





REMEDIATION AND ENABLING WORKS VALIDATION

New Little Mill
Radium Street
Ancoats
Manchester

Prepared for:
Eric Wright Construction

Report Ref: 12-386-R2
Date Issued: August 2019

New Little Mill

Remediation and Enabling Works Validation

August 2019

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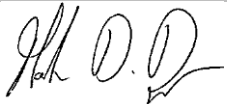
PROJECT NUMBER	12-386		
VERSION	Version 1	Version 2	Version 3
REMARKS	Final		
DATE	August 2019		
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QUALIFICATIONS	BSc(Hons), FGS, AIEMA, AMICE		
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1. INTRODUCTION

1.1. BACKGROUND

This report details the remediation and enabling works operations that were undertaken by Eric Wright Construction under the supervision of E3P to facilitate the preparation of the mid-rise residential development within an existing mill building known as New Little Mill, Radium Street, Ancoats, Manchester, herein referred to as the site.

E3P were appointed by Eric Wright as independent Geo-Environmental Consultant for the site remediation, preparation / enabling and validation works and the subsequent production of a suitably detailed report to ensure the satisfaction of the relevant planning conditions and geotechnical engineering requirements for Building Control, warranty providers and the future adoption of infrastructure by the Highways Authority and statutory service providers.

1.2. PROPOSED DEVELOPMENT

Eric Wright have been retained to construct 68 apartments within a mid rise (5 storey) residential grade II listed Mill Building with associated parking and adopted drainage infrastructure.

E3P has not been provided with a proposed development plan at this time however figure 1.1 identifies the boundary and existing position of the mill that will remain (36B).

FIGURE 1.1 SNAPSHOT OF SITE LOCATION



1.3. SUMMARY OF PARTIES INVOLVED

Function/interest	Name of Party
Local Planning Authority	Manchester City Council
Developer	Manchester Life
Geoenvironmental Consultant	E3P
Main Contractor	Eric Wright Construction (EWC)
Remediation/Enabling Works Contractor	TBC/ EWC
Human Health Regulator	Manchester City Council
Controlled Waters and Waste Regulator	Environment Agency
Highways Adoption Authority	Manchester City Council

1.4. PREVIOUS WORKS

The following previous phases of site investigation and assessment have been completed at the subject site:

- ✳ Arup – Preliminary Geotechnical and Geo-environmental Report. Ref: NLM/ REP/GEO/002, April 2017.

This report contained the pertinent points and assessment of information within:

- ✳ White Young Green - Geo-Environmental Desk Study and Ground Investigation Report, New Little Mill (2013), and;
- ✳ Hydrock - Factual Ground Investigation Report, New Little Mill (2017)

These documents were utilised to development the following Remediation and Enabling Works Strategy:

- ✳ E3P – Supplementary Site Investigation, Remediation and Enabling Works Report, Ref: 12-386-R1, Dated October 2018

The above documents should be read in conjunction with this Validation Report.



2. SUMMARY OF REMEDIATION AND ENABLING WORKS OBJECTIVES

The proposed remediation activities were detailed within the E3P Remediation and Enabling Works Strategy (12-386-R1; dated October 2018) and supplementary supporting documents provided by E3P.

This report has been prepared to document the completion of all necessary land remediation and enabling works and to record the presence of any variation in ground conditions or previously unidentified sources of potential contamination, environmental impact or potential nuisance to the wider environ.

The Remediation and Enabling Works elements are summarised below:

- ✿ RE-1 – Pre-commencement Detailed Quantitative Risk Assessment
- ✿ RE-2 – Pre-commencement Regulatory Compliance
- ✿ RE-3 – Environment and Nuisance Control
- ✿ RE-4 – Risk to Infrastructure
- ✿ RE-5 – Site Clearance Operations
- ✿ RE-6 – Delineation, Excavation and Treatment of Identified Asbestos Impact
- ✿ RE-7 – Cut-and-Filling of MADE GROUND to Development Levels
- ✿ RE-8 – Importation of Bulk Fill
- ✿ RE-9 – Preparation for Cover System
- ✿ RE-10 – Provision of Subsoil
- ✿ RE-11 – Provision of Topsoil
- ✿ RE-12 – Remedial Verification Report

3. SECOND PHASE MITIGATION AND MANAGEMENT – BUILD PHASE

A second post demolition phase of works will be required to ensure the proposed development is constructed in a manner that incorporates the required mitigation measures to ensure the development is compliant with UK Building Regulations and the Local Authority Planning requirements.

These obligations are specified in more detail within Section 5.



4. DETAILED REMEDIATION AND ENABLING WORKS ACTIVITIES

The focus of the remediation and enabling works are to address the contaminant issues previously identified within the site investigations that presented an unacceptable risk to human health following the redevelopment of the site.

For completeness, each of these activities has been discussed below within the context of the actual remediation works that were undertaken on site.

The Remediation & Site Enabling works commenced in July 2018 and were completed by August 2019.

RE-1 – PRE-COMMENCEMENT DETIALED QUANTITATIVE RISK ASSESSMENT

DATE OF WORKS UNDERTAKEN

Throughout

PHOTOGRAPHS

Plates 1,2 and 3

CHEMICAL TESTING

Chemical Analysis Report Ref: 18-96459 (Lift1 and Lift2)
--

OVERVIEW OF WORKS

Within the E3P Remediation and Enabling Works Strategy it was outlined that Naphthalene was elevated above screening criteria in soils at two locations (HDTP200 and WS200) which were noted to be isolated occurrences and not indicative of the Made Ground throughout the subbase of the building. Supplementary sampling by E3P confirmed the absence of volatile compounds and concluded that no remediation action was necessary. However, a watching brief was implemented throughout the groundworks to identify and previously unidentified contamination.

To date, and following the groundworks element of activities at the site, no further impact has been identified. Due to the design of the new structure within the historic building the existing ground slab has remained in situ, only broken out in one area to facilitate a lift shaft. On breaking of the concrete in this area E3P carried out soils analysis to confirm the absence of any contamination in this location. Two soils samples were obtained (Lift1, Lift 2) and show no exceedances or contaminants of concern.

RE-2 – PRE-COMMENCEMENT REGULATORY COMPLIANCE

DATE OF WORKS UNDERTAKEN

Prior to Works

PHOTOGRAPHS

N/A

CHEMICAL TESTING

N/A



OVERVIEW OF WORKS

Prior to commencement of any works on-site, all reports relating to the assessment of risk to contaminated land were submitted to the regulatory authorities and written approval obtained.

All relevant Standard Rules Permits were registered with the EA.

The LAPC Part B Notification for deployment of mobile crushing plant was not required for the site.

Copies of all relevant permits and agreements are available from the main contractor.

RE-3 – ENVIRONMENT AND NUISANCE CONTROL

DATE OF WORKS UNDERTAKEN

Throughout

PHOTOGRAPHS

N/A

CHEMICAL TESTING

N/A

OVERVIEW OF WORKS

During remediation, works were restricted to between 8.00am and 5.30pm. A road sweeper was present to keep the access and Radium Street clean and clear of debris during works.

A power washer and bowser were present to dampen down materials throughout the works.

Management of all works so as to ensure that no environmental nuisance is created through dust emissions, noise or vibration levels.

RE-4 – MINIMISE RISK TO INFRASTRUCTURE

DATE OF WORKS UNDERTAKEN

Throughout

PHOTOGRAPHS

N/A

CHEMICAL TESTING

N/A

OVERVIEW OF WORKS

Given that the works were being completed with a Grade II listed building preservation of the infrastructure was highly considered. The external shell of the building was protected and improved where necessary, and given the slab remained in situ no potential risk of undermining was present. Furthermore, the historic internal levels were removed in a controlled manner as to not risk external walls.



RE-5 – SITE CLEARANCE OPERATIONS

DATE OF WORKS UNDERTAKEN

Throughout

CHEMICAL TESTING

NA

OVERVIEW OF WORKS

The main structure of the building was set to remain and so clearance works included clearance of all internal spaces, demolition of partition walls, removal of internal floors to open up the shell of the building within which the new structure was to be constructed.

Clearance of external areas was completed prior to adoption of the site due to the use as a building materials store for adjacent developments. Once materials were clean no further works were required. The future use of this area will be hardstand.

A full and complete asbestos survey was completed by the main contractor prior to works and where necessary controlled removal of ACM materials was completed before any clearance works took place.

RE-6 – DELINEATION, EXCAVATION AND TREATMENT OF IDENTIFIED ASBESTOS IMPACT

DATE OF WORKS UNDERTAKEN

15 th January 2019

CHEMICAL TESTING

N/A

OVERVIEW OF WORKS

The soils surrounding WS107 were identified in the ground investigation to be impacted with Asbestos Fibres. Within the final development this area is internal to the structure and covered with the existing concrete slab, a layer of granular subbase, followed by the new concrete slab.

As such the potential pathway of fibre release to atmosphere is severed by the planned building design and encased in hardstanding.

It was concluded that to break out and excavate the material would prejudice the concrete slab and bearing capacity in this area but also that the materials location would be in line with the asbestos conceptual model and there not a risk to human health in the final development. Therefore, the materials remain in the location of WS107.



RE-7 – CUT & FILLING OF MADE GROUND TO DEVELOPMENT LEVELS

DATE OF WORKS UNDERTAKEN

Throughout

OVERVIEW OF WORKS

Given that the new structure was formed within the shell of the Grade II listed building, and that the external areas were already at level with the adjacent highway no cut/fill works were required to prepare the site.

Within the external areas the existing basement slab was retained and so did not require levels to change.

RE-8 – IMPORTATION OF BULK FILL

DATE OF WORKS UNDERTAKEN

May 2019

CHEMICAL TESTING

I2 Analytical Report 19-42794-1 dated May 2019 – MOT1, MOT2
Geotechnical Testing Report: MSTs TYPE 1

OVERVIEW OF WORKS

To create a subbase for the new concrete slab at the site, type 1 MOT was imported to the site and tested on arrival (Mot1, Mot2). The results show that chemically the materials were suitable for use and would not prejudice the site or human health for the future.

Geotechnical grading certificates were also obtained from the supplier to show that the material meets the geotechnical properties required for a subbase and a use of this type.

No further import of bulk materials was required through the build.

RE-9 – PREPARATION OF LANDSCAPING FOR COVER SYSTEM

DATE OF WORKS UNDERTAKEN

N/A

CHEMICAL TESTING

N/A

OVERVIEW OF WORKS

All of the external areas of the site are to be covered with hardstanding and so there has been no requirement to prepare areas of the site in anticipation of 600mm of soils.



RE-10 – PROVISION OF SUBSOIL

DATE OF WORKS UNDERTAKEN

N/A

OVERVIEW OF WORKS

As above the external areas of the site are to be covered in hardstanding in their entirety. As such there has been no requirement to import subsoil to the site.

RE-11 – PROVISION OF TOPSOIL

DATE OF WORKS UNDERTAKEN

N/A

OVERVIEW OF WORKS

As RE-9 there has been no requirement for the import and provision of topsoil at the site as all of the external areas will be subject to a hardstanding surface to facilitate the car parking infrastructure.
--

RE-12 – REMEDIAL VALIDATION REPORT

DATE OF WORKS UNDERTAKEN

August 2019

OVERVIEW OF WORKS

This report serves as the validation report to ensure the requirements to prepare the site for a residential end use have been met.

It is E3Ps opinion that the required aspects to provide a suitably prepared compliant site have been met.



5. POST REMEDIATION BUILD PHASE REQUIREMENTS

This document details the construction works that are required to ensure full compliance with the remediation Strategy, Regulatory Authorities, Building Control & Warranty Providers; It is not expected that any further requirements are necessary during the build phase of works other than the provision of suitable water supply pipeline materials.

5.1. POTABLE WATER SUPPLY – CONTAMINANT ASSESSMENT CRITERIA

CONTAMINANT GROUP	PE-THRESHOLD ^A	MAXIMUM PERMISSIBLE CONCENTRATION AT PROPOSED PIPELINE DEPTH ^A	MAXIMUM PERMISSIBLE SITE CONCENTRATION ^A
Total VOC	0.5	N/A	N/A
Total BTEX And MTBE	0.1	N/A	N/A
Total SVOCs (Excluding PAH and those substances marked with an *)	2	N/A	< 0.3
EC5-EC10 Aliphatic and Aromatic Hydrocarbons	2	< 0.1	< 0.1
EC10-EC16- Aliphatic and Aromatic Hydrocarbons	10	5.7	5.7
EC16-EC40 Aliphatic and Aromatic Hydrocarbons	500	49	149
Phenols (From SVOC Analysis)*	2	< 0.3	< 0.3
Cresols and Chlorinated Phenols (From SVOC Analysis)	2	< 0.3	< 0.3

Notes

A. All concentrations in mg/kg.



6. CONCLUSION

The remediation elements identified within the approved Remediation and Enabling Works Strategy have been completed with validation testing confirming that the works have been completed to the required standard.

As part of the on-going construction works the developer will be required to construct and validate the items listed below in strict accordance with the requirements of the regulatory authorities as documented in detail within this report.

-  Provision a suitable water supply infrastructure.

END OF REPORT



APPENDIX I

LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between E3P and the Client as indicated in Section 1.2.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. During the site walkover, reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover, no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials, this is for indicative purposes only and do not constitute or replace full and proper surveys.
8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
9. E3P cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by E3P is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by E3P in this connection without their explicit written agreement there to by E3P.
10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.



APPENDIX II

GLOSSARY

TERMS

ACM	Asbestos-containing material	MMP	Materials management plan
ADS	Acoustic design statement	ND	Not detected
AST	Above-ground storage tank	NDP	Nuclear density probe
BGS	British Geological Survey	NMP	Noise management plan
BSI	British Standards Institute	NPSE	Noise policy statement for England
BTEX	Benzene, toluene, ethylbenzene, xylenes	NR	Not recorded
CA	Coal Authority	PAH	Polycyclic aromatic hydrocarbon
CBR	California bearing ratio	PCB	Polychlorinated biphenyl
CIEH	Chartered Institute of Environmental Health	PI	Plasticity index
CIRIA	Construction Industry Research Association	PID	Photo ionisation detector
CLEA	Contaminated land exposure assessment	POS	Public open space
CML	Council of Mortgage Lenders	PPE	Personnel protective equipment
CoC	Contaminants of concern	ProPG	Professional practice guidance
CSM	Conceptual site model	QA	Quality assurance
DNAPL	Dense non-aqueous phase liquid (chlorinated solvents, PCB)	SGV	Soil guideline value
DWS	Drinking water standard	SPH	Separate-phase hydrocarbon
EA	Environment Agency	SPT	Standard penetration test
EQS	Environmental quality standard	SVOC	Semi-volatile organic compound
FFL	Finished floor level	TPH	Total and speciated petroleum hydrocarbon
GAC	General assessment criteria	TPH CWG	Total Petroleum Hydrocarbon (Criteria Working Group)
GL	Ground level	UKWIR	United Kingdom Water Infrastructure Risk
GSV	Gas screening value	UST	Underground storage tank
HCV	Health criteria value	VCC	Vibro-concrete column
ICSM	Initial conceptual site model	VOC	Volatile organic compound
LEL	Lower explosive limit	VRSC	Vibro-replacement stone columns
LMRL	Lower method reporting limit	VSC	Vibro-stone columns
LNAPL	Light non-aqueous phase liquid (petrol, diesel, kerosene)	WHO	World Health Organisation
MCV	Moisture condition value	WRAP	Waste and Resources Action Programme
MIBK	Methyl isobutyl ketone	WTE	Water table elevation



New Little Mills

Remediation and Enabling Works Validation

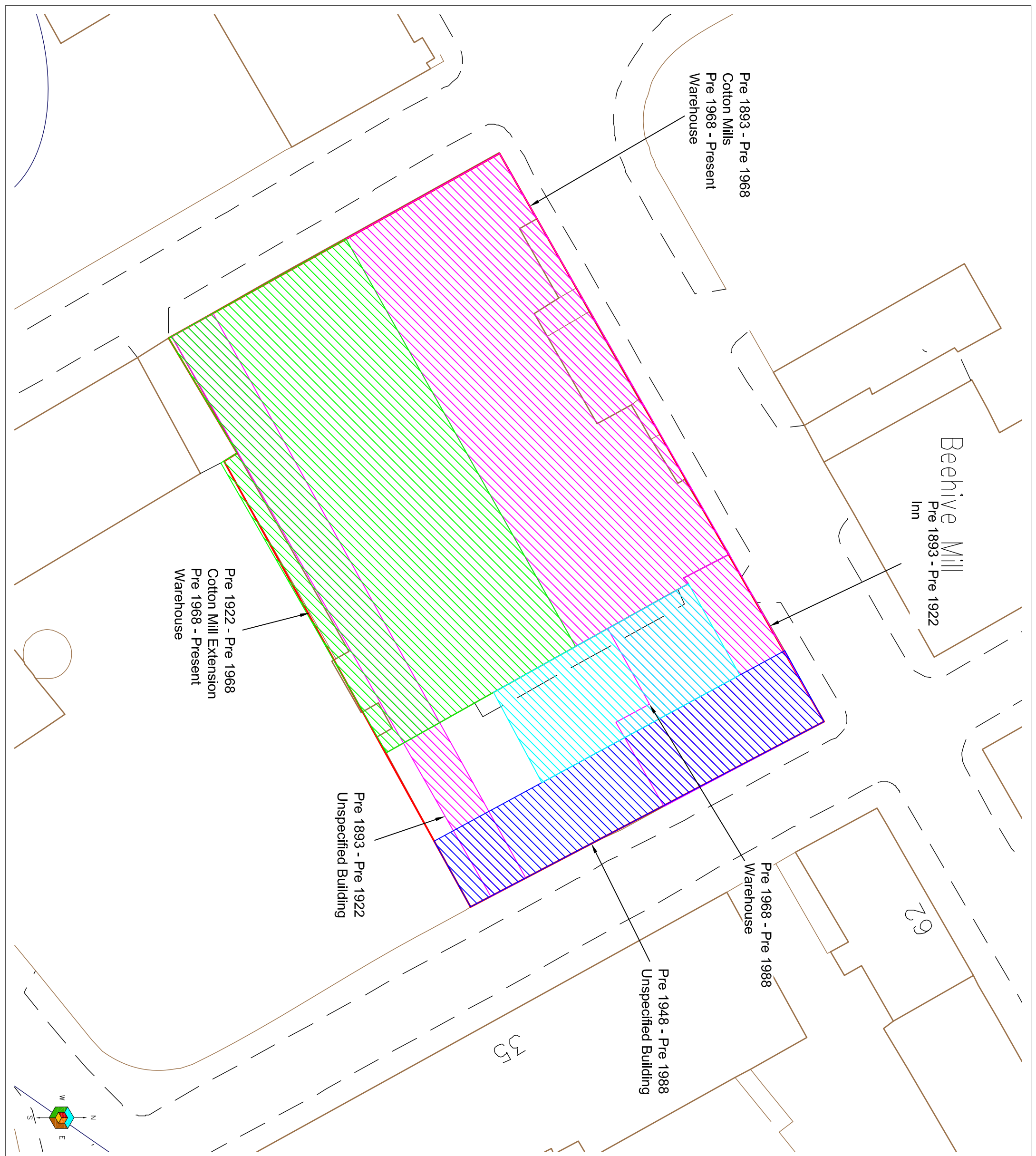
August 2019

m	Metres	ppm	Parts per million
km	Kilometres	mg/m³	Milligram per metre cubed
% v/v	Percent volume in air	m bgl bgl	Metres below ground level
mb	Millibars (atmospheric pressure)	m bcl	Metre below cover level
l/hr	Litres per hour	mAOD	Metres above ordnance datum (sea level)
µg/l	Micrograms per litre (parts per billion)	kN/m²	Kilonewtons per metre squared
ppb	Parts per billion	µm	Micrometre
mg/kg	Milligrams per kilogram (parts per million)	SSRT	Site Specific Remediation Target
PSD	Particle Size Distribution	DD	Dry Density
CL:AIRE	Contaminated Land: Applications in Real Environments	Mc	Moisture Content
ρ	Bulk Density	GPR	Ground Penetrating Radar
NDP	Nuclear Density Probe	FFL	Finished Floor Level
LEL	Lower Explosive Limit	UKWIR	UK Water Industry Research
CIRIA	Construction Industry Research and Information Association	LOD	Limit of Detection



APPENDIX III

DRAWINGS



- Historical Features**
- Pre 1893 (Cotton Mills, Inn, Unspecified Buildings)
 - Pre 1922 (Cotton Mill Extension)
 - Pre 1948 (Unspecified Building)
 - Pre 1968 (Warehouse)

Notes:					
Client:					
P1	-	27-03-2018	DRAFT	CB	MD
Phase	Revision	Date	Issue	Drawn	Authorised
Client:			Job No:	Date:	
Manchester Life Development			Drawing No:	27-03-2018	
			003	Scale:	
			NTS		
Job Title:			Drawing Title:		
New Little Mill, Manchester			Historical Features Plan		
e3p Environmental Engineering Partnerships Ltd City Helport & Business Centre Eccles, Manchester, M30 7RU Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk					
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Location Symbols

 WS101 Approximate Window Sample Probehole Location

Notes:					

P1		-	19.02.2018	DRAFT	HM	MD
Phase	Revision	Date	Issue	Drawn	Authorised	
Client:		Job No:	12-386	Date:	19.02.2018	
Manchester Life Development		Drawing No:	004	Scale:	NTS	

Job Title:	New Little Mill, Manchester	Drawing Title:	Exploratory Hole Location Plan
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APPENDIX IV CHEMICAL TESTING RESULTS

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e: reception@i2analytical.com

Analytical Report Number : 18-96459

Project / Site name: NJew Little Mills

Samples received on: 14/08/2018

Your job number:

Samples instructed on: 14/08/2018

Your order number:

Analysis completed by: 21/08/2018

Report Issue Number: 1

Report issued on: 21/08/2018

Samples Analysed: 2 soil samples

Signed:

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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Analytical Report Number: 18-96459

Project / Site name: NJew Little Mills

Lab Sample Number				1023557	1023558			
Sample Reference				Lift 1	Lift 2			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				14/08/2018	14/08/2018			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	14	9.7			
Total mass of sample received	kg	0.001	NONE	0.42	0.43			

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected			
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	9.8	9.8			
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1			
Total Sulphate as SO ₄	mg/kg	50	MCERTS	5500	10000			
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	2500	4100			
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.2	2.0			
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	1240	2040			
Sulphide	mg/kg	1	MCERTS	22	10			
Total Sulphur	mg/kg	50	MCERTS	2100	4000			

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0			
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Phenanthrene	mg/kg	0.05	MCERTS	1.5	< 0.05			
Anthracene	mg/kg	0.05	MCERTS	0.38	< 0.05			
Fluoranthene	mg/kg	0.05	MCERTS	2.6	< 0.05			
Pyrene	mg/kg	0.05	MCERTS	2.8	< 0.05			
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.1	< 0.05			
Chrysene	mg/kg	0.05	MCERTS	1.8	< 0.05			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.4	< 0.05			
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.57	< 0.05			
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.6	< 0.05			
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.59	< 0.05			
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.20	< 0.05			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.77	< 0.05			

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	17.3	< 0.80			
-----------------------------	-------	-----	--------	------	--------	--	--	--

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	10			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2			
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	19	22			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	57	27			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	140	34			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17	15			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	48	24			

Analytical Report Number: 18-96459

Project / Site name: NJew Little Mills

Lab Sample Number				1023557	1023558			
Sample Reference				Lift 1	Lift 2			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				14/08/2018	14/08/2018			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Petroleum Hydrocarbons

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0			
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0			
TPH (C12 - C16)	mg/kg	4	MCERTS	7.2	< 4.0			
TPH (C16 - C21)	mg/kg	1	MCERTS	28	6.4			
TPH (C21 - C35)	mg/kg	1	MCERTS	110	46			
TPH (C35 - C40)	mg/kg	10	MCERTS	10	< 10			
TPH Total C5 - C40	mg/kg	10	MCERTS	160	54			



Analytical Report Number : 18-96459

Project / Site name: NJew Little Mills

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1023557	Lift 1	None Supplied	None Supplied	Brown clay and sand with gravel and brick.
1023558	Lift 2	None Supplied	None Supplied	Brown sand with gravel and brick.

Analytical Report Number : 18-96459

Project / Site name: NJew Little Mills

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding.	L076-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

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

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

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Analytical Report Number : 19-42794

Project / Site name:	New Little Mill	Samples received on:	21/05/2019
Your job number:	12-386	Samples instructed on:	23/05/2019
Your order number:	12386-8302-MW	Analysis completed by:	31/05/2019
Report Issue Number:	1	Report issued on:	31/05/2019
Samples Analysed:	2 soil samples		

Signed: 

Zina Abdul Razzak
Senior Quality Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

Iss No 19-42794-1 New Little Mill 12-386

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

The results included within the report are representative of the samples submitted for analysis.

Page 1 of 5

Analytical Report Number: 19-42794

Project / Site name: New Little Mill

Your Order No: 12386-8302-MW

Lab Sample Number				1230116	1230117			
Sample Reference				Mot 1	Mot 2			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				21/05/2019	21/05/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	0.89	0.90			
Total mass of sample received	kg	0.001	NONE	0.54	0.50			

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected			
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	9.0	9.0			
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1			
Total Sulphate as SO ₄	mg/kg	50	MCERTS	200	260			
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	35	39			
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.017	0.020			
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	17.3	19.6			
Sulphide	mg/kg	1	MCERTS	12	10			
Total Sulphur	mg/kg	50	MCERTS	120	110			

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0			
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80			
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Analytical Report Number: 19-42794

Project / Site name: New Little Mill

Your Order No: 12386-8302-MW

Lab Sample Number	1230116	1230117			
Sample Reference	Mot 1	Mot 2			
Sample Number	None Supplied	None Supplied			
Depth (m)	None Supplied	None Supplied			
Date Sampled	21/05/2019	21/05/2019			
Time Taken	None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	2.4	< 1.0		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.6	0.6		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	6.1	6.9		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	5.0		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	13	17		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	2.6	3.0		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	9.6	13		

Petroleum Hydrocarbons

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0		
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1		
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1		
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0		
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0		
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	< 1.0		
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0	< 1.0		
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	< 10		
TPH Total C5 - C40	mg/kg	10	MCERTS	< 10	< 10		



Analytical Report Number : 19-42794

Project / Site name: New Little Mill

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1230116	Mot 1	None Supplied	None Supplied	Beige gravelly sand with concrete.
1230117	Mot 2	None Supplied	None Supplied	Beige gravelly sand with concrete.

Analytical Report Number : 19-42794

Project / Site name: New Little Mill

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

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

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

APPENDIX V

PHOTOGRAPHS

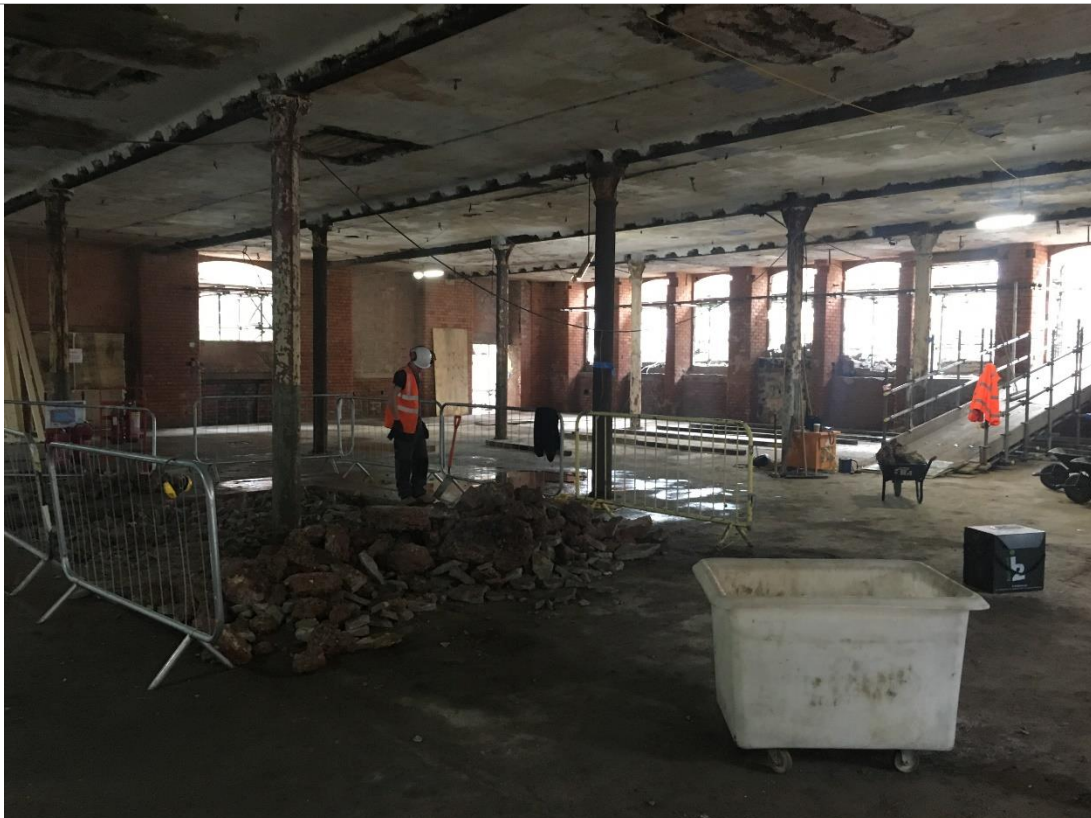
New Little Mills

Remediation and Enabling Works Validation
August 2019

PLATE 1 BROKEN CONCRETE IN AREA OF LIFT SHAFT



PLATE 2 SHAFT POSITION IN REFERENCE TO WIDER SITE



New Little Mills

Remediation and Enabling Works Validation

August 2019

PLATE 3 MADE GROUND IN BASE OF LIFT SHAFT



APPENDIX V

GEOTECHNICAL TESTING

RESULTS



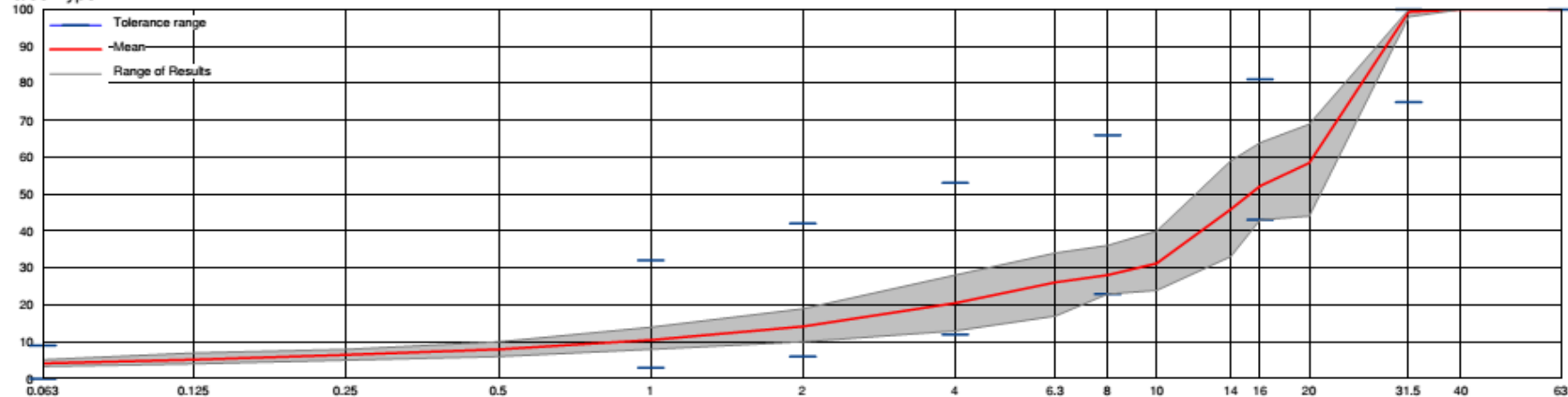
MARCHINGTONSTONE

Material Type: Limestone
 Product: TYPE 1 SUB-BASE CL803.
 Material Code: 110A801

Quarry: **MSTS**
 Site: all
 Size/Specs: 0/63 Type 1 evaluated against SHW 803

5 samples from 03/01/19 to 29/01/19 starting with sample no. 1

0/63 Type 1



Seq. No.	Sample No.	Sample date	Percentage Passing Sieves (mm)																	Retained on d/D (mm)		Moisture %	Flakiness FI	Within CtrlLmt	Complies
			63	40	31.5	20	16	14	10	8	6.3	4	2	1	0.5	0.25	0.125	0.063	no rec	no rec					
1	14	03/01/19			100	98	69	64	59	40	33	32	24	16	11	9	7	6	4.5			0.6		-	yes
2	32	08/01/19			100	100	63	57	53	39	36	34	28	19	14	10	8	7	5.2			1.2		-	yes
3	61	17/01/19			100	99	44	43	35	26	24	24	20	15	11	9	7	5	3.9			1.6		-	yes
4	90	24/01/19			100	100	65	54	49	27	24	23	17	11	8	6	5	4	3.5			0.7		-	yes
5	105	29/01/19			100	100	51	43	33	24	23	17	13	10	8	6	5	4	3.3			0.9		-	yes
Target					100	99	89	65	59	50	45	40	36	29	23	18	15	12	11	7.0					
Specified min					100		75		43			23		12	6	3									
Control limit min																									
Control limit max																									
Specified max						100		81			66		53	42	32				9.0						
Average					100.0	99.4	58.4	52.2	45.8	31.2	28.0	26.0	20.4	14.2	10.4	8.0	6.4	5.2	4.1			1.0			
Standard Deviation						0.9	10.5	9.1	11.4	7.7	6.0	7.0	5.9	3.7	2.5	1.9	1.3	1.3	0.8			0.4			
Minimum Value					100	98	44	43	33	24	23	17	13	10	8	6	5	4	3.3			0.6			
Maximum Value					100	100	69	64	59	40	36	34	28	19	14	10	8	7	5.2			1.6			

APPENDIX VI CONTRACTOR COMPLETION CHECK SHEET

GEOTECHNICAL ENABLING WORKS COMPLETION FORM

Upon completion of all site remediation and enabling works, this form will be completed by E3P, in the presence of the appointed contractor, to ensure that all pertinent geotechnical enabling works activities are complete or, where a deviation from the specification has occurred, all future limitations and issues are documented for the client's records.

Activity	Complete			Signature
	Yes	No	N/A	(initial)
Eradication of all invasive plant species			✓	
Removal of all vegetation			✓	
Removal of all root bulbs and root networks			✓	
Stockpiling of topsoil and certification of suitability for reuse			✓	
Stockpiling of subsoil and certification of suitability for reuse			✓	
Stockpile all recycled aggregate with geotechnical and chemical validation testing			✓	
Removal of all relict foundations and infrastructure in their entirety			✓	
Decommission of all redundant drainage infrastructure	✓			
Decommission of all former interceptors			✓	
Decommission of all former above- and below-ground tanks			✓	
Removal of all waste materials to a licensed facility	✓			
Removal of all asbestos to a licensed facility	✓			
Engineering of all plots for shallow spread foundation in accordance with E3P Geotechnical Specification			✓	
Engineering of all plots for VSC in accordance with E3P Geotechnical Specification			✓	
Engineering of all plots for pile foundation in accordance with E3P Geotechnical Specification			✓	
Engineering of all plots for raft foundation in accordance with E3P Geotechnical Specification			✓	
Engineering of highways bulk upfill in accordance with E3P Specification with compliant validation testing			✓	
Engineering of highways subgrade in accordance with E3P Specification with compliant validation testing			✓	
Engineering of highways capping in accordance with E3P Specification with compliant validation testing			✓	
Cut-and-fill the development site to client's required elevation with as-built survey			✓	



POST-REMEDIATION AND ENABLING LIMITATIONS

All and every deviation from the approved specification for works should be documented by the remediation and enabling works contractor below.



