAILS
- BOLLARD LIGHTING TO ENGINEERS DETAILS
- PROPOSED TREE TO Q11
- EXISTING TREE RETAINED
- PROPOSED GRASS TURF TO Q22
- PROPOSED BULB PLANTING TO Q31
- PROPOSED SHRUB PLANTING TO Q11
- EXISTING MANHOLE TO BE RETAINED, REFER TO ENGINEERS INFORMATION. ACCESS COVER TO BE REPLACED WITH RECESSED TO REQUIRED LOADING CATEGORY
- EXISTING EXTERNAL ELEMENTS REFER TO TOPO SURVEY

NOTES:
TO BE READ IN CONJUNCTION WITH THE FOLLOWING DRAWINGS:
5983-BDP-MECD-EXG-DR-AL-90-10201 - 10203 - GENERAL ARRANGEMENTS
5983-BDP-MECD-EXG-DR-AL-90-10711 - 10713 - PROPOSED LEVELS PLANS
5983-BDP-MECD-EXG-DR-AL-90-10301 - 10312 - DETAIL AREAS
5983-BDP-MECD-EXG-DR-AL-90-10501 - CONSTRUCTION DETAILS SHEET 1 OF 2
5983-BDP-MECD-EXG-DR-AL-90-10502 - CONSTRUCTION DETAILS SHEET 2 OF 2
5983-BDP-MECD-EXG-DR-AL-90-10901 - "B3 & B4" GATE DETAILS
5983-BDP-MECD-EXG-DR-AL-90-10701 - "SW" GATE DETAILS
5983-BDP-MECD-EXG-DR-AL-90-10503 - TREE GRILLE DETAILS
5983-BDP-MECD-EXG-DR-AL-90-10504 - TYPICAL SPOT LEVEL DETAILS
5983-BDP-MECD-EXG-DR-AL-90-10507 - "P2" PLANTER DETAILS
5983-BDP-MECD-EXG-DR-AL-90-10101 - 10103 PLANTING PLANS
5983-BDP-MECD-EXG-DR-AL-90-10201 - PLANTING DETAILS
5983-BDP-MECD-EXG-SP-AL-90-10201 - LANDSCAPE SPECIFICATION

ALL EXISTING AND PROPOSED MANHOLE COVERS WITHIN PAVED AREAS TO BE ACCEASED COVER TYPES AND ALIGNED WITH PAVING.

TO BE READ IN CONJUNCTION WITH ARUP DRAINAGE AND LIGHTING DRAWINGS

MOVEMENT AND ISOLATION JOINTS WILL BE REQUIRED WITHIN PAVING. LOCATION, EXTENT AND DETAILS TO REFER TO ARUP DRAWINGS 5983-ARUP-MECD-EXG-DR-CE-00020-24. MOVEMENT JOINTS WITH PAVING TO BE CONFIRMED.

Keyplan: North:

BY ADDITION TO THE HAZARDS NOTED BELOW ALL OPERATIONS ARE TO BE CARRIED OUT IN ACCORDANCE WITH THE TYPES OF WORK NOTED ON THIS DRAWING, AND THE INFORMATION IN THE HEALTH & SAFETY FILE.

Art	Relevant hazards are indicated on this drawing sheet. Hazards are described in greater detail on the BDP Hazard Risk Register		Per Hazard Risk Register

Item	Hazard	Risk	

Rev	Description	By	Date	Check	Auth
C11	BOLLARDS ALONG SIDE OF OLDHAM HALL ADDED, SLOT DRAIN ANTI-SIDED, DOOR ACCESS POSTS TO 1885.	TIMS	20.05.20	TIMS	JRM
C10	DOOR ACCESS POSTS ADDED.	TIMS	18.05.20	TIMS	JRM
C09	DATES UPDATED IN LINE WITH FINE CONSULTANTS COMMENTS. CHAINAGE AMENDED TO GIVE FALL WITH NEW DATE POST	TIMS	20.04.03	TIMS	JRM
C08	1No ROW OF CONCRETE EVERY SPACE I ADDITIONAL CHANNELS IN LINE WITH MOVEMENT JOINTS. DATE POSITIONS UPDATED IN LINE WITH AMENDED CHAINAGE. CONTRACTION JOINTS ADDED TO REFLECTING STREET. ADDITIONAL BANDING ADDED - 28	LJJ	20.02.14	TIMS	JRM
C07	AUTOMATIC BOLLARD CONTROL BOX LOCATION UPDATED	TIMS	19.11.19	TIMS	JRM
C06		TIMS	20.06.19	TIMS	JRM

The University of Manchester
Directorate of Estates and Facilities
Beyer Building
The University of Manchester
Oxford Road
Manchester
M13 9PL

BDP.
1 North Bank, Sheffield, S3 8JY
Tel: 0114 273 2141
www.bdp.com, sheffield@bdp.com

Drawing Status: For Construction

Project: Manchester Engineering Campus Development
5983

Building Name: -

Sub Site Name: -

Site Name: MECD

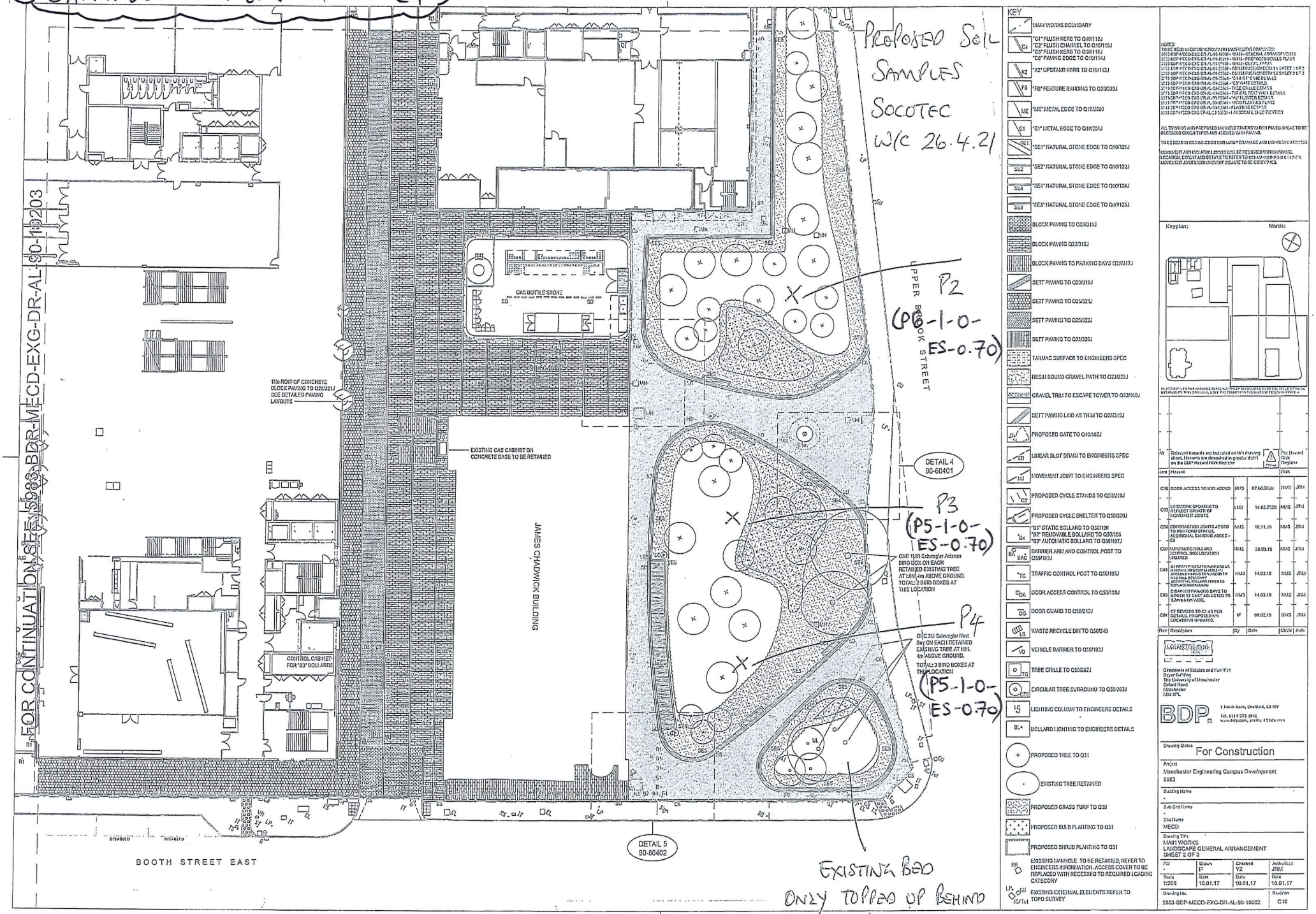
Drawing Title: MAIN WORKS LANDSCAPE GENERAL ARRANGEMENT SHEET 1 OF 3

PM	Drawn	Checked	Authorised
-	IF	YZ	JRM
Scale	Date	Date	Date
1:200	10.01.17	10.01.17	10.01.17

Drawing No.: 5983-BDP-MECD-EXG-DR-AL-90-10201 | Revision: C11

SAMPLES TAKEN 10.05.21

PAGE 2



KEY

- MAIN WORKS BOUNDARY
- "C1" FLUSH KERB TO Q10/112J
- "C2" FLUSH CHANNEL TO Q10/115J
- "C5" FLUSH KERB TO Q10/116J
- "C6" PAVING EDGE TO Q10/114J
- "K2" UPSTAND KERB TO Q10/113J
- "FB" FEATURE BANDING TO Q25/330J
- "ME" METAL EDGE TO Q10/120J
- "E1" METAL EDGE TO Q10/201J
- "SE1" NATURAL STONE EDGE TO Q10/121J
- "SE2" NATURAL STONE EDGE TO Q10/122J
- "SE4" NATURAL STONE EDGE TO Q10/124J
- "SE5" NATURAL STONE EDGE TO Q10/125J
- BLOCK PAVING TO Q25/315J
- BLOCK PAVING Q25/316J
- BLOCK PAVING TO PARKING BAYS Q25/317J
- SETT PAVING TO Q25/318J
- SETT PAVING TO Q25/321J
- SETT PAVING TO Q25/322J
- SETT PAVING TO Q25/330J
- TARMAC SURFACE TO ENGINEERS SPEC
- RESIN BOUND GRAVEL PATH TO Q23/225J
- GRAVEL TRIM TO ESCAPE TOWER TO Q23/160J
- SETT PAVING LAID AS TRIM TO Q25/315J
- PROPOSED GATE TO Q10/362J
- LINEAR SLOT DRAIN TO ENGINEERS SPEC
- MOVEMENT JOINT TO ENGINEERS SPEC
- PROPOSED CYCLE STANDS TO Q50/210J
- PROPOSED CYCLE SHELTER TO Q50/220J
- "B1" STATIC BOLLARD TO Q50/189
- "B3" REMOVABLE BOLLARD TO Q50/195
- "B3" AUTOMATIC BOLLARD TO Q50/197J
- BARRIER ARM AND CONTROL POST TO Q50/193J
- TRAFFIC CONTROL POST TO Q50/195J
- DOOR ACCESS CONTROL TO Q50/199J
- DOOR GUARD TO Q50/213J
- WASTE RECYCLE BIN TO Q50/240
- VEHICLE BARRIER TO Q50/192J
- TREE GRILLE TO Q50/262J
- CIRCULAR TREE SURROUND TO Q50/263J
- LIGHTING COLUMN TO ENGINEERS DETAILS
- BOLLARD LIGHTING TO ENGINEERS DETAILS
- PROPOSED TREE TO Q31
- EXISTING TREE RETAINED
- PROPOSED GRASS TURF TO Q30
- PROPOSED BULB PLANTING TO Q31
- PROPOSED SHRUB PLANTING TO Q31
- EXISTING MANHOLE TO BE RETAINED, REFER TO ENGINEERS INFORMATION, ACCESS COVER TO BE REPLACED WITH RECESSED TO REQUIRED LOADING CATEGORY
- EXISTING EXTERNAL ELEMENTS REFER TO TOPO SURVEY

NOTES:
TO BE READ IN CONJUNCTION WITH MAIN WORKS DRAWINGS:
5983-BDP-MECD-EXG-DR-AL-90-10201 - GENERAL ARRANGEMENT
5983-BDP-MECD-EXG-DR-AL-90-10202 - PROPOSED LEVELS PLAN
5983-BDP-MECD-EXG-DR-AL-90-10203 - SETTING OUT PLAN
5983-BDP-MECD-EXG-DR-AL-90-10301 - CONSTRUCTION DETAILS SHEET 1 OF 2
5983-BDP-MECD-EXG-DR-AL-90-10302 - CONSTRUCTION DETAILS SHEET 2 OF 2
5983-BDP-MECD-EXG-DR-AL-90-10304 - "C1 & C2" KERB DETAILS
5983-BDP-MECD-EXG-DR-AL-90-10305 - "C5 & C6" KERB DETAILS
5983-BDP-MECD-EXG-DR-AL-90-10306 - TYPICAL CABLE DETAILS
5983-BDP-MECD-EXG-DR-AL-90-10307 - TYPICAL TEST WELL DETAILS
5983-BDP-MECD-EXG-DR-AL-90-10308 - "K2" FLUSHER DETAILS
5983-BDP-MECD-EXG-DR-AL-90-10309 - MOVEMENT JOINT DETAILS
5983-BDP-MECD-EXG-DR-AL-90-10401 - PLANTING DETAILS
5983-BDP-MECD-EXG-DR-AL-90-10402 - PLANTING SCHEDULE

ALL EXISTING AND PROPOSED MANHOLE COVERS WITHIN PAVED AREAS TO BE RECESSED COVER TYPES AND ALIGNED WITH PAVING.

TO BE READ IN CONJUNCTION WITH MAIN DRAINAGE AND LIGHTING DRAWINGS.

MOVEMENT AND ISOLATION JOINTS WILL BE REQUIRED WITHIN PAVING. LOCATION, EXTENT AND DETAILS TO REFER TO 5983-BDP-MECD-EXG-DR-AL-90-10306. MOVEMENT JOINTS WITHIN EXTENT TO BE CONFIRMED.

Keyplan: North:

Rev	Description	By	Date	Check	Auth
C10	DOOR ACCESS TO B35 ADDED	MMS	07.02.2020	MMS	JRM
C09	LANDWORK UPDATED TO REFLECT UPDATE OF BOUNDARY JOINTS	LMJ	14.02.2020	MMS	JRM
C08	CONSTRUCTION JOINTS ADDED TO MAIN ENTRANCE, ADDITIONAL BANDING ADDED - C3	MMS	18.11.19	MMS	JRM
C07	AUTOMATIC BOLLARD CONTROL BOX LOCATION UPDATED	MMS	30.09.19	MMS	JRM
C06	C1 REVISED TO C3 TO MAINTAIN LEVEL MATCH TO EXISTING ENTRANCE AT ACCESS PAVING TO MECD. ADDITIONAL BOLLARD ADDED TO REPLACE BOOM BARRIER	MMS	14.03.19	MMS	JRM
C05	DISABLED PARKING BAYS TO BOOTH ST EAST ADJUSTED TO 2.9m x 5.5m WIDE.	MMS	14.03.19	MMS	JRM
C04	C1 REVISED TO C3 AS PER DETAIL. PROPOSED BIN LOCATIONS UPDATED.	MF	08.02.19	MMS	JRM

Directorate of Estates and Facilities
Beyer Building
The University of Manchester
Oxford Road
Manchester
M13 9PL

BDP.
3 Hatch Bank, Sheffield, S3 8DY
Tel. 0114 272 2641
www.bdp.com, profile 42bdp.com

Drawing Status: For Construction

Project: Manchester Engineering Campus Development
5983

Building Name: -

Sub-Site Name: -

Site Name: MECD

Drawing Title: MAIN WORKS LANDSCAPE GENERAL ARRANGEMENT SHEET 2 OF 3

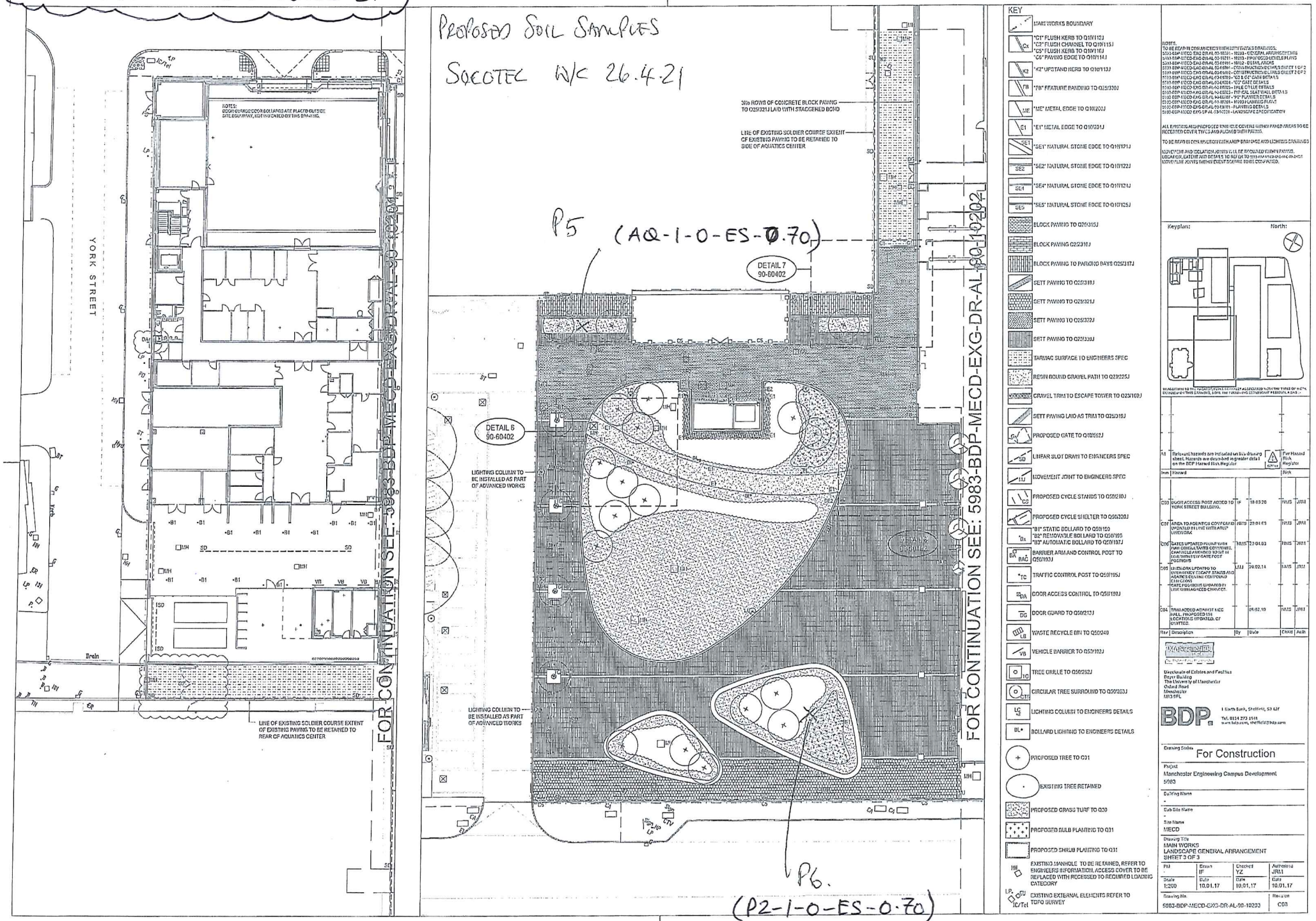
Job	Drawn	Checked	Authorised
-	IF	YZ	JRM
Scale	Date	Date	Date
1:200	10.01.17	10.01.17	10.01.17

Drawing No.: 5983-BDP-MECD-EXG-DR-AL-90-10202

Revision: C10

SAMPLES TAKEN 10.05.21

PAGE 3



TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Alan Draper
R. Draper Ltd
Barrow Nook Lane
Bickerstaffe
Nr. Ormskirk
Lancashire
L39 0ET

23rd January 2020
Our Ref: TOHA/20/9367/SS
Your Ref: as below

R. Draper Ltd

Dear Sirs

Topsoil Analysis Report – G1 Topsoil

We have completed the analysis of the topsoil sample recently submitted, referenced *G1 Topsoil,* and have pleasure reporting our findings.

The purpose of the analysis was to determine the suitability of the topsoil sample for general landscape purposes (trees, shrubs, amenity grass). In addition, this sample has been assessed to determine its compliance with the requirements of the British Standard for Topsoil *(BS3882:2015 Specification for Topsoil – Multipurpose Topsoil)*.

This report presents the results of analysis for the sample submitted to our office, and it should be considered 'indicative' of the topsoil source. The report and results should therefore not be used by third parties as a means of verification or validation testing or waste designation purposes, especially after the topsoil has left the R Draper Ltd site.

SAMPLE EXAMINATION

The sample was described as a very dark grey (Munsell Colour 10YR 3/1) slightly moist, slightly plastic, very slightly calcareous LOAMY SAND with a weakly developed, fine to occasionally coarse granular structure*. The sample was slightly stony and contained very common organic fines. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

*This appraisal of soil structure was made from examination of disturbed sample(s). Structure is a key soil characteristic that may only be accurately assessed by examination in an in-situ state.

ANALYTICAL SCHEDULE

The sample was submitted to a UKAS and MCERTS accredited laboratory for a range of physical and chemical tests to confirm the composition and fertility of the soil, and the concentration of selected potential contaminants. The following parameters were determined:

- particle size analysis (sand, silt, clay);
- stone content (2-20mm, 20-50mm, >50mm);
- pH and electrical conductivity values;
- exchangeable sodium percentage;
- major plant nutrients (N, P, K, Mg);
- organic matter content;
- C:N ratio;
- heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn, B);
- total cyanide and total (mono) phenols;
- speciated PAHs (US EPA16 suite);
- aromatic and aliphatic TPH (C5-C35 banding);
- benzene, toluene, ethylbenzene, xylene (BTEX);
- asbestos screen.

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

RESULTS OF ANALYSIS

Particle Size Analysis and Stone Content

The sample fell into the *loamy sand* texture class, which is usually considered suitable for general landscape applications provided the soil's physical condition is satisfactory.

The stone content of the sample was low and, as such, stones should not restrict the use of the soil for general landscape purposes.

pH and Electrical Conductivity Values

The sample was slightly acid in reaction (pH 6.5), with a pH value that would be considered ideal for general landscape purposes.

The electrical conductivity (salinity) value (water extract) was moderately high. Although the growth of many plant species (including amenity turf) are unlikely to be affected by this level of salinity, it is possible that salt sensitive species, including emergent seedlings, could show reduced growth potential.

The electrical conductivity value by $CaSO_4$ extract (3530 µS/cm - *BS3882* requirement) slightly exceeded the maximum specified value (3300 µS/cm) given in *BS3882:2015 – Table 1*.

Organic Matter and Fertility Status

The sample was adequately supplied with organic matter and all major plant nutrients.

The C:N ratio of the sample was acceptable for general landscape purposes.

Potential Contaminants

With reference to *BS3882:2015 - Table 1*: Notes 3 and 4, there is a recommendation to confirm levels of potential contaminants in relation to the topsoil's proposed end use. This includes human health, environmental protection and metals considered toxic to plants. In the absence of site-specific assessment criteria, the concentrations that affect human health have been compared with the *residential with home grown produce* land use in the Suitable For Use Levels (S4ULs) presented in *The LQM/CIEH S4ULs for Human Health Risk Assessment* (2015) and the DEFRA SP1010: *Development of Category 4 Screening Levels* (C4SLs) *for Assessment of Land Affected by Contamination – Policy Companion Document* (2014).

Of the potential contaminants determined, none was found at levels that exceeded their guideline values.

R. Draper Ltd

Phytotoxic Contaminants

Of the phytotoxic (toxic to plants) contaminants determined (copper, nickel, zinc), none was found at levels that exceeded the maximum permissible levels specified in *BS3882:2015 – Table 1*.

CONCLUSION

The purpose of the analysis was to determine the suitability of the topsoil sample for general landscape purposes (trees, shrubs, amenity grass). In addition, this sample has been assessed to determine compliance with the requirements of the British Standard for Topsoil *(BS3882:2015 Specification for Topsoil – Multipurpose Topsoil)*.

From the soil examination and laboratory analysis, the sample was described as a slightly acid, moderately saline, very slightly calcareous loamy sand with a weakly developed structure and low stone content. The sample contained sufficient reserves of organic matter and major plant nutrients. Of the potential contaminants determined, none exceeded their respective guideline values.

The electrical conductivity (salinity) value (water extract) was moderately high. In this instance, the proportion of soluble salts should not be significant for more hardy plants or grass cultivars. However, the soil represented by this sample may not be suitable for salt-sensitive species or young seedlings.

To conclude, based on our findings, the topsoil represented by this sample would be considered suitable for general landscape purposes (hardy trees, shrubs and amenity grass), provided the physical condition of the soil is satisfactory.

The sample was largely compliant with the requirements of the British Standard for Topsoil *(BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil)* with the exception of the slightly elevated electrical conductivity ($CaSO_4$ extract). On this occasion, this non-compliance is considered minor when reviewed in the context of all the other results and given the proposed end-use of the soil.

RECOMMENDATIONS

Soil Handling Recommendations

It is important to maintain the physical condition of the soil and avoid structural damage during all phases of soil handling (e.g. stockpiling, respreading, cultivating, planting, seeding or turfing). As a consequence, soil handling operations should be carried out when soil is reasonably dry and non-plastic (friable) in consistency.

It is important to ensure that the soil is not unnecessarily compacted by trampling or trafficking by site machinery, and soil handling should be stopped during and after heavy rainfall and not continued until the soil is friable in consistency. If the soil is structurally damaged and compacted at any stage during the course of soiling or landscaping works, it should be cultivated appropriately to relieve the compaction and to restore the soil's structure prior to any planting, turfing or seeding.

Further details on soil handling are provided in Annex A of *BS3882:2015.*

R. Draper Ltd

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if we can be of further assistance.

Yours faithfully

Aaron Cross
BSc
Graduate Soil Scientist

Laura Hathaway-Jenkins
BSc MSc EngD MISoilSci
Senior Associate

For & on behalf of Tim O'Hare Associates LLP

R. Draper Ltd

TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Client:	**R Draper Ltd**
Project	**G1 Topsoil**
Job:	**Topsoil Analysis - BS3882:2015**
Date:	**23/01/2020**
Job Ref No:	**TOHA/20/9367/SS**

Sample Reference			**G1 Topsoil**
		Acreditation	
Clay (<0.002mm)	%	UKAS	7
Silt (0.002-0.063mm)	%	UKAS	8
Sand (0.063-2.0mm)	%	UKAS	85
Texture Class (UK Classification)	--	UKAS	LS
Stones (2-20mm)	% DW	GLP	6
Stones (20-50mm)	% DW	GLP	6
Stones (>50mm)	% DW	GLP	0
pH Value (1:2.5 water extract)	units	UKAS	6.5
Electrical Conductivity (1:2.5 water extract)	uS/cm	UKAS	1640
Electrical Conductivity (1:2 $CaSO_4$ extract)	uS/cm	UKAS	3530
Exchangeable Sodium Percentage	%	UKAS	5.2
Organic Matter (LOI)	%	UKAS	5.4
Total Nitrogen (Dumas)	%	UKAS	0.22
C : N Ratio	ratio	UKAS	14
Extractable Phosphorus	mg/l	UKAS	65
Extractable Potassium	mg/l	UKAS	1450
Extractable Magnesium	mg/l	UKAS	141
Total Arsenic (As)	mg/kg	MCERTS	7
Total Cadmium (Cd)	mg/kg	MCERTS	< 0.2
Total Chromium (Cr)	mg/kg	MCERTS	13
Hexavalent Chromium (Cr VI)	mg/kg	MCERTS	< 4.0
Total Copper (Cu)	mg/kg	MCERTS	26
Total Lead (Pb)	mg/kg	MCERTS	33
Total Mercury (Hg)	mg/kg	MCERTS	< 0.3
Total Nickel (Ni)	mg/kg	MCERTS	10
Total Selenium (Se)	mg/kg	MCERTS	< 1.0
Total Zinc (Zn)	mg/kg	MCERTS	48
Water Soluble Boron (B)	mg/kg	MCERTS	1.5
Total Cyanide (CN)	mg/kg	MCERTS	< 1
Total (mono) Phenols	mg/kg	MCERTS	< 1.0
Naphthalene	mg/kg	MCERTS	< 0.05
Acenaphthylene	mg/kg	MCERTS	< 0.05
Acenaphthene	mg/kg	MCERTS	< 0.05
Fluorene	mg/kg	MCERTS	< 0.05
Phenanthrene	mg/kg	MCERTS	0.4
Anthracene	mg/kg	MCERTS	< 0.05
Fluoranthene	mg/kg	MCERTS	0.36
Pyrene	mg/kg	MCERTS	0.33
Benzo(a)anthracene	mg/kg	MCERTS	< 0.05
Chrysene	mg/kg	MCERTS	< 0.05
Benzo(b)fluoranthene	mg/kg	MCERTS	< 0.05
Benzo(k)fluoranthene	mg/kg	MCERTS	< 0.05
Benzo(a)pyrene	mg/kg	MCERTS	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	MCERTS	< 0.05
Dibenzo(a,h)anthracene	mg/kg	MCERTS	< 0.05
Benzo(g,h,i)perylene	mg/kg	MCERTS	< 0.05
Total PAHs (sum USEPA16)	mg/kg	MCERTS	1.1
Aliphatic TPH >C5 - C6	mg/kg	MCERTS	< 0.001
Aliphatic TPH >C6 - C8	mg/kg	MCERTS	< 0.001
Aliphatic TPH >C8 - C10	mg/kg	MCERTS	< 0.001
Aliphatic TPH >C10 - C12	mg/kg	MCERTS	< 1.0
Aliphatic TPH >C12 - C16	mg/kg	MCERTS	< 2.0
Aliphatic TPH >C16 - C21	mg/kg	MCERTS	< 8.0
Aliphatic TPH >C21 - C35	mg/kg	MCERTS	< 8.0
Aliphatic TPH (C5 - C35)	mg/kg	MCERTS	< 10
Aromatic TPH >C5 - C7	mg/kg	MCERTS	< 0.001
Aromatic TPH >C7 - C8	mg/kg	MCERTS	< 0.001
Aromatic TPH >C8 - C10	mg/kg	MCERTS	< 0.001
Aromatic TPH >C10 - C12	mg/kg	MCERTS	< 1.0
Aromatic TPH >C12 - C16	mg/kg	MCERTS	< 2.0
Aromatic TPH >C16 - C21	mg/kg	MCERTS	< 10
Aromatic TPH >C21 - C35	mg/kg	MCERTS	< 10
Aromatic TPH (C5 - C35)	mg/kg	MCERTS	< 10
Benzene	mg/kg	MCERTS	< 0.001
Toluene	mg/kg	MCERTS	< 0.001
Ethylbenzene	mg/kg	MCERTS	< 0.001
p & m-xylene	mg/kg	MCERTS	< 0.001
Xylene	mg/kg	MCERTS	< 0.001
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	MCERTS	< 0.001
Asbestos Screen	N/ND	ISO 17025	Not-detected

LS = LOAMY SAND

Visual Examination

The sample was described as a very dark grey (Munsell Colour 10YR 3/1) slightly moist, slightly plastic, very slightly calcareous LOAMY SAND with a weakly developed, fine to occasionally coarse granular structure. The sample was slightly stony and contained very common organic fines. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

Aaron Cross
BSc MSc
Graduate Soil Scientist

Results of analysis should be read in conjunction with the report they were issued with.

The contents of this certificate shall not be reproduced without the express written permission of Tim O'Hare Associates LLP

R. Draper Ltd

Environmental Chemistry
SOCOTEC UK
Ashby Rd, Bretby,
Burton-on-Trent, UK
DE15 0YZ

Certificate of Analysis

Project No: 21050817

Client: SOCOTEC Consultancy North

Quote Number: BEC210216158

Project Reference: MECD Manchester

Site Name: NOR1013

Contact: Chris Evans

Address: SOCOTEC Central
Leofric Business Park
Progress Close
Coventry

Post Code: CV3 2TF

E-Mail: Chris.Evans@socotec.com

Phone No: 01244 980 010

Number of Samples Received: 6

Date Received: 13/05/2021

Analysis Date: 24/05/2021

Date Issued: 24/05/2021

Job Status: Complete

Report Type: Final Version 01

This report supersedes any versions previously issued by the laboratory



Account Manager

Ayshea Dunsby



Authorised by the Operations Manager
Becky Batham

Client: SOCOTEC Consultancy North

Project Name: NOR1013

Project No: 21050817

Date Issued: 24/05/2021

Samples Analysed

Sample Reference	Text ID	Sample Date	Sample Type
P5-1-0-ES-0.70	21050817-001	10/05/2021 00:00:00	SOLID
P5-2-0-ES-0.70	21050817-002	10/05/2021 00:00:00	SOLID
P6-1-0-ES-0.70	21050817-003	10/05/2021 00:00:00	SOLID
OFH-1-0-ES-0.70	21050817-004	10/05/2021 00:00:00	SOLID
P2-1-0-ES-0.70	21050817-005	10/05/2021 00:00:00	SOLID
AQ-1-0-ES-0.70	21050817-006	10/05/2021 00:00:00	SOLID

Client: SOCOTEC Consultancy North

Project Name: NOR1013

Project No: 21050817

Date Issued: 24/05/2021

Analysis Results

				Project ID	21050817				
				Sample ID	001	002	003	004	005
				Customer ID	P5-1-0-ES-0.70	P5-2-0-ES-0.70	P6-1-0-ES-0.70	OFH-1-0-ES-0.70	P2-1-0-ES-0.70
				Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
				Sampling Date	10/05/2021	10/05/2021	10/05/2021	10/05/2021	10/05/2021
Analysis	Method Code	MDL	Units	Accred					
>C6-C7 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.253	<0.249	<0.238	<0.299	<0.240
>C7-C8 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.253	<0.249	<0.238	<0.299	<0.240
>C7-C8 Aromatic	GROHSA/BTEXHSA	0.01	mg/kg^	UM	<0.013	<0.013	0.016	<0.015	<0.012
>C8-C10 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.253	<0.249	<0.238	<0.299	<0.240
>C8-C10 Aromatic	GROHSA/BTEXHSA	0.04	mg/kg^	UM	<0.051	<0.051	<0.048	<0.060	<0.048
C5-C6 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.253	<0.249	<0.238	<0.299	<0.240
C5-C7 Aromatic	GROHSA/BTEXHSA	0.01	mg/kg^	UM	<0.013	<0.013	<0.012	<0.015	<0.012
Total GRO C5-C10	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.253	<0.249	<0.238	<0.299	<0.240
Total Cyanide	SFAPI	0.5	mg/kg^	UM	<0.6	<0.6	<0.6	<0.7	<0.6
Arsenic as As	ICPMSS	0.3	mg/kg^	UM	3.4	7.3	10.2	6.7	15.6
Cadmium as Cd	ICPMSS	0.2	mg/kg^	UM	<0.2	0.3	0.2	<0.2	0.2
Copper as Cu	ICPMSS	1.6	mg/kg^	UM	18.3	31.7	37.5	26.3	62.0
Lead as Pb	ICPMSS	0.7	mg/kg^	UM	32.1	839.7	129.5	42.9	49.1
Mercury as Hg	ICPMSS	0.5	mg/kg^	UM	<0.5	<0.5	<0.5	<0.6	<0.5
Nickel as Ni	ICPMSS	2	mg/kg^	UM	7.8	12.4	18.0	11.5	18.9
Selenium as Se	ICPMSS	0.5	mg/kg^	UM	<0.5	<0.5	<0.5	<0.6	<0.5
Total Chromium as Cr	ICPMSS	1.2	mg/kg^	UM	10.6	13.0	19.8	13.6	20.7
Zinc as Zn	ICPMSS	16	mg/kg^	UM	36.9	52.6	60.1	53.4	68.8
Benzene	BTEXHSA	10	µg/kg^	UM	<13	<13	<12	<15	<12
Ethylbenzene	BTEXHSA	10	µg/kg^	UM	<13	<13	<12	<15	<12
m/p-Xylene	BTEXHSA	20	µg/kg^	UM	<25	<25	<24	<30	<24
o-Xylene	BTEXHSA	10	µg/kg^	UM	<13	<13	<12	<15	<12
Toluene	BTEXHSA	10	µg/kg^	UM	<13	<13	16	<15	<12
Acenaphthene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10	0.10	<0.12	<0.10

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Client: SOCOTEC Consultancy North

Project Name: NOR1013

Project No: 21050817

Date Issued: 24/05/2021

Analysis Results

Analysis	Method Code	MDL	Units	Accred	Project ID: 21050817 Sample ID: 006 Customer ID: AQ-1-0-ES-0.70 Sample Type: SOLID Sampling Date: 10/05/2021
>C6-C7 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.278
>C7-C8 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.278
>C7-C8 Aromatic	GROHSA/BTEXHSA	0.01	mg/kg^	UM	<0.014
>C8-C10 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.278
>C8-C10 Aromatic	GROHSA/BTEXHSA	0.04	mg/kg^	UM	<0.056
C5-C6 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.278
C5-C7 Aromatic	GROHSA/BTEXHSA	0.01	mg/kg^	UM	<0.014
Total GRO C5-C10	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.278
Total Cyanide	SFAPI	0.5	mg/kg^	UM	<0.7
Arsenic as As	ICPMSS	0.3	mg/kg^	UM	6.4
Cadmium as Cd	ICPMSS	0.2	mg/kg^	UM	<0.2
Copper as Cu	ICPMSS	1.6	mg/kg^	UM	23.0
Lead as Pb	ICPMSS	0.7	mg/kg^	UM	34.4
Mercury as Hg	ICPMSS	0.5	mg/kg^	UM	<0.5
Nickel as Ni	ICPMSS	2	mg/kg^	UM	11.3
Selenium as Se	ICPMSS	0.5	mg/kg^	UM	<0.5
Total Chromium as Cr	ICPMSS	1.2	mg/kg^	UM	13.6
Zinc as Zn	ICPMSS	16	mg/kg^	UM	39.9
Benzene	BTEXHSA	10	µg/kg^	UM	<14
Ethylbenzene	BTEXHSA	10	µg/kg^	UM	<14
m/p-Xylene	BTEXHSA	20	µg/kg^	UM	<28
o-Xylene	BTEXHSA	10	µg/kg^	UM	<14
Toluene	BTEXHSA	10	µg/kg^	UM	<14
Acenaphthene	PAHMSUS	0.08	mg/kg^	UM	<0.11

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Client: SOCOTEC Consultancy North

Project Name: NOR1013

Project No: 21050817

Date Issued: 24/05/2021

Analysis Results

				Project ID	21050817				
				Sample ID	001	002	003	004	005
				Customer ID	P5-1-0-ES-0.70	P5-2-0-ES-0.70	P6-1-0-ES-0.70	OFH-1-0-ES-0.70	P2-1-0-ES-0.70
				Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
				Sampling Date	10/05/2021	10/05/2021	10/05/2021	10/05/2021	10/05/2021
Analysis	Method Code	MDL	Units	Accred					
Acenaphthylene	PAHMSUS	0.08	mg/kg^	U	<0.10	<0.10	<0.10	<0.12	<0.10
Anthracene	PAHMSUS	0.08	mg/kg^	U	<0.10	0.14	0.11	<0.12	<0.10
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg^	UM	<0.10	0.45	0.34	0.30	<0.10
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg^	UM	<0.10	0.49	0.38	0.32	0.11
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg^	UM	<0.10	0.48	0.36	0.31	0.10
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg^	UM	<0.10	0.21	0.15	<0.12	<0.10
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg^	UM	<0.10	0.20	0.13	0.13	<0.10
Chrysene	PAHMSUS	0.08	mg/kg^	UM	<0.10	0.44	0.41	0.29	0.10
Dibenzo[a,h]anthracene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10	<0.10	<0.12	<0.10
Fluoranthene	PAHMSUS	0.08	mg/kg^	UM	<0.10	0.81	0.68	0.42	0.13
Fluorene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10	<0.10	<0.12	<0.10
Indeno[1,2,3-cd]pyrene	PAHMSUS	0.08	mg/kg^	UM	<0.10	0.27	0.20	0.16	<0.10
Naphthalene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10	<0.10	<0.12	<0.10
Phenanthrene	PAHMSUS	0.08	mg/kg^	UM	<0.10	0.50	0.56	<0.12	<0.10
Pyrene	PAHMSUS	0.08	mg/kg^	UM	<0.10	0.83	0.77	0.44	0.13
Total PAH 16	PAHMSUS	1.28	mg/kg^	U	<1.62	<5.31	<4.57	<3.31	<1.62
>C10-C12 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	<5.07	<4.99	<4.76	<5.97	<4.79
>C12-C16 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	<5.07	<4.99	<4.76	<5.97	<4.79
>C16-C21 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	<5.07	<4.99	<4.76	<5.97	<4.79
>C21-C35 (Aliphatic)	TPHFIDUS (Aliphatic)	10	mg/kg^	U	18.3	15.5	<11.9	25.4	<12.0
Total TPH >C8-C40 (Aliphatic)	TPHFIDUS (Aliphatic)	20	mg/kg^	U	<25.3	<24.9	<23.8	32.1	<24.0
>C10-C12 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	<5.07	<4.99	<4.76	<5.97	<4.79
>C12-C16 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	<5.07	<4.99	<4.76	<5.97	<4.79
>C16-C21 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	5.67	9.37	7.85	6.79	<4.79

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Client: SOCOTEC Consultancy North

Project Name: NOR1013

Project No: 21050817

Date Issued: 24/05/2021

Analysis Results

				Project ID	21050817
				Sample ID	006
				Customer ID	AQ-1-0-ES-0.70
				Sample Type	SOLID
				Sampling Date	10/05/2021
Analysis	Method Code	MDL	Units	Accred	
Acenaphthylene	PAHMSUS	0.08	mg/kg^	U	<0.11
Anthracene	PAHMSUS	0.08	mg/kg^	U	<0.11
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg^	UM	0.18
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg^	UM	0.19
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg^	UM	0.21
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg^	UM	<0.11
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg^	UM	<0.11
Chrysene	PAHMSUS	0.08	mg/kg^	UM	0.22
Dibenzo[a,h]anthracene	PAHMSUS	0.08	mg/kg^	UM	<0.11
Fluoranthene	PAHMSUS	0.08	mg/kg^	UM	0.35
Fluorene	PAHMSUS	0.08	mg/kg^	UM	<0.11
Indeno[1,2,3-cd]pyrene	PAHMSUS	0.08	mg/kg^	UM	0.11
Naphthalene	PAHMSUS	0.08	mg/kg^	UM	<0.11
Phenanthrene	PAHMSUS	0.08	mg/kg^	UM	0.26
Pyrene	PAHMSUS	0.08	mg/kg^	UM	0.35
Total PAH 16	PAHMSUS	1.28	mg/kg^	U	<2.75
>C10-C12 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	<5.56
>C12-C16 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	<5.56
>C16-C21 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	<5.56
>C21-C35 (Aliphatic)	TPHFIDUS (Aliphatic)	10	mg/kg^	U	83.2
Total TPH >C8-C40 (Aliphatic)	TPHFIDUS (Aliphatic)	20	mg/kg^	U	87.0
>C10-C12 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	<5.56
>C12-C16 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	5.75
>C16-C21 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	8.43

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Client: SOCOTEC Consultancy North

Project Name: NOR1013

Project No: 21050817

Date Issued: 24/05/2021

Analysis Results

				Project ID	21050817				
				Sample ID	001	002	003	004	005
				Customer ID	P5-1-0-ES-0.70	P5-2-0-ES-0.70	P6-1-0-ES-0.70	OFH-1-0-ES-0.70	P2-1-0-ES-0.70
				Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
				Sampling Date	10/05/2021	10/05/2021	10/05/2021	10/05/2021	10/05/2021
Analysis	Method Code	MDL	Units	Accred					
>C21-C35 (Aromatic)	TPHFIDUS (Aromatic)	10	mg/kg^	U	16.5	43.6	26.8	47.5	21.3
Total TPH >C8-C40 (Aromatic)	TPHFIDUS (Aromatic)	20	mg/kg^	U	27.7	61.9	41.4	62.3	31.9
Total Moisture at 105°C	TMSS	0.1	%	U	21.1	19.8	15.9	33.0	16.5
Total Moisture at 35°C	CLANDPREP	0.1	%	N	18.7	17.9	16.1	22.8	14.9
Colour of Material	CLANDPREP		-	N	Brown	Brown	Brown	Brown	Brown
Major Constituents	CLANDPREP		-	N	SILT	SILT	CLAY	SILT	SILT
Minor Constituents	CLANDPREP		-	N	Sand	Clay	Silt	Clay	Clay
Miscellaneous Constituents	CLANDPREP		-	N	Gravel	Gravel	Gravel	Gravel	Gravel
Asbestos Identification	SUB002		-	N	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Client: SOCOTEC Consultancy North

Project Name: NOR1013

Project No: 21050817

Date Issued: 24/05/2021

Analysis Results

				Project ID	**21050817**
				Sample ID	**006**
				Customer ID	AQ-1-0-ES-0.70
				Sample Type	**SOLID**
				Sampling Date	**10/05/2021**
Analysis	**Method Code**	**MDL**	**Units**	**Accred**	
>C21-C35 (Aromatic)	TPHFIDUS (Aromatic)	10	mg/kg^	U	32.9
Total TPH >C8-C40 (Aromatic)	TPHFIDUS (Aromatic)	20	mg/kg^	U	49.7
Total Moisture at 105°C	TMSS	0.1	%	U	28.1
Total Moisture at 35°C	CLANDPREP	0.1	%	N	27.3
Colour of Material	CLANDPREP		-	N	Brown
Major Constituents	CLANDPREP		-	N	SILT
Minor Constituents	CLANDPREP		-	N	Clay
Miscellaneous Constituents	CLANDPREP		-	N	Gravel
Asbestos Identification	SUB002		-	N	NAIIS

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

ASBEST□S ANAL□SIS RESULTS

S□C□TEC Asbestos Limited Certificate of Analysis for Asbestos in Soils□Sediments and Aggregates

UKAS TESTING
1089

Detection limit of Method SCI-ASB-020 is 0.00□□

Sampling has been carried out by a third party

SOCOTEC

Client□	SOCOTEC Environmental Chemistry	**Page □of □**	
Address□	Etwall House, Bretby Business Park, Ashby Road, Burton upon Trent	**Report No□**	**AN□-050□-2□□□□**
For the attention of□	SOCOTEC Environmental Chemistry	**Report Date□**	**20/05/202□**
Site Address□	NOR1013	**Pro□ect Number□**	**2□050□□□**

Sample Number	Sample Date	Sample Location □ Matrix	Test Date	Total Sample Dry □eight □g□	□eight of □□0mm Fraction □g□	Asbestos □g□ in □□0mm	Asbestos □g□in □ □0mm	□ Asbestos by □eight of Total Dried Sample	Moisture Content	Asbestos Fibre Types Identified
1	10/05/21	P5-1-0-ES-0.70 Soils	20/05/2021	1117.6	1024.6	0.00000	0.00000			NADIS
2	10/05/21	P5-2-0-ES-0.70 Soils	20/05/2021	1083.6	1057.9	0.00000	0.00000			NADIS
3	10/05/21	P6-1-0-ES-0.70 Soils	19/05/2021	1096.7	1060.4	0.00000	0.00000			NADIS
4	10/05/21	OFH-1-0-ES-0.70 Soils	19/05/2021	970.3	952.7	0.00000	0.00000			NADIS
5	10/05/21	P2-1-0-ES-0.70 Soils	19/05/2021	1049.7	1035.9	0.00000	0.00000			NADIS
6	10/05/21	AQ-1-0-ES-0.70 Soils	19/05/2021	827.0	773.6	0.00000	0.00000			NADIS

□eys

NAACR □Not Analysed at Clients Re□uest — **NAIIS □No Asbestos Identified in Sample □Identification □nly□**

□visible to na□ed eye — **NADIS □No Asbestos Detected in Sample □ID □ □uant □nly□**

Name:	Rachel Howell	Authorised Signatory:
Position:	Lab Technician	

The sample analysis for the above results was carried out using the procedures detailed in SOCOTEC Asbestos Limited in house method (SCI-ASB-020) based on EA document Quantification of asbestos in soil and associated materials - Draft 2017. Fibre identification was carried out using SOCOTEC Asbestos Limited in house method of transmitted/polarised light microscopy and centre stop dispersion staining (SCI-ASB-007), based on HSE's HSG 248. The analysis of the < 10mm fraction for asbestos content only includes ACMs and fibres and does not discriminate non-asbestos fibres. All fibres are assumed, unless specified, to be amphiboles. All tests were carried out at a SOCOTEC Asbestos Ltd laboratory, Ashbourne House, Bretby Business Park, Ashby Road, Burton-upon-Trent, DE15 0□Z. UKAS Testing Number 1089. Recommended sample weight is 1kg-2kg, samples less than 1kg are classified as deviating samples.

SOCOTEC Asbestos Limited is a wholly owned subsidiary of SOCOTEC UK Limited, registered in England and Wales, registered company 04951688.

Client: SOCOTEC Consultancy North

Project Name: NOR1013

Project No: 21050817

Date Issued: 24/05/2021

Deviating Sample Report

Sample Reference	Text ID	Reported Name	Incorrect Container	Incorrect Label	Headspace	Incorrect/No Preservative	No Sampling Date	Holding Time

Analysis Method

Analysis	Analysis Type	Analysis Method
BTEXHSA	ORGANIC	As Received
CLANDPREP	PHYS	As Received
GROHSA	ORGANIC	As Received
GROHSA/BTEXHSA	ORGANIC	As Received
ICPMSS	METALS	Air Dried & Ground
PAHMSUS	ORGANIC	As Received
SFAPI	INORGANIC	As Received
SUB002	SUBCON	
TMSS	PHYS	As Received
TPHFIDUS (Aliphatic)	ORGANIC	As Received
TPHFIDUS (Aromatic)	ORGANIC	As Received

Client: SOCOTEC Consultancy North

Project Name: NOR1013

Project No: 21050817

Date Issued: 24/05/2021

Additional Information

This report refers to samples as received, and SOCOTEC Uk Ltd takes no responsibility for accuracy or competence of sampling by others.

Results within this report relate only to the samples tested.

In the accreditation column of analysis report the codes are as follows:

U = UKAS accredited analysis
M = MCERT accredited analysis
N = Unaccredited analysis

Any units marked with ^ signify results are reported on a dry weight basis of 105° C

All Air Dried and Ground Samples (ADG) are oven dried at less than 35° C.

This report shall not be reproduced except in full and with approval from the laboratory.

Opinions and interpretations given are outside the scope of our UKAS accreditation.

Any samples marked with * are not covered by our scope of UKAS accreditation. If applicable, further report notes have been added.

Any solid samples where the Major Constituents are not one of the following (Sand, Silt, Clay, Made Ground) are not one of our accredited matrix types.

Any samples marked with ‡ have had MCERTS accreditation removed for this result

Any samples marked with a tick in the deviant table is deviant for the specific reason.

Any samples reported as IS, NA, ND mean the following:

IS = Insufficient Sample to complete analysis
NA = Sample is not amenable for the required analysis
ND = Results cannot be determined

Our deviating sample report does not include deviancy information for Subcontracted analysis. Please see the report from the Subcontracted lab for information regarding any deviancies for this analysis.

End of Certificate of Analysis

21050817		Sample Number:	21050817-001	21050817-002	21050817-003	21050817-004	21050817-005	21050817-006
SOCOTEC Consultancy North		Customer Reference:	P5-1-0-ES-0.70	P5-2-0-ES-0.70	P6-1-0-ES-0.70	OFH-1-0-ES-0.70	P2-1-0-ES-0.70	AQ-1-0-ES-0.70
NOR1013		Matrix:	Soil Sample	Soil Sample	Soil Sample	Soil Sample	Soil Sample	Soil Sample
24/05/2021	Screening value	Sampling Date:	10/05/2021 00:00	10/05/2021 00:00	10/05/2021 00:00	10/05/2021 00:00	10/05/2021 00:00	10/05/2021 00:00
Analyte		**Units**						
Benzene^	900	µg/kg	<13	<13	<12	<15	<12	<14
Ethylbenzene^	80000	µg/kg	<13	<13	<12	<15	<12	<14
m/p-Xylene^	80000	µg/kg	<25	<25	<24	<30	<24	<28
o-Xylene^	80000	µg/kg	<13	<13	<12	<15	<12	<14
Toluene^	800000	µg/kg	<13	<13	16	<15	<12	<14
Colour of Material^		-	Brown	Brown	Brown	Brown	Brown	Brown
Major Constituents^		-	SILT	SILT	CLAY	SILT	SILT	SILT
Minor Constituents^		-	Sand	Clay	Silt	Clay	Clay	Clay
Miscellaneous Constituents^		-	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel
Total Moisture at 35°C	-	%	18.7	17.9	16.1	22.8	14.9	27.3
>C6-C7 Aliphatic^	100	mg/kg	<0.253	<0.249	<0.238	<0.299	<0.240	<0.278
>C7-C8 Aliphatic^	100	mg/kg	<0.253	<0.249	<0.238	<0.299	<0.240	<0.278
>C7-C8 Aromatic^	800	mg/kg	<0.013	<0.013	0.016	<0.015	<0.012	<0.014
>C8-C10 Aliphatic^	30	mg/kg	<0.253	<0.249	<0.238	<0.299	<0.240	<0.278
>C8-C10 Aromatic^	50	mg/kg	<0.051	<0.051	<0.048	<0.060	<0.048	<0.056
C5-C6 Aliphatic^	40	mg/kg	<0.253	<0.249	<0.238	<0.299	<0.240	<0.278
C5-C7 Aromatic^	0.9	mg/kg	<0.013	<0.013	<0.012	<0.015	<0.012	<0.014
Total GRO C5-C10^	-	mg/kg	<0.253	<0.249	<0.238	<0.299	<0.240	<0.278
Arsenic as As^	40	mg/kg	3.4	7.3	10.2	6.7	15.6	6.4
Cadmium as Cd^	3	mg/kg	<0.2	0.3	0.2	<0.2	0.2	<0.2
Copper as Cu^	200	mg/kg	18.3	31.7	37.5	26.3	62	23
Lead as Pb^	300	mg/kg	32.1	839.7	129.5	42.9	49.1	34.4
Mercury as Hg^	1	mg/kg	<0.5	<0.5	<0.5	<0.6	<0.5	<0.5
Nickel as Ni^	110	mg/kg	7.8	12.4	18	11.5	18.9	11.3
Selenium as Se^	3	mg/kg	<0.5	<0.5	<0.5	<0.6	<0.5	<0.5
Total Chromium as Cr^	400	mg/kg	10.6	13	19.8	13.6	20.7	13.6
Zinc as Zn^	300	mg/kg	36.9	52.6	60.1	53.4	68.8	39.9
Acenaphthene^	-	mg/kg	<0.10	<0.10	0.1	<0.12	<0.10	<0.11
Acenaphthylene^	-	mg/kg	<0.10	<0.10	<0.10	<0.12	<0.10	<0.11
Anthracene^	-	mg/kg	<0.10	0.14	0.11	<0.12	<0.10	<0.11
Benzo[a]anthracene^	10	mg/kg	<0.10	0.45	0.34	0.3	<0.10	0.18
Benzo[a]pyrene^	5	mg/kg	<0.10	0.49	0.38	0.32	0.11	0.19
Benzo[b]fluoranthene^	4	mg/kg	<0.10	0.48	0.36	0.31	0.1	0.21
Benzo[g,h,i]perylene^	-	mg/kg	<0.10	0.21	0.15	<0.12	<0.10	<0.11
Benzo[k]fluoranthene^	-	mg/kg	<0.10	0.2	0.13	0.13	<0.10	<0.11
Chrysene^	30	mg/kg	<0.10	0.44	0.41	0.29	0.1	0.22
Dibenzo[a,h]anthracene^	0.3	mg/kg	<0.10	<0.10	<0.10	<0.12	<0.10	<0.11
Fluoranthene^	-	mg/kg	<0.10	0.81	0.68	0.42	0.13	0.35
Fluorene^	-	mg/kg	<0.10	<0.10	<0.10	<0.12	<0.10	<0.11
Indeno[1,2,3-cd]pyrene^	45	mg/kg	<0.10	0.27	0.2	0.16	<0.10	0.11
Naphthalene^	2	mg/kg	<0.10	<0.10	<0.10	<0.12	<0.10	<0.11
Phenanthrene^	-	mg/kg	<0.10	0.5	0.56	<0.12	<0.10	0.26
Pyrene^	-	mg/kg	<0.10	0.83	0.77	0.44	0.13	0.35
Total PAH 16^	-	mg/kg	<1.62	<5.31	<4.57	<3.31	<1.62	<2.75
Total Cyanide^	24	mg/kg	<0.6	<0.6	<0.6	<0.7	<0.6	<0.7
Asbestos Identification	0	-	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS
Total Moisture at 105°C	-	%	21.1	19.8	15.9	33	16.5	28.1
>C10-C12 (Aliphatic)^	50	mg/kg	<5.07	<4.99	<4.76	<5.97	<4.79	<5.56
>C12-C16 (Aliphatic)^	500	mg/kg	<5.07	<4.99	<4.76	<5.97	<4.79	<5.56
>C16-C21 (Aliphatic)^	500	mg/kg	<5.07	<4.99	<4.76	<5.97	<4.79	<5.56
>C21-C35 (Aliphatic)^	500	mg/kg	18.3	15.5	<11.9	25.4	<12.0	83.2
Total TPH >C8-C40 (Aliphatic)^	-	mg/kg	<25.3	<24.9	<23.8	32.1	<24.0	87
>C10-C12 (Aromatic)^	250	mg/kg	<5.07	<4.99	<4.76	<5.97	<4.79	<5.56
>C12-C16 (Aromatic)^	170	mg/kg	<5.07	<4.99	<4.76	<5.97	<4.79	5.75
>C16-C21 (Aromatic)^	500	mg/kg	5.67	9.37	7.85	6.79	<4.79	8.43
>C21-C35 (Aromatic)^	500	mg/kg	16.5	43.6	26.8	47.5	21.3	32.9
Total TPH >C8-C40 (Aromatic)^	-	mg/kg	27.7	61.9	41.4	62.3	31.9	49.7

Attachment C9 Topsoil test results, Upper Brook Street landscaping and podium planters (Nov 2020)

TOPSOIL SAMPLES - SOCOTEC 18.2.21

5983-BDP-MECD-EXG-DR-AL-90-10203

FOR CONTINUATION SEE 5983-BDP-MECD-EXG-DR-AL-90-10201

7-HP2

7-HP1

UPPER BROOK STREET

JAMES CHADWICK BUILDING

BOOTH STREET EAST

GAS BOTTLE STORE

1No ROW OF CONCRETE BLOCK PAVING TO Q25/321J SEE DETAILED PAVING LAYOUTS

EXISTING GAS CABINET ON CONCRETE BASE TO BE RETAINED

CONTROL CABINET FOR "B3" BOLLARDS

DISABLED

DISABLED

DETAIL 3 90-60401

DETAIL 4 90-60401

DETAIL 5 90-60402

ONE 1MR Schwegler Avianex BIRD BOX ON EACH RETAINED EXISTING TREE AT MIN. 4m ABOVE GROUND. TOTAL: 2 BIRD BOXES AT THIS LOCATION

ONE 2M Schwegler Nest Box ON EACH RETAINED EXISTING TREE AT MIN. 4m ABOVE GROUND.

TOTAL: 3 BIRD BOXES AT THIS LOCATION

KEY

- MAIN WORKS BOUNDARY
- Cx "C1" FLUSH KERB TO Q10/112J "C2" FLUSH CHANNEL TO Q10/115J "C5" FLUSH KERB TO Q10/116J "C6" PAVING EDGE TO Q10/114J
- K2 "K2" UPSTAND KERB TO Q10/113J
- FB "FB" FEATURE BANDING TO Q25/330J
- ME "ME" METAL EDGE TO Q10/200J
- E1 "E1" METAL EDGE TO Q10/201J
- SE1 "SE1" NATURAL STONE EDGE TO Q10/121J
- SE2 "SE2" NATURAL STONE EDGE TO Q10/122J
- SE4 "SE4" NATURAL STONE EDGE TO Q10/124J
- SE5 "SE5" NATURAL STONE EDGE TO Q10/125J
- BLOCK PAVING TO Q25/315J
- BLOCK PAVING Q25/316J
- BLOCK PAVING TO PARKING BAYS Q25/317J
- SETT PAVING TO Q25/318J
- SETT PAVING TO Q25/321J
- SETT PAVING TO Q25/322J
- SETT PAVING TO Q25/330J
- TARMAC SURFACE TO ENGINEERS SPEC
- RESIN BOUND GRAVEL PATH TO Q23/225J
- GRAVEL TRIM TO ESCAPE TOWER TO Q23/160J
- SETT PAVING LAID AS TRIM TO Q25/319J
- Gx PROPOSED GATE TO Q40/562J
- SD LINEAR SLOT DRAIN TO ENGINEERS SPEC
- MJ MOVEMENT JOINT TO ENGINEERS SPEC
- CS PROPOSED CYCLE STANDS TO Q50/210J
- PROPOSED CYCLE SHELTER TO Q50/320J
- Bx "B1" STATIC BOLLARD TO Q50/190 "B2" REMOVABLE BOLLARD TO Q50/196 "B3" AUTOMATIC BOLLARD TO Q50/197J
- BA BAC BARRIER ARM AND CONTROL POST TO Q50/193J
- TC TRAFFIC CONTROL POST TO Q50/195J
- DA DOOR ACCESS CONTROL TO Q50/198J
- DG DOOR GUARD TO Q50/213J
- LB WASTE RECYCLE BIN TO Q50/240
- VB VEHICLE BARRIER TO Q50/192J
- TG TREE GRILLE TO Q50/262J
- CTS CIRCULAR TREE SURROUND TO Q50/263J
- LC LIGHTING COLUMN TO ENGINEERS DETAILS
- BL• BOLLARD LIGHTING TO ENGINEERS DETAILS
- PROPOSED TREE TO Q31
- EXISTING TREE RETAINED
- PROPOSED GRASS TURF TO Q30
- PROPOSED BULB PLANTING TO Q31
- PROPOSED SHRUB PLANTING TO Q31
- MH EXISTING MANHOLE TO BE RETAINED, REFER TO ENGINEERS INFORMATION. ACCESS COVER TO BE REPLACED WITH RECESSED TO REQUIRED LOADING CATEGORY
- LP. GU IC/Tel EXISTING EXTERNAL ELEMENTS REFER TO TOPO SURVEY

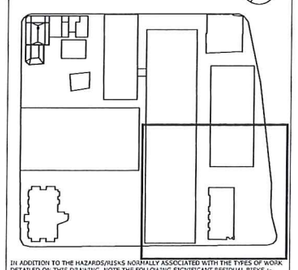
NOTES:
TO BE READ IN CONJUNCTION WITH MAIN WORKS DRAWINGS:
5983-BDP-MECD-EXG-DR-AL-90-10201 - 10203 - GENERAL ARRANGEMENTS
5983-BDP-MECD-EXG-DR-AL-90-10211 - 10213 - PROPOSED LEVELS PLANS
5983-BDP-MECD-EXG-DR-AL-93-60401 - 10402 - DETAIL AREAS
5983-BDP-MECD-EXG-DR-AL-90-60701 - CONSTRUCTION DETAILS SHEET 1 OF 2
5983-BDP-MECD-EXG-DR-AL-90-60702 - CONSTRUCTION DETAILS SHEET 2 OF 2
5983-BDP-MECD-EXG-DR-AL-90-60703 - "G3 & G4" GATE DETAILS
5983-BDP-MECD-EXG-DR-AL-90-60704 - "G5" GATE DETAILS
5983-BDP-MECD-EXG-DR-AL-90-60705 - TREE GRILLE DETAILS
5983-BDP-MECD-EXG-DR-AL-90-60706 - TYPICAL SEAT WALL DETAILS
5983-BDP-MECD-EXG-DR-AL-90-60707 - "P2" PLANTER DETAILS
5983-BDP-MECD-EXG-DR-AL-93-10201 - 10203 PLANTING PLANS
5983-BDP-MECD-EXG-DR-AL-93-60101 - PLANTING DETAILS
5983-BDP-MECD-EXG-SP-AL-93-90901 - LANDSCAPE SPECIFICATION

ALL EXISTING AND PROPOSED MANHOLE COVERS WITHIN PAVED AREAS TO BE RECESSED COVER TYPES AND ALIGNED WITH PAVING.

TO BE READ IN CONJUNCTION WITH ARUP DRAINAGE AND LIGHTING DRAWINGS

MOVEMENT AND ISOLATION JOINTS WILL BE REQUIRED WITHIN PAVING. LOCATION, EXTENT AND DETAILS TO REFER TO 5983-ARP-MECD-EXG-SI-C-00-2X056. MOVEMENT JOINTS WITHIN EVENT SQUARE TO BE CONFIRMED.

Keyplan: North:



IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS :-

All Relevant hazards are indicated on this drawing sheet. Hazards are described in greater detail on the BDP Hazard Risk Register — Per Hazard Risk Register

Item	Hazard	Risk

Rev	Description	By	Date	Chk'd	Auth
C10	DOOR ACCESS TO UBS ADDED	NMS	02.06.2020	NMS	JRM
C09	LINEWORK UPDATED TO REFLECT UPDATE OF MOVEMENT JOINTS	LMJ	14.02.2020	NMS	JRM
C08	CONTRACTION JOINTS ADDED TO RUMFORD STREET. ADDITIONAL BANDING ADDED - C6	NMS	18.11.19	NMS	JRM
C07	AUTOMATIC BOLLARD CONTROL BOX LOCATION UPDATED	NMS	30.08.19	NMS	JRM
C06	C1 REVISED TO C2 TO RUMFORD ST. HATCHES TO Q25/315J AND 317J AMENDED PAVING TRIM ADDED TO MSC HALL BOUNDARY ADDITIONAL BOLLARD ADDED TO REPLACE DOORGUARD	NMS	14.03.19	NMS	JRM
C05	DISABLED PARKING BAYS TO BOOTH ST EAST ADJUSTED TO 2.7m x 6.6m WIDE.	NMS	14.03.19	NMS	JRM
C04	C7 REVISED TO C1 AS PER DETAILS. PROPOSED MH LOCATIONS UPDATED.	IF	08.02.19	NMS	JRM

MANCHESTER 1824

Directorate of Estates and Facilities
Beyer Building
The University of Manchester
Oxford Road
Manchester
M13 9PL

BDP. 1 North Bank, Sheffield, S3 8JY
Tel. 0114 273 1641
www.bdp.com, sheffield@bdp.com

Drawing Status: For Construction

Project: Manchester Engineering Campus Development
5983

Building Name: -

Sub Site Name: -

Site Name: MECD

Drawing Title:
MAIN WORKS
LANDSCAPE GENERAL ARRANGEMENT
SHEET 2 OF 3

PM	Drawn	Checked	Authorised
-	IF	YZ	JRM
Scale	Date	Date	Date
1:200	10.01.17	10.01.17	10.01.17

Drawing No.: 5983-BDP-MECD-EXG-DR-AL-90-10202

Revision: C10

GROSVENOR STREET

GROSVENOR STREET

TOPSOIL SAMPLES
SOCOTEC
18.2.21

ODDFELLOWS HALL

CONTROL CABINET FOR "B3" BOLLARDS.

3No ROWS OF CONCRETE BLOCK PAVING TO Q25/321J LAID WITH STAGGERED BOND

FOR DETAILS OF STEPS REFER TO ARCHITECTS DETAILS

FOR DETAILS OF STEPS AND RAMP REFER TO ARCHITECTS DETAILS

BOLLARDS IN ABEYANCE

SERVICES INCASED IN TRENCH LEVEL FFL - 480mm

DETAIL 1
90-60401

DETAIL 2
90-60401

UPPER BROOK STREET

3No ROWS OF CONCRETE BLOCK PAVING TO Q25/321J LAID WITH STAGGERED BOND

1No ROW OF CONCRETE BLOCK PAVING TO Q25/321J SEE DETAILED PAVING LAYOUTS

LINE OF EXISTING SOLDIER COURSE EXTENT OF EXISTING PAVING TO BE RETAINED TO SIDE OF AQUATICS CENTER

3No ROWS OF CONCRETE BLOCK PAVING TO Q25/321J LAID WITH STAGGERED BOND

7-HP6

7-HP5

7-HP4

7-HP3

FOR CONTINUATION SEE: 5983-BDP-MECD-EXG-DR-AL-90-10203

FOR CONTINUATION SEE: 5983-BDP-MECD-EXG-DR-AL-90-10202

KEY

- MAIN WORKS BOUNDARY
- Cx "C1" FLUSH KERB TO Q10/112J; "C2" FLUSH CHANNEL TO Q10/115J; "C5" FLUSH KERB TO Q10/116J; "C6" PAVING EDGE TO Q10/114J
- K2 "K2" UPSTAND KERB TO Q10/113J
- FB "FB" FEATURE BANDING TO Q25/330J
- ME "ME" METAL EDGE TO Q10/200J
- E1 "E1" METAL EDGE TO Q10/201J
- SE1 "SE1" NATURAL STONE EDGE TO Q10/121J
- SE2 "SE2" NATURAL STONE EDGE TO Q10/122J
- SE4 "SE4" NATURAL STONE EDGE TO Q10/124J
- SE5 "SE5" NATURAL STONE EDGE TO Q10/125J
- BLOCK PAVING TO Q25/315J
- BLOCK PAVING Q25/316J
- BLOCK PAVING TO PARKING BAYS Q25/317J
- SETT PAVING TO Q25/318J
- SETT PAVING TO Q25/321J
- SETT PAVING TO Q25/322J
- SETT PAVING TO Q25/330J
- TARMAC SURFACE TO ENGINEERS SPEC
- RESIN BOUND GRAVEL PATH TO Q23/225J
- GRAVEL TRIM TO ESCAPE TOWER TO Q23/160J
- SETT PAVING LAID AS TRIM TO Q25/319J
- Gx PROPOSED GATE TO Q40/562J
- SD LINEAR SLOT DRAIN TO ENGINEERS SPEC
- MJ MOVEMENT JOINT TO ENGINEERS SPEC
- CS PROPOSED CYCLE STANDS TO Q50/210J
- PROPOSED CYCLE SHELTER TO Q50/320J
- Bx "B1" STATIC BOLLARD TO Q50/190; "B2" REMOVABLE BOLLARD TO Q50/196; "B3" AUTOMATIC BOLLARD TO Q50/197J
- BA BAC BARRIER ARM AND CONTROL POST TO Q50/193J
- TC TRAFFIC CONTROL POST TO Q50/195J
- DA DOOR ACCESS CONTROL TO Q50/198J
- DG DOOR GUARD TO Q50/213J
- LB WASTE RECYCLE BIN TO Q50/240
- VB VEHICLE BARRIER TO Q50/192J
- TG TREE GRILLE TO Q50/262J
- CTS CIRCULAR TREE SURROUND TO Q50/263J
- LC LIGHTING COLUMN TO ENGINEERS DETAILS
- BL BOLLARD LIGHTING TO ENGINEERS DETAILS
- PROPOSED TREE TO Q31
- EXISTING TREE RETAINED
- PROPOSED GRASS TURF TO Q30
- PROPOSED BULB PLANTING TO Q31
- PROPOSED SHRUB PLANTING TO Q31
- MH EXISTING MANHOLE TO BE RETAINED, REFER TO ENGINEERS INFORMATION. ACCESS COVER TO BE REPLACED WITH RECESSED TO REQUIRED LOADING CATEGORY
- LP GU IC/Tel EXISTING EXTERNAL ELEMENTS REFER TO TOPO SURVEY

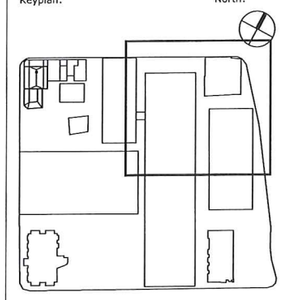
NOTES:
TO BE READ IN CONJUNCTION WITH MAIN WORKS DRAWINGS:
5983-BDP-MECD-EXG-DR-AL-90-10201 - 10203 - GENERAL ARRANGEMENTS
5983-BDP-MECD-EXG-DR-AL-90-10211 - 10213 - PROPOSED LEVELS PLANS
5983-BDP-MECD-EXG-DR-AL-90-60401 - 10402 - DETAIL AREAS
5983-BDP-MECD-EXG-DR-AL-90-60701 - CONSTRUCTION DETAILS SHEET 1 OF 2
5983-BDP-MECD-EXG-DR-AL-90-60702 - CONSTRUCTION DETAILS SHEET 2 OF 2
5983-BDP-MECD-EXG-DR-AL-90-60703 - "G3 & G4" GATE DETAILS
5983-BDP-MECD-EXG-DR-AL-90-60704 - "G5" GATE DETAILS
5983-BDP-MECD-EXG-DR-AL-90-60705 - TREE GRILLE DETAILS
5983-BDP-MECD-EXG-DR-AL-90-60706 - TYPICAL SEAT WALL DETAILS
5983-BDP-MECD-EXG-DR-AL-90-60707 - "P2" PLANTER DETAILS
5983-BDP-MECD-EXG-DR-AL-93-10301 - 10303 PLANTING PLANS
5983-BDP-MECD-EXG-DR-AL-93-60701 - PLANTING DETAILS
5983-BDP-MECD-EXG-SP-AL-93-90001 - LANDSCAPE SPECIFICATION

ALL EXISTING AND PROPOSED MANHOLE COVERS WITHIN PAVED AREAS TO BE RECESSED COVER TYPES AND ALIGNED WITH PAVING.

TO BE READ IN CONJUNCTION WITH ARUP DRAINAGE AND LIGHTING DRAWINGS

MOVEMENT AND ISOLATION JOINTS WILL BE REQUIRED WITHIN PAVING. LOCATION, EXTENT AND DETAILS TO REFER TO 5983-ARP-MECD-EXG-SI-C-60-2X056 MOVEMENT JOINTS WITHIN EVENT SQUARE TO BE CONFIRMED.

Keyplan: North:



IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS :-

All Relevant hazards are indicated on this drawing sheet. Hazards are described in greater detail on the BDP Hazard Risk Register — Per Hazard Risk Register

Item	Hazard	Risk

Rev	Description	By	Date	Chk'd	Auth
C11	BOLLARDS ALONGSIDE ODDFELLOWS HALL ADDED, SLOT DRAIN AMENDED. DOOR ACCESS POSTS TO UBS.	NMS	02.06.20	NMS	JRM
C10	DOOR ACCESS POSTS AMENDED.	IF	18.05.20	NMS	JRM
C09	GATES UPDATED IN LINE WITH FIRE CONSULTANTS COMMENTS CHANNELS AMENDED TO SIT IN LINE WITH NEW GATE POST POSITIONS	NMS	20.04.03	NMS	JRM
C08	ODDFELLOWS EVENT SPACE : ADDITIONAL CHANNELS IN LINE WITH MOVEMENT JOINTS. GATE POSITIONS UPDATED IN LINE WITH AGREED CHANGES.	LMJ	20.02.14	NMS	JRM
C07	CONTRACTION JOINTS ADDED TO RUMFORD STREET. ADDITIONAL BANDING ADDED - C8	NMS	18.11.19	NMS	JRM
C06	AUTOMATIC BOLLARD CONTROL BOX LOCATION UPDATED	NMS	30.08.19	NMS	JRM

MANCHESTER 1824

Directorate of Estates and Facilities
Beyer Building
The University of Manchester
Oxford Road
Manchester
M13 9PL

BDP.
1 North Bank, Sheffield, S3 8JY
Tel. 0114 273 1641
www.bdp.com, sheffield@bdp.com

Drawing Status: For Construction

Project: Manchester Engineering Campus Development
5983

Building Name: -

Sub Site Name: -

Site Name: MECD

Drawing Title: MAIN WORKS
LANDSCAPE GENERAL ARRANGEMENT
SHEET 1 OF 3

PM	Drawn	Checked	Authorised
-	IF	YZ	JRM
Scale	Date	Date	Date
1:200	10.01.17	10.01.17	10.01.17

Drawing No.: 5983-BDP-MECD-EXG-DR-AL-90-10201

Revision: C11

Topsoil Samples Socotec 18.2.21

YORK STREET

NOTES:
DOOR GUARDS/DOOR BOLLARDS ARE PLACED OUTSIDE SITE BOUNDARY, NOT INDICATED ON THIS DRAWING.

3No ROWS OF CONCRETE BLOCK PAVING TO Q25/321J LAID WITH STAGGERED BOND

LINE OF EXISTING SOLDIER COURSE EXTENT OF EXISTING PAVING TO BE RETAINED TO SIDE OF AQUATICS CENTER

DETAIL 7 90-60402

DETAIL 6 90-60402

DETAIL 8 90-60402

LIGHTING COLUMN TO BE INSTALLED AS PART OF ADVANCED WORKS

LIGHTING COLUMN TO BE INSTALLED AS PART OF ADVANCED WORKS

LINE OF EXISTING SOLDIER COURSE EXTENT OF EXISTING PAVING TO BE RETAINED TO REAR OF AQUATICS CENTER

FOR CONTINUATION SEE: 5983-BDP-MECD-EXG-DR-AL-90-10201

FOR CONTINUATION SEE: 5983-BDP-MECD-EXG-DR-AL-90-10202

11/12-HP1

11/12-HP2

11/12-HP3

11/12-HP4

11/12-HP5

11/12-HP6

11/12-HP7

KEY

- MAIN WORKS BOUNDARY
- "C1" FLUSH KERB TO Q10/112J
- "C2" FLUSH CHANNEL TO Q10/115J
- "C5" FLUSH KERB TO Q10/116J
- "C6" PAVING EDGE TO Q10/114J
- "K2" UPSTAND KERB TO Q10/113J
- "FB" FEATURE BANDING TO Q25/330J
- "ME" METAL EDGE TO Q10/200J
- "E1" METAL EDGE TO Q10/201J
- "SE1" NATURAL STONE EDGE TO Q10/121J
- "SE2" NATURAL STONE EDGE TO Q10/122J
- "SE4" NATURAL STONE EDGE TO Q10/124J
- "SE5" NATURAL STONE EDGE TO Q10/125J
- BLOCK PAVING TO Q25/315J
- BLOCK PAVING Q25/316J
- BLOCK PAVING TO PARKING BAYS Q25/317J
- SETT PAVING TO Q25/318J
- SETT PAVING TO Q25/321J
- SETT PAVING TO Q25/322J
- SETT PAVING TO Q25/330J
- TARMAC SURFACE TO ENGINEERS SPEC
- RESIN BOUND GRAVEL PATH TO Q23/225J
- GRAVEL TRIM TO ESCAPE TOWER TO Q23/160J
- SETT PAVING LAID AS TRIM TO Q25/319J
- PROPOSED GATE TO Q40/562J
- LINEAR SLOT DRAIN TO ENGINEERS SPEC
- MOVEMENT JOINT TO ENGINEERS SPEC
- PROPOSED CYCLE STANDS TO Q50/210J
- PROPOSED CYCLE SHELTER TO Q50/320J
- "B1" STATIC BOLLARD TO Q50/190 "B2" REMOVABLE BOLLARD TO Q50/196 "B3" AUTOMATIC BOLLARD TO Q50/197J
- BARRIER ARM AND CONTROL POST TO Q50/193J
- TRAFFIC CONTROL POST TO Q50/195J
- DOOR ACCESS CONTROL TO Q50/198J
- DOOR GUARD TO Q50/213J
- WASTE RECYCLE BIN TO Q50/240
- VEHICLE BARRIER TO Q50/192J
- TREE GRILLE TO Q50/262J
- CIRCULAR TREE SURROUND TO Q50/263J
- LIGHTING COLUMN TO ENGINEERS DETAILS
- BOLLARD LIGHTING TO ENGINEERS DETAILS
- PROPOSED TREE TO Q31
- EXISTING TREE RETAINED
- PROPOSED GRASS TURF TO Q30
- PROPOSED BULB PLANTING TO Q31
- PROPOSED SHRUB PLANTING TO Q31
- EXISTING MANHOLE TO BE RETAINED, REFER TO ENGINEERS INFORMATION. ACCESS COVER TO BE REPLACED WITH RECESSED TO REQUIRED LOADING CATEGORY
- EXISTING EXTERNAL ELEMENTS REFER TO TOPO SURVEY

NOTES:
TO BE READ IN CONJUNCTION WITH MAIN WORKS DRAWINGS:
5983-BDP-MECD-EXG-DR-AL-90-10201 - 10203 - GENERAL ARRANGEMENTS
5983-BDP-MECD-EXG-DR-AL-90-10211 - 10213 - PROPOSED LEVELS PLANS
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5983-BDP-MECD-EXG-DR-AL-90-60703 - "G3 & G4" GATE DETAILS
5983-BDP-MECD-EXG-DR-AL-90-60704 - "G5" GATE DETAILS
5983-BDP-MECD-EXG-DR-AL-90-60705 - TREE GRILLE DETAILS
5983-BDP-MECD-EXG-DR-AL-90-60706 - TYPICAL SEAT WALL DETAILS
5983-BDP-MECD-EXG-DR-AL-90-60707 - "P2" PLANTER DETAILS
5983-BDP-MECD-EXG-DR-AL-93-10201 - 10203 PLANTING PLANS
5983-BDP-MECD-EXG-DR-AL-93-60701 - PLANTING DETAILS
5983-BDP-MECD-EXG-SP-AL-98-90901 - LANDSCAPE SPECIFICATION

ALL EXISTING AND PROPOSED MANHOLE COVERS WITHIN PAVED AREAS TO BE RECESSED COVER TYPES AND ALIGNED WITH PAVING.

TO BE READ IN CONJUNCTION WITH ARUP DRAINAGE AND LIGHTING DRAWINGS

MOVEMENT AND ISOLATION JOINTS WILL BE REQUIRED WITHIN PAVING. LOCATION, EXTENT AND DETAILS TO REFER TO 5983-ARP-MECD-EXG-SI-C-00-2X106. MOVEMENT JOINTS WITHIN EVENT SQUARE TO BE CONFIRMED.

Keyplan: North:

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS :-

All: Relevant hazards are indicated on this drawing sheet. Hazards are described in greater detail on the BDP Hazard Risk Register — CDM 07 — Per Hazard Risk Register

Item	Hazard	Risk

Rev	Description	By	Date	Chk'd	Auth
C08	DOOR ACCESS POST ADDED TO YORK STREET BUILDING.	IF	18.05.20	NMS	JRM
C07	AREA TO AQUATICS COMPOUND UPDATED IN LINE WITH ARUP LINEWORK	NMS	20.04.08	NMS	JRM
C06	GATES UPDATED IN LINE WITH FIRE CONSULTANTS COMMENTS. CHANNELS AMENDED TO SIT IN LINE WITH NEW GATE POST POSITIONS	NMS	20.04.03	NMS	JRM
C05	LINEWORK UPDATED TO EMERGENCY ESCAPE STAIRS AND AQATICS CENTRE COMPOUND CEN CE05S GATE POSITIONS UPDATED IN LINE WITH AGREED CHANGES.	LMJ	20.02.14	NMS	JRM
C04	TRIM ADDED AGAINST MEC HALL. PROPOSED MH LOCATIONS UPDATED. C7 OMITTED.		08.02.19	NMS	JRM

MANCHESTER 1824 The University of Manchester

Directorate of Estates and Facilities
Beyer Building
The University of Manchester
Oxford Road
Manchester
M13 9PL

BDP. 1 North Bank, Sheffield, S3 8JY
Tel. 0114 273 1641
www.bdp.com, sheffield@bdp.com

Drawing Status: For Construction

Project: Manchester Engineering Campus Development
5983

Building Name: -

Sub Site Name: -

Site Name: MECD

Drawing Title: MAIN WORKS LANDSCAPE GENERAL ARRANGEMENT SHEET 3 OF 3

PM	Drawn	Checked	Authorised
-	IF	YZ	JRM
Scale	Date	Date	Date
1:200	10.01.17	10.01.17	10.01.17

Drawing No.: 5983-BDP-MECD-EXG-DR-AL-90-10203

Revision: C08

TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

MB Soils & Groundworks Ltd

Mr Mark Bennett
MB Soils & Groundworks Limited
46-52 Richmond Hill
Wigan
WN5 8AA

19th November 2020
Our Ref: TOHA/20/9733/SS/Rev.1
Your Ref: see below.

Dear Sirs

Topsoil Analysis Report: Miller Homes, Back Lane, Congleton

We have completed the analysis of the soil sample recently submitted, referenced *Miller Homes Topsoil,* and have pleasure reporting our findings.

The purpose of the analysis was to determine the suitability of the sample for general landscape purposes (trees, shrubs, amenity grass). In addition, the sample has been assessed to determine its compliance with the requirements of the British Standard for Topsoil *(BS3882:2015 – Specification for Topsoil - Table 1, Multipurpose Topsoil).*

This report presents the results of analysis for the sample submitted to our office, and it should be considered 'indicative' of the topsoil source. The report and results should therefore not be used by third parties as a means of verification testing, validation testing or waste designation purposes.

SAMPLE EXAMINATION

The sample was described as a very dark greyish brown (Munsell Colour 10YR 3/2), slightly moist, friable, non-calcareous SANDY SILT LOAM with a moderately developed, fine to medium granular and sub-angular blocky structure*. The sample was virtually stone-free and no unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

*This appraisal of soil structure was made from examination of a disturbed sample(s). Structure is a key soil characteristic that may only be accurately assessed by examination in an in-situ state.

ANALYTICAL SCHEDULE

The sample was submitted to a UKAS and MCERTS accredited laboratory for a range of physical and chemical tests to confirm the composition and fertility of the soil, and the concentration of selected potential contaminants. The following parameters were determined:

- particle size analysis (sand, silt, clay);
- stone content (2-20mm, 20-50mm, >50mm);
- pH and electrical conductivity values;
- exchangeable sodium percentage;
- major plant nutrients (N, P, K, Mg);
- organic matter content;
- C:N ratio;
- heavy metals (As, B, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn);
- total cyanide and total (mono) phenols;
- speciated PAHs (US EPA16 suite);
- aromatic and aliphatic TPH (C5-C35 banding);
- benzene, toluene, ethylbenzene, xylene (BTEX);
- asbestos screen.

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

RESULTS OF ANALYSIS

Particle Size Analysis and Stone Content

The sample fell into the *sandy silt loam* texture class, which is usually considered suitable for general landscape applications provided the soil's physical condition is satisfactory.

Such soils usually have good water and nutrient retention capacities, but they are also prone to structural degradation and compaction during handling, and especially when plastic in consistency. Any damage to the structural condition of this soil is likely to reduce its drainage and aeration properties.

The sample was virtually stone-free and as such, stones should not restrict the use of the soil for general landscape purposes.

pH and Electrical Conductivity Values

The sample was slightly acid in reaction (pH 6.9), with a pH value that would be considered ideal for general landscape purposes.

The electrical conductivity (salinity) value (water extract) was low, which indicates that soluble salts should not be present at levels that would be harmful to plants.

The electrical conductivity value by $CaSO_4$ extract (*BS3882* requirement) fell below the maximum specified value (3300 µS/cm) given in *BS3882:2015 – Table 1*.

Organic Matter and Fertility Status

The sample was adequately supplied with organic matter and all major plant nutrients.

The C:N ratio of the sample was acceptable for general landscape purposes.

Potential Contaminants

With reference to *BS3882:2015 - Table 1*: Notes 3 and 4, there is a recommendation to confirm levels of potential contaminants in relation to the topsoil's proposed end use. This includes human health, environmental protection and metals considered toxic to plants. In the absence of site-specific assessment criteria, the concentrations that affect human health have been compared with the *residential with home-grown produce* land use in the Suitable For Use Levels (S4ULs) presented in *The LQM/CIEH S4ULs for Human Health Risk Assessment* (2015) and the DEFRA SP1010: *Development of Category 4 Screening Levels* (C4SLs) *for Assessment of Land Affected by Contamination – Policy Companion Document* (2014).

Of the potential contaminants determined, none was found at levels that exceeded their guideline values.

MB Soils & Groundworks Ltd

Phytotoxic Contaminants

Of the phytotoxic (toxic to plants) contaminants determined (copper, nickel, zinc), none was found at levels that exceeded the maximum permissible levels specified in *BS3882:2015 – Table 1*.

CONCLUSION

The purpose of the analysis was to determine the suitability of the topsoil sample for general landscape purposes. The analysis has also been undertaken to determine the sample's compliance with the requirements of the British Standard for Topsoil *(BS3882:2015 – Specification for Topsoil - Table 1, Multipurpose Topsoil).*

From the soil examination and subsequent laboratory analysis, the sample was described as a slightly acid, non-saline, non-calcareous sandy silt loam with a moderately developed structure and low stone content. The sample was adequately supplied with organic matter and all major plant nutrients. Of the potential contaminants determined, none exceeded their respective guideline values.

Based on our findings, the topsoil represented by this sample would be considered suitable for general landscape purposes (trees, shrubs, amenity grass), provided the soil's physical condition is satisfactory.

The sample was also fully compliant with the requirements of the British Standard for Topsoil (*BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil*).

RECOMMENDATIONS

Soil Handling Recommendations

It is important to maintain the physical condition of the soil and avoid structural damage during all phases of soil handling (e.g. stockpiling, respreading, cultivating, planting, seeding or turfing). As a consequence, soil handling operations should be carried out when soil is reasonably dry and non-plastic (friable) in consistency.

It is important to ensure that the soil is not unnecessarily compacted by trampling or trafficking by site machinery, and soil handling should be stopped during and after heavy rainfall and not continued until the soil is friable in consistency. If the soil is structurally damaged and compacted at any stage during the course of soiling or landscaping works, it should be cultivated appropriately to relieve the compaction and to restore the soil's structure prior to any planting, turfing or seeding.

Further details on soil handling are provided in Annex A of *BS3882:2015.*

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if we can be of further assistance.

Yours faithfully

Aaron Cross
BSc MSc
Soil Scientist

Laura Hathaway-Jenkins
BSc MSc EngD MISoilSci CSci
Senior Associate

For & on behalf of Tim O'Hare Associates LLP

MB Soils & Groundworks Ltd

TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Client:	**MB Soils & Groundworks Ltd**
Project	**Miller Homes, Back Lane, Congleton**
Job:	**Topsoil Analysis - BS3882:2015**
Date:	**19/11/2020**
Job Ref No:	**TOHA/20/9733/SS/Rev.1**

Sample Reference			**Miller Homes Topsoil**
		Accreditation	
Clay (<0.002mm)	%	UKAS	18
Silt (0.002-0.063mm)	%	UKAS	47
Sand (0.063-2.0mm)	%	UKAS	35
Texture Class (UK Classification)	--	UKAS	SZL
Stones (2-20mm)	% DW	GLP	1
Stones (20-50mm)	% DW	GLP	1
Stones (>50mm)	% DW	GLP	0
pH Value (1:2.5 water extract)	units	UKAS	6.9
Electrical Conductivity (1:2.5 water extract)	uS/cm	UKAS	112
Electrical Conductivity (1:2 $CaSO_4$ extract)	uS/cm	UKAS	2054
Exchangeable Sodium Percentage	%	UKAS	0.5
Organic Matter (LOI)	%	UKAS	6.3
Total Nitrogen (Dumas)	%	UKAS	0.28
C : N Ratio	ratio	UKAS	13
Extractable Phosphorus	mg/l	UKAS	26
Extractable Potassium	mg/l	UKAS	158
Extractable Magnesium	mg/l	UKAS	88
Total Arsenic (As)	mg/kg	MCERTS	5
Total Cadmium (Cd)	mg/kg	MCERTS	0.2
Total Chromium (Cr)	mg/kg	MCERTS	8
Hexavalent Chromium (Cr VI)	mg/kg	MCERTS	< 4.0
Total Copper (Cu)	mg/kg	MCERTS	21
Total Lead (Pb)	mg/kg	MCERTS	37
Total Mercury (Hg)	mg/kg	MCERTS	< 0.3
Total Nickel (Ni)	mg/kg	MCERTS	7
Total Selenium (Se)	mg/kg	MCERTS	< 1.0
Total Zinc (Zn)	mg/kg	MCERTS	31
Water Soluble Boron (B)	mg/kg	MCERTS	0.4
Total Cyanide (CN)	mg/kg	MCERTS	< 1
Total (mono) Phenols	mg/kg	MCERTS	< 1
Naphthalene	mg/kg	MCERTS	< 0.05
Acenaphthylene	mg/kg	MCERTS	< 0.05
Acenaphthene	mg/kg	MCERTS	< 0.05
Fluorene	mg/kg	MCERTS	< 0.05
Phenanthrene	mg/kg	MCERTS	< 0.05
Anthracene	mg/kg	MCERTS	< 0.05
Fluoranthene	mg/kg	MCERTS	< 0.05
Pyrene	mg/kg	MCERTS	< 0.05
Benz(a)anthracene	mg/kg	MCERTS	< 0.05
Chrysene	mg/kg	MCERTS	< 0.05
Benzo(b)fluoranthene	mg/kg	MCERTS	< 0.05
Benzo(k)fluoranthene	mg/kg	MCERTS	< 0.05
Benzo(a)pyrene	mg/kg	MCERTS	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	MCERTS	< 0.05
Dibenzo(a,h)anthracene	mg/kg	MCERTS	< 0.05
Benzo(g,h,i)perylene	mg/kg	MCERTS	< 0.05
Total PAHs (sum USEPA16)	mg/kg	MCERTS	< 0.8
Aliphatic TPH >C5 - C6	mg/kg	MCERTS	< 0.001
Aliphatic TPH >C6 - C8	mg/kg	MCERTS	< 0.001
Aliphatic TPH >C8 - C10	mg/kg	MCERTS	< 0.001
Aliphatic TPH >C10 - C12	mg/kg	MCERTS	< 1.0
Aliphatic TPH >C12 - C16	mg/kg	MCERTS	< 2.0
Aliphatic TPH >C16 - C21	mg/kg	MCERTS	< 8.0
Aliphatic TPH >C21 - C35	mg/kg	MCERTS	< 8.0
Aliphatic TPH (C5 - C35)	mg/kg	MCERTS	< 10
Aromatic TPH >C5 - C7	mg/kg	MCERTS	< 0.001
Aromatic TPH >C7 - C8	mg/kg	MCERTS	< 0.001
Aromatic TPH >C8 - C10	mg/kg	MCERTS	< 0.001
Aromatic TPH >C10 - C12	mg/kg	MCERTS	< 1.0
Aromatic TPH >C12 - C16	mg/kg	MCERTS	< 2.0
Aromatic TPH >C16 - C21	mg/kg	MCERTS	< 10
Aromatic TPH >C21 - C35	mg/kg	MCERTS	< 10
Aromatic TPH (C5 - C35)	mg/kg	MCERTS	< 10
Benzene	mg/kg	MCERTS	< 0.001
Toluene	mg/kg	MCERTS	< 0.001
Ethylbenzene	mg/kg	MCERTS	< 0.001
p & m-xylene	mg/kg	MCERTS	< 0.001
o-xylene	mg/kg	MCERTS	< 0.001
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	MCERTS	< 0.001
Asbestos	--	ISO 17025	Not-detected

SZL = SANDY SILT LOAM

Visual Examination

The sample was described as a very dark greyish brown (Munsell Colour 10YR 3/2), slightly moist, friable, non-calcareous SANDY SILT LOAM with a moderately developed, fine to medium granular and sub-angular blocky structure. The sample was virtually stone-free and no unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

Aaron Cross
BSc MSc
Soil Scientist

Results of analysis should be read in conjunction with the report they were issued with

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MB Soils & Groundworks Ltd

Environmental Chemistry
SOCOTEC UK
Ashby Rd, Bretby,
Burton-on-Trent, UK
DE15 0YZ

Certificate of Analysis

Project No: 21021435

Client: SOCOTEC Consultancy North

Quote Number: BEC210216158

Project Reference: NOR1013

Site Name: MECD Topsoil Test

Contact: Chris Evans

Address: SOCOTEC Central
Leofric Business Park
Progress Close
Coventry

Post Code: CV3 2TF

E-Mail: Chris.Evans@socotec.com

Phone No: 01244 980 010

Number of Samples Received: 13

Date Received: 19/02/2021

Analysis Date: 01/03/2021

Date Issued: 02/03/2021

Job Status: Complete

Report Type: Final Version 01

This report supersedes any versions previously issued by the laboratory

Account Manager

Emily Jones

Authorised by the Operations Manager
Becky Batham

Client: SOCOTEC Consultancy North

Project Name: MECD Topsoil Test

Project No: 21021435

Date Issued: 02/03/2021

Samples Analysed

Sample Reference	Text ID	Sample Date	Sample Type
7-HP1-0-ES-0.00-0.20	21021435-001	18/02/2021 00:00:00	SOLID
7-HP2-0-ES-0.00-0.20	21021435-002	18/02/2021 00:00:00	SOLID
7-HP3-0-ES-0.00-0.20	21021435-003	18/02/2021 00:00:00	SOLID
7-HP4-0-ES-0.00-0.20	21021435-004	18/02/2021 00:00:00	SOLID
7-HP5-0-ES-0.00-0.20	21021435-005	18/02/2021 00:00:00	SOLID
7-HP6-0-ES-0.00-0.20	21021435-006	18/02/2021 00:00:00	SOLID
11/12-HP1-0-ES-0.00-0.20	21021435-007	18/02/2021 00:00:00	SOLID
11/12-HP2-0-ES-0.00-0.20	21021435-008	18/02/2021 00:00:00	SOLID
11/12-HP3-0-ES-0.00-0.20	21021435-009	18/02/2021 00:00:00	SOLID
11/12-HP4-0-ES-0.00-0.20	21021435-010	18/02/2021 00:00:00	SOLID
11/12-HP5-0-ES-0.00-0.20	21021435-011	18/02/2021 00:00:00	SOLID
11/12-HP6-0-ES-0.00-0.20	21021435-012	18/02/2021 00:00:00	SOLID
11/12-HP7-0-ES-0.00-0.20	21021435-013	18/02/2021 00:00:00	SOLID

Client: SOCOTEC Consultancy North

Project Name: MECD Topsoil Test

Project No: 21021435

Date Issued: 02/03/2021

Analysis Results

				Project ID	21021435				
				Sample ID	001	002	003	004	005
				Customer ID	7-HP1-0-ES-0.00-0.20	7-HP2-0-ES-0.00-0.20	7-HP3-0-ES-0.00-0.20	7-HP4-0-ES-0.00-0.20	7-HP5-0-ES-0.00-0.20
				Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
				Sampling Date	18/02/2021	18/02/2021	18/02/2021	18/02/2021	18/02/2021
Analysis	Method Code	MDL	Units	Accred					
>C6-C7 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.277	<0.268	<0.277	<0.280	<0.271
>C7-C8 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.277	<0.268	<0.277	<0.280	<0.271
>C7-C8 Aromatic	GROHSA/BTEXHSA	0.01	mg/kg^	UM	<0.014	0.027	0.062	<0.014	0.022
>C8-C10 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.277	<0.268	<0.277	<0.280	<0.271
>C8-C10 Aromatic	GROHSA/BTEXHSA	0.04	mg/kg^	UM	<0.056	<0.054	<0.056	<0.056	<0.055
C5-C6 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.277	<0.268	<0.277	<0.280	<0.271
C5-C7 Aromatic	GROHSA/BTEXHSA	0.01	mg/kg^	UM	<0.014	<0.013	<0.014	<0.014	<0.014
Total GRO C5-C10	GROHSA/BTEXHSA	0.2	mg/kg^	N	<0.277	<0.268	<0.277	<0.280	<0.271
Total Cyanide	SFAPI	0.5	mg/kg^	UM	<0.7	<0.7	<0.7	<0.7	<0.7
Arsenic as As	ICPMSS	0.3	mg/kg^	UM	6.2	6.5	15.4	15.2	13.0
Cadmium as Cd	ICPMSS	0.2	mg/kg^	UM	<0.2	<0.2	<0.2	<0.2	<0.2
Copper as Cu	ICPMSS	1.6	mg/kg^	UM	29.2	27.2	66.5	65.0	62.6
Lead as Pb	ICPMSS	0.7	mg/kg^	UM	54.6	49.4	68.1	65.2	60.2
Mercury as Hg	ICPMSS	0.5	mg/kg^	UM	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel as Ni	ICPMSS	2	mg/kg^	UM	11.1	11.5	20.1	19.3	17.0
Selenium as Se	ICPMSS	0.5	mg/kg^	UM	<0.5	<0.5	<0.5	<0.5	<0.5
Total Chromium as Cr	ICPMSS	1.2	mg/kg^	UM	13.6	13.5	21.6	24.0	19.0
Zinc as Zn	ICPMSS	16	mg/kg^	UM	69.3	58.8	93.4	86.2	86.6
Benzene	BTEXHSA	10	µg/kg^	UM	<14	<13	<14	<14	<14
Ethylbenzene	BTEXHSA	10	µg/kg^	UM	<14	<13	<14	<14	<14
m/p-Xylene	BTEXHSA	20	µg/kg^	UM	<28	<27	<28	<28	<27
o-Xylene	BTEXHSA	10	µg/kg^	UM	<14	<13	<14	<14	<14
Toluene	BTEXHSA	10	µg/kg^	UM	<14	27	62	<14	22
Acenaphthene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.11	<0.11	<0.11	<0.11

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Client: SOCOTEC Consultancy North

Project Name: MECD Topsoil Test

Project No: 21021435

Date Issued: 02/03/2021

Analysis Results

				Project ID	21021435					
				Sample ID	006	007	008	009	010
				Customer ID	7-HP6-0-ES-0.00-0.20	11/12-HP1-0-ES-0.00-0.20	11/12-HP2-0-ES-0.00-0.20	11/12-HP3-0-ES-0.00-0.20	11/12-HP4-0-ES-0.00-0.20
				Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
				Sampling Date	18/02/2021	18/02/2021	18/02/2021	18/02/2021	18/02/2021
Analysis	Method Code	MDL	Units	Accred					
>C6-C7 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.262	<0.256	<0.253	<0.307	<0.253
>C7-C8 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.262	<0.256	<0.253	<0.307	<0.253
>C7-C8 Aromatic	GROHSA/BTEXHSA	0.01	mg/kg^	UM	<0.013	<0.013	<0.013	<0.015	<0.013
>C8-C10 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.262	<0.256	<0.253	<0.307	<0.253
>C8-C10 Aromatic	GROHSA/BTEXHSA	0.04	mg/kg^	UM	<0.053	<0.052	<0.051	<0.061	<0.051
C5-C6 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.262	<0.256	<0.253	<0.307	<0.253
C5-C7 Aromatic	GROHSA/BTEXHSA	0.01	mg/kg^	UM	<0.013	<0.013	<0.013	<0.015	<0.013
Total GRO C5-C10	GROHSA/BTEXHSA	0.2	mg/kg^	N	<0.262	<0.256	<0.253	<0.307	<0.253
Total Cyanide	SFAPI	0.5	mg/kg^	UM	<0.7	<0.6	<0.6	<0.8	<0.6
Arsenic as As	ICPMSS	0.3	mg/kg^	UM	15.1	15.7	16.9	4.4	16.0
Cadmium as Cd	ICPMSS	0.2	mg/kg^	UM	<0.2	<0.2	<0.2	<0.2	<0.2
Copper as Cu	ICPMSS	1.6	mg/kg^	UM	68.9	65.4	70.1	14.7	59.8
Lead as Pb	ICPMSS	0.7	mg/kg^	UM	60.2	57.2	59.9	25.6	63.3
Mercury as Hg	ICPMSS	0.5	mg/kg^	UM	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel as Ni	ICPMSS	2	mg/kg^	UM	19.9	19.8	21.4	9.3	20.4
Selenium as Se	ICPMSS	0.5	mg/kg^	UM	<0.5	<0.5	<0.5	<0.5	<0.5
Total Chromium as Cr	ICPMSS	1.2	mg/kg^	UM	23.0	22.9	24.9	10.7	21.7
Zinc as Zn	ICPMSS	16	mg/kg^	UM	80.6	76.2	90.1	38.1	82.5
Benzene	BTEXHSA	10	µg/kg^	UM	<13	<13	<13	<15	<13
Ethylbenzene	BTEXHSA	10	µg/kg^	UM	<13	<13	<13	<15	<13
m/p-Xylene	BTEXHSA	20	µg/kg^	UM	<26	<26	<25	<31	<25
o-Xylene	BTEXHSA	10	µg/kg^	UM	<13	<13	<13	<15	<13
Toluene	BTEXHSA	10	µg/kg^	UM	<13	<13	<13	<15	<13
Acenaphthene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.10	<0.10	<0.12	<0.10

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Client: SOCOTEC Consultancy North

Project Name: MECD Topsoil Test

Project No: 21021435

Date Issued: 02/03/2021

Analysis Results

				Project ID	21021435		
				Sample ID	011	012	013
				Customer ID	11/12-HP5-0-ES-0.00-0.20	11/12-HP6-0-ES-0.00-0.20	11/12-HP7-0-ES-0.00-0.20
				Sample Type	SOLID	SOLID	SOLID
				Sampling Date	18/02/2021	18/02/2021	18/02/2021
Analysis	Method Code	MDL	Units	Accred			
>C6-C7 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.258	<0.246	<0.242
>C7-C8 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.258	<0.246	<0.242
>C7-C8 Aromatic	GROHSA/BTEXHSA	0.01	mg/kg^	UM	<0.013	<0.012	<0.012
>C8-C10 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.258	<0.246	<0.242
>C8-C10 Aromatic	GROHSA/BTEXHSA	0.04	mg/kg^	UM	<0.052	<0.049	<0.048
C5-C6 Aliphatic	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.258	<0.246	<0.242
C5-C7 Aromatic	GROHSA/BTEXHSA	0.01	mg/kg^	UM	<0.013	<0.012	<0.012
Total GRO C5-C10	GROHSA/BTEXHSA	0.2	mg/kg^	N	<0.258	<0.246	<0.242
Total Cyanide	SFAPI	0.5	mg/kg^	UM	<0.6	<0.6	<0.6
Arsenic as As	ICPMSS	0.3	mg/kg^	UM	4.3	4.5	4.0
Cadmium as Cd	ICPMSS	0.2	mg/kg^	UM	<0.2	<0.2	<0.2
Copper as Cu	ICPMSS	1.6	mg/kg^	UM	15.6	16.9	19.1
Lead as Pb	ICPMSS	0.7	mg/kg^	UM	52.1	51.5	49.7
Mercury as Hg	ICPMSS	0.5	mg/kg^	UM	<0.5	<0.5	<0.5
Nickel as Ni	ICPMSS	2	mg/kg^	UM	5.3	6.3	6.4
Selenium as Se	ICPMSS	0.5	mg/kg^	UM	<0.5	<0.5	<0.5
Total Chromium as Cr	ICPMSS	1.2	mg/kg^	UM	6.6	7.5	8.7
Zinc as Zn	ICPMSS	16	mg/kg^	UM	37.3	54.6	47.2
Benzene	BTEXHSA	10	µg/kg^	UM	<13	<12	<12
Ethylbenzene	BTEXHSA	10	µg/kg^	UM	<13	<12	<12
m/p-Xylene	BTEXHSA	20	µg/kg^	UM	<26	<25	<24
o-Xylene	BTEXHSA	10	µg/kg^	UM	<13	<12	<12
Toluene	BTEXHSA	10	µg/kg^	UM	<13	<12	<12
Acenaphthene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10	<0.10

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Client: SOCOTEC Consultancy North

Project Name: MECD Topsoil Test

Project No: 21021435

Date Issued: 02/03/2021

Analysis Results

				Project ID	21021435				
				Sample ID	001	002	003	004	005
				Customer ID	7-HP1-0-ES-0.00-0.20	7-HP2-0-ES-0.00-0.20	7-HP3-0-ES-0.00-0.20	7-HP4-0-ES-0.00-0.20	7-HP5-0-ES-0.00-0.20
				Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
				Sampling Date	18/02/2021	18/02/2021	18/02/2021	18/02/2021	18/02/2021
Analysis	Method Code	MDL	Units	Accred					
Acenaphthylene	PAHMSUS	0.08	mg/kg^	U	<0.11	<0.11	<0.11	<0.11	<0.11
Anthracene	PAHMSUS	0.08	mg/kg^	U	<0.11	<0.11	<0.11	<0.11	<0.11
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg^	UM	0.14	0.13	0.20	<0.11	<0.11
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg^	UM	0.15	0.12	0.18	<0.11	<0.11
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg^	UM	0.18	0.16	0.22	0.13	<0.11
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.11	<0.11	<0.11	<0.11
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.11	<0.11	<0.11	<0.11
Chrysene	PAHMSUS	0.08	mg/kg^	UM	0.13	0.12	0.20	<0.11	<0.11
Dibenzo[a,h]anthracene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.11	<0.11	<0.11	<0.11
Fluoranthene	PAHMSUS	0.08	mg/kg^	UM	0.18	0.18	0.40	0.16	<0.11
Fluorene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.11	<0.11	<0.11	<0.11
Indeno[1,2,3-cd]pyrene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.11	0.12	<0.11	<0.11
Naphthalene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.11	<0.11	<0.11	<0.11
Phenanthrene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.11	0.35	<0.11	<0.11
Pyrene	PAHMSUS	0.08	mg/kg^	UM	0.17	0.18	0.38	0.16	<0.11
Total PAH 16	PAHMSUS	1.28	mg/kg^	U	<2.04	<1.96	<2.94	<1.90	<1.73
>C10-C12 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	<5.53	<5.37	<5.55	<5.60	<5.42
>C12-C16 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	<5.53	<5.37	<5.55	<5.60	<5.42
>C16-C21 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	6.03	6.38	6.30	6.89	5.90
>C21-C35 (Aliphatic)	TPHFIDUS (Aliphatic)	10	mg/kg^	U	18.1	15.9	16.3	<14.0	<13.6
Total TPH (Aliphatic)	TPHFIDUS (Aliphatic)	20	mg/kg^	U	27.9	<26.8	<27.7	<28.0	<27.1
>C10-C12 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	<5.53	<5.37	<5.55	<5.60	<5.42
>C12-C16 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	6.94	7.40	7.26	7.68	6.97
>C16-C21 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	<5.53	5.99	7.32	6.58	5.44

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Client: SOCOTEC Consultancy North

Project Name: MECD Topsoil Test

Project No: 21021435

Date Issued: 02/03/2021

Analysis Results

				Project ID	21021435					
				Sample ID	006	007	008	009	010
				Customer ID	7-HP6-0-ES-0.00-0.20	11/12-HP1-0-ES-0.00-0.20	11/12-HP2-0-ES-0.00-0.20	11/12-HP3-0-ES-0.00-0.20	11/12-HP4-0-ES-0.00-0.20
				Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
				Sampling Date	18/02/2021	18/02/2021	18/02/2021	18/02/2021	18/02/2021
Analysis	Method Code	MDL	Units	Accred					
Acenaphthylene	PAHMSUS	0.08	mg/kg^	U	<0.11	<0.10	<0.10	<0.12	<0.10
Anthracene	PAHMSUS	0.08	mg/kg^	U	<0.11	<0.10	<0.10	<0.12	<0.10
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.10	<0.10	<0.12	0.21
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.10	<0.10	<0.12	0.25
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.10	<0.10	<0.12	0.32
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.10	<0.10	<0.12	0.17
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.10	<0.10	<0.12	0.12
Chrysene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.10	<0.10	<0.12	0.23
Dibenzo[a,h]anthracene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.10	<0.10	<0.12	<0.10
Fluoranthene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.10	<0.10	<0.12	0.37
Fluorene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.10	<0.10	<0.12	<0.10
Indeno[1,2,3-cd]pyrene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.10	<0.10	<0.12	0.21
Naphthalene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.10	<0.10	<0.12	<0.10
Phenanthrene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.10	<0.10	<0.12	0.13
Pyrene	PAHMSUS	0.08	mg/kg^	UM	<0.11	<0.10	<0.10	<0.12	0.34
Total PAH 16	PAHMSUS	1.28	mg/kg^	U	<1.68	<1.64	<1.62	<1.96	<2.94
>C10-C12 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	<5.25	<5.12	<5.07	<6.13	<5.05
>C12-C16 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	<5.25	<5.12	<5.07	<6.13	<5.05
>C16-C21 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	5.96	6.50	<5.07	8.36	6.57
>C21-C35 (Aliphatic)	TPHFIDUS (Aliphatic)	10	mg/kg^	U	13.8	16.1	17.6	30.4	22.6
Total TPH (Aliphatic)	TPHFIDUS (Aliphatic)	20	mg/kg^	U	<26.2	26.5	<25.3	43.2	32.7
>C10-C12 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	<5.25	<5.12	<5.07	<6.13	<5.05
>C12-C16 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	7.33	7.05	6.91	8.38	8.01
>C16-C21 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	5.70	5.14	<5.07	<6.13	5.86

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Client: SOCOTEC Consultancy North

Project Name: MECD Topsoil Test

Project No: 21021435

Date Issued: 02/03/2021

Analysis Results

				Project ID	21021435		
				Sample ID	011	012	013
				Customer ID	11/12-HP5-0-ES-0.00-0.20	11/12-HP6-0-ES-0.00-0.20	11/12-HP7-0-ES-0.00-0.20
				Sample Type	SOLID	SOLID	SOLID
				Sampling Date	18/02/2021	18/02/2021	18/02/2021
Analysis	Method Code	MDL	Units	Accred			
Acenaphthylene	PAHMSUS	0.08	mg/kg^	U	<0.10	<0.10	<0.10
Anthracene	PAHMSUS	0.08	mg/kg^	U	<0.10	<0.10	<0.10
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg^	UM	0.13	0.31	0.21
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg^	UM	0.15	0.33	0.24
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg^	UM	0.18	0.41	0.31
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg^	UM	0.11	0.21	0.17
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg^	UM	<0.10	0.16	0.11
Chrysene	PAHMSUS	0.08	mg/kg^	UM	0.14	0.32	0.23
Dibenzo[a,h]anthracene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10	<0.10
Fluoranthene	PAHMSUS	0.08	mg/kg^	UM	0.20	0.53	0.32
Fluorene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10	<0.10
Indeno[1,2,3-cd]pyrene	PAHMSUS	0.08	mg/kg^	UM	0.12	0.26	0.20
Naphthalene	PAHMSUS	0.08	mg/kg^	UM	<0.10	<0.10	<0.10
Phenanthrene	PAHMSUS	0.08	mg/kg^	UM	<0.10	0.16	<0.10
Pyrene	PAHMSUS	0.08	mg/kg^	UM	0.20	0.48	0.31
Total PAH 16	PAHMSUS	1.28	mg/kg^	U	<2.05	<3.74	<2.77
>C10-C12 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	<5.15	<4.91	<4.84
>C12-C16 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	<5.15	<4.91	<4.84
>C16-C21 (Aliphatic)	TPHFIDUS (Aliphatic)	4	mg/kg^	U	6.64	6.24	4.94
>C21-C35 (Aliphatic)	TPHFIDUS (Aliphatic)	10	mg/kg^	U	19.6	21.7	21.6
Total TPH (Aliphatic)	TPHFIDUS (Aliphatic)	20	mg/kg^	U	30.2	31.6	29.7
>C10-C12 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	<5.15	<4.91	<4.84
>C12-C16 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	6.59	6.98	<4.84
>C16-C21 (Aromatic)	TPHFIDUS (Aromatic)	4	mg/kg^	U	5.24	6.01	5.60

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Client: SOCOTEC Consultancy North

Project Name: MECD Topsoil Test

Project No: 21021435

Date Issued: 02/03/2021

Analysis Results

				Project ID	21021435				
				Sample ID	001	002	003	004	005
				Customer ID	7-HP1-0-ES-0.00-0.20	7-HP2-0-ES-0.00-0.20	7-HP3-0-ES-0.00-0.20	7-HP4-0-ES-0.00-0.20	7-HP5-0-ES-0.00-0.20
				Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
				Sampling Date	18/02/2021	18/02/2021	18/02/2021	18/02/2021	18/02/2021
Analysis	Method Code	MDL	Units	Accred					
>C21-C35 (Aromatic)	TPHFIDUS (Aromatic)	10	mg/kg^	U	17.4	17.5	19.6	25.6	17.7
Total TPH (Aromatic)	TPHFIDUS (Aromatic)	20	mg/kg^	U	30.7	31.8	34.8	40.3	31.0
Total Moisture at 105°C	TMSS	0.1	%	U	27.7	25.5	27.9	28.6	26.2
Total Moisture at 35°C	CLANDPREP	0.1	%	N	25.2	26.2	25.8	26.3	25.3
Colour of Material	CLANDPREP		-	N	Brown	Brown	Brown	Brown	Brown
Major Constituents	CLANDPREP		-	N	CLAY	CLAY	CLAY	CLAY	CLAY
Minor Constituents	CLANDPREP		-	N	Sand	Sand	Gravel	Gravel	Gravel
Miscellaneous Constituents	CLANDPREP		-	N	Gravel	Gravel	Organic Matter	Organic Matter	Organic Matter
Asbestos Identification	SUB002		-	N	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Client: SOCOTEC Consultancy North

Project Name: MECD Topsoil Test

Project No: 21021435

Date Issued: 02/03/2021

Analysis Results

				Project ID	21021435				
				Sample ID	006	007	008	009	010
				Customer ID	7-HP6-0-ES-0.00-0.20	11/12-HP1-0-ES-0.00-0.20	11/12-HP2-0-ES-0.00-0.20	11/12-HP3-0-ES-0.00-0.20	11/12-HP4-0-ES-0.00-0.20
				Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
				Sampling Date	18/02/2021	18/02/2021	18/02/2021	18/02/2021	18/02/2021
Analysis	Method Code	MDL	Units	Accred					
>C21-C35 (Aromatic)	TPHFIDUS (Aromatic)	10	mg/kg^	U	16.5	14.6	17.5	22.1	24.2
Total TPH (Aromatic)	TPHFIDUS (Aromatic)	20	mg/kg^	U	30.9	27.8	30.2	36.7	39.0
Total Moisture at 105°C	TMSS	0.1	%	U	23.8	21.8	21.1	34.8	20.8
Total Moisture at 35°C	CLANDPREP	0.1	%	N	23.4	20.4	19.3	33.3	18.8
Colour of Material	CLANDPREP		-	N	Brown	Brown	Brown	Brown	Brown
Major Constituents	CLANDPREP		-	N	CLAY	SILT	SILT	SILT	SILT
Minor Constituents	CLANDPREP		-	N	Gravel	Clay	Clay	Sand	Clay
Miscellaneous Constituents	CLANDPREP		-	N	Organic Matter	Gravel	Gravel	na	Gravel
Asbestos Identification	SUB002		-	N	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Client: SOCOTEC Consultancy North

Project Name: MECD Topsoil Test

Project No: 21021435

Date Issued: 02/03/2021

Analysis Results

				Project ID	21021435		
				Sample ID	011	012	013
				Customer ID	11/12-HP5-0-ES-0.00-0.20	11/12-HP6-0-ES-0.00-0.20	11/12-HP7-0-ES-0.00-0.20
				Sample Type	SOLID	SOLID	SOLID
				Sampling Date	18/02/2021	18/02/2021	18/02/2021
Analysis	Method Code	MDL	Units	Accred			
>C21-C35 (Aromatic)	TPHFIDUS (Aromatic)	10	mg/kg^	U	19.0	24.1	30.3
Total TPH (Aromatic)	TPHFIDUS (Aromatic)	20	mg/kg^	U	31.5	37.7	41.8
Total Moisture at 105°C	TMSS	0.1	%	U	22.4	18.6	17.3
Total Moisture at 35°C	CLANDPREP	0.1	%	N	21.7	17.5	16.4
Colour of Material	CLANDPREP		-	N	Brown	Brown	Brown
Major Constituents	CLANDPREP		-	N	SILT	SILT	SILT
Minor Constituents	CLANDPREP		-	N	Sand	Sand	Sand
Miscellaneous Constituents	CLANDPREP		-	N	Gravel	Gravel	Gravel
Asbestos Identification	SUB002		-	N	NAIIS	NAIIS	NAIIS

UKAS TESTING 1252

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

ASBESTOS ANALYSIS RESULTS

SOCOTEC Asbestos Limited Certificate of Analysis for Asbestos in Soils, Sediments and Aggregates

UKAS TESTING
1089

Detection limit of Method SCI-ASB-020 is 0.001%

Sampling has been carried out by a third party

SOCOTEC

Client:	SOCOTEC Environmental Chemistry	**Page 1 of 1**	
Address:	Etwall House, Bretby Business Park, Ashby Road, Burton upon Trent	**Report No:**	**ANO-0503-23881**
For the attention of:	SOCOTEC Environmental Chemistry	**Report Date:**	**01/03/2021**
Site Address:	MECD Topsoil Test	**Project Number:**	**21021435**

Sample Number	Sample Date	Sample Location & Matrix	Test Date	Total Sample Dry Weight (g)	Weight of <10mm Fraction (g)	Asbestos(g) in >10mm	Asbestos(g) in < 10mm	% Asbestos by weight of Total Dried Sample	Moisture Content	Asbestos Fibre Types Identified
1	18/02/21		26/02/2021	1181.9	1146.1	0.00000	0.00000			NADIS
2	18/02/21		25/02/2021	1029.6	984.3	0.00000	0.00000			NADIS
3	18/02/21		26/02/2021	955.1	935.8	0.00000	0.00000			NADIS
4	18/02/21		26/02/2021	1091.6	1067.3	0.00000	0.00000			NADIS
5	18/02/21		26/02/2021	1158.8	1105.8	0.00000	0.00000			NADIS
6	18/02/21		26/02/2021	1146.9	1113.7	0.00000	0.00000			NADIS
7	18/02/21		25/02/2021	966.5	945.4	0.00000	0.00000			NADIS
8	18/02/21		26/02/2021	1043.4	1026.6	0.00000	0.00000			NADIS
9	18/02/21		26/02/2021	780.0	758.3	0.00000	0.00000			NADIS
10	18/02/21		26/02/2021	922.4	885.0	0.00000	0.00000			NADIS
11	18/02/21		01/03/2021	970.7	957.3	0.00000	0.00000			NADIS
12	18/02/21		01/03/2021	931.6	918.7	0.00000	0.00000			NADIS
13	18/02/21		01/03/2021	966.6	957.2	0.00000	0.00000			NADIS

Keys

NAACR = Not Analysed at Clients Request

*** visible to naked eye**

NAIIS = No Asbestos Identified in Sample (Identification Only)

NADIS = No Asbestos Detected in Sample (ID & Quant Only)

Name:	Rachel Howell	Authorised Signatory:
Position:	Lab Technician	

The sample analysis for the above results was carried out using the procedures detailed in SOCOTEC Asbestos Limited in house method (SCI-ASB-020) based on EA document Quantification of asbestos in soil and associated materials - Draft 2017. Fibre identification was carried out using SOCOTEC Asbestos Limited in house method of transmitted/polarised light microscopy and centre stop dispersion staining (SCI-ASB-007), based on HSE's HSG 248. The analysis of the < 10mm fraction for asbestos content only includes ACMs and fibres and does not discriminate non-asbestos fibres. All fibres are assumed, unless specified, to be amphiboles. All tests were carried out at a SOCOTEC Asbestos Ltd laboratory, Ashbourne House, Bretby Business Park, Ashby Road, Burton-upon-Trent, DE15 0YZ. UKAS Testing Number 1089. Recommended sample weight is 1kg-2kg, samples less than 1kg are classified as deviating samples.

SOCOTEC Asbestos Limited is a wholly owned subsidiary of SOCOTEC UK Limited, registered in England and Wales, registered company 04951688.

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
BTEXHSA	004	Due to matrix interference, the Internal Standard recovery for this Test is below the required QMS specification. All other Laboratory Process Controls meet the requirements of the QMS unless otherwise stated. These circumstances should be taken into consideration when utilising the data.

LIMS-F002 - Report Notes

Client: SOCOTEC Consultancy North

Project Name: MECD Topsoil Test

Project No: 21021435

Date Issued: 02/03/2021

Deviating Sample Report

Sample Reference	Text ID	Reported Name	Incorrect Container	Incorrect Label	Headspace	Incorrect/No Preservative	No Sampling Date	Holding Time

Analysis Method

Analysis	Analysis Type	Analysis Method
BTEXHSA	ORGANIC	As Received
CLANDPREP	PHYS	As Received
GROHSA	ORGANIC	As Received
GROHSA/BTEXHSA	ORGANIC	
ICPMSS	METALS	Air Dried & Ground
PAHMSUS	ORGANIC	As Received
SFAPI	INORGANIC	As Received
SUB002	SUBCON	
TMSS	PHYS	As Received
TPHFIDUS (Aliphatic)	ORGANIC	As Received
TPHFIDUS (Aromatic)	ORGANIC	As Received

Client: SOCOTEC Consultancy North

Project Name: MECD Topsoil Test

Project No: 21021435

Date Issued: 02/03/2021

Additional Information

This report refers to samples as received, and SOCOTEC Uk Ltd takes no responsibility for accuracy or competence of sampling by others.

Results within this report relate only to the samples tested.

In the accreditation column of analysis report the codes are as follows:

U = UKAS accredited analysis
M = MCERT accredited analysis
N = Unaccredited analysis

Any units marked with ^ signify results are reported on a dry weight basis of 105° C

All Air Dried and Ground Samples (ADG) are oven dried at less than 35° C.

This report shall not be reproduced except in full and with approval from the laboratory.

Opinions and interpretations given are outside the scope of our UKAS accreditation.

Any samples marked with * are not covered by our scope of UKAS accreditation. If applicable, further report notes have been added.

Any solid samples where the Major Constituents are not one of the following (Sand, Silt, Clay, Made Ground) are not one of our accredited matrix types.

Any samples marked with ‡ have had MCERTS accreditation removed for this result

Any samples marked with a tick in the deviant table is deviant for the specific reason.

Any samples reported as IS, NA, ND mean the following:

IS = Insufficient Sample to complete analysis
NA = Sample is not amenable for the required analysis
ND = Results cannot be determined

Our deviating sample report does not include deviancy information for Subcontracted analysis. Please see the report from the Subcontracted lab for information regarding any deviancies for this analysis.

End of Certificate of Analysis

Soil Sample			7-HP1-0-ES-0.00-0.20	7-HP2-0-ES-0.00-0.20	7-HP3-0-ES-0.00-0.20	7-HP4-0-ES-0.00-0.20	7-HP5-0-ES-0.00-0.20	7-HP6-0-ES-0.00-0.20	11/12-HP1-0-ES-0.00-0.20	11/12-HP2-0-ES-0.00-0.20	11/12-HP3-0-ES-0.00-0.20	11/12-HP4-0-ES-0.00-0.20	11/12-HP5-0-ES-0.00-0.20	11/12-HP6-0-ES-0.00-0.20	11/12-HP7-0-ES-0.00-0.20
Depth (m)															
Date															
#REF!															
#REF!															
Strata															
#REF!															
		Screening Criteria													
Determinants	Units														
Benzene^	µg/kg	900	<14	<13	<14	<14	<14	<13	<13	<13	<15	<13	<13	<12	<12
Ethylbenzene^	µg/kg	80000	<14	<13	<14	<14	<14	<13	<13	<13	<15	<13	<13	<12	<12
m/p-Xylene^	µg/kg	80000	<28	<27	<28	<28	<27	<26	<26	<25	<31	<25	<26	<25	<24
o-Xylene^	µg/kg	80000	<14	<13	<14	<14	<14	<13	<13	<13	<15	<13	<13	<12	<12
Toluene^	µg/kg	800000	<14	27	62	<14	22	<13	<13	<13	<15	<13	<13	<12	<12
Colour of Material^	-	#N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Major Constituents^	-	#N/A	CLAY	CLAY	CLAY	CLAY	CLAY	CLAY	SILT	SILT	SILT	SILT	SILT	SILT	SILT
Minor Constituents^	-	#N/A	Sand	Sand	Gravel	Gravel	Gravel	Gravel	Clay	Clay	Sand	Clay	Sand	Sand	Sand
Miscellaneous Constituents^	-	#N/A	Gravel	Gravel	Organic Matter	Organic Matter	Organic Matter	Organic Matter	Gravel	Gravel	na	Gravel	Gravel	Gravel	Gravel
Total Moisture at 35°C	%	#N/A	25.2	26.2	25.8	26.3	25.3	23.4	20.4	19.3	33.3	18.8	21.7	17.5	16.4
>C6-C7 Aliphatic^	mg/kg	100	<0.277	<0.268	<0.277	<0.280	<0.271	<0.262	<0.256	<0.253	<0.307	<0.253	<0.258	<0.246	<0.242
>C7-C8 Aliphatic^	mg/kg	100	<0.277	<0.268	<0.277	<0.280	<0.271	<0.262	<0.256	<0.253	<0.307	<0.253	<0.258	<0.246	<0.242
>C7-C8 Aromatic^	mg/kg	800	<0.014	0.027	0.062	<0.014	0.022	<0.013	<0.013	<0.013	<0.015	<0.013	<0.013	<0.012	<0.012
>C8-C10 Aliphatic^	mg/kg	30	<0.277	<0.268	<0.277	<0.280	<0.271	<0.262	<0.256	<0.253	<0.307	<0.253	<0.258	<0.246	<0.242
>C8-C10 Aromatic^	mg/kg	50	<0.056	<0.054	<0.056	<0.056	<0.055	<0.053	<0.052	<0.051	<0.061	<0.051	<0.052	<0.049	<0.048
C5-C6 Aliphatic^	mg/kg	40	<0.277	<0.268	<0.277	<0.280	<0.271	<0.262	<0.256	<0.253	<0.307	<0.253	<0.258	<0.246	<0.242
C5-C7 Aromatic^	mg/kg	1	<0.014	<0.013	<0.014	<0.014	<0.014	<0.013	<0.013	<0.013	<0.015	<0.013	<0.013	<0.012	<0.012
Total GRO C5-C10^	mg/kg	#N/A	<0.277	<0.268	<0.277	<0.280	<0.271	<0.262	<0.256	<0.253	<0.307	<0.253	<0.258	<0.246	<0.242
Arsenic as As^	mg/kg	40	6.2	6.5	15.4	15.2	13	15.1	15.7	16.9	4.4	16	4.3	4.5	4
Cadmium as Cd^	mg/kg	3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Copper as Cu^	mg/kg	200	29.2	27.2	66.5	65	62.6	68.9	65.4	70.1	14.7	59.8	15.6	16.9	19.1
Lead as Pb^	mg/kg	300	54.6	49.4	68.1	65.2	60.2	60.2	57.2	59.9	25.6	63.3	52.1	51.5	49.7
Mercury as Hg^	mg/kg	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel as Ni^	mg/kg	110	11.1	11.5	20.1	19.3	17	19.9	19.8	21.4	9.3	20.4	5.3	6.3	6.4
Selenium as Se^	mg/kg	3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Chromium as Cr^	mg/kg	400	13.6	13.5	21.6	24	19	23	22.9	24.9	10.7	21.7	6.6	7.5	8.7
Zinc as Zn^	mg/kg	300	69.3	58.8	93.4	86.2	86.6	80.6	76.2	90.1	38.1	82.5	37.3	54.6	47.2
Acenaphthene^	mg/kg	#N/A	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.10	<0.10	<0.12	<0.10	<0.10	<0.10	<0.10
Acenaphthylene^	mg/kg	#N/A	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.10	<0.10	<0.12	<0.10	<0.10	<0.10	<0.10
Anthracene^	mg/kg	#N/A	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.10	<0.10	<0.12	<0.10	<0.10	<0.10	<0.10
Benzo[a]anthracene^	mg/kg	10	0.14	0.13	0.2	<0.11	<0.11	<0.11	<0.10	<0.10	<0.12	0.21	0.13	0.31	0.21
Benzo[a]pyrene^	mg/kg	5	0.15	0.12	0.18	<0.11	<0.11	<0.11	<0.10	<0.10	<0.12	0.25	0.15	0.33	0.24
Benzo[b]fluoranthene^	mg/kg	4	0.18	0.16	0.22	0.13	<0.11	<0.11	<0.10	<0.10	<0.12	0.32	0.18	0.41	0.31
Benzo[g,h,i]perylene^	mg/kg	#N/A	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.10	<0.10	<0.12	0.17	0.11	0.21	0.17
Benzo[k]fluoranthene^	mg/kg	#N/A	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.10	<0.10	<0.12	0.12	<0.10	0.16	0.11
Chrysene^	mg/kg	30	0.13	0.12	0.2	<0.11	<0.11	<0.11	<0.10	<0.10	<0.12	0.23	0.14	0.32	0.23
Dibenzo[a,h]anthracene^	mg/kg	0	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.10	<0.10	<0.12	<0.10	<0.10	<0.10	<0.10
Fluoranthene^	mg/kg	#N/A	0.18	0.18	0.4	0.16	<0.11	<0.11	<0.10	<0.10	<0.12	0.37	0.2	0.53	0.32
Fluorene^	mg/kg	#N/A	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.10	<0.10	<0.12	<0.10	<0.10	<0.10	<0.10
Indeno[1,2,3-cd]pyrene^	mg/kg	45	<0.11	<0.11	0.12	<0.11	<0.11	<0.11	<0.10	<0.10	<0.12	0.21	0.12	0.26	0.2
Naphthalene^	mg/kg	2	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.10	<0.10	<0.12	<0.10	<0.10	<0.10	<0.10
Phenanthrene^	mg/kg	#N/A	<0.11	<0.11	0.35	<0.11	<0.11	<0.11	<0.10	<0.10	<0.12	0.13	<0.10	0.16	<0.10
Pyrene^	mg/kg	#N/A	0.17	0.18	0.38	0.16	<0.11	<0.11	<0.10	<0.10	<0.12	0.34	0.2	0.48	0.31
Total PAH 16^	mg/kg	#N/A	<2.04	<1.96	<2.94	<1.90	<1.73	<1.68	<1.64	<1.62	<1.96	<2.94	<2.05	<3.74	<2.77
Total Cyanide^	mg/kg	24	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.6	<0.6	<0.8	<0.6	<0.6	<0.6	<0.6
Asbestos Identification	-	#N/A	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS
Total Moisture at 105°C	%	#N/A	27.7	25.5	27.9	28.6	26.2	23.8	21.8	21.1	34.8	20.8	22.4	18.6	17.3
>C10-C12 (Aliphatic)^	mg/kg	#N/A	<5.53	<5.37	<5.55	<5.60	<5.42	<5.25	<5.12	<5.07	<6.13	<5.05	<5.15	<4.91	<4.84
>C12-C16 (Aliphatic)^	mg/kg	#N/A	<5.53	<5.37	<5.55	<5.60	<5.42	<5.25	<5.12	<5.07	<6.13	<5.05	<5.15	<4.91	<4.84
>C16-C21 (Aliphatic)^	mg/kg	#N/A	6.03	6.38	6.3	6.89	5.9	5.96	6.5	<5.07	8.36	6.57	6.64	6.24	4.94
>C21-C35 (Aliphatic)^	mg/kg	#N/A	18.1	15.9	16.3	<14.0	<13.6	13.8	16.1	17.6	30.4	22.6	19.6	21.7	21.6
Total TPH (Aliphatic)^	mg/kg	#N/A	27.9	<26.8	<27.7	<28.0	<27.1	<26.2	26.5	<25.3	43.2	32.7	30.2	31.6	29.7
>C10-C12 (Aromatic)^	mg/kg	#N/A	<5.53	<5.37	<5.55	<5.60	<5.42	<5.25	<5.12	<5.07	<6.13	<5.05	<5.15	<4.91	<4.84
>C12-C16 (Aromatic)^	mg/kg	#N/A	6.94	7.4	7.26	7.68	6.97	7.33	7.05	6.91	8.38	8.01	6.59	6.98	<4.84
>C16-C21 (Aromatic)^	mg/kg	#N/A	<5.53	5.99	7.32	6.58	5.44	5.7	5.14	<5.07	<6.13	5.86	5.24	6.01	5.6
>C21-C35 (Aromatic)^	mg/kg	#N/A	17.4	17.5	19.6	25.6	17.7	16.5	14.6	17.5	22.1	24.2	19	24.1	30.3
Total TPH (Aromatic)^	mg/kg	#N/A	30.7	31.8	34.8	40.3	31	30.9	27.8	30.2	36.7	39	31.5	37.7	41.8

Attachment C10 Record of topsoil source check (Miller Homes, Congleton)

ARUP

Subject MECD Topsoil Source check

Date 17 March 2021 **Job No/Ref** 258907

1 Topsoil Source Check

Balfour Beatty's landscaping contractor, Ashlea Landscaping, has imported topsoil that has been placed within the Upper Brook Street and podium landscaping areas for tree and shrub planting.

The proposed topsoil source is: Miller Homes development site, off Back Lane, Congleton. Approximate NGR: SJ841642.

A ground investigation report prepared by Coopers (Chester) Ltd[1] confirmed that the site has been used for agriculture since the earliest mapping dated 1873. A small fuel tank was associated with farm buildings and some infilled ponds. Topsoil was present across the majority of the site except in the area of an infilled pond and in areas of buildings, where made ground was present. No visual or olfactory evidence of contamination was identified and no evidence of kerosene contamination was found relating to the former small fuel tank.

Provided that the topsoil only is imported to MECD (not made ground) then the soil should meet the requirements of the remediation strategy, subject to further validation testing on site.

The proposed source soil is deemed to be greenfield and suitable for use at MECD.

[1] Coopers (Chester) Ltd (2019) Enabling works and build phase remediation strategy for land at Back Lane Congleton. For Miller Homes, 20 December 2019.

Attachment C11 Confirmation of depths topsoil laid

Del Harrison

From: Fraser, Stuart (03) <Stuart.Fraser03@balfourbeatty.com>
Sent: 19 August 2021 14:44
To: Del Harrison; John.Billing
Subject: RE: MECD : Soil Sampling
Attachments: 20-9367-SS - R Draper - G1 - Topsoil Analysis report - Jan 20.pdf; 7351rs - Compiled.pdf; 5mm sand 75mm sand 2020.pdf; 88373 - 739171 Bold Heath Thermal Conductivity.pdf

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Del

Sub-soil certs and testing attached from Bold Heath Quarry covers all imported sub-soil.
Topsoil for all of Ashleas work was the same source as you note Miller Homes site in Congleton, testing attached.

I can also confirm that all topsoil was laid to the correct depths in all of the beds, the only exception being in and around the existing trees to the East of the project where we couldn't disturb their roots and we had to top up and make good around them.

Trust the above is acceptable

Regards

Stuart Fraser

Senior Engineer | Balfour Beatty | UK Construction Services – Regional England & Wales | Manchester Engineering Campus MECD

T: +44 (0)7824 402671 | M: +44 (0)7824 402671 | E: Stuart.Fraser03@balfourbeatty.com

MECD Project Offices, Booth Street East , Manchester, M13 9SS

www.balfourbeatty.com | @balfourbeatty | LinkedIn

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Appendix D

Evidence of validation of concrete

D1 Evidence of validation of concrete

The evidence presented in this appendix is to verify that protected concrete materials (specifically, conforming to design class for sulphate DS-2) have been used in below ground structures at MECD.

Attachment D1 presents Arup's piling and retaining wall specification 5893-ARP-00-XX-SP-S-000001 C2 1st December 2016, specified the use of contiguous bored piles to form the MEC Hall north and south basements; cast in-situ bored piles outside basement areas including MEC Hall, York Street building, Upper Brook Street building and Oddfellows Hall extension. Concrete conforming to DS-2 was to be used for all external structures. This specification set the requirements for Expanded Piling's contract for MECD.

Attachment D2 presents Expanded Piling's design report for the piles required at MECD, Expanded Project Reference: 5983-EXP-MECD-B-X-CA-00001/P05 Contract Design – Contiguous piled embedded wall and bearing piles, Document No. Y3483/Contract Design/rev C05 dated 21st February 2017. This document confirms that CFA piling was to be used at the site. Section 6.5 of this document stated that the concrete mix to be used was to be appropriate for Design Class for Sulphate DS-2. The design report also confirmed that the cover thickness of piles was consistent with requirements for DS-2 (minimum requirement 75mm).

Attachment D3 presents the handover pack containing all as-built piling information: Expanded Piling, ITP No. and Revision: 5983-EXP-MECD-B-QP-Y-00027 AB01, MECD Piling Handover Pack. Works: CFA and Rotary Piles. This document confirms that CFA piles were installed at the site. Pages 1595 and 1596 of this document detail the concrete mix used for the piles (C32/40 MCC 340 W/C 0.45 IIIA F5) which is consistent with the requirements for DS-2.

Attachment D1 piling and retaining wall specification 5893-ARP-00-XX-SP-S-000001 C2

University of Manchester

MECD

Structural Concrete Specification

5983-ARP-00-XX-SP-S-000023

Issue 8 | 26 June 2017

Job number 235779

Ove Arup & Partners Ltd
6th Floor 3 Piccadilly Place
Manchester M1 3BN
United Kingdom
www.arup.com

ARUP

P1.8.2 Designed concrete

To be In accordance with BS 8500–2 and BS EN 206–1

Project values should be entered in the grey panels.

	Requirements	Defaults	Water-resisting construction	Upper Book Street ground based water tanks	External Reinforced concrete
1.	Concrete reference		WR32/40	WR40/50	RC32/40
2.	Strength class		C32/40	C40/50	C32/40
3.	Maximum water-cement ratio		0.45	0.45	0.55
4.	Minimum cement content kg/m^3		320	320	300
5.	DC-Class where appropriate		DC-1	DC-1	DC-2
6.	Permitted cement types - See BS 8500-1:2006, Cl. 4.3.2, Note 3		Req 6.1 Min 40% ggbs	Req 6.1 Min 40% ggbs	Req 6.1 Min 40% ggbs
7.	Maximum aggregate size (mm) - Enter 10, 14, 20 or 40	20	20	20	20
8.	Chloride class (a value must be entered unless Cl 0,40 is acceptable)	Cl 0,40	Cl 0,40	Cl 0,40	Cl 0,40
9.	Target density/density class (for lightweight and heavyweight concrete)	N/A	N/A	N/A	N/A
10	Consistence class S1, S2, S3, S4		F5	S3	S3
11	Method of placing concrete		TBC	TBC	TBC
12	Requirement for finishing concrete	See P1.9	See P1.9	See P1.9	See P1.9
13	Type and dosage of fibres	See P1.5.1	See P1.5.1	See P1.5.1	See P1.5.1
14.	Use of RA conforming to BS 8500-2:2006, Cl. 4.3, permitted? If YES: enter requirements for: Maximum acid-soluble sulphate, method for determination of the chloride content classification with respect to ASR, method for determination of alkali content., any limitations on use in concrete, e.g. exposure classes, maximum mass fractions etc (Enter details in P1.13)		Req. 14.1	Req. 14.1	Req. 14.1
15	Special requirements for aggregates		None	None	None

Attachment D2 Expanded Piling's design report for the piles required at MECD, Expanded Project Reference: 5983-EXP-MECD-B-X-CA-00001/P05

Project reference: 5983-EXP-MECD-B-X-CA-00001/P05

CONTRACT DESIGN – Contiguous piled embedded wall and bearing piles

Project:	**The University of Manchester: MECD**
Location:	**Upper Brook Street, Manchester**
Client:	**Balfour Beatty**
Doc No.:	**Y3843/Contract Design/rev C05**
Date:	**21 February 2017**

ISSUING OFFICE

Expanded
Archway 3
Birley Fields
Hulme
Manchester
M15 5QJ

Tel.: 0161 227 6004

A single additional piles has been added to the pile schedule to reduce pile loads to magnitudes that can be economically carried by the proposed pile diameters. In addition to the single pile, additional ground beams are required by the design to provide rotational restraint to the heads of piles currently considered to be unrestrained. The additional ground beams are required to enable the piles to carry the specified loads. The additional pile is noted on the attached schedule. The location of the additional pile is shown on the sketches in Appendix H.15.

The additional bearing pile is proposed adjacent to pile YP-080. The additional pile has been referenced YP-080a. The design assumes that the two piles YP-080 and YP-080a each carry an equal share of the load originally scheduled to be supported on pile YP-080 alone.

The lateral pile design is based the Oddfellows bearing piles ref O-P002, O-P003 and O-P004 being restrained in the directions perpendicular to grid line 01. This has been confirmed by the Engineer.

Tower Crane 3 is located immediately behind the embedded contiguous wall piles. The excavation in front of the embedded wall piles will potentially lead to a reduction in the ground support to the TC3 bearing piles. Furthermore, ground movement loading may be applied to the TC3 bearing piles due to the potential ground movements behind the contiguous piles that occurs as excavations proceed in front of them. We have considered these affects in a separate lateral pile design given in Appendix H.

6.5 Structural requirements

The embedded pile and bearing pile design are both based on Grade C32/40 MPa strength concrete. Durability assessment to BRE Special Digest 1 (2005) indicates that DC-1 concrete is suitable and this is in accordance with the recommendations of the Geoenvironmental report. However, as normal CFA piling mixes satisfy the higher condition of DC-2 we propose to use DC-2 concrete in the works.

Bending moments and shear capacity checks have been carried out in accordance with BS EN 1992:2004. The structural capacity calculations are provided in Appendix F for the embedded pile design and in Appendix I for the bearing pile design.

A chart of minimum anchorage lengths is included in Appendix I to anchor the bearing pile longitudinal steel into the pile caps. The chart is based on pile cap concrete = C32/40MPa.

Sulphate Class Calculation

Version: BS Sulpate Class V2.25

Design Chemical (DC) Class in accordance with BRE Special Digest 1:2005 (3rd Edition)

Brownfield	Yes	Intended Working Life	At least 100 Years
Mobile Groundwater	No	Member Thickness (mm)	>140 to 450
Concrete Exposed to Sulphate Ions	No	Hydrostatic head greater than 5x member thickness	No

Copy Refs

Soil Samples: Sample Ref	2:1 Water/soil extract SO_4 (mg/l)
WS104-0.5	950
WS106-1.0	190
WS105-5	96
WS102-1	90
WS102-0.5	80
BH102-4	47
RBH101-1	30
BH102-0.5	30
BH102-3	23
WS103-0.5	20
WS105-0.5	20
BH103-0.1	20
BH102-1.2	16
BH103-1.2	15
BH103-3	10
BH104-1	10
WS101-0.3	10
WS101-0.5	10
WS102-0.2	10
WS106-0.4	10
WS108-0.3	10
WS109-0.3	10
WS110-0.3	10
WS110-1.0	10
BH103-0.5	10
BH104-0.1	10
BH104-0.8	10
No of Samples	5 of 27
Characteristic Soils $S0_4$	300

Soil Samples: Sample Ref	2.5:1 Water/soil extract pH
WS101-0.3	6.30
WS102-0.2	6.60
WS106-1.0	6.60
WS101-0.5	6.80
BH104-0.1	7.00
BH104-0.8	7.30
BH104-1	7.40
WS108-0.3	7.40
WS102-0.5	7.50
WS106-0.4	7.50
RBH101-1	7.60
WS104-0.5	7.70
BH103-0.1	7.70
WS105-0.5	7.80
WS110-0.3	7.80
WS109-0.3	7.90
WS110-1.0	7.90
BH103-0.5	7.90
WS102-1	8.00
BH102-0.5	8.00
BH102-1.2	8.10
BH102-3	8.10
BH103-1.2	8.10
WS103-0.5	8.10
BH102-4	8.30
BH103-3	8.30
WS105-5	8.30
No of Samples	5 of 27
Characteristic Soils pH	6.66

Water Samples: Sample Ref	pH
BH102	7.10
No of Samples	1 of 1
Characteristic Water pH	7.10

Water Samples: Sample Ref	Sulphate SO_4 (mg/l)
BH102	350
No of Samples	1 of 1
Characteristic Water $S0_4$	400

Minimum Characteristic pH 6.66

Results

Sulphate Class from soil sulphates	DS-1
Sulphate Class from water sulphates	DS-2
Sulphate Class from total sulphates	---
Design Sulphate Class	DS-2
ACEC Class for site	AC-1s
Design Class / No. of APM's required	DC-1

Notes

FIGURE B.13
SULPHATE CLASS ASSESSMENT

Attachment D3 Expanded Piling, ITP No. and Revision: 5983-EXP-MECD-B-QP-Y-00027 AB01, MECD Piling Handover Pack

MECD Piling Handover Pack

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Laing O'Rourke Infrastructure

Material Technology Centre
Cromwell Road Bredbury Stockport SK6 2RL

a UKAS TESTING Laboratory No:	2851 N
File No:	2.17
Job No:	Y3823

Expanded Geotechnical / MECD Building

Hanson - Miles Platting Plant - Mix A - C32/40 MCC 340 W/C 0.45 IIIA F5

Sample No	Sample Date	Time	Mix Reference	Sample Location	Contract No	Ticket No	Supplier	Source	Project	Consistence	Conc Temp	7 Day Density	7 Day Strength	28 Day Density (1)	28 Day Strength (1)	28 Day Density (2)	28 Day Strength (2)	Mean 28 Day Density	Mean 28 Day Strength	56 Day Density	56 Day Strength	Remarks
C01130a-d	03-Jan-17	1121	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 539	Y3843	218801	Hanson	Miles Platting	MECD Building	640	12	2420	45.8	2430	64.9	2420	64.6	2430	64.8	2420	65.4	Made in Laboratory
C01131a-d	04-Jan-17	0851	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 551	Y3843	218808	Hanson	Miles Platting	MECD Building	640	14	2420	48.3	2410	69.1	2410	66.7	2410	67.9	2430	76.8	Made in Laboratory
C01132a-d	04-Jan-17	0803	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 556	Y3843	218809	Hanson	Miles Platting	MECD Building	630	15	2410	50.5	2410	67.1	2410	69.0	2410	68.1	2420	71.8	Made in Laboratory
C01133a-d	05-Jan-17	0829	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 526	Y3843	218841	Hanson	Miles Platting	MECD Building	640	7	2410	47.3	2410	60.5	2410	61.7	2410	61.1	2420	75.5	Made in Laboratory
C01134a-d	05-Jan-17	0837	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 550	Y3843	218842	Hanson	Miles Platting	MECD Building	640	8	2440	53.9	2430	71.5	2440	69.2	2440	70.4	2450	80.7	Made in Laboratory
C01137a-d	06-Jan-17	0759	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 528	Y3843	218874	Hanson	Miles Platting	MECD Building	570	9	2460	53.2	2460	75.7	2460	75.1	2460	75.4	2460	80.6	Made in Laboratory
C01138a-d	06-Jan-17	0827	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 540	Y3843	218877	Hanson	Miles Platting	MECD Building	610	11	2450	50.4	2460	63.4	2430	71.2	2450	67.3	2440	75.5	Made in Laboratory
C01140a-d	09-Jan-17	0943	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 571	Y3843	210614	Hanson	Miles Platting	MECD Building	640	13	2450	58.7	2440	77.1	2460	75.9	2450	76.5	2460	72.3	Made in Laboratory
C01145a-d	10-Jan-17	1221	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 573	Y3843	218911	Hanson	Miles Platting	MECD Building	630	14	2440	43.0	2440	67.8	2420	67.9	2430	67.9	2450	74.1	Made on Site
C01146a-d	10-Jan-17	1234	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 581	Y3843	218912	Hanson	Miles Platting	MECD Building	640	14	2410	43.0	2420	67.5	2420	67.8	2420	67.7	2440	72.6	Made on Site
C01149a-d	12-Jan-17	0752	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 529	Y3843	218950	Hanson	Miles Platting	MECD Building	640	9	2440	50.4	2440	67.2	2440	69.0	2440	68.1	2440	74.5	Made in Laboratory
C01150a-d	12-Jan-17	0828	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 555	Y3843	218953	Hanson	Miles Platting	MECD Building	640	10	2420	54.1	2420	73.2	2430	73.2	2430	73.2	2420	73.5	Made in Laboratory
C01153a-d	13-Jan-17	1317	C32/40 MCC 340 W/C 0.45 IIIA F5	Pie 553	Y3843	219021	Hanson	Miles Platting	MECD Building	620	7	2440	51.7	2430	67.2	2450	70	2440	68.6	2450	74.9	Made in Laboratory
C01159a-d	16-Jan-17	1037	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 561	Y3843	219051	Hanson	Miles Platting	MECD Building	630	13	2410	52.2	2410	80.5	2420	78.9	2420	79.7	2420	74.7	Made in Laboratory
C01160a-d	16-Jan-17	1249	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 578	Y3843	219060	Hanson	Miles Platting	MECD Building	600	13	2400	45.7	2410	72.1	2400	71.8	2410	71	2410	69.7	Made in Laboratory
C01163a-d	17-Jan-17	0853	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 591	Y3843	219083	Hanson	Miles Platting	MECD Building	570	12	2430	53.0	2440	81.3	2440	79.5	2440	79.9	2440	75.8	Made in Laboratory
C01164a-d	17-Jan-17	0921	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 603	Y3843	219085	Hanson	Miles Platting	MECD Building	580	12	2390	57.0	2420	67.5	2420	67.7	2420	67.6	2430	56	Made in Laboratory
C01167a-d	18-Jan-17	0925	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 627	Y3843	219122	Hanson	Miles Platting	MECD Building	640	12	2380	45.3	2390	63	2390	61.6	2390	62.4	2390	64.2	Made in Laboratory
C01169a-d	18-Jan-17	1003	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 613	Y3843	219126	Hanson	Miles Platting	MECD Building	590	12	2430	53.7	2390	67.4	2400	67.9	2400	67.7	2450	85.4	Made in Laboratory
C01170a-d	19-Jan-17	0922	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 664	Y3843	219179	Hanson	Miles Platting	MECD Building	620	12	2440	51.0	2440	75.2	2440	73.6	2440	74.4	2430	83.1	Made in Laboratory
C01173a-d	19-Jan-17	0909	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 660	Y3843	219177	Hanson	Miles Platting	MECD Building	620	12	2400	46.3	2440	73.1	2440	69.5	2440	71.3	2400	62	Made in Laboratory
C01178a-d	20-Jan-17	1038	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 646	Y3843	219994	Hanson	Miles Platting	MECD Building	640	12	2430	49.3	2440	68.3	2430	69.9	2440	69.1	2430	69.4	Made in Laboratory
C01179a-d	20-Jan-17	1120	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 625	Y3843	219221	Hanson	Miles Platting	MECD Building	610	12	2420	47.1	2430	63.4	2410	64	2420	63.7	2420	71.5	Made in Laboratory
C01181a-d	23-Jan-17	1025	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 678	Y3843	219252	Hanson	Miles Platting	MECD Building	640	13	2430	50.5	2430	74.2	2430	73.1	2430	73.7	2430	78.4	Made in Laboratory
C01182a-d	23-Jan-17	1116	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 670	Y3843	219254	Hanson	Miles Platting	MECD Building	600	14	2430	53.4	2440	74.2	2450	74.2	2450	74.2	2440	75.5	Made in Laboratory
C01184a-d	24-Jan-17	0810	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 614	Y3843	219270	Hanson	Miles Platting	MECD Building	550	7	2410	60.0	2420	74	2400	75.2	2410	74.6	2410	66.1	Made on Site
C01185a-d	24-Jan-17	0910	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 679	Y3843	219272	Hanson	Miles Platting	MECD Building	590	7	2400	31.1	2420	47.7	2370	47.8	2400	47.8	2390	47.1	Made on Site
C01193a-d	26-Jan-17	0914	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 676	Y3843	219348	Hanson	Miles Platting	MECD Building	630	10	2390	50.0	2410	71.5	2400	67.6	2410	69.7	2390	60.8	Made in Laboratory
C01196a-d	30-Jan-17	1049	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 700	Y3843	219393	Hanson	Miles Platting	MECD Building	610	13	2470	55.1	2470	68	2470	72.8	2470	70.4	2460	66	Made in Laboratory
C01197a-d	30-Jan-17	1056	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 684	Y3843	219394	Hanson	Miles Platting	MECD Building	580	13	2460	54.4	2470	73.4	2470	75	2470	74.2	2460	68.9	Made in Laboratory
C01201a-d	31-Jan-17	1002	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 636	Y3843	219424	Hanson	Miles Platting	MECD Building	640	11	2450	47.3	2440	63.3	2460	63.4	2450	63.4	2450	63.6	Made in Laboratory
C01202a-d	31-Jan-17	1021	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 524	Y3843	219425	Hanson	Miles Platting	MECD Building	640	11	2430	54.0	2430	81.4	2440	78.9	2440	80.2	2430	73.2	Made in Laboratory
C01205a-d	01-Feb-17	0853	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 688	Y3843	219438	Hanson	Miles Platting	MECD Building	610	13	2450	57.0	2450	71.1	2440	71.2	2450	71.2	2450	72.2	Made in Laboratory
C01206a-d	01-Feb-17	0903	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 703	Y3843	219439	Hanson	Miles Platting	MECD Building	600	13	2430	51.4	2440	70.3	2440	70.4	2440	70.4	2430	74.3	Made in Laboratory
C01209a-d	02-Feb-17	1158	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 702	Y3843	219497	Hanson	Miles Platting	MECD Building	640	13	2440	57.4	2450	64.2	2450	64.3	2450	64.3	2460	69.9	Made in Laboratory
C01210a-d	02-Feb-17	1209	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 689	Y3843	219498	Hanson	Miles Platting	MECD Building	540	13	2430	50.4	2440	61.3	2450	63.7	2450	62.5	2450	60.6	Made in Laboratory
C01212a-d	03-Feb-17	0956	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 518	Y3843	219522	Hanson	Miles Platting	MECD Building	590	13	2420	45.7	2440	68.5	2450	64.3	2450	66.4	2440	69.5	Made in Laboratory
C01213a-d	03-Feb-17	1005	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 552	Y3843	219523	Hanson	Miles Platting	MECD Building	640	13	2420	44.4	2420	57.9	2410	53.7	2420	55.8	2420	67.5	Made in Laboratory
C01216a-d	06-Feb-17	1106	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 731	Y3843	219552	Hanson	Miles Platting	MECD Building	640	12	2450	51.5	2460	73.4	2470	72	2470	72.7	2460	75.5	Made in Laboratory
C01217a-d	06-Feb-17	1242	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 727	Y3843	219553	Hanson	Miles Platting	MECD Building	630	12	2450	48.1	2440	66.4	2420	67	2430	66.7	2380	71.5	Made in Laboratory
C01219a-d	07-Feb-17	0804	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 160	Y3843	219568	Hanson	Miles Platting	MECD Building	620	13	2340	32.5	2390	58.1	2400	58	2400	58.1	2400	69.6	Made in Laboratory
C01220a-d	07-Feb-17	0925	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 164	Y3843	216569	Hanson	Miles Platting	MECD Building	630	13	2430	52.6	2430	73.1	2430	71.6	2430	72.4	2440	71.5	Made in Laboratory
C01224a-d	08-Feb-17	1113	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 218	Y3843	219610	Hanson	Miles Platting	MECD Building	640	12	2420	34.8	2400	53.9	2420	55.3	2410	54.6	2440	63	Made in Laboratory - Rig 2
C01225a-d	08-Feb-17	1108	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 161	Y3843	219609	Hanson	Miles Platting	MECD Building	640	12	2420	42.9	2420	60.1	2420	63.9	2420	62	2410	68.3	Made in Laboratory - Rig 1
C01226a-d	08-Feb-17	1252	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 149	Y3843	219619	Hanson	Miles Platting	MECD Building	640	12	2410	43.5	2410	59	2400	59.4	2410	59.2	2400	70.8	Made in Laboratory - Rig 1
C01227a-d	08-Feb-17	1312	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 206	Y3843	219622	Hanson	Miles Platting	MECD Building	640	12	2430	50.0	2420	63.2	2430	65.4	2430	64.3	2440	66.3	Made in Laboratory - Rig 2
C01228a-d	09-Feb-17	0757	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 117	Y3843	219647	Hanson	Miles Platting	MECD Building	550	11	2420	51.9	2420	75.7	2420	75.9	2420	75.8	2420	69.8	Made in Laboratory - Rig 1
C01229a-d	09-Feb-17	0917	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 163	Y3843	219652	Hanson	Miles Platting	MECD Building	580	11	2400	44.2	2410	53.8	2410	56	2410	54.9	2410	56.7	Made in Laboratory - Rig 1
C01230a-d	09-Feb-17	1341	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 178	Y3843	219678	Hanson	Miles Platting	MECD Building	570	11	2430	46.1	2430	55	2430	55.8	2430	55.4	2440	63.7	Made in Laboratory - Rig 2
C01232a-d	10-Feb-17	0730	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 142	Y3843	219705	Hanson	Miles Platting	MECD Building	560	9	2460	54.7	2450	77.1	2480	77.1	2470	77.1	2460	78.4	Made in Laboratory - Rig 1
C01233a-d	10-Feb-17	0746	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 213	Y3843	219706	Hanson	Miles Platting	MECD Building	590	9	2420	49.5	2430	68.8	2400	69.1	2420	69	2400	76.2	Made in Laboratory - Rig 2
C01235a-d	10-Feb-17	1218	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 166	Y3843	219735	Hanson	Miles Platting	MECD Building	620	11	2450	40.9	2440	67.6	2450	68.4	2450	67	2460	74.4	Made in Laboratory - Rig 2
C01237a-d	14-Feb-17	0752	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 220	Y3843	219763	Hanson	Miles Platting	MECD Building	620	11	2460	52.2	2460	74.8	2450	72.7	2460	73.8	2450	77.9	Made in Laboratory - Rig 2
C01239a-d	14-Feb-17	1441	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 456	Y3843	219807	Hanson	Miles Platting	MECD Building	630	11	2410	43.5	2410	64.2	2420	62.2	2420	63.2	2390	66.5	Made on Site - Rig 1
C01243a-d	15-Feb-17	0811	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 215	Y3843	219833	Hanson	Miles Platting	MECD Building	610	12	2470	55.3	2480	77.1	2490	79.7	2490	78.5	2490	86.1	Made in Laboratory
C01244a-d	15-Feb-17	0825	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 219	Y3843	219834	Hanson	Miles Platting	MECD Building	620	12	2470	55.4	2470	78.6	2470	73.5	2470	76.1	2480	83	Made in Laboratory
C01245a-d	15-Feb-17	1104	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 444	Y3843	219843	Hanson	Miles Platting	MECD Building	610	13	2420	58.1	2440	52	2430	56.3	2440	54.2	2430	77.7	Made on Site
C01246a-d	15-Feb-17	1112	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 440	Y3843	219844	Hanson	Miles Platting	MECD Building	620	13	2450	46.4	2460	58.1	2440	49.9	2450	54	2450	54.4	Made on Site - Invalid Cube Result >15% D
C01247a-d	16-Feb-17	0859	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 239	Y3843	219869	Hanson	Miles Platting	MECD Building	590	13	2450	51.9	2460	75.6	2450	73.9	2460	74.8	2460	72.1	Made in Laboratory - Rig 2
C01248a-d	16-Feb-17	0908	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 103	Y3843	219870	Hanson	Miles Platting	MECD Building	610	13	2460	57.6	2460	81	2460	77.8	2460	79.4	2470	62.5	Made in Laboratory - Rig 1
C01251a-d	17-Feb-17	0913	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 243	Y3843	219893	Hanson	Miles Platting	MECD Building	620	12	2450	52.8	2460	57.4	2450	61.5	2460	59.4			Made in Laboratory - Rig 2
C01252a-d	17-Feb-17	0920	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 179	Y3843	219894	Hanson	Miles Platting	MECD Building	560	12	2470	48.7	2470	68.8	2460	72	2470	70.4			Made in Laboratory - Rig 1
C01253a-d	17-Feb-17	1321	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 466	Y3843	219912	Hanson	Miles Platting	MECD Building	620	13	2470	45.3	2470	65.5	2460	70.5	2470	68			Made on Site
C01254a-d	17-Feb-17	1330	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 462	Y3843	219913	Hanson	Miles Platting	MECD Building	610	13	2450	41.8	2450	69	2440	72.6	2450	70.8			Made on Site
C01255a-d	20-Feb-17	0848	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 250	Y3843	219939	Hanson	Miles Platting	MECD Building	580	13	2450	47.4	2460	62.4	2450	64.5	2460	63.5			Made in Laboratory - Rig 2
C01256a-d	20-Feb-17	0909	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 442	Y3843	219942	Hanson	Miles Platting	MECD Building	600	13	2450	52.2	2450	66.2	2450	68.6	2450	67.4			Made in Laboratory - Rig 1
C01257a-d	20-Feb-17	1123	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 422	Y3843	219958	Hanson	Miles Platting	MECD Building	640	13	2460	47.0	2460	57.5	2440	57.7	2450	57.6			Made on Site - Rig 1
C01258a-d	20-Feb-17	1139	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 418	Y3843	219960	Hanson	Miles Platting	MECD Building	610	13	2460	48.1	2460	77.6	2470	74.9	2470	76.3			Made on Site - Rig 2
C01262a-d	21-Feb-17	0820	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 441	Y3843	219989	Hanson	Miles Platting	MECD Building	620	12	2460	50.5	2460	73.5	2470	70	2470	71.8			Made in Laboratory
C01263a-d	21-Feb-17	0829	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 433	Y3843	219990	Hanson	Miles Platting	MECD Building	630	13	2450	43.4	2440	62.8	2450	62.8	2450	62.8			Made in Laboratory
C01264a-d	21-Feb-17	1226	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 274	Y3843	220008	Hanson	Miles Platting	MECD Building	640	13	2440	41.9	2460	67.6	2430	67.4	2450	67.5			Made on Site - Rig 2
C01265a-d	21-Feb-17	1220	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 398	Y3843	220002	Hanson	Miles Platting	MECD Building	640	13	2450	44.1	2430	64.1	2450	65.5	2440	64.8			Made on Site - Rig 1
C01266a-d	22-Feb-17	0755	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 362	Y3843	220018	Hanson	Miles Platting	MECD Building	640	13	2440	48.5	2450	69.8	2460	68.1	2460	69			Made in Laboratory
C01267a-d	22-Feb-17	0812	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 348	Y3843	220019	Hanson	Miles Platting	MECD Building	630	13	2450	54.7	2450	70.2	2450	68.8	2450	69.5			Made in Laboratory
C01268a-d	22-Feb-17	1300	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 369	Y3843	220029	Hanson	Miles Platting	MECD Building	640	13	2440	47.0	2440	65.2	2430	64.4	2440	64.8			Made on Site
C01269a-d	22-Feb-17	1312	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 273	Y3843	220030	Hanson	Miles Platting	MECD Building	630	13	2470	51.0	2470	65.9	2440	67.2	2460	66.6			Made on Site
C01272a-d	24-Feb-17	1043	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 402	Y3843	220067	Hanson	Miles Platting	MECD Building	630	13	2450	50.9	2430	69.1	2450	69.4	2440	69.3			Made in Laboratory - Rig 1
C01274a-d	24-Feb-17	1137	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 393	Y3843	220073	Hanson	Miles Platting	MECD Building	640	14	2420	51.8	2450	64.3	2440	64	2450	64.2			Made in Laboratory - Rig 1
C01275a-d	27-Feb-17	0955	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 292	Y3843	220104	Hanson	Miles Platting	MECD Building	630	11	2450	51.9	2440	58.2	2460	60.3	2450	59.3			Made in Laboratory
C01276a-d	27-Feb-17	1007	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 285	Y3843	220105	Hanson	Miles Platting	MECD Building	630	11	2440	50.4	2440	70.3	2450	68.9	2450	69.6			Made in Laboratory
C01277a-d	28-Feb-17	0758	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 268	Y3843	220124	Hanson	Miles Platting	MECD Building	630	11	2450	47.2	2450	71	2440	66.7	2450	68.9			Made in Laboratory
C01278a-d	28-Feb-17	0811	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 317	Y3843	220125	Hanson	Miles Platting	MECD Building	640	11	2450	46.2	2450	62.9	2440	61.7	2450	62.3			Made in Laboratory
C01279a-d	28-Feb-17	0811	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 317	Y3843	220125	Hanson	Miles Platting	MECD Building	640	11			2450	66.4	2440	65.3	2450	65.8			Made in Laboratory - Comparison Excersise
C01280a-d	28-Feb-17	1312	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 370	Y3843	220139	Hanson	Miles Platting	MECD Building	630	11	2400	50.1	2390	78.8	2400	78.6	2400	78.7			Made on Site
C01281a-d	28-Feb-17	1334	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 268	Y3843	220140	Hanson	Miles Platting	MECD Building	640	11	2440	46.0	2450	69.2	2440	62.9	2450	66.1			Made on Site

Compressive Strength Density are UKAS Accredited Results. UKAS accredited cube making only claimed for those cubes made at the MTC -Bredbury Lab

Laing O'Rourke Infrastructure

Material Technology Centre
Cromwell Road Bredbury Stockport SK6 2RL

a UKAS TESTING Laboratory No:	2851 N
File No:	2.17
Job No:	Y3823

Expanded Geotechnical / MECD Building

Hanson - Miles Platting Plant - Mix A - C32/40 MCC 340 W/C 0.45 IIIA F5

Sample No	Sample Date	Time	Mix Reference	Sample Location	Contract No	Ticket No	Supplier	Source	Project	Consistence	Conc Temp	7 Day Density	7 Day Strength	28 Day Density (1)	28 Day Strength (1)	28 Day Density (2)	28 Day Strength (2)	Mean 28 Day Density	Mean 28 Day Strength	56 Day Density	56 Day Strength	Remarks
C01284a-d	01-Mar-17	0838	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 368	Y3843	220155	Hanson	Miles Platting	MECD Building	600	10	2440	53.6	2450	73.9	2440	74.3	2450	74.1			Made in Laboratory
C01285a-d	01-Mar-17	0859	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 361	Y3843	220156	Hanson	Miles Platting	MECD Building	630	11	2460	57.3	2470	69.5	2470	71.1	2470	70.3			Made in Laboratory
C01286a-d	02-Mar-17	1606	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 384	Y3843	220188	Hanson	Miles Platting	MECD Building	600	12	2450	50.7	2440	70.2	2450	69.2	2450	69.7			Made on Site
C01287a-d	02-Mar-17	1432	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 388	Y3843	220186	Hanson	Miles Platting	MECD Building	620	12	2430	48.2	2440	63.7	2440	64	2440	63.9			Made on Site
C01288a-d	03-Mar-17	0806	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 408	Y3843	220195	Hanson	Miles Platting	MECD Building	580	11	2460	54.1	2450	73.8	2450	70.5	2450	71.7			Made in Laboratory
C01289a-d	03-Mar-17	0909	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 404	Y3843	220199	Hanson	Miles Platting	MECD Building	570	11	2440	45.8	2440	65.5	2440	64.3	2440	64.9			Made in Laboratory
C01295a-d	06-Mar-17	1048	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 308	Y3843	220224	Hanson	Miles Platting	MECD Building	620	11	2410	38.7	2400	58.3	2410	60.7	2410	59.6			Made in Laboratory
C01296a-d	06-Mar-17	1057	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 311	Y3843	220225	Hanson	Miles Platting	MECD Building	620	11	2450	37.3	2440	55.8	2430	56.2	2440	56			Made in Laboratory
C01297a-d	07-Mar-17	1259	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 290	Y3843	220255	Hanson	Miles Platting	MECD Building	610	11	2440	42.0	2440	60.3	2440	62.9	2440	61.6			Made in Laboratory
C01298a-d	07-Mar-17	1346	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 296	Y3843	220256	Hanson	Miles Platting	MECD Building	620	11	2460	45.6	2470	69.3	2460	71.3	2470	69.8			Made in Laboratory
C01299a-d	08-Mar-17	0902	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 305	Y3843	220283	Hanson	Miles Platting	MECD Building	610	11	2460	45.1	2460	76.1	2460	76.1	2460	76.1			Made in Laboratory
C01300a-d	08-Mar-17	1006	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 302	Y3843	220286	Hanson	Miles Platting	MECD Building	620	12	2460	54.0	2460	66.2	2460	69.4	2460	67.8			Made in Laboratory
C01305a-d	09-Mar-17	1354	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 330	Y3843	220342	Hanson	Miles Platting	MECD Building	610	13	2450	52.4	2460	69.9	2460	72.6	2460	71.3			Made in Laboratory
C01306a-d	09-Mar-17	1407	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 335	Y3843	220343	Hanson	Miles Platting	MECD Building	600	13	2460	52.5	2470	72.6	2470	69.7	2470	71.2			Made in Laboratory
C01307a-d	10-Mar-17	0805	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 301	Y3843	220350	Hanson	Miles Platting	MECD Building	630	13	2420	63.1	2420	76.7	2440	75.4	2430	76.1			Made in Laboratory
C01309a-d	13-Mar-17	1206	C32/40 MCC 340 W/C 0.45 IIIA F5	Piles TC3/1 & TC3/2	Y3843	220362	Hanson	Miles Platting	MECD Building	610	13	2430	45.8	2430	52.3	2430	56.9	2430	54.6			Made in Laboratory
C01313a-d	15-Mar-17	1039	C32/40 MCC 340 W/C 0.45 IIIA F5	Piles 17 & 26	Y3843	220415	Hanson	Miles Platting	MECD Building	640	15	2410	47.0	2410	59.7	2410	62.3	2410	61			Made in Laboratory
C01314a-d	15-Mar-17	1318	C32/40 MCC 340 W/C 0.45 IIIA F5	Piles 28 & 33	Y3843	220419	Hanson	Miles Platting	MECD Building	620	16	2420	43.0	2410	63.7	2400	61	2410	62.4			Made in Laboratory
C01315a-d	16-Mar-17	1019	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 19	Y3843	220437	Hanson	Miles Platting	MECD Building	610	15	2460	52.7	2460	66.7	2460	66.3	2460	66.5			Made in Laboratory
C01316a-d	16-Mar-17	1055	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 25	Y3843	220438	Hanson	Miles Platting	MECD Building	620	15	2430	48.3	2470	60.5	2460	67.4	2470	64			Made in Laboratory
C01317a-f	17-Mar-17	1113	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 14	Y3843	220455	Hanson	Miles Platting	MECD Building	630	12	2430	50.6									Made in Laboratory - Comparison Excersise
C01319a-d	20-Mar-17	1128	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile MH 4	Y3843	220469	Hanson	Miles Platting	MECD Building	610	13	2450	44.6									Made in Laboratory
C01320a-d	20-Mar-17	1144	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile MH 33A	Y3843	220470	Hanson	Miles Platting	MECD Building	620	13	2430	39.3									Made in Laboratory
C01321a-d	21-Mar-17	1203	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile YS 16	Y3843	220476	Hanson	Miles Platting	MECD Building	620	12	2460	49.4									Made in Laboratory
C01322a-d	22-Mar-17	1117	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile YS 97	Y3843	220490	Hanson	Miles Platting	MECD Building	600	12	2450	50.1									Made in Laboratory
C01323a-d	22-Mar-17	1202	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile YS 92	Y3843	220491	Hanson	Miles Platting	MECD Building	630	13	2440	47.1									Made in Laboratory
C01324a-d	23-Mar-17	1130	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 84	Y3843	220510	Hanson	Miles Platting	MECD Building	620	13	2420	43.1									Made in Laboratory
C01325a-d	23-Mar-17	1149	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 87	Y3843	220511	Hanson	Miles Platting	MECD Building	610	13	2460	46.1									Made in Laboratory
C01329a-d	24-Mar-17	1100	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 88	Y3843	220523	Hanson	Miles Platting	MECD Building	590	13	2450	43.0									Made in Laboratory
C01330a-d	27-Mar-17	1113	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile TC 2	Y3843	220535	Hanson	Miles Platting	MECD Building	630	13	2460	52.8									Made in Laboratory
C01331a-d	27-Mar-17	1146	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile TC 4	Y3843	220537	Hanson	Miles Platting	MECD Building	610	13	2440	49.8									Made in Laboratory
C01333a-d	28-Mar-17	0831	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 7	Y3843	220551	Hanson	Miles Platting	MECD Building	640	15	2400	48.1									Made in Laboratory
C01334a-d	28-Mar-17	0849	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 10	Y3843	220552	Hanson	Miles Platting	MECD Building	620	15	2420	47.8									Made in Laboratory
C01337a-d	29-Mar-17	1104	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 16	Y3843	220522	Hanson	Miles Platting	MECD Building	640	12	2440	46.6									Made on Site
C01338a-d	29-Mar-17	1119	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 9	Y3843	220584	Hanson	Miles Platting	MECD Building	620	12	2420	43.4									Made on Site
C01340a-d	30-Mar-17	0835	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 33	Y3843	220607	Hanson	Miles Platting	MECD Building	620	12	2410	43.7									Made in Laboratory
C01341a-f	30-Mar-17	0818	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 32	Y3843	220606	Hanson	Miles Platting	MECD Building	630	13	2410	35.1									Made in Laboratory
C01344a-d	31-Mar-17	0956	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 31	Y3843	220631	Hanson	Miles Platting	MECD Building	620	18	2430	39.2									Made in Laboratory
C01345a-d	31-Mar-17	1017	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 22	Y3843	220632	Hanson	Miles Platting	MECD Building	640	18	2450	48.5									Made in Laboratory
C01346a-d	03-Apr-17	0932	C32/40 MCC 340 W/C 0.45 IIIA F5	Pile 94	Y3843	220654	Hanson	Miles Platting	MECD Building	630	14	2440	50.2									Made in Laboratory

Compressive Strength Density are UKAS Accredited Results. UKAS accredited cube making only claimed for those cubes made at the MTC -Bredbury Lab

Appendix E

Evidence of water supply pipe material

E1 Evidence of validation of water supply pipe material

The evidence presented in this appendix is to verify that consideration has been given to the need for protected water supply pipe material to be used within the MECD site.

Attachment E1: United Utilities application form for new water connection to MECD site, including risk assessment for protected pipe material.

Supplementary guidance for the selection of water pipes in land potentially affected by contamination

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Introduction

In January 2011, UK Water Industry Research (UKWIR) published "Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites" (Ref 10/WM/03/21; the 'UKWIR Guidance'). Its aim is to ensure that the correct materials are selected for water pipes and components to be used below ground in brownfield sites to protect the quality of drinking water whilst taking into account the service life of the water distribution system. It supersedes the Water Regulations Advisory Scheme (WRAS) Information and Guidance Note 9-04-03 "Laying Pipes in Contaminated Land" which has been withdrawn.

The UKWIR Guidance is for use by developers, self-lay organisations, water companies and consultants when planning, designing and constructing water mains and/or services in brownfield sites. It defines brownfield sites as "land or premises that have previously been used or developed. They may also be vacant or derelict. However, they are not necessarily contaminated." The UKWIR Guidance states that it does not apply to greenfield sites; however, we consider this supplementary guidance and the relevant sections of the UKWIR guidance as being equally suitable for application to those greenfield sites considered to be potentially affected by contamination. Where greenfield sites are not affected by contamination a preliminary risk assessment (see below) will suffice.

The UKWIR Guidance also states that there should be no departure from its provisions *"except where formally approved by the Water Company, such departure being technically justifiable or representing advances in knowledge or product development".*

We have adopted the UKWIR Guidance in principle and produced this company specific supplementary guidance (the 'UUW Guidance') which includes the Risk Assessment for Water Pipes (the 'RA').

This guidance does not cover operative safety, health exposure modelling or accidental pipe damage.

Risk Assessment for Water Pipes in Land Potentially Affected by Contamination

Any application for new water supplies to a development (construction of new properties, or renovation or conversion of existing buildings) in land potentially affected by contamination shall include a completed RA.

As a minimum a desk study (preliminary risk assessment) shall be provided with the RA in accordance with the framework in Environment Agency publication "Model Procedures for the Management of Land Contamination" (ref: CLR11) that sets out whether the land through which the pipes are to be laid may be affected by contamination. The application of the source, pathway, receptor concept will be an integral part of any pipeline risk assessment. For each potential source (the contamination) and each potential receptor (the water pipe), consideration shall be given to whether a potential pathway between source and receptor exists, or may exist in the future, linking the two. There are normally only three pathways by which contamination may come into contact with water pipes. These are direct contact with the soil or backfill, an excessive vapour phase or a contaminated groundwater regime. If none of these conditions exist on site (adopting the source, pathway, receptor concept) then it is likely that extended and/or targeted soil testing will not be required and a simple risk assessment will suffice. For those sites where land may be affected by contamination appropriate testing shall be undertaken on the materials within which the pipes are to be laid, whether that be existing ground materials, remediated materials or imported capping materials. The testing requirements are as described in the following section.

The signatories of the Water Supply Application Form and the RA must ensure that all assessments of land condition have been carried out in accordance with applicable current standards and guidelines by or under the direction of a suitably qualified competent person.

We require the competent person to be a) a chartered member of an appropriate professional body (such as the Institution of Civil Engineers, the Geological Society of London or the Royal Institution of Chartered Surveyors) with relevant experience of investigating contaminated sites or b) a Specialist in Land Condition (SiLC) with appropriate geo-environmental experience.

Testing Requirements

How to contact us about the information in this leaflet



DeveloperServicesWater@uuplc.co.uk'



0345 072 6067
Opening hours:
8am-5pm Mon to Thurs
8am-4.30pm Fri

The soil, rock and if appropriate groundwater tests that are required on all sites where the potential for organic contamination has been identified in the desk study and where water pipes are proposed to be laid must be accredited by United Kingdom Accreditation Service (UKAS) as a minimum and where commercially available the Environment Agency's Monitoring Certification Service (MCERTS). These accredited tests should be undertaken for:

Banded hydrocarbons EC5-EC10, EC10-EC16, EC16-EC40 (Total aliphatic and aromatic hydrocarbons for each banding may be summed). Aliphatic/aromatic fractionation and subsequent banding may be required should a more detailed site specific risk assessment be undertaken. The bandings have been amended to take into account readily available laboratory tests. The equivalent carbon number (EC) is used to assess petroleum hydrocarbon mixtures rather than the actual number of carbon atoms in the molecule in line with guidance issued by the Environment Agency (2005).

Volatile organic compounds (VOCs) (method by head space or purge & trap GCMS) with tentative identification of compounds greater than 20µg/kg. The method used should be capable of detecting a wide range of compounds listed in US EPA Method 8260C or similar. The method should include analysis of naphthalene.

BTEX (Benzene, toluene, ethyl benzene and xylenes) plus MTBE (Methyl-tertiary butyl ether) (by head space GCMS)

Semi-Volatile Organic Compounds (SVOCs) (method by GCMS) with tentative identification of compounds greater than 20µg/kg The method used should be capable of detecting the compounds listed in US EPA Method 8270D or similar. The total concentration of SVOCs excludes polycyclic aromatic hydrocarbons, ethers, nitrobenzene, ketones, aldehydes, phenols, cresols and chlorinated phenols. Phenols, cresols and chlorinated phenols which are detected by the SVOC analysis are given their own assessment criteria.

We do not consider Table G1 and Table 3.1 of the UKWIR Guidance to be a definitive guide for assessing total concentrations. Table 1 in the RA below replaces Table 3.1 of the UKWIR Guidance.

Where previous site uses include the use, storage, treatment, disposal or manufacture of any of the following, appropriate testing for these substances will be required:

- Ethers, nitrobenzene, ketones, aldehydes and amines. Note that the presence of amines on any site at the proposed pipe depth +/- 1.0m precludes the use of polyethylene. The methods of analysis and method of calculation of total concentrations of these compounds will need to be agreed with UUW.

To comply with the testing requirements, the suites of tests that are required on all brownfield sites where wrapped steel, wrapped ductile iron or copper pipes are to be laid as minimum must include:

- pH, Conductivity and redox potential

Sufficiency of Testing

Water pipes are normally laid at between 0.75 and 1.35m from finished ground level to crown of pipe. Samples taken and tested must represent both a) the soil in which the water pipes are to be laid and b) the soil down to at least 500mm below the underside of the proposed pipe. Where the proposed depth of the pipes is unknown at the time of application, soil samples representative of the ground condition between surface level and 1.5m below finished ground level shall be taken as a minimum. Where appropriate (see UKWIR Guidance) groundwater sampling and groundwater monitoring will also be necessary. Photo-ionisation detection (PID) monitoring along the proposed route of the pipeline may be employed, though this does not provide a definitive guide to the suitability of water pipe materials.

Where required a sufficient number of test results should be obtained from the material in which the pipes are to be laid. CLAIRE/CIEH 2008 "Guidance on comparing soil contamination data with a critical concentration" may be used, where appropriate, to justify the number of soil samples tested; however, this statistical model should not be used on heterogeneous materials or used to average test results from different types of materials.

Further guidance on representative sampling is contained within BS10175:2011 Code of Practice for the Investigation of Potentially Contaminated Sites, the Department of the Environment's Contaminated Land Research Report "Sampling strategies for contaminated land" prepared by The Centre for Research into the Built Environment, Nottingham Trent University (Ref: CLR 4; 1994) and the Environment Agency's "Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination" (ref: R&D Technical Report P5-066/TR; 2000).

Where remediation has been carried out on the site, the test results obtained from validation samples will be used in the assessment. Where a horizontal capping system has been or will be employed using materials spread across a site, sufficient samples will need to be taken to characterise the capping material used and the results presented to UUW. However, the sufficiency of sampling on the horizontal capping system, in which the pipeline will be placed, may be assessed on the basis of the source, quantity and type of materials used.

Detection Limits

Only positive concentrations, ie those above the limit of detection should be used in summation of VOC and SVOC (or other test groups of compounds ie phenols, cresols and chlorinated phenols). Laboratory methods shall provide a minimum limit of detection of 10µg/kg for each individual VOC or SVOC (or other test groups of compounds) quantitatively detected in accordance with the methods described above. For tentatively identified compounds (TICs), only those compounds with a concentration of 20µg/kg or greater shall be used in the summation of VOC and SVOC (or other test groups of compounds).

Protective Measures

Where polyethylene, ductile iron, steel or copper pipes are to be laid on a brownfield site or other land potentially affected by contamination (whether or not it has been remediated) and where the concentrations exceed the generic guideline values set out in Table 1 of the RA, the developer shall provide either:

a) a robust risk assessment to show how any contaminants will not significantly impact on proposed water supplies or buried assets over the lifetime of the assets; or

b) more suitable pipe materials; or

c) an engineering solution to protect the pipe work backed up by an adequate assessment of the risk.

Liquid free phase product (e.g. oil or free solvent layers) shall not remain in the ground or groundwater in the vicinity of water pipes, whether barrier pipe or any other pipe materials are used.

When designing pipe routes on land potentially affected by contamination, new preferential contamination pathways along the route of new water pipes shall not be created. Particular measures may be required to prevent the possible migration of contamination through pipe bedding and into controlled waters.

References

BS10175: 2011
"Investigation of Potentially Contaminated Sites Code of Practice"

CLAIRE/CIEH
"Guidance on comparing soil contamination data with a critical concentration" 2008

Department of the Environment Contaminated Land Research Report
"Sampling strategies for contaminated land" prepared by The Centre for Research into the Built Environment, Nottingham Trent University (Ref: CLR 4) 1994

Environment Agency
"Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination"
(ref: R&D Technical Report P5-066/TR) 2000

Environment Agency
"Model Procedures for the Management of Land Contamination" (ref: CLR11), 2004

Environment Agency P5-080/TR3
"The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils", 2005

UK Water Industry Research (UKWIR)
"Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites" (Ref 10/WM/03/21) January 2011

Water Regulations Advisory Scheme (WRAS) Information and Guidance Note 9-04-03
"Laying Pipes in Contaminated Land" 2002

Frequently asked questions

Why has UUW published supplementary guidance to the 'UKWIR Guidance for the Selection of Water Pipes to be used in Brownfield Sites'?

UUW agrees with the UKWIR Guidance in principle; we have published supplementary guidance to clarify some of the areas in which it will operate.

Does the UKWIR Guidance only apply to 'brownfield sites'?

Yes, the UKWIR Guidance does apply to brownfield sites; in addition United Utilities Water will apply this guidance and the UUW supplementary guidance to any greenfield sites which are potentially affected by contamination.

Who is responsible for completing/ signing the Risk Assessment for Water Pipes (RA)?

This may be the Developer, the Developers representative, or the competent person directing the land assessment. The signatory of the Risk Assessment for Water Pipes (RA) must ensure that all land assessments have been carried out in accordance with current standards and guidelines by or under the direction of a suitably qualified competent person. For water supply applications on land potentially affected by contamination, UUW requires the competent person to be either a chartered member of an appropriate professional body (such as the Institution of Civil Engineers, the Geological Society of London or the Royal Institution of Chartered Surveyors) with relevant experience of investigating contaminated sites or a Specialist in Land Condition (SiLC). This level of competency is intended to promote good practice and high professional standards and is no greater than that required for planning purposes by Local Authorities under Planning Policy Statement 23, see link below: **www.communities.gov.uk/publications/planningandbuilding/planningpolicystatement23**

Do we need to agree the number and location of soil samples with the Water Company as indicated by the UKWIR guidance following the Preliminary Risk Assessment (PRA)?

Where a preliminary risk assessment (PRA) highlights the need for a site investigation UUW considers it is a responsibility of the qualified competent person directing the land assessment to determine the location and frequency of sampling. UUW's role would be to confirm that the appropriate choice of pipe material has been made on the basis of the information provided.

What do we do if the pipe route is not known when the Site Investigation report is commissioned?

Where the route of the pipe is not known at the site investigation stage, then any resultant pipe selection needs to take account of any contamination found on the site. Consideration should be given to identifying the route and depth of the pipeline at the site investigation stage to avoid unnecessary testing.

Is it acceptable not to undertake a site investigation and specify the use of barrier pipe which seems to be suitable for all conditions?

Not all brownfield land is contaminated, and because of that a default to barrier pipe is not an acceptable approach to UUW, due to the possibility of higher installation and future maintenance costs. The approach as to whether a site investigation is needed should be risk based. For those sites where land may be affected by contamination appropriate testing shall be undertaken on the ground materials within which the pipes are to be laid, whether that be existing ground materials, remediated materials or imported capping materials.

Examples where defaulting to barrier pipe would not be acceptable: -

- Where a capping layer (non-contaminated) is introduced within which the pipes will be installed.
- Sites with a potential low risk for contamination.
- Where liquid free phase product (e.g. oil or free solvent layers) is in the ground or groundwater in the vicinity of water pipes.
- Where the route of the pipe could be diverted to another suitable location free from contamination.

Are UUW employees who will assess the Design Proposals for contaminated sites suitably qualified?

It is the role of the Developer's suitably qualified competent person to deal with or direct the assessment of land. UUW's role is to assess the Risk Assessment for Water Pipes and supporting Site Assessment Report (SAR) which is provided with any new water supply application (ie. it has been provided in the correct format, proposals for pipe selection are included, the methodology is in line with the UKWIR Guidance and UUW Supplementary Guidance, it has been directed by a suitably qualified competent person etc.). If UUW do need to provide assistance or information in deciding pipe materials then the assessment would be carried out under the direction of a suitably qualified competent person.

What happens to existing PE that is in the ground under the "old" guidelines?

The latest UKWIR guidance and UUW's supplementary guidance are intended to be used to decide what pipe materials will be used for new water mains and services. It will have no effect for developers with regard to any parts of UUW's existing network.

Will the Developer be required to submit a fully completed Risk Assessment for Water Pipes (RA) and supporting Site Assessment Report (SAR), including pipe material recommendation, for both the option of a mains requisition application and the option of a self-lay application?

Yes, UUW expect the 'Developer', as defined in UUW Supplementary Guidance, to submit a Risk Assessment for Water Pipes (RA) and supporting Site Assessment Report (SAR), including pipe material recommendation, in respect of any water pipes being installed on the development irrespective of who is to install them.

Does Table 1 in UUW's Risk Assessment for Water Pipes (RA) replace any of the tables to be completed in the Site Assessment Report (SAR) as required in the UKWIR Guidance?

UUW does not consider Table G1 and Table 3.1 of the UKWIR Guidance to be a definitive guide for assessing total concentrations. Table 1 in UUW's RA replaces Table 3.1 of the UKWIR Guidance.

Have any other Water Companies adopted the UKWIR Guidance yet?

You will need to contact the water company concerned if you are intending to install water pipes outside UUW's licensed area.

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About us

United Utilities is the North West's water company. We keep the taps flowing and toilets flushing for seven million customers every day. From Crewe to Carlisle, we work hard behind the scenes to help your life flow smoothly.

United Utilities Water Limited, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Warrington WA5 3LP.
Registered in England and Wales. Registered Number 2366678.

03/15/SD/6445a

Risk assessment for water pipes (RA)

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The risk assessment for water pipes will help you choose appropriate materials for your development. We are happy to deal with a risk assessment for water pipes in advance of any formal application for a new water supply.

If you need any help completing the form please call us on **0345 072 6067.**

Section 1: Development details	
Development Name *(if it has one)*	Manchester Engineering Campus Development
Development Address	Booth Street East, Manchester
OS Grid Reference *(mid point)*	SJ 84546 97043
Developers Name	Balfour Beatty
UUW reference number *(for UU use only)*	

Please provide details below of the current and historical use of the site and adjacent sites.
If your supporting information has details of the current and historical site use, please reference below the relevant sections of your report.

The site is currently vacant land being prepared for redevelopment. It was until recently occupied by several buildings used for academic purposes and student accommodation, as part of the University of Manchester.

Historically, the site has been occupied by terraced housing, together with various public uses such as assembly rooms, a club house, public/beer houses, chapels and churches. Commercial uses within the site boundary included a warehouse, marble and stone yard, municipal water works, aerated water works, clothing factory, printing works, a mother and baby hospital, dairy and garage.

A description of recent use and the site history are detailed in Sections 3.2 and Section 5.0 of the Desk Study report.

Section 2: Preliminary risk assessment	
Has your desk study and site walkover identified any land potentially affected by contamination?	☒ Yes ☐ No

If the site is potentially affected by contamination but you have not completed any intrusive site investigation please provide details below of the rationale behind the intended pipe selection.
If your supporting information has details of the rationale behind the intended pipe selection, please reference below the relevant sections of your report.

Intrusive site investigation has been carried out within the development site, but not specifically along the proposed pipeline route. This is because at the time of the investigations, the proposed pipeline route was not known. In addition, the development works will involve a substantial amount of excavation and it is likely that a significant amount of made ground will be removed from the site.

The proposed water supply pipe route connects to the building after passing under the pavement on the east side of York Street, with the remainder of the pipeline being within public highway (York Street). The length of pipeline which lies within the site boundary is approximately 5m, all of which is located beneath the pavement.

Section 3: Intrusive site investigation

Have you completed any intrusive site investigation?	☒ Yes ☐ No
Have you completed any none intrusive site investigation?	☐ Yes ☒ No
Date(s) when the site investigation(s) undertaken	14 04 2014 23 04 2015 D D M M Y Y Y Y
At what level has groundwater been encountered?	1 to 2.5 metres below ground level or ☐ Not encountered

Table 1 (Pipeline Selection Risk Assessment Summary (PSRAS)) below classifies testing required where the preliminary risk assessment has identified land potentially affected by contamination. Please provide details below of any test groups which have not been tested and the rationale for not testing.

If your supporting information has details of the rationale behind not testing any particular test groups, please reference below the relevant sections of your report.

Test groups not included are:
- esters, nitrobenzenes, ketones, aldehydes and esters
these substances are not known to have been stored, manufactured or disposed of on the site.

If the intrusive site investigation has identified concentrations above the PE threshold (see PSRAS) and your intended pipe selection is PE. Please provide details below of the rationale behind the intended pipe selection.

If your supporting information has details of the rationale behind the intended pipe selection, please reference below the relevant sections of your report.

The intrusive investigation identified a single concentration of E10-E16 aliphatic and aromatic hydrocarbons about the threshold and two concentrations of Total SVOCs above the threshold. None of the exceedences were detected at the depth where the pipe would be laid, or in the area where the pipe is to be laid.
The pipe is to be laid within the pavement outside the site and within public highways, and the existing intrusive data does not cover the pipeline area. The soil conditions within the site can not be taken to be indicative of conditions outside the site.

Section 4: Site remediation

Please provide details below of any site remediation (which may include a change in site levels) already completed.

If your supporting information has details of the site remediation already completed, please reference below the relevant sections of your report.

The site has been prepared for redevelopment by demolishing existing structures within the site boundary. A small quantity of asbestos contamination was encountered during demolition, which was stockpiled and removed from site for disposal to landfill. No other remediation has taken place to date.

Has the PSRAS (Table 1) been completed using appropriate data after remediation?	☐ Yes ☒ No ☐ N/A

Please provide details below of any proposed site remediation and an analysis of whether this will affect your intended pipe selection.

If your supporting information has details of any proposed site remediation and whether this will affect your intended pipe selection, please reference below the relevant sections of your report.

No general site remediation is proposed, as the concentrations of contamination encountered within the site were not unacceptable for the proposed development (academic buildings). A remediation strategy has been prepared for the development, which involves monitoring the excavations and earthworks to ensure that any unexpected contamination is excavated and stockpiled until it can be proven to be suitable for re-use within the site, or taken for offsite disposal.

Section 5: Final use of site

Please provide details below of any chemicals (including fuel) to be stored on site and any other future contamination risks which may affect your intended pipe selection.

If your supporting information has details of potential contamination risks which may affect your intended pipe selection, please reference below the relevant sections of your report.

None.

What water pipe materials are intended to be used on site?	☐ PE ☐ PE Barrier Pipe Type A ☒ PE Barrier Pipe Type B Other *(please specify)*:

Section 6: Additional information

Please provide details below of any chemicals (including fuel) to be stored on site and any other future contamination risks which may affect your intended pipe selection.

If your supporting information has additional information to support your intended pipe selection, please reference below the relevant sections of your report.

There is a external gas bottle store area proposed for storage of laboratory gases but this is to be located at the South-Eastern side of the site (c. 120 m away) near the James Chadwick Building

Section 7: Risk assessor

Name and relevant qualifications of person directing the risk assessment for water pipes	Delyth Harrison MCIWEM C.WEM C.Sci
Name and address of risk assessor's company	Ove Arup and Partners Ltd 9th Floor, 3 St. Paul's Place Norfolk Street, Sheffield S1 2JE
Date risk assessment performed	29 09 2016

Section 8: Declaration

I confirm I have completed this form and provided supporting information in accordance with 'UKWIR Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites' and UUW's Supplementary Guidance. I also confirm that if any further site investigation is needed and carried out, I will be required to submit an additional Risk Assessment for Water Pipes with the relevant supporting information. I understand that failure to supply any of the required information may delay my application being processed.

Name		Company	Ove Arup and Partners Ltd
Telephone	0114 2833632	Date	12 06 2017

Please email the completed form and supporting information to **DeveloperServicesWater@uuplc.co.uk**. Alternatively you can fax a paper version to **01925 677973** or post to us at United Utilities Water, Developer Services, Windermere House, Lingley Mere, Warrington WA5 3LP.

United Utilities
helping life flow smoothly

About us

United Utilities is the North West's water company. We keep the taps flowing and toilets flushing for seven million customers every day. From Crewe to Carlisle, we work hard behind the scenes to help your life flow smoothly.

United Utilities Water Limited, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Warrington WA5 3LP.
Registered in England and Wales. Registered Number 2366678.

03/15/SD/6445b

Table 1 - Pipe selection risk assessment summary (PSRAS)

1. Testing must be undertaken on the materials within which the pipes are to be laid, whether that be existing ground materials, remediated materials or imported capping materials. Please use the appropriate testing data to complete Table 1 below.

2. If more than one pipe selection is being made, for example, for pipes in different areas of a large site, a completed PSRAS is required for each selection.

What materials have been tested to populate Table 1 below?	☒ Existing ground materials ☐ Remediated materials ☐ Imported capping materials

All concentrations in mg/kg								
Test Group	**Testing Required?**	**PE threshold**	**Metal Pipes/ Barrier Pipe**	**Laboratory Detection Limit**	**Testing UKAS accredited Y/N**	**Maximum concentration at proposed pipeline depth** *See Note [2]*	**Maximum site concentration** *See Note [3]*	**Locations and depths where concentrations exceed proposed pipeline threshold**
Total VOCs	Where Preliminary Risk Assessment (PRA) has identified land potentially affected by contamination	0.5	Pass	0.05	Y	<0.05	<0.05	n/a
Total BTEX & MTBE		0.1	Pass	0.01	Y	0.013	<0.01	n/a
Total SVOCs (excluding PAHs and those substances marked with an *)		2	Pass	0.1	Y	<0.1	3.8	WS102 @ 0.5m, WS109 @ 0.3m
EC5-EC10 aliphatic and aromatic hydrocarbons		2	Pass	0.1	Y	<0.1	<0.1	n/a
EC10-EC16 aliphatic and aromatic hydrocarbons		10	Pass	2	Y	<10	18	WS109 @ 0.3m
EC16-EC40 aliphatic and aromatic hydrocarbons		500	Pass	4	Y	71	97	n/a
Phenols* (from SVOC analysis)		2	Pass	0.1	Y	<0.1	<1	n/a
Cresols and chlorinated phenols* (from SVOC analysis)		2	Pass	0.1	Y	<0.1	<0.1	n/a
Ethers*	Only where identified	0.5	Pass					
Nitrobenzene*		0.5	Pass					
Ketones*		0.5	Pass					
Aldehydes*		0.5	Pass					
Amines		Fail	Pass					
Corrosive	Conductivity, Redox and pH	Pass	*See Note [1]*	n/a	Y	pH 8.5	pH 8.5	TPA1 @ 1.2m

Note [1] Threshold: For wrapped steel, corrosive if pH<7 and conductivity > 400µS/cm. For wrapped ductile iron corrosive if pH<5, Eh not neutral and conductivity > 400µS/cm. For copper, corrosive if pH<5 or >8 and Eh positive.

Note [2] Water pipes are normally laid at 0.75-1.35m below finished ground level.

Note [3] Also state if liquid free product is present in soil or groundwater.

Attachment E2: Extract from Mechanical, Electrical and Public Health Engineering Employer's Requirements. 5983-ARP-MECD-Z-SP-ME-51-00001 including drawing 5983-ARP-MECD-EXG-SI-C-94-2XE01 Revision T4 showing the route of new water supplies through the site.

The University of Manchester

Manchester Engineering Campus Development

Mechanical, Electrical and Public Health Engineering Employer's Requirements

5983-ARP-MECD-Z-SP-ME-51-00001

Tender T2 | 16 June 2017

Job number 235779-00

Ove Arup & Partners Ltd
6th Floor Piccadilly Place
Manchester M1 3BN
United Kingdom
www.arup.com

ARUP

Service	Material	Jointing Method
Radio-active Drainage	Twin wall SDR 17.6 Polypropylene to BS EN 1852 DIN 8077 & DIN 9078	Polypropylene Electro-fusion welded couplings and mechanical ring seal captive nut and olive to BS EN 1852 DIN 8077 & DIN 9078
Laboratory waste and ventilation pipework	Polypropylene to BS EN 1451-1	Polypropylene Electro-fusion welded couplings and mechanical ring seal captive nut and olive to BS EN 1451-1
Pumping Mains	Ductile iron to BS EN 598 SDR11 Polypropylene to BS EN 1852 DIN 8077 & DIN 9078	Double socket or flanged BS EN 598 Fusion welded couplings
Laboratory gas pipework	Degreased TCC grade 316 stainless steel 6.0 grade gas purity	Orbital welded 6.0 grade gas purity
Natural gas pipework (up to 50mm)	Black mild steel to BS EN10255. Heavy grade.	Screwed Malleable iron to BS EN 10242.
Natural gas pipework (over 65mm)	Black mild steel to BS EN 10255. Heavy weight.	Welded to BS EN 10253-1.
Compressed air pipework	Teseo Extruded aluminium alloy to EN AW-6060 T6 EN 573-3:1996	Mechanically clamped with double MVR O-ring seal
Dry Riser	Galvanised mild steel to BS EN 10255. Heavy grade.	Gruvlok couplings to ASTM A-53 / A-536
Sprinklers	Black mild steel to BS EN 10255. Medium weight.	For up to 80mm: Screwed Malleable iron to BS EN 10242. For 100mm and above: Gruvlok couplings to ASTM A-53 / A-536
Water heater blow offs	BS2874:Part2 Table X (EN1057-R250)	Capillary lead free soldered to BS 864:Part 2 (BS EN 1254-1)
Steam	As per DSSR Steam Specification (20/05/2016)	
Steam condensate (gravity)	As per DSSR Steam Specification (20/05/2016)	
Steam condensate (pumped)	As per DSSR Steam Specification (20/05/2016)	

4.12.1.6 The following materials shall be used for external below ground piped services:

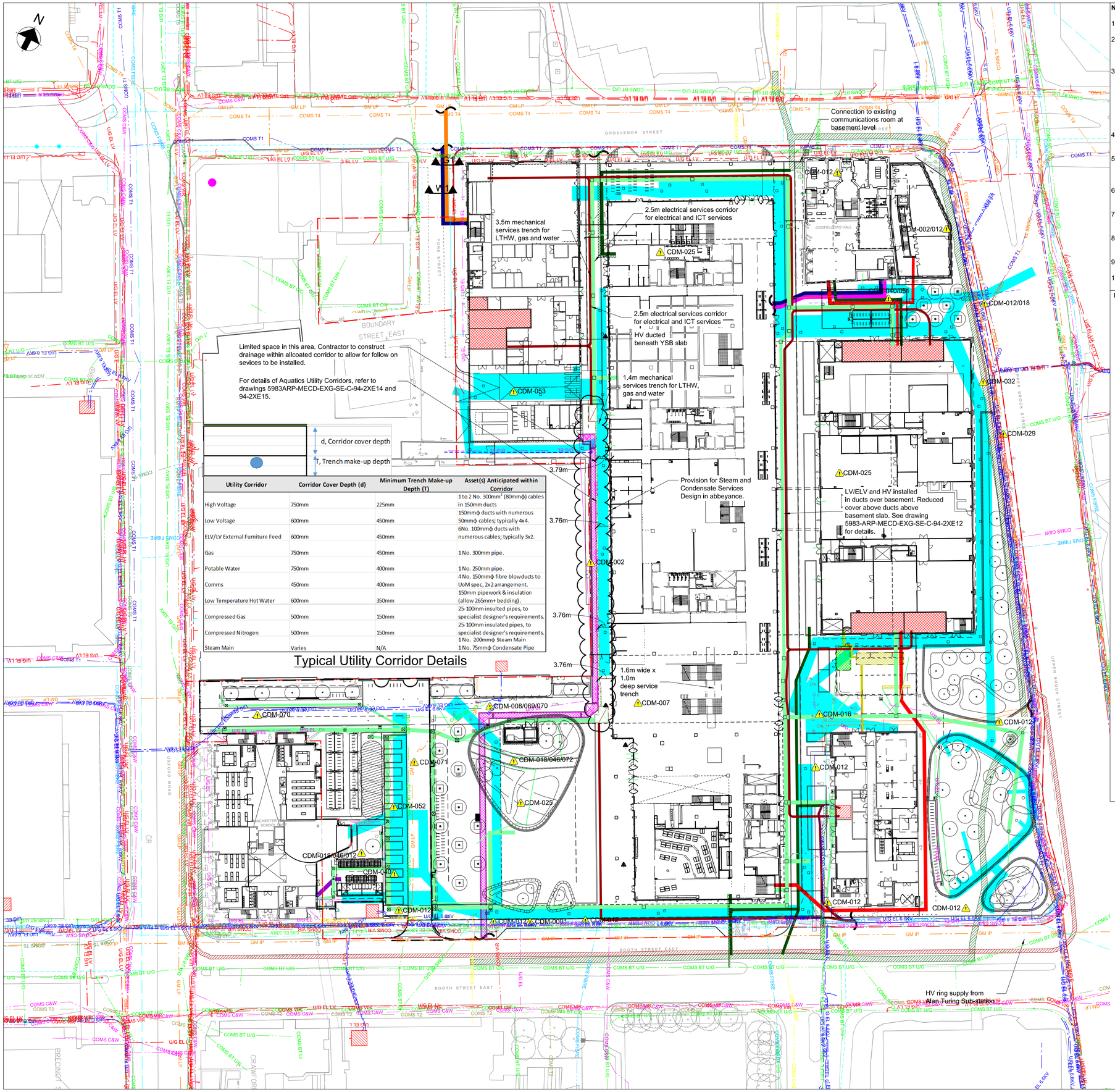
Service	Material	Jointing Method
Domestic water services	Multi-layer MDPE/aluminium barrier pipe to BS 6920, Type A WIS 4-32-19 Polypipe Polyguard or equal & accepted	Gun metal compression couplings Polypipe Polyguard or equal & accepted
LTHW pipework (buried)	Pre-insulated cross-linked polyethylene Brugg Calpex or equal and accepted	Electro-welding joints in crosslinked polyethylene

4.12.1.7 The following materials shall be used for ductwork in the building:

Ductwork Type	Location	Systems
Galvanised mild steel	Plant areas and risers	Intake, exhaust and supply air ductwork
		General and toilet extract ductwork
		Non-chemical LEV ductwork
Pre-insulated Spiralite ductwork from phenolic insulation board	At each occupied floor level	Supply air ductwork
		General and toilet extract ductwork
		Non-chemical LEV ductwork
PVC-u	All	Fume extract ductwork
		Solvent cupboard ductwork
		Ventilated chemical storage ductwork
PTFE coated PVC-u	All	Process extract ductwork associated with the use of hydrofluoric acid
Twin wall stainless steel	All	High temperature process extract systems (>750 °C)
Twin wall stainless steel	All	Dedicated equipment flues and CHP flues
Single wall stainless steel	All	Gas fired condensing boiler flues

4.12.1.8 General extract ductwork serving the basement areas shall be of fire rated construction to Method 3 described in BS 9999, and comply with the performance criteria in BS 476-24 such that it can be used for smoke extract purposes.

4.12.1.9 All external galvanised mild steel ductwork shall be suitably protected using a fully sealed proprietary cladding system applied over vapour sealed insulation.



Utility Corridor	Corridor Cover Depth (d)	Minimum Trench Make-up Depth (T)	Asset(s) Anticipated within Corridor
High Voltage	750mm	225mm	1 to 2 No. 300mm² (80mmϕ) cables in 150mm ducts
Low Voltage	600mm	450mm	150mmϕ ducts with numerous 50mmϕ cables; typically 4x4.
ELV/LV External Furniture Feed	600mm	450mm	6No. 100mmϕ ducts with numerous cables; typically 3x2.
Gas	750mm	450mm	1 No. 300mm pipe.
Potable Water	750mm	400mm	1 No. 250mm pipe.
Comms	450mm	400mm	4 No. 150mmϕ fibre blowducts to UoM spec, 2x2 arrangement.
Low Temperature Hot Water	600mm	350mm	150mm pipework & insulation (allow 265mm+ bedding).
Compressed Gas	500mm	150mm	25-100mm insulted pipes, to specialist designer's requirements.
Compressed Nitrogen	500mm	150mm	25-100mm insulated pipes, to specialist designer's requirements.
Steam Main	Varies	N/A	1 No. 200mmϕ Steam Main 1 No. 75mmϕ Condensate Pipe

Typical Utility Corridor Details

Notes

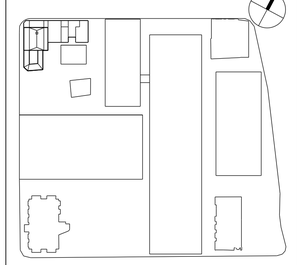
1. All dimensions are in mm, all levels in mAOD unless specified otherwise.
2. This map is reproduced from Ordnance Survey Material with the permission of the Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office (c) Crown Copyright. License Number 0100031673 (2016).
3. Layout is based on Topographical Survey and Utility Tracing drawing 7855/002 rev J undertaken by N D Oliver & Co Ltd dated 07/09/2016, additional Topo undetaken by Survey Systems (Balfour Beatty) supplied 29/06/2016. Positions of services and plant on this drawing are indicative only and are taken from drawings listed above and utility company plans obtained by University of Manchester in August 2013 and UoM owned utility layout drawings. No guarantee is given for the accuracy of information and it is intended for information only.
4. Layout is based on BDP Masterplan drawing 5983-BDP-MECD-EXG-DR-AL-90-10211 to 13 Rev P03 dated 25/05.
5. Proposed ground levels are based on BDP Masterplan drawing 5983-BDP-MECD-EXG-DR-AL-90-10211 to 13 Rev P03 dated 25/05 and BDP drawing 5983-BDP-ACC-EXG-DR-AL-90-10202 C02 dated 06/03/2017.
6. Services may exist at various depths and their routes may deviate within the vicinity of the routes shown.
7. This drawing is not for construction and should not be relied upon for any site related works. Refer to Utility Company Records for details of apparatus.
8. This drawing should be read in conjunction with all relevant Engineer's and Architect's drawings, reports and specifications.
9. This drawing was previously issued as 5983-ARP-SW-BG-SI-CU-121007.
10. For utility corridor details, refer to drawing 5983-ARP-MECD-EXG-SE-C-94-2XE06.

Key

- Planning Site Boundary
- Aquatics Car Park Boundary
- New HV Corridor (1m)
- Enabling Works HV Corridor (0.6m)
- New LV Corridor (1.5m)
- New Water Corridor (1m)
- Demolition Stage Water Corridor (1m)
- New Compressed Gas Corridor (0.5m)
- New Gaseous Nitrogen Corridor (0.25m)
- New Gas Corridor (1m)
- Demolition Stage New Gas Corridor (1m)
- New Communications Corridor (0.75m)
- New BT Corridor (0.65m)
- Enabling Works Communications Corridor (1 - 1.5m)
- New Drainage Corridor (2.5m Varies)
- New Low Temperature Hot Water Services Corridor (1m)
- New Steam and Condensate Services Provision (1.6m Varies)
- New CCTV / Lighting / ELV Corridor (1.05m)
- External Furniture ELV Corridor (0.3m Varies)
- Electrical Switch Room
- Compressed Gas Store
- Compressed Nitrogen Gas Store
- Masterplan Basement Extent
- Mechanical Service Link Trench MEC Hall to York Street Building
- Electrical Service Link Trench MEC Hall to York Street Building/Oddfellows Hall
- Pumped Drainage Corridor (1m)
- Security/Controlled Access Corridor (3m x 0.25m)
- Shared HV and ELV Corridor Provision (0.3m)

The University of Manchester

Keyplan: North:



IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS :-

All	Relevant hazards are indicated on this drawing sheet. Hazards are discribed in greater detail on the Arup Hazard Risk Register	CDM-xxx Per Hazard Risk Register

Item	Hazard	Risk

Rev	Description	By	Date	Chk'd	Auth
T4	Updated to reflect latest masterplan and RFC changes.	TH	23/06/17	MT	TWS
T3	For Tender	TH	22/11/16	TWS	TWS
T2	For Tender	TH	18/11/16	TWS	TWS
T1	For Tender Issue	TH	03/11/16	-	-

MANCHESTER 1824 The University of Manchester

Directorate of Estates and Facilities
Beyer Building
The University of Manchester
Oxford Road
Manchester
M13 9PL

ARUP 6th Floor, 3 Piccadilly Place, Manchester. M1 3BN
T +44 161 228 2331, F +44 161 236 105
www.arup.com

Drawing Status: For Tender

Project: Manchester Engineering Campus Development -5983

Building Name: -

Sub Site Name: -

Site Name: MECD

Drawing Title: Utilities - External Service Corridors

PM	Drawn	Checked	Authorised
-	TH	TWS	TWS
Scale: 1:500	Date: 18/11/16	Date: 18/11/16	Date: 18/11/16

Drawing No.: 5983-ARP-MECD-EXG-SI-C-94-2XE01

Revision: T4

Appendix F

Evidence of additional ground investigation

F1 Evidence of additional ground investigation

The evidence presented in this appendix is to verify that additional ground investigation was carried out within the footprints of existing buildings after demolition but before the start of construction.

Attachment F1 - Rationale and specification for validation testing within building footprint areas

ARUP

Subject	MECD: Validation testing for building footprint areas		
Date	20 October 2016	Job No/Ref	235779

1 Introduction

Balfour Beatty has requested that Arup prepare a brief specification for additional trial pitting and chemical testing to former building footprint areas. MCC Environmental Health department has previously stated that the current extent of ground investigation within the MECD site is inadequate, as previous ground investigations were undertaken when the former student halls of residence were still present, which limited the coverage of investigation on the site.

MCC suggested that once the existing buildings were demolished, further inspection of the footprint areas could be undertaken to improve the coverage of the ground investigation.

Demolition of the buildings on site has taken place in two phases:

- **Phase 1:** Four of the site buildings were demolished in 2015 by Connells: Bowden Court blocks 1 and 2; Ronson Hall and the southern wing of Grosvenor Place. No formation inspections were carried out during the demolition of these buildings as the work was carried out pre-planning.
- **Phase 2:** Three of the site buildings were demolished in 2016 by Connells: the northern wing of Grosvenor Place; the Grosvenor Street building and the Materials Science Building. As the need for a formation inspection was known about at the time Connells were contracted to undertake Phase 2, the demolition specification required Connells to inspect the formation levels for contamination and keep records of the findings. Connells identified an area of asbestos contamination within the foundations of the Grosvenor Street building, which was excavated and removed from site as part of the demolition works contract. Redhills, a specialist asbestos consultancy, have been contracted to advise on the remaining asbestos risks in the ground at the site and have recently completed supplementary investigation in the area of former contamination as well as other areas of suspected asbestos.

It should be noted that the Grosvenor Place building had a small basement area, which has not been demolished to date and the structures remain in the ground in that area.

The purpose of the additional trial pitting and chemical testing is therefore to investigate the footprint areas of those buildings demolished in 2015, namely Grosvenor Place (minus basement area), Bowden Court blocks 1 and 2 and Ronson Hall. It is intended to submit the information from the investigation to MCC in order to partially discharge Condition 5 of the planning consent for the MECD development relating to the adequacy of site investigation information.

This supplementary investigation will not replace the requirement for a general watching brief by a suitably experienced Civil Engineer during the bulk excavation works on the site.

2 Investigation locations

The building footprint areas which require investigation are outlined in red on the attached drawing, together with approximate positions for the trial pits. It is proposed that the investigation will comprise the following:

Grosvenor Place, southern wing

Three trial pits to prove original formation level where possible. One trial pit to be located in the northern part of the wing and two in the southern part. The basement area has been infilled with site-won demolition rubble for safety and will not be investigated at this time.

Bowden Court, Block 1

Two trial pits to prove original formation level. The formation level is understood to have been fairly shallow in the southern part of the site.

Bowden Court, Block 2

Two trial pits to prove original formation level. The formation level is understood to have been fairly shallow in the southern part of the site.

Ronson Hall

Two trial pits to prove original formation level. The formation level is understood to have been fairly shallow in the southern part of the site.

3 Sampling and testing requirements

The trial pits should be dug using a tracked 360° excavator to ensure that the formation level can be reached where it is at depth, or where obstructions remain in the ground. The trial pits should be large enough to allow the ground conditions to be inspected. Based on experience from the demolition of Grosvenor Street building, trial pits should try and pick up the edges of former buildings where foundations were present, as contaminated materials may have been placed beneath footings in these areas.

The locations of all trial pits or trenches should be surveyed so that their exact locations can be plotted on a site plan and superimposed over the former building footprint areas. This information will be required to form part of the Verification Report. Should any contamination be identified during the laboratory testing, recording the location will also enable pits to be re-visited at a later date if necessary.

Up to two environmental samples should be taken from each trial pit from the made ground (fill) materials. More than one sample may be required where there is an obvious difference in the nature of the made ground, to ensure that all materials are characterised. Any recently-placed demolition arisings on the surface should not be sampled for chemical analysis.

Each environmental sample should be transported to the analytical laboratory within 24 hours of being taken, and analysed for the following chemical parameters:

Determinand	Detection level required
Arsenic	1 mg/kg
Cadmium	0.5 mg/kg
Chromium - total	10 mg/kg
Copper	10 mg/kg
Lead	10 mg/kg
Mercury	0.5 mg/kg
Nickel	10 mg/kg
Selenium	0.5 mg/kg
Zinc	10 mg/kg
Antimony	0.1 mg/kg
Beryllium	1 mg/kg
Vanadium	0.5mg/kg
Cyanide - total	5 mg/kg
pH	0.1 units
Boron (water soluble)	0.5 mg/kg
Phenols - total	1 mg/kg
Total Organic Carbon	0.1% w/w
TPHCWG	10 mg/kg
BTEX	0.05 mg/kg
USEPA 16 Polyaromatic Hydrocarbons	0.2 mg/kg
Semi-Volatile Hydrocarbons*	0.01 mg/kg
Volatile Hydrocarbons*	0.01 mg/kg
Chromium - hexavalent	5 mg/kg
Asbestos – ID and quantification	0.001%
* to be scheduled for testing only if evidence of hydrocarbon or chemical contamination is noted within the ground/sample	

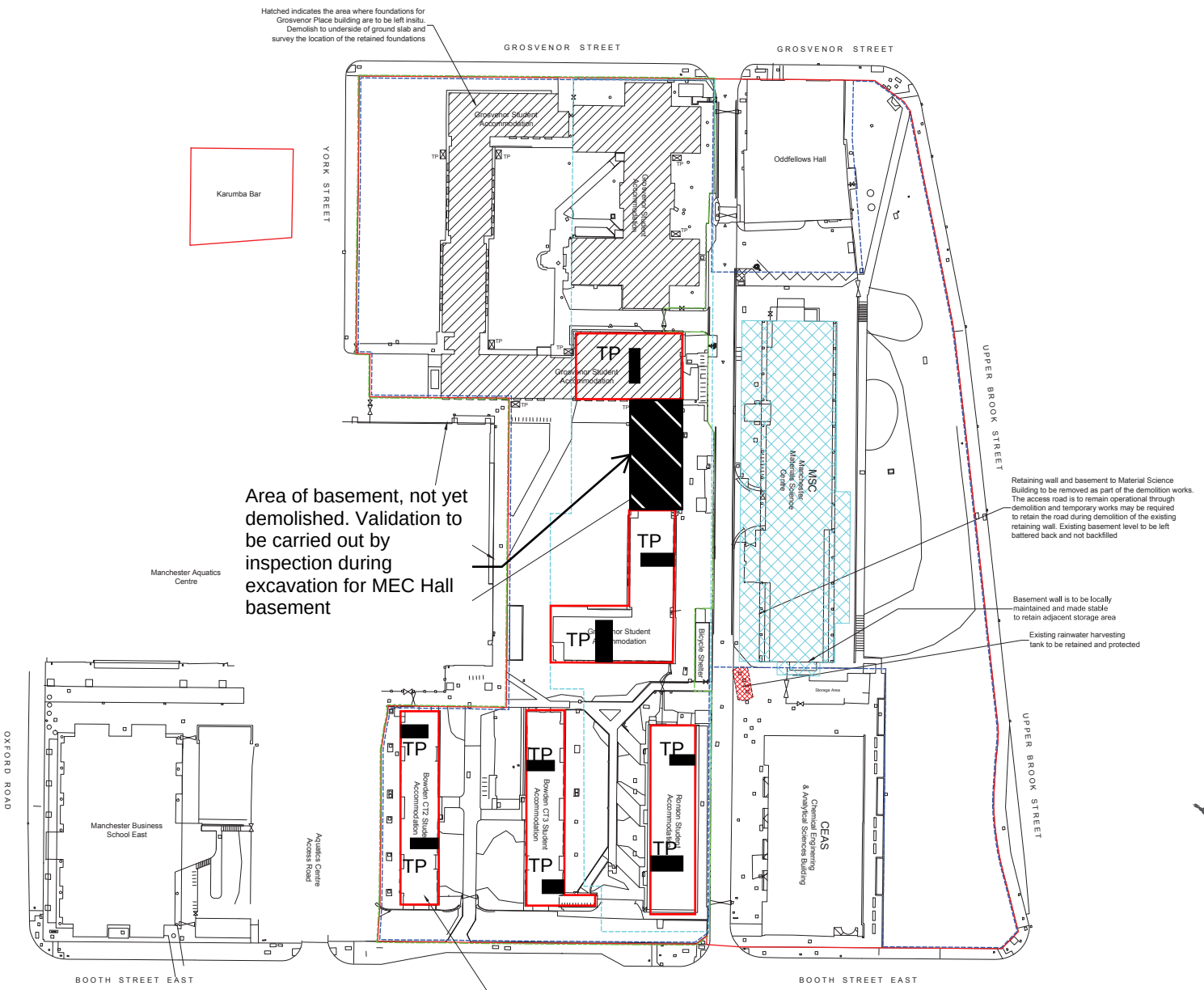
The chemical testing listed above is based on the scope of testing adopted for the previous ground investigations. It is understood that Redhills will be present during the investigation and will be monitoring the excavation of the trial pits for asbestos.

4 Interpretation of data

The chemical testing data will be compared against the same assessment criteria used in the previous risk assessment carried out for MECD by Arup and reported in the Outline Remediation Strategy for the development. The results will be reported to MCC and a record kept for inclusion in the final Verification Report for the development.

NOTE
Information concerning the location of services is given for your assistance and is intended for guidance only.
The accuracy thereof cannot be guaranteed.

Notes
1. This drawing is to be read in conjunction with all other Architects / Engineers drawings and specifications.
2. This drawing is to be read in conjunction with the Arup Demolition Specification.
3. Refer to drawing no. 5983-ARP-00-XX-GA-S-102001 for all other notes.



Demolition

Location of existing basements to be demolished

Foundations to be retained

Legend

Site Boundary Line

Indicative Hoarding for Phase 1 Demolition Boundary (to be installed in phase 0)

Works within zone to take place between 5th June and 1st September 2015 only

Phase 2 Demolition Boundary. Hoarding to be left insitu following completion of demolition works

TP Location of trail pits to be completed prior to demolition works to verify the nature of the existing foundations. Location and number of trial pits subject to agreement with the supervisor. Trail pits to be fully recorded and surveyed as agreed with the supervisor

Drawing to be read in colour

Topographical Survey information imported from N D Oliver & Co Ltd. Site Survey drawing no. 7855_001 rev0 received 30th April 2014.

Redline site boundary supplied by Mecanoo Architects received 4th August 2014.

revisions:

22/05/2015	T2	Contract Issue	CL	GH
15/12/2014	T1	Issued for Tender	CL	GH

mecanoo architecten bv
Oude Delft 203, 2611 HD Delft, the Netherlands
P.O. Box 3277, 2601 DG Delft, the Netherlands
Manchester Office: 52 Princess Street, Manchester M1 6JX, UK
T +31 (0)15 279 81 00, F +31 (0)15 279 81 11
www.mecanoo.nl, info@mecanoo.nl

ARUP
6th Floor, 3 Piccadilly Place, Manchester. M1 3BN
T +44 161 228 2331, F +44 161 236 105
www.arup.com

MANCHESTER 1824 The University of Manchester
The University of Manchester, Oxford Road, Manchester M13 9PL, UK

project name:
Manchester Engineering Campus Redevelopment

sheet name:
Demolition Plan
Existing Basements

date:	project phase:	status:
29/09/2014	Demolition	Tender
scale:	paper size:	project number:
1:500	A1	5983

sheet number: 5983-ARP-00-XX-GA-S-102002
revision number: T2

Attachment F2 - Agreement of scope of investigation from Manchester City Council

Del Harrison

From: L.Miller@manchester.gov.uk
Sent: 25 October 2016 08:30
To: Del Harrison
Cc: Carl Lowe; Cowie, John; Sam Moss
Subject: Re: MECD: proposals for additional investigation

Good Morning Del,

Sorry for the delay responding but I was in meetings/training all day Friday and off yesterday.

I agree with the proposals for the additional investigation and look forward to seeing the results.

Kind Regards

Laura

Laura Miller MRes, MA, BSc(Hons)
Neighbourhood Officer - Environmental Protection
Citywide Support - Environmental Health

The Neighbourhoods Service
Growth and Neighbourhoods
Manchester City Council
1 Hammerstone Road
Manchester
M18 8EQ

Tel: 0161 234 5004 (Internal: 801 31742)

Email: l.miller@manchester.gov.uk
Web: http://www.manchester.gov.uk

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You can find out more by visiting www.manchester.gov.uk/electoralregister

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Del Harrison <Del.Harrison@arup.com>

22/10/2016 08:32

To "L.Miller@manchester.gov.uk" <L.Miller@manchester.gov.uk>
cc "Cowie, John" <john.cowie@balfourbeatty.com>, Sam Moss <Sam.Moss@arup.com>, Carl Lowe <Carl.Lowe@arup.com>
Subject MECD: proposals for additional investigation

Hi Laura,

As advised in my recent email, Balfor Beatty has decided to proceed with some additional ground investigation, in the footprint areas of the buildings which have not yet had formation inspections, in order

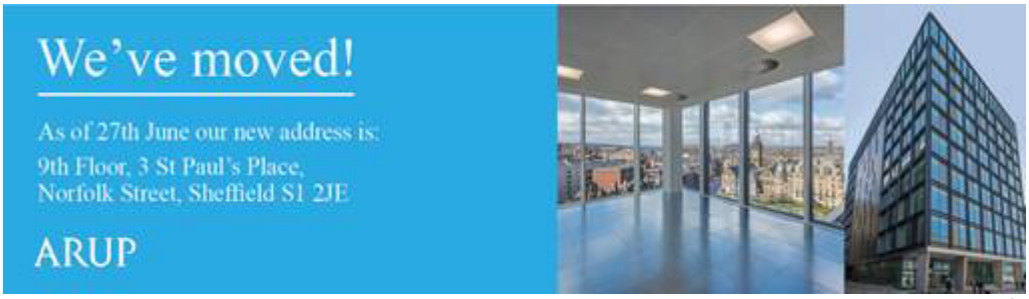
to address the adequacy of the ground investigation at the site to date.

Please find attached the proposed scheme for the additional testing, for your information and comment. I understand that the sampling is due to be carried out on site on Monday 24th October.

Best wishes,
Del

Delyth Harrison
Senior Scientist | Environmental Geotechnics
BSc(Hons) MSc MCIWEM C.WEM CSci

Arup
9th Floor, 3 St Paul's Place, Norfolk Street, Sheffield S1 2JE, United Kingdom
d: +44 114 283 3632 m: +44 77 8831 7936



[attachment "2010-10-16_Validation Testing to Bldg Footprints.pdf" deleted by Laura Miller/Environmental.Health/MCC]

****

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Please contact internet.administrators@manchester.gov.uk with any queries.

****

Attachment F3 - Results of additional testing within building footprint areas

Classification of Material for Disposal from MECD

A trial-pitting and sampling exercise was carried out on 24 October as part of the validation testing required for compliance with the planning consent. The results of this showed elevated lead concentrations and high pH readings in trail pits 1,2,3,4,5,6 and 8 thereby classifying the material as non-hazardous for disposal purposes. In addition, trial pit 1 contained rags, metal and other detritus.

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 16/06801
Issue Number: 1 **Date:** 07 November, 2016

Client:
Churchill Enviro Ltd
1 Eyebrook Road
Bowdon
Cheshire
UK
WA14 3LR

Project Manager: Terry Annis
Project Name: MEDC, Balfour Beatty
Project Ref: Not specified
Order No: N/A
Date Samples Received: 24/10/16
Date Instructions Received: 25/10/16
Date Analysis Completed: 07/11/16

Prepared by:
MMarshall
Melanie Marshall
Laboratory Coordinator

Approved by:
IBHaslock
Iain Haslock
Analytical Consultant

mCERTS
UKAS TESTING
1247

envirolab

Envirolab Job Number: 16/06801

Client Project Name: MEDC, Balfour Beatty

Client Project Ref: Not specified

Lab Sample ID	16/06801/1	16/06801/2	16/06801/3	16/06801/4	16/06801/5	16/06801/6	16/06801/7	16/06801/8	Units	Method ref
Client Sample No										
Client Sample ID	TP1	TP1/2	TP2	TP2 (fragment)	TP3	TP4	TP5	TP6		
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type	Soil	Soil	Soil	Solid - Fragment / Tile	Soil	Soil	Soil	Soil		
Sample Matrix Code	4AB	4A	4A	8	4AB	4A	4A	4A		
% Stones >10mm$_A$ #	14.6	2.2	36.9	-	17.3	41.6	15.5	11.9	% w/w	A-T-044
pH$_D$ M#	7.62	7.71	10.00	-	9.45	10.03	10.21	9.10	pH	A-T-031s
Cyanide (total)$_A$ M#	<1	<1	<1	-	<1	<1	<1	<1	mg/kg	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	mg/kg	A-T-050s
Total Organic Carbon$_D$ M#	6.61	6.64	1.47	-	3.23	0.41	0.44	0.92	% w/w	A-T-032s
Antimony$_D$	8	8	<5	-	<5	<5	5	<5	mg/kg	A-T-024s
Arsenic$_D$ M#	9	10	8	-	15	4	8	8	mg/kg	A-T-024s
Beryllium$_D$ #	1	<1	1	-	1	1	1	<1	mg/kg	A-T-024s
Boron (water soluble)$_D$ M#	1.0	1.1	1.8	-	1.6	<1.0	2.2	1.4	mg/kg	A-T-027s
Cadmium$_D$ M#	2.3	2.5	0.9	-	2.1	0.8	1.1	6.1	mg/kg	A-T-024s
Copper$_D$ M#	232	213	18	-	59	13	126	21	mg/kg	A-T-024s
Chromium$_D$ M#	24	21	13	-	29	13	18	12	mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	-	<1	<1	<1	<1	mg/kg	A-T-040s
Lead$_D$ M#	524	731	43	-	299	79	475	2180	mg/kg	A-T-024s
Mercury$_D$	49.9	70.5	2.78	-	1.46	0.54	3.48	0.65	mg/kg	A-T-024s
Nickel$_D$ M#	19	19	11	-	26	12	13	10	mg/kg	A-T-024s
Selenium$_D$	<1	<1	<1	-	<1	1	<1	<1	mg/kg	A-T-024s
Vanadium$_D$ M#	20	19	15	-	36	12	19	16	mg/kg	A-T-024s
Zinc$_D$ M#	476	539	54	-	148	46	74	156	mg/kg	A-T-024s
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A$ #	NAD	NAD	NAD	-	NAD	NAD	NAD	NAD		A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	-	N/A	N/A	N/A	N/A		
Bulk Fibre ID (inc. matrix)										
Bulk Fibre Identification$_A$ #	-	-	-	NAD	-	-	-	-		A-T-045
Bulk Fibre Identification - Suitable for Water Absorption Test?$_D$	-	-	-	N/A	-	-	-	-		Gravimetry

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Envirolab Job Number: 16/06801

Client Project Name: MEDC, Balfour Beatty

Client Project Ref: Not specified

Lab Sample ID	16/06801/1	16/06801/2	16/06801/3	16/06801/4	16/06801/5	16/06801/6	16/06801/7	16/06801/8	Units	Method ref
Client Sample No										
Client Sample ID	TP1	TP1/2	TP2	TP2 (fragment)	TP3	TP4	TP5	TP6		
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type	Soil	Soil	Soil	Solid - Fragment / Tile	Soil	Soil	Soil	Soil		
Sample Matrix Code	4AB	4A	4A	8	4AB	4A	4A	4A		
PAH 16										
Acenaphthene$_A^{M\#}$	0.01	0.01	0.06	-	0.33	0.03	0.02	0.02	mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	-	0.04	<0.01	<0.01	<0.01	mg/kg	A-T-019s
Anthracene$_A^{M\#}$	0.05	0.04	0.07	-	0.48	0.05	<0.02	0.04	mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.08	0.13	0.37	-	2.28	0.15	0.06	0.18	mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.06	0.12	0.38	-	1.90	0.13	0.05	0.19	mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.09	0.20	0.57	-	2.61	0.18	0.08	0.29	mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	0.09	0.24	-	1.21	0.07	<0.05	0.17	mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	0.17	-	0.92	<0.07	<0.07	0.09	mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.12	0.19	0.43	-	2.44	0.18	0.08	0.25	mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	0.04	-	0.22	<0.04	<0.04	<0.04	mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.40	0.28	0.74	-	4.94	0.36	0.16	0.38	mg/kg	A-T-019s
Fluorene$_A^{M\#}$	0.01	<0.01	0.04	-	0.19	0.03	<0.01	0.02	mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.05	0.09	0.24	-	1.24	0.07	<0.03	0.15	mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03	-	<0.03	<0.03	<0.03	<0.03	mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.12	0.15	0.35	-	2.11	0.23	0.12	0.20	mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.29	0.24	0.72	-	4.19	0.31	0.13	0.34	mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	1.27	1.53	4.44	-	25.1	1.87	0.73	2.32	mg/kg	A-T-019s

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Envirolab Job Number: 16/06801

Client Project Name: MEDC, Balfour Beatty

Client Project Ref: Not specified

Lab Sample ID	16/06801/1	16/06801/2	16/06801/3	16/06801/4	16/06801/5	16/06801/6	16/06801/7	16/06801/8	Units	Method ref
Client Sample No										
Client Sample ID	TP1	TP1/2	TP2	TP2 (fragment)	TP3	TP4	TP5	TP6		
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type	Soil	Soil	Soil	Solid - Fragment / Tile	Soil	Soil	Soil	Soil		
Sample Matrix Code	4AB	4A	4A	8	4AB	4A	4A	4A		
TPH CWG										
Ali >C5-C6$_A^\#$	<0.01	<0.01	<0.01	-	<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	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Ali >C8-C10$_A^\#$	<0.01	<0.01	<0.01	-	<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	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Ali >C12-C16$_A^\#$	<0.1	<0.1	1.5	-	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Ali >C16-C21$_A^\#$	5.3	15.5	6.8	-	<0.1	<0.1	<0.1	0.7	mg/kg	A-T-023s
Ali >C21-C35$_A^\#$	47.5	85.5	24.1	-	<0.1	<0.1	<0.1	4.0	mg/kg	A-T-023s
Total Aliphatics$_A$	52.9	101	32.4	-	<0.1	<0.1	<0.1	4.6	mg/kg	A-T-023s
Aro >C5-C7$_A^\#$	<0.01	<0.01	<0.01	-	<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	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C8-C9$_A^\#$	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C9-C10$_A^\#$	<0.01	<0.01	<0.01	-	<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	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C12-C16$_A^\#$	<0.1	<0.1	<0.1	-	1.4	<0.1	0.4	<0.1	mg/kg	A-T-023s
Aro >C16-C21$_A^\#$	<0.1	5.6	2.5	-	6.6	1.4	2.2	1.3	mg/kg	A-T-023s
Aro >C21-C35$_A^\#$	<0.1	22.7	7.7	-	16.9	2.2	3.5	3.2	mg/kg	A-T-023s
Total Aromatics$_A$	<0.1	28.3	10.2	-	25.0	3.6	6.1	4.5	mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	52.9	129	42.6	-	25.0	3.6	6.1	9.1	mg/kg	A-T-023s
BTEX - Benzene$_A^\#$	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - Toluene$_A^\#$	<0.01	<0.01	<0.01	-	<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	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - m & p Xylene$_A^\#$	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - o Xylene$_A^\#$	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
MTBE$_A^\#$	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s

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Envirolab Job Number: 16/06801

Client Project Name: MEDC, Balfour Beatty

Client Project Ref: Not specified

Lab Sample ID	16/06801/9	16/06801/10	16/06801/11	16/06801/12					Units	Method ref
Client Sample No										
Client Sample ID	TP6/2	TP7	TP8	TP9						
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil						
Sample Matrix Code	1A	1A	4A	4A						
% Stones >10mm$_A$ #	12.8	6.9	21.9	17.1					% w/w	A-T-044
pH$_D$ M#	9.30	9.00	10.59	9.13					pH	A-T-031s
Cyanide (total)$_A$ M#	<1	<1	<1	<1					mg/kg	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2	<0.2	<0.2					mg/kg	A-T-050s
Total Organic Carbon$_D$ M#	0.37	0.20	0.42	0.51					% w/w	A-T-032s
Antimony$_D$	<5	<5	<5	<5					mg/kg	A-T-024s
Arsenic$_D$ M#	4	4	3	5					mg/kg	A-T-024s
Beryllium$_D$ #	<1	<1	1	<1					mg/kg	A-T-024s
Boron (water soluble)$_D$ M#	<1.0	1.0	1.3	1.5					mg/kg	A-T-027s
Cadmium$_D$ M#	3.5	1.7	0.9	1.0					mg/kg	A-T-024s
Copper$_D$ M#	12	10	12	15					mg/kg	A-T-024s
Chromium$_D$ M#	10	12	12	14					mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1					mg/kg	A-T-040s
Lead$_D$ M#	774	29	49	59					mg/kg	A-T-024s
Mercury$_D$	0.26	<0.17	0.33	0.27					mg/kg	A-T-024s
Nickel$_D$ M#	8	14	10	13					mg/kg	A-T-024s
Selenium$_D$	<1	<1	<1	<1					mg/kg	A-T-024s
Vanadium$_D$ M#	12	14	13	14					mg/kg	A-T-024s
Zinc$_D$ M#	75	67	41	51					mg/kg	A-T-024s
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A$ #	NAD	NAD	NAD	NAD						A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A						

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Envirolab Job Number: 16/06801

Client Project Name: MEDC, Balfour Beatty

Client Project Ref: Not specified

Lab Sample ID	16/06801/9	16/06801/10	16/06801/11	16/06801/12					Units	Method ref
Client Sample No										
Client Sample ID	TP6/2	TP7	TP8	TP9						
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil						
Sample Matrix Code	1A	1A	4A	4A						
PAH 16										
Acenaphthene$_A^{M\#}$	<0.01	0.12	0.05	0.05					mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	0.20	0.07	0.07					mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.09	0.26	0.24	0.21					mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.09	0.18	0.21	0.20					mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.14	0.22	0.29	0.26					mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.09	0.07	0.12	0.12					mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	0.08	0.09	0.09					mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.12	0.29	0.29	0.27					mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04					mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.19	0.72	0.52	0.48					mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	0.13	0.05	0.04					mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.08	0.08	0.12	0.12					mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	0.08	0.05	<0.03					mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.10	0.78	0.39	0.35					mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.16	0.55	0.49	0.42					mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	1.09	3.78	2.98	2.66					mg/kg	A-T-019s

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Envirolab Job Number: 16/06801

Client Project Name: MEDC, Balfour Beatty

Client Project Ref: Not specified

Lab Sample ID	16/06801/9	16/06801/10	16/06801/11	16/06801/12					Units	Method ref
Client Sample No										
Client Sample ID	TP6/2	TP7	TP8	TP9						
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil						
Sample Matrix Code	1A	1A	4A	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	0.4					mg/kg	A-T-023s
Ali >C16-C21$_A^\#$	<0.1	<0.1	<0.1	7.5					mg/kg	A-T-023s
Ali >C21-C35$_A^\#$	<0.1	<0.1	<0.1	21.7					mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1	<0.1	29.6					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$_A^\#$	<0.01	<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$_A^\#$	0.7	<0.1	1.2	<0.1					mg/kg	A-T-023s
Aro >C16-C21$_A^\#$	4.0	0.6	5.0	0.6					mg/kg	A-T-023s
Aro >C21-C35$_A^\#$	17.9	1.4	9.4	1.4					mg/kg	A-T-023s
Total Aromatics$_A$	22.7	2.1	15.6	2.0					mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	22.7	2.1	15.6	31.6					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$_A^\#$	<0.01	<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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REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
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 and/or if they are from outside the European Union and this supersedes any "D" subscripts.

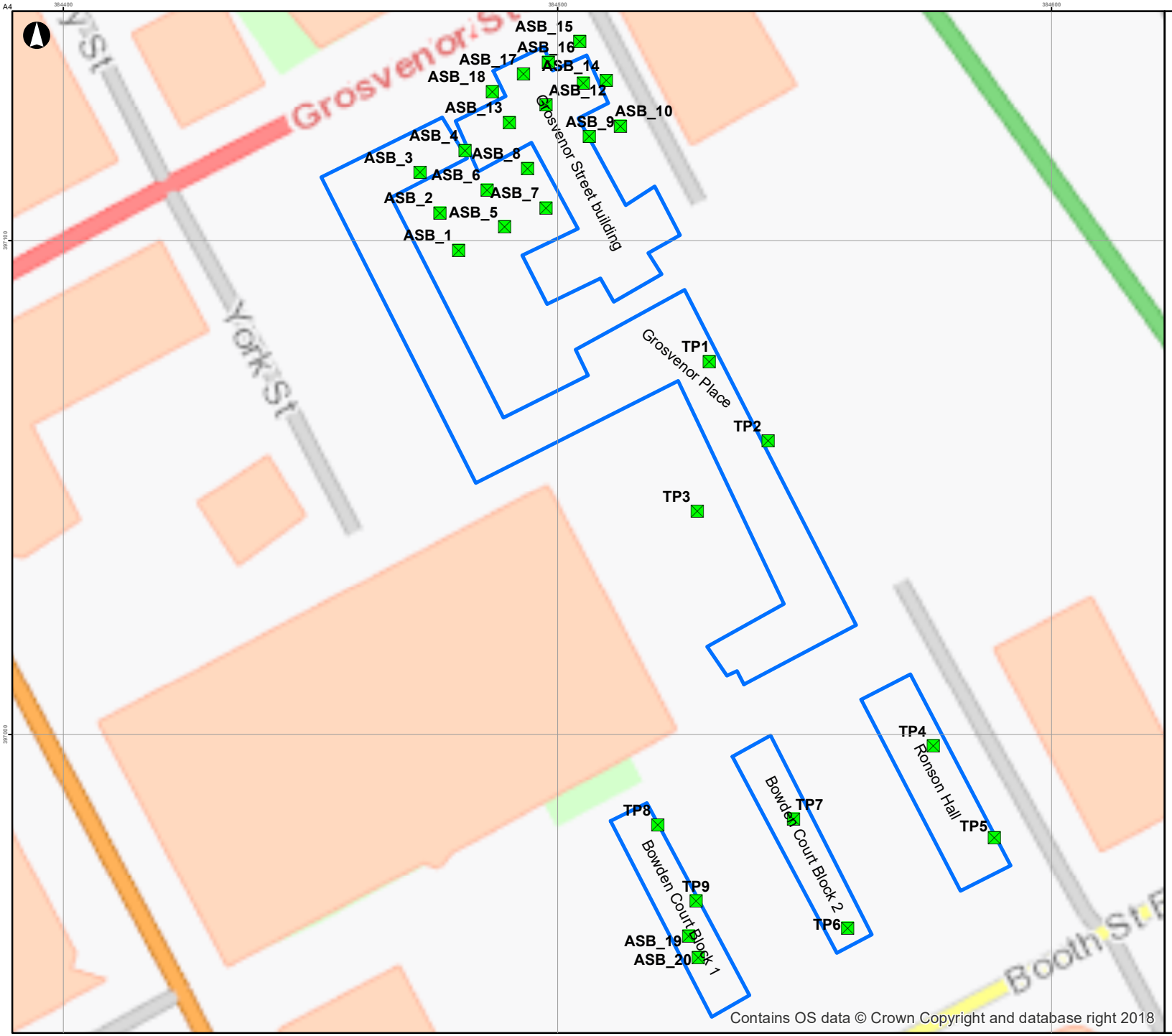
TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

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.



Legend

- Churchills post-demolition investigation
- Former buildings to be investigated

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Issue	Date	By	Chkd	Appd
P1	26-02-19	DH	DH	JAL

Metres
0 12.5 25 50

ARUP

9th Floor, 3 St. Pauls Place
Norfolk Street, Sheffield S1 2JE
Tel. +44(0)114 272 8247
www.arup.com

Client
Balfour Beatty

Job Title
MECD

As-built post-demolition investigation locations

Scale at A4
1:1,100

Job No	Drawing Status
258907-00	**Information**

Drawing No	Issue
APPENDIX F	**P1**

Template A4: Version 2
© Arup

Attachment F4 – Balfour Beatty statements confirming no unexpected contamination and example Daily Activity Briefing sheet

Del Harrison

From: Rogan, Ashley <Ashley.Rogan@balfourbeatty.com>
Sent: 01 August 2017 07:27
To: Del Harrison
Subject: RE: south basement

Hi Del

Please accept this email as confirmation that during the excavation works to underside of slab in the south basement, no ACM's (asbestos containing materials) or other visible contamination where encountered and that the supervisor from the muck shifting contractor briefed his operatives on the potential for the presence of ACMS or other visible contamination.

Kind Regards

Ashley Rogan

Assistant Construction Manager | Balfour Beatty |Northern Major Projects/Regional

T: TBC| M: +44 (0)7776 160 847 | E: ashley.rogan@balfourbeatty.com

Balfour Beatty Site Offices, MECD, University of Manchester, York Street, Off Grosvenor Street, Manchester. M1 7HE

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Balfour Beatty

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Del Harrison

From: Crayton, Michael <Michael.Crayton@balfourbeatty.com>
Sent: 14 November 2018 16:55
To: Del Harrison
Cc: Defonseka, Raj; Graham, Mark; Kelly, John
Subject: [External] North basement excavation works

Follow Up Flag: Follow up
Flag Status: Flagged

Del

Please accept this email as confirmation that during the excavation works to underside of ground floor slab in the north basement, no ACM's (asbestos containing materials) or other visible contamination was encountered and that the supervisor from the muck shifting contractor briefed his operatives on the potential for the presence of ACMS or other visible contamination.

Regards

Michael Crayton
Sub Agent | Balfour Beatty | Regional
M: +44 (0)7779428883 | **E:** michael.crayton@balfourbeatty.com
MECD, University of Manchester, Balfour Beatty Site Offices, Booth Street East, Manchester. M13 9SS
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Balfour Beatty

Daily Activity Briefing
GOOD-2-GO?

ZERO HARM

Project:	MEC . D	Date:	16/8/17
Task:	MUCK SHIFT	Location:	SOUTH

CONSIDER THE FOLLOWING POINTS BEFORE STARTING A NEW TASK:

YOU MUST ANSWER 'YES' OR 'N/A' TO ALL POINTS BEFORE STARTING WORK.

		Yes	No	N/A
1	Is your risk assessment /method statement applicable to today's task?	✓		
2	Will you be safe from people working overhead and anything falling?	✓		
3	Are you segregated from overhead lifting activity?	✓		
4	Is your work area segregated from plant and vehicles?	✓		
5	Is your access route and work area level, clear and tidy?	✓		
6	Is your access route and work area well lit?	✓		
7	Are your tools and work equipment in good order?	✓		
8	Do you have the right access equipment to protect you from falls?	✓		
9	Will the public and other workers be protected from your work with hoarding, decking & edge protection to prevent people, equipment & materials falling?	✓		
10	When breaking ground do you have a permit, insulated tools and flame retardant PPE?	✓		
[illegible]	Do you know how long you can use your vibratory equipment?			—
12	Are you aware of the risk assessment for handling materials and do you know your limitations when manually lifting?			✓
13	Are you adequately segregated from live electrical wires / equipment?			✓
14	Will any substances / materials you are using affect your health and are you aware of the COSHH assessments in place?		✓	
15	Are you wearing, the correct PPE / RPE for the task (including safety helmet / footwear, gloves, Hi-Vis, eye / hearing protection and mask)? If using a dust mask have you been face fit tested and are you clean shaven?	✓		

IF YOU ARE UNABLE TO RECTIFY ANY UNSAFE CONDITION DO NOT START WORK. REPORT TO YOUR SUPERVISOR OR THE BALFOUR BEATTY SITE MANAGER.

PLEASE ENSURE THIS FORM IS SIGNED ON THE BACK BY THE WORK TEAM.

Other Issues Covered in the DABs:

As an open, two way conversation, talk through the following with the team:

- **Hazards** – any others not on the list (what could hurt members of the team or others)?
- **Risks** – (how could the hazards hurt someone)?
- **Controls** – (what will the team put in place to stop anyone getting hurt)?

Make sure you think through and talk about the following:

- **Other work adjacent** to this teams work area.
- **Deliveries.**
- How we will get **materials and tools** to the work area.
- The need to **keep the area tidy** and free from slips, trips & falls – arrangements for removing rubbish.
- The four golden rules:
  - **Be fit for work**
  - **Always receive a briefing before starting work**
  - **Report all unsafe events and conditions**
  - **Stop work if anything changes**
- The **60 second Plant People Interface Briefing.**
- **Observation cards** received yesterday - thanks and **what is being done**.
- **Encouragement** to use observation cards today.

Notes on anything discussed and agreed:

WACH OUT FOR ASBESTOS

Contractor Name:	Work Group Leader Name:	Signature:

Work Group Members			
Name:	**Signature:**	**Name:**	**Signature:**
Jonah Wilson			
Josh Maher			
Mitch Hathaway			