REMEDIATION AND ENABLING WORKS VALIDATION REPORT

The Flour Project, Jersey Street, Ancoats, Manchester

Prepared for:

manchester life

ERIC WRIGHT CONSTRUCTION

Report Ref: 12-596-R1
Date Issued: May 2018



e3p | Environmental | Energy | Engineering

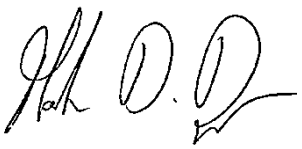
E3P

Heliport Business Park,
Liverpool Road,
Eccles,
Manchester,
M30 7RU

Tel : + 00 (0) 161 707 9612
http:\\www. e3p.co.uk

Registered in England
No.: 807255262

QUALITY ASSURANCE

REMARKS	***FINAL***
DATE	May 2018
PREPARED BY	M Dyer
QUALIFICATIONS	BSc (Hons) FGS, AIEMA, MIEnvSc, CEnv
SIGNATURE	
CHECKED BY	R. Walker
QUALIFICATIONS	BSc, FGS,
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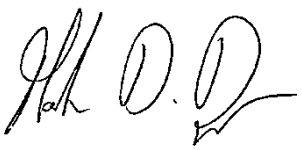
SIGNATURE	
PROJECT NUMBER	12-596

IMS Template Reference
QR001-1

EXECUTIVE SUMMARY	
Site Address	The Flour Project, Jersey Street, Ancoats, Manchester
Grid Reference	E385109, N398653
Site Area	0.45 Ha
Stated Objective	The primary purpose of this report is to provide validation of remediation and enabling works completed as part of the construction of a high rise residential development on land to the north of Jersey Street in Ancoats, Manchester. For the avoidance of any doubt, this document relates to the contaminated land aspects to these works and does not relate to the geotechnical engineering verification of the site enabling works.
Site Remediation and Enabling Works	All works at the site have been conducted in accordance with the agreed Remediation Strategy. The main outputs from the works are: • General site clearance and legislatively compliant demolition of all above ground structures, breaking out, excavation and removal of all slabs, hard-standing and buried structures to the base of the Made Ground (~2.6m); • Removal of all deleterious and unsuitable fill materials from site. any imported material to be within parameters of the engineers' specification; • Management of all works so as to ensure that no environmental nuisance is created through dust emissions, noise or vibration levels & compliance with the Construction Management Plan; • Ensure that all works are completed in a manner so as not to create any structural risk to the adjacent highways / footpaths / infrastructure; • Ensure that the risks from asbestos have been appropriately managed, in line with current guidance and in line with the recommendations made in the Scott Hughes Enabling Scope of Works; • Confirm the absence of any previously unidentified contamination sources.
Materials Management Plan & Legislative Waste Compliance	A Materials Management Plan (MMP) was developed by Eric Wright Construction in accordance with Version 2 of the CL:AIRE Code of Practice as documented within the MMP (ref: EWG-E-F-835) dated June 2016. All waste transfer notes and duty of care certification is held by the Remediation Contractor in the site completion file. The works did not require the treatment of any materials and therefore no Environmental Permit was registered for the site. Recycling of demolition material was completed using LAPC licensed crushing plant operated by Howard Stott Demolition Ltd.
Construction Management Plan	The CMP required that all works be completed in strict accordance with the control procedures as documented within the CMP prepared by Eric Wright (ref: 1880-MLDC-F) dated September 2015.

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E3P Drawing No 12-596-001 Site Location Plan

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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 to facilitate the preparation of a high-rise residential development on land to the north of Jersey Street, Ancoats, Manchester; herein referred to as ***the site*** which forms part of the 'Flour Project'.

E3P were appointed by Eric Wright, on behalf of Manchester Life as independent Geo-Environmental Consultant for the production of a suitably detailed report to ensure the satisfaction of the relevant planning conditions.

For the avoidance of doubt, this document relates to the contaminated land aspects to these works and does not relate to the geotechnical aspects of the works.

The development area is approximately 0.45 hectares in size and is situated approximately 1.5km north east of Manchester City Centre (see site location plan in figure 1).

For the avoidance of doubt, E3P can confirm that the parcel of land refers to the red-line boundary as indicated in Figure 1.1 below:

Figure 1.1 Site Location Plan – Jersey Street



1.3 Site Location / Setting

SITE ADDRESS	LAND NORTH OF JERSEY STREET, ANCOATS, MANCHESTER, M4 1LE
NATIONAL GRID REFERENCE	E385109, N398653
AREA	0.45 hectares

Prior to the commencement of demolition works, the site comprised industrial units and derelict land.

Former buildings on site comprised multi-story brick and steel clad industrial premises with adjacent hardstanding, in the east were classrooms and administration offices with associated plant rooms. Basements were formerly present on site although these are understood to have been excavated, grubbed out and crushed during the demolition works.

1.4 Proposed Development

Manchester Life have constructed 31 No. apartments over 9no. storey high-rise residential high rise. The lower five floors comprise car parking.

1.5 Summary of Parties Involved

NAME OF PARTY	FUNCTION / INTEREST
Land Owner	Manchester Life
Developer	Manchester Life
Main Contractor	Eric Wright Construction
Remediation Contractor	PP O'Connor
Validation Consultant	E3P
Human Health Regulator / Local Planning Authority	Manchester City Council
Controlled Waters Regulator	Environment Agency

1.6 Limitations

The limitations of this report are presented in Appendix I.

1.7 Confidentiality

E3P has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from E3P; a charge may be levied against such approval.

2. CONTAMINATION, REMEDIATION & ENABLING WORKS REQUIREMENTS

2.1 Summary of Contamination Issues

2.1.1 Human Health

The Tier I human health risk assessment completed by Hydrock Ltd determined that concentrations of the following determinants exceed guideline values for a residential end use:

- Asbestos
- Benzo (a) pyrene

For these elevated concentrations, the exposure pathway is related to dermal contact and ingestion, soil ingestion and inhalation. All exceedances were identified in shallow Made Ground soils.

Minimal mitigation for future end users of the site is deemed necessary as the site is to be overlain with buildings and hardstanding for carparking. Therefore, therefore there is no exposure pathway to future site users ensuring no unacceptable risk from the identified contaminant exceedances.

2.1.2 Controlled Waters

The site is underlain by a Principle Aquifer (high risk receptor) in the solid geology with surface water features within influencing distance of the site.

Significant concentrations of soluble compounds (Manganese) were identified in the groundwater although as this is thought to be naturally derived no unacceptable risk due to the development was foreseen.

2.1.3 Ground Gas

The ground gas assessment as detailed within the Hydrock Geo-Environmental Report indicated that the site is Characteristic Situation 2 – meaning that ground gas protection measures are necessary in the construction of the new development.

Although a gas risk assessment document has not been made available to E3P, looking at the proposed development plans, a 5no. storey, partial basement car park is proposed. This

would provide more than adequate protection for the proposed residential development, based on the recommendations in BS8485:2015. This is detailed further in Secion 4.0.

2.1.4 Potable Water Supply Infrastructure

Following a process of cut fill earthworks, it is considered that Polyethylene pipeline will be suitable for the proposed potable water infrastructure in the near surface soils between 0.75 and 1.35m bgl.

2.2 Correspondence with Regulatory Authorities

2.2.1 Local Planning Authority – Human Health

It is understood that the CMP and Enabling Works Specification to Manchester City Council and that the documents have been approved.

2.2.2 Environment Agency – Controlled Water & Wider Environ

The EA act as a statutory consultee of Manchester City Council Planning Authority and in this instance, it is understood that no consultation correspondence has been supplied by MCC and as such we presume the EA have no further requirements with respect to controlled waters.

2.3 Environmental Permit & Approvals

2.3.2 Local Authority Pollution Control – LAPC Part B Licensing

The demolition materials were processed using dedicated 'crushing plant' mobilised to site by the Remediation Contractor.

Prior to mobilisation the appropriate deployment notification was submitted by the operator to the Local Authority to ensure due notification of the intended arrival and operation of the Part B LAPC process.

Copies of the standard deployment notification are available from the operator directly.

2.3.2 Standard Rules Permit.

In this instance there was no requirement for the notification of works under a U1 or T5 standard rules permit as a Materials Management Plan has been produced for the site.

2.3.2 CL:AIRE MMP – Definition of Waste

A Materials Management Plan (MMP) was developed by Eric Wright Group (EWG) in accordance with the industry Code of Practice (Version 2) to document the proposed materials management operations and corresponding management objectives to demonstrate the safe, sustainable and legislatively compliant management and re-use of soils on-site.

E3P understand that the MMP was subject to review by an Qualified Person (QP) in accordance with the requirements of the CoP prior to the signed declaration being made to the CL:AIRE.

Copies of the MMP & QP Declaration are available from the Contractor on request.

2.2 Summary of Remediation & Enabling Works Objectives

The proposed remediation activities were detailed within the Scott Hughes Enabling Works Report (June 2016) and the EWG Construction Works Plan (September 2017) and supplementary supporting documents supplied to 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.

ENABLING WORKS NO.	GENERAL OVERVIEW OF OBJECTIVES
EW1	Site Clearance and Excavation of structures and obstructions.
EW2	Disposal of any excess generated materials.
EW3	Management/mitigation of potential asbestos impacted made ground.
EW4	Confirmation of unforeseen contamination.

3. DETAILED REMEDIATION & EARTHWORKS 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 on the 30th March 2015 and were completed by the 21st May 2015.

EW1 Site Clearance & Excavation of Structures and Obstructions

Date of Works Undertaken
30th March – 8th May

Photographs
Plates 1 – 26

Overview of Works
The subject site was historically occupied by multi-story brick and steel clad industrial premises with adjacent hardstanding, in the east were classrooms and administration offices with associated plant rooms. Basements were formerly present on site although these are understood to have been excavated, grubbed out and crushed during the demolition works, with the underlying Made Ground turned over. The turnover of Made Ground in this manner allowed for the removal of any oversize materials to facilitate piling through the made ground, in addition to the identification of any previously unidentified areas of contamination.

A Materials Management Plan produced for the site facilitated the reuse of crushed demolition material for the upfill of the cleared site to create a development platform for the proposed pilling works.

Following this, the building was constructed, effectively sealing the underlying made ground from future site users of the site beneath hardstanding and/or the building itself.

E3P maintained a part time watching brief during the turning and processing of the Made Ground to audit and validate the site enabling works in addition to inspecting all materials turned over and identifying any previously unidentified contamination hotspots, including Asbestos Containing Materials (ACMs).

3.2 Removal/Disposal of Excess Generated Materials
Overview of Works Pile arisings were disposed of off site appropriately by the contractor. WAC testing of these materials is included in Appendix V. Copies of the relevant waste transfer notes are available from the contractor, on request.

3.3 Management / Mitigation of Potential Asbestos Impacted Made Ground
Overview of Works E3P understands that the Contractor undertook relevant management/mitigation measures (as per the 'Enabling Scope of Works' document) to appropriately address the potential risks posed from possible asbestos in made ground. It is understood that stockpiles were kept dampened down during periods of dry weather and that dust was kept to a minimum and that appropriate PPE was worn by site operatives following appropriate risk assessment of each activity.

3.4 Confirmation of Unforeseen Contamination
Overview of Works The Contractor has confirmed to E3P that obvious signs if visual and/or olfactory contamination was not encountered during the construction works. A suitably qualified E3P engineer was in part-time attendance during the turnover of Made Ground underlying historic building footprints. All soils were screened with a Photo Ionisation Detector (PID), showing no elevated readings of VOCs and there was no visual or olfactory evidence of contamination identified within the soils.

4. POST REMEDIATION BUILD PHASE REQUIREMENTS

4.1 Overview of 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;

The following should be implemented during the build phase of the development:

- Installation and validation of ground gas protection measures.
- Confirmation that the final development layout does not include areas of landscaping and that all areas of the site are covered by hardstanding and/or buildings.

4.2 Requirements for Further Works Prior to Substructure Construction

The following items remain to be addressed prior to construction of the development:

ITEM	DISCUSSION
Submission of Validation Report to Regulators	N/A

4.3 Gas Mitigation Measures

Ground gas monitoring to date indicates that the site will fall into the bracket for Characteristic Situation 2, which will require specialist mitigation measures to be constructed in accordance with BS8485 as summarised below:

GAS PROTECTION SCORES FOR THE STRUCTURAL BARRIER	SCORE
a) **Floor and substructure design**	
Precast suspended segmental subfloor (i.e. beam and block).	0
Cast in situ ground bearing floor slab (with only nominal mesh reinforcement.	0.5
Cast in situ monolithic reinforced ground bearing raft or reinforced cast in situ suspended floor slab with minimal penetrations.	1 or 1.5
Basement floor and walls conforming to BS 8102:2009, Grade 2 waterproofing.	2
Basement floor and walls conforming to BS 8102:2009, Grade 3 waterproofing.	2.5

PROTECTION ELEMENT SYSTEM		SCORE	COMMENTS
Gas protection scores for ventilation protection measures			
(a) Pressure relief pathway (usually formed of low fines gravel or with a thin geocomposite blanket or strips terminating in a gravel trench external to the building)		0.5	Whenever possible a pressure relief pathway (as a minimum) should be installed in all gas protection measures systems. If the layer has a low permeability and / or is not terminated in a venting trench (or similar), then the score is zero.
(b) Passive sub floor dispersal layer: Media used to provide the dispersal layer are: • *Clear void* • *Polystyrene void former blanket* • *Geocomposite void former blanket* • *No-fines gravel layer with gas drains* • *No-fines gravel layer*	Very good performance	2.5	The ventilation effectiveness of different media depends on a number of different factors including the transmissivity of the medium, the width of the building, the side ventilation spacing and type and the thickness of the layer. The selected score should be assigned taking into account the recommendations in Annex B of BS8485:2015. Passive ventilation should be designed to meet at least "good performance".
	Good performance	1.5	
(c) Active dispersal layer, usually comprising fans with active abstraction (suction) from a sub floor dilution layer, with roof level vents. The dilution layer may comprise a clear void or be formed of geocomposite or polystyrene void formers.		1.5 to 2.5	This system relies on continued serviceability of the pumps, therefore alarm and response systems should be in place. There should be robust management systems in place to ensure the continued maintenance of the system, including pumps and vents. Active ventilation should always be designed to meet at least "good performance".
(d) Active positive pressurization by the creation of a blanket of external fresh air beneath the building floor slab by pumps supplying air to points across the central footprint of the building into a permeable layer, usually formed of a thin geocomposite blanket.		1.5 to 2.5	This system relies on continued operation of the pumps, therefore alarm and response systems should be in place. The score assigned should be based on the efficient "coverage" of the building footprint and the redundancy of the system. Active ventilation should always be designed to meet at least "good performance".
(e) Ventilated car park (floor slab of occupied part of the building under consideration is underlain by a basement or undercroft car park)		4	Assumes that the car park is vented to deal with car exhaust fumes, designed to *Buildings Regulations 2000, Approved Document F [9].*

PROTECTION ELEMENT SYSTEM	SCORE	COMMENTS
Gas protection score for the gas resistant membrane		
Gas resistant membrane meeting all of the following criteria: • *Sufficiently impervious to the gases with a methane gas transmission rate <40.0 ml/day/m²/atm (average) for sheet and joints (tested in accordance with BS ISO 15105-1 manometric method_;* • *Sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions;* • *Sufficiently strong to withstand in-service stresses (eg settlement if placed below a floor slab);* • *Sufficiently strong to withstand the installation process and following trades until covered (eg penetration from steel fibres in fibre reinforced concrete, penetration of reinforcement ties, tearing due to working above it, dropping tools etc);* • *Capable, after installation, of providing a complete barrier to the entry of the relevant gas; and,* • *Verified in accordance with CIRIA C735.*	2	The performance of membranes is heavily dependent on the quality and design of the installation, resistance to damage after installation and integrity of joints. For example, a minimum 0.40mm thickness (equivalent to 370g/m² for polyethylene) reinforced membrane (virgin polymer) meets the performance criteria opposite. If a membrane is installed that does not meet all the criteria opposite then the score is zero.

Due to the fact that the development incorporates a ventilated car park in to the design, this achieves the required points to satisfy the protection requirements of BS8485:2015.

E3P can confirm the development has been constructed to the required standard with the following design to mitigate gas ingress risk.

- The car park is naturally vented at Level 1
- The lower area has a fan to clear any fumes, as detailed within the drawings appended; and,
- The car park roller shutter is perforated.

4.4 Water Pipeline Risk Assessment

It is understood that standard water supply pipes have been agreed between the Contractor and United Utilities.

4.5 Post Remediation Constraints for the site will include:

Consultations will have to be completed with the Local Authority to enable the satisfactory discharge of planning conditions associated with the planning consent for the site.

5. CONCLUSION AND RECOMMENDATIONS

E3P has completed the validation of the agreed land remediation works completed as part of the regeneration of land at Jersey Street, Ancoats.

E3P can confirm that the works in relation to contaminated land have been implemented in accordance with the agreed Remediation Strategy with all materials managed in such a way as to ensure that the completed works posed no risk to construction operatives or the wider environ.

E3P can also confirm that all materials that remain in-situ pose no unacceptable degree of potential risk to the identified receptors within the context of the developed Conceptual Site Model (CSM) (effectively covered by buildings and hardstanding) and as such the site is deemed suitable for use residential endues.

The completed developed ensured the construction of the building in accordance with the approved designs which allow complete ventilation.

No formal landscaping is constructed within only installed planters in the courtyard area.

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 be 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

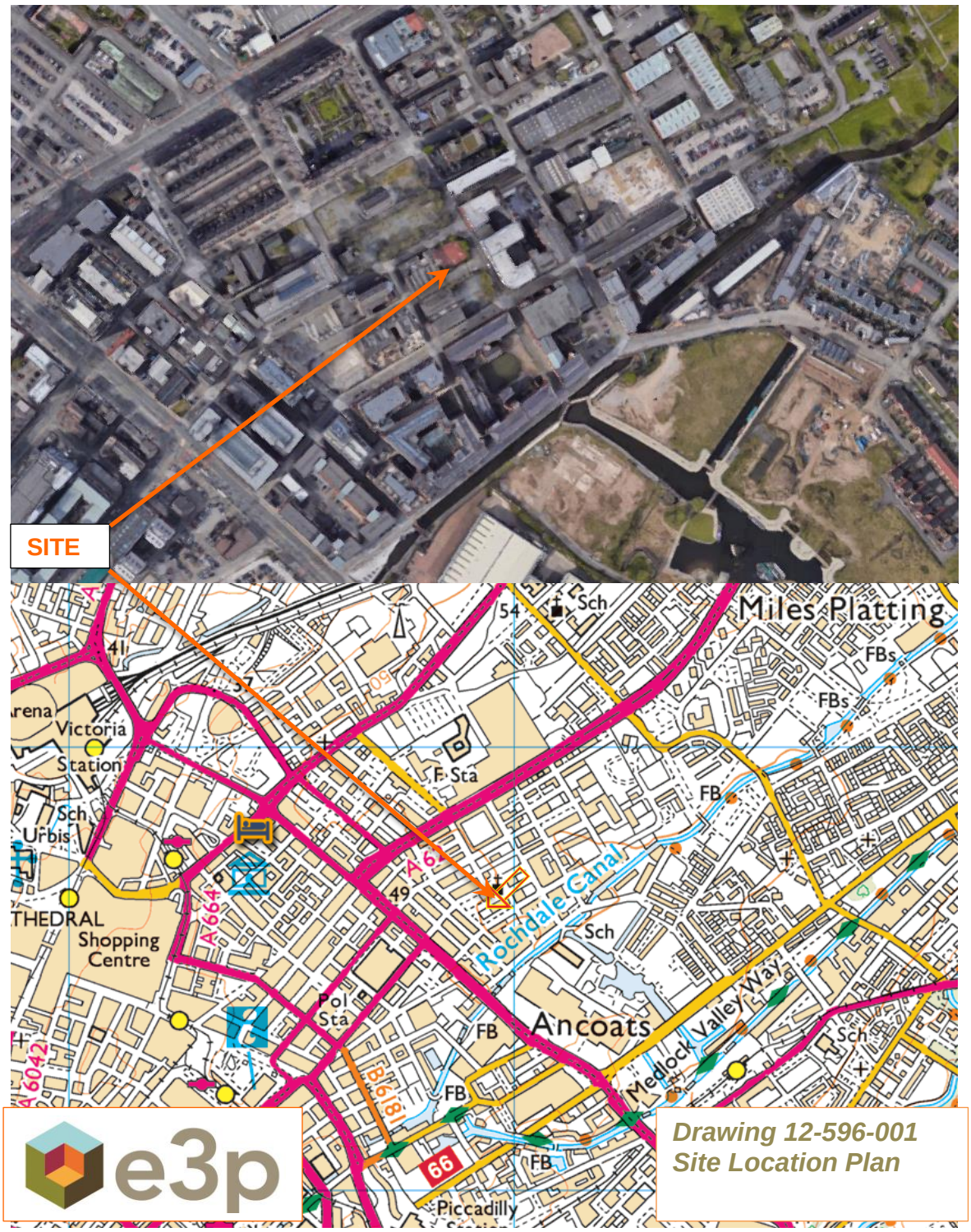


TERMS

AST	Above Ground Storage Tank	**SGV**	Soil Guideline Value
BGS	British Geological Survey	**SPH**	Separate Phase Hydrocarbon
BSI	British Standards Institute	**TPH CWG**	Total Petroleum Hydrocarbon (Criteria Working Group)
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes	**SPT**	Standard Penetration Test
CIEH	Chartered Institute of Environmental Health	**SVOC**	Semi Volatile Organic Compound
CIRIA	Construction Industry Research Association	**UST**	Underground Storage Tank
CLEA	Contaminated Land Exposure Assessment	**VCCs**	Vibro Concrete Columns
CSM	Conceptual Site Model	**VOC**	Volatile Organic Compound
DNAPL	Dense Non-Aqueous Phase Liquid (chlorinated solvents, PCB)	**WTE**	Water Table Elevation
DWS	Drinking Water Standard	**m**	Metres
EA	Environment Agency	**km**	Kilometres
EQS	Environmental Quality Standard	**%**	Percent
GAC	General Assessment Criteria	**%v/v**	Percent volume in air
GL	Ground Level	**mb**	Milli Bars (atmospheric pressure)
GSV	Gas Screening Value	**l/hr**	Litres per hour
HCV	Health Criteria Value	**µg/l**	Micrograms per Litre (parts per billion)
ICSM	Initial Conceptual Site Model	**ppb**	Parts Per Billion
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene)	**mg/kg**	Milligrams per kilogram (parts per million)
ND	Not Detected	**ppm**	Parts Per Million
LMRL	Lower Method Reporting Limit	**mg/m^3**	Milligram per metre cubed
NR	Not Recorded	**m bgl**	Metres Below Ground Level
PAH	Polycyclic Aromatic Hydrocarbon	**m bcl**	Metre Below Cover Level
PCB	Poly-Chlorinated Biphenyl	**mAOD**	Metres Above Ordnance Datum (sea level)
PID	Photo Ionisation Detector	**kN/m^2**	Kilo Newtons per metre squared
QA	Quality Assurance	**µm**	Micro metre
SGV	Soil Guideline Value		

APPENDIX III
DRAWINGS




SITE
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FBs
FBs
Victoria
Station
Sch
Urbis
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FB
THEDRAL
Shopping
Centre
A664
A62
49
Rochdale Canal
Sch
Pol
Sta
FB
Ancoats
Medlock Valley Way
Sch
A6042
B6181
FB
66
FB
Piccadilly
e3p
Drawing 12-596-001
Site Location Plan

Contaminated waste stockpile to be taken off site separatley

Trial dig to locate services

Trial dig to locate services

Trial dig to locate services

Trial dig to locate services

Stockpile of excavated material. Volume 7m3

Trial dig to locate services

Excavation. Wall to back of footpath. Check for drains leaving existing Building

Trial dig to locate services

Trial dig to locate services

Trial dig to locate services

Cast Iron Water main - Out of use

Trial dig to locate services

Trial dig to locate services

Stockpile of crushed material Volume 1350m3

Stockpile of Excavated material Volume 61m3

Trial dig to locate services

Trial dig to locate services

Trial dig to locate services

Existing Electricity supply

Trial dig to locate services

Trial dig to locate services

Trial dig to locate services

Trial dig to locate services

Eric Wright Construction Ltd.
Sceptre House
Sceptre Way
Bamber Bridge
Preston

Contract	
Drawing Title	
Drwg. No.	Scale (@A3)
Revision	Surveyed
Date	Drawn

DO NOT SCALE - IF IN DOUBT ASK

CARBON MONOXIDE DETECTOR

JET FAN 2200L x 504H

CONTROL PANEL 1000H x 800W x 300D REQUIRES MAINS & SECONDARY INCOMERS - 20A/415V/3PH/50Hz

FIREMAN'S OVERRIDE SWITCH

STOP

Water Tank Room 90.30 m²

Refuse Store 34.41 m²

Commercial Refuse 33.65 m²

LV Switch Room 28.09 m²

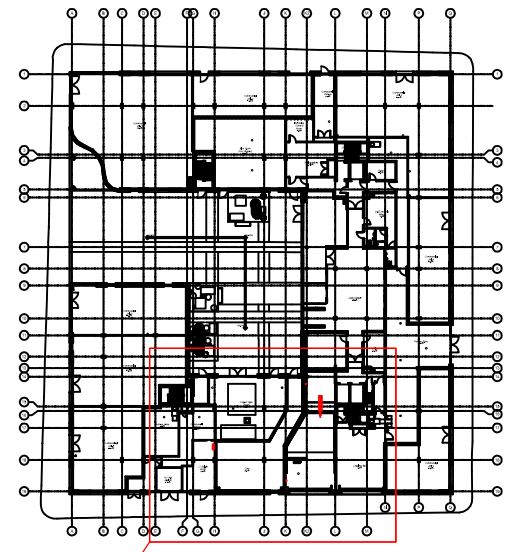
HV Sub Station 12.49 m²

Gym 89.27 m²

Loading Bay 70.80 m²

12 13 14 15 16 17 18 19

E F G H J K K2 L M N



ENLARGED AREA

KEY PLAN

REV. A
CONSTRUCTION ISSUE

Drawn	Date	Chk	App
B.SMITH	20.06.17	P.FRAIN	

INTERACTIVE SPECIAL PROJECTS
P.O. Box 473
Manchester
M28 8BX
Tel: 0845.672.9392
email: general@interactivespecialprojects.co.uk
www.interactivespecialprojects.co.uk

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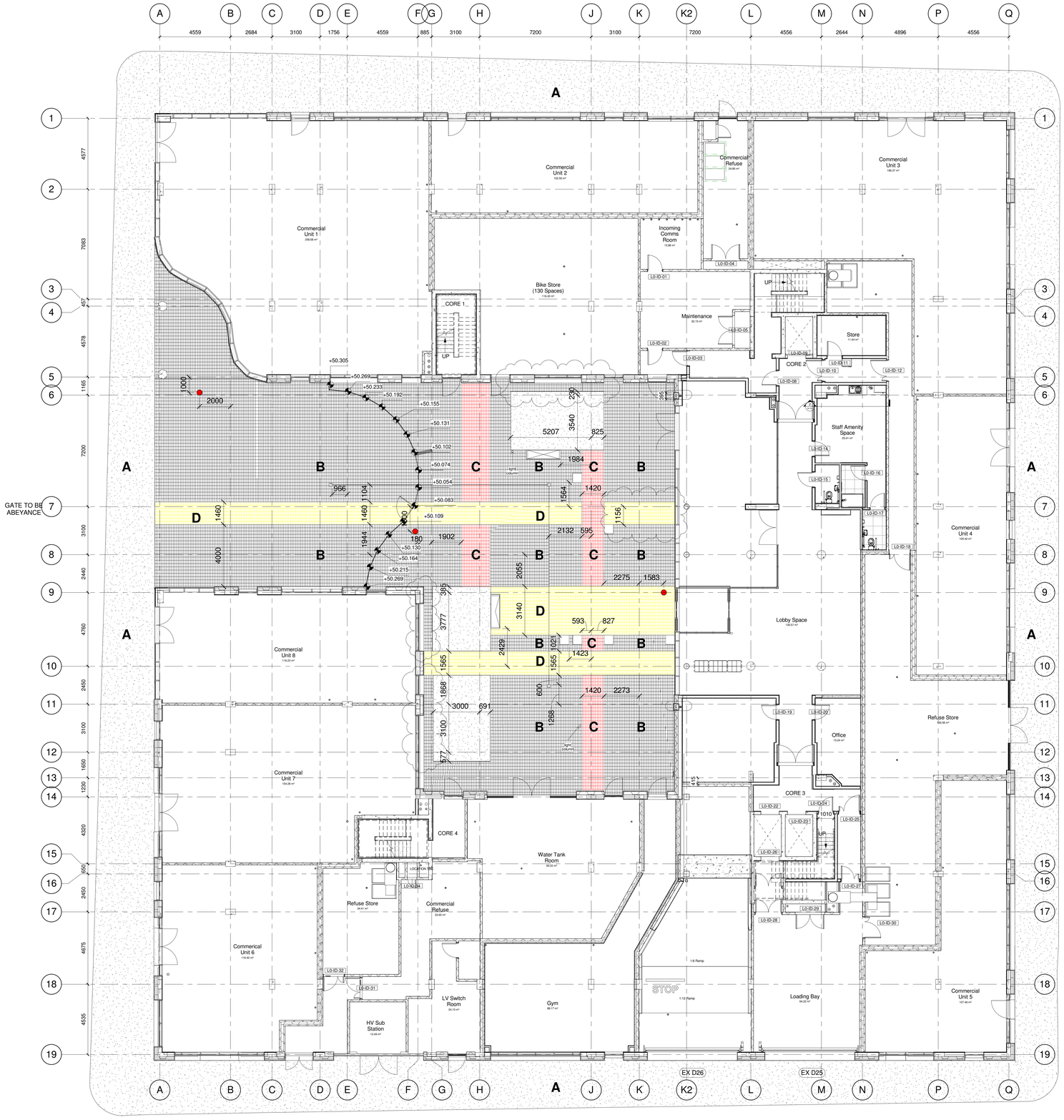
TITLE	EQUIPMENT LAYOUT – GROUND FLOOR LEVEL				
PROJECT	JERSEY STREET (MAN FLOUR), MANCHESTER				
PROJECT No	6649	AREA		DRAWN	B.SMITH
SITE		SCALE	1:100@A2	CHK	P.FRAIN
CLIENT	AMEON	DATE	26.05.17	APP	
DRG No	6649–006			REV	A



1 **Level 0 External Works**
1 : 100



KEY PLAN

NOTES

THIS DRAWING MUST NOT BE SCALED.

ALL DIMENSIONS ARE TO BE VERIFIED AND CHECKED ON SITE. ANY DISCREPANCIES THAT ARE, OR BECOME APPARENT SHOULD BE REPORTED TO CHAPMAN TAYLOR.

AREAS INDICATED ARE APPROXIMATE GROSS INTERNAL AREA. THEY RELATE TO THE MULTI AREAS OF THE BUILDING AT THE CURRENT STAGE OF DESIGN. ANY DECISIONS TO BE MADE ON THE BASIS OF THESE PREDICTIONS, WHETHER AS TO PROJECT VIABILITY, PRE-LETTING, LEASE AGREEMENTS, OR THE LIKE, SHOULD INCLUDE DUE ALLOWANCE FOR THE INCREASES AND DECREASES INHERENT IN THE DESIGN DEVELOPMENT AND BUILDING PROCESS.

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- A — Adoptable macadam surface to engineers specification.
- B — Plaza Paving Block - Pepper. 200(l) X 100 (w) X 80(d)mm Stretcher bond
- C — Plaza Paving Block - Paprika 200(l) x 100(w) x 80(d)mm
- D — Plaza Paving Block- Safran 200(l) x 100(w) x 80(d)mm
- Shrub, herbaceous and bulb planting. Refer to CTL-XX-00-96-1000
- Bench refer to spec.
- 600x600 chamber cover
- Access / Totem Posts

REFER TO:

- 20 SERIES DRAWINGS FOR GA PLANS
- 95 SERIES DRAWINGS FOR EXTERNAL WORKS & LEVELS
- 96 SERIES DRAWINGS FOR SOFT LANDSCAPING
- 97 SERIES DRAWINGS FOR ENTRANCE GATE DETAILS

- MUST BE READ IN CONJUNCTION WITH NBS SPECIFICATIONS

ACCESS AND TOTEM POST LOCATIONS ARE CT INITIAL PROPOSALS AND MUST BE AGREED WITH MLDC PRIOR TO COMMERCEMENT OF ANY WORKS

REV	DATE	BY	DESCRIPTION	CHK'D
C7	10.05.18	AH	600mm STRIP ADDED TO PLANTING BEDS. D PATH EXTENDED TO BUILDING LINE	AK
C6	19.03.18	AK	AMENDED EXIT POST LOCATION	AK
C5	16.03.18	AK	ADDITIONAL SETTING OUT DIMESNIONS / GATE AND PORT LOCATIONS ADDED	AK
C4	05.02.18	AH	CHAMBERS AND SETTING OUT DIMENSIONS ADDED	AK
C3	19.10.17	AH	CHANGE TO PAVING SPEC	AN
C2	19.04.17	NP	RELOCATED ENTRANCE DOOR TO COMM UNIT 5	AH
C1	13.01.17	HG	ISSUED FOR DESIGN INTENT	AH
P1	22.12.16	HG	ISSUED FOR INFORMATION	AH

CLIENT
ERIC WRIGHT

PROJECT
Flour Mill
ANCOATS

ARCHITECT
Chapman Taylor
INTERNATIONAL ARCHITECTS MASTERPLANNERS DESIGNERS
Bass Warehouse, 4 Castle Street, Castlefield, Manchester M3 4LZ
Tel +44 (0)161 828 6500 | Fax +44 (0)161 828 6505
manchester@chapmantaylor.com

STRUCTURAL ENGINEER
SCOTT HUGHES
The Flint Glass Works
64 Jersey Street
Manchester
M4 6JW

SERVICES ENGINEER

DRAWING TITLE
External Works Plan

Scale As indicated @ A0

JOB NO	ISSUE DATE	DRAWN BY	CHECKED BY
B891FMM	22.12.16	HG	AH

ORGANIZATION	ZONE	LEVEL	CATEGORY	NUMBER	REVISION
CTL	XX	00	95	1000	C7

APPENDIX IV
PHOTOGRAPHS












CAT



APPENDIX V
CHEMICAL TESTING RESULTS

TESTCONSULT LIMITED
Ruby House, 40A Hardwick Grange, Warrington WA1 4RF
Tel (01925) 286880 Fax (01925) 286881

LABORATORY TEST CERTIFICATE

Contamination Analysis - Waste Acceptance Criteria

Project :	Bengal St, Manchester	**Job No.:**	23314
Client :	Eric Wright Construction	**Lab Ref No.:**	SA25568
		Date Received:	19/07/2016
		Date Tested:	20/07/2016
		Date Reported:	28/07/2016
Originator:	**Peter Harrinson**	**Material:**	Analysed as Soil

Soil Summary	**Units**	**Sample 1**	**Inert Waste Landfill**	**Stable Non-Reactive**	**Hazardous Waste Landfill**
Acid Neutralising Capacity (pH 4)	Mol/kg	<2			
Acid Neutralising Capacity (pH 7)	Mol/kg	<2			
BTEX (Sum)	mg/kg	(110) <0.0080	6.0		
Loss on Ignition	%	13.0			10.0
Moisture	%	21			
Total Organic Carbon	%	9.1	3.0	5.0	6.0
Total Petroleum Hydrocarbons C10-C40	mg/kg	(13) 53	500.0		
PAH (Sum)	mg/kg	17	100.0		
PCB (Congeners)	mg/kg	<0.00035	1.0		
pH		7.7		>6.0	
10:1 Leachate	**Units**	**Leachate 10:1**			
Antimony (Dissolved)	mg/kg	0.017	0.06	0.7	5.0
Arsenic (Dissolved)	mg/kg	0.0160	0.5	2.0	25.0
Barium (Dissolved)	mg/kg	0.33	20.0	100.0	300.0
Cadmium (Dissolved)	mg/kg	<0.00020	0.04	1.0	5.0
Chromium (Dissolved)	mg/kg	<0.010	0.5	10.0	70.0
Copper (Dissolved)	mg/kg	0.019	2.0	50.0	100.0
Lead (Dissolved)	mg/kg	0.093	0.5	10.0	50.0
Mercury (Dissolved)	mg/kg	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	mg/kg	0.32	0.5	10.0	30.0
Nickel (Dissolved)	mg/kg	<0.010	0.4	10.0	40.0
Selenium (Dissolved)	mg/kg	0.011	0.1	0.5	7.0
Zinc (Dissolved)	mg/kg	0.026	4.0	50.0	200.0
Chloride	mg/kg	22.0	800.0	15000.0	25000.0
Fluoride	mg/kg	6	10.0	150.0	500.0
Sulphate Ion	mg/kg	2100	1000.0	20000.0	50000.0
Phenols (Mono)	mg/kg	<1.0	1.0		
Total Dissolved Solids	mg/kg	25	4000.0	60000.0	100000.0
Dissolved Organic Carbon	mg/kg	3600	500.0	800.0	1000.0

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TESTCONSULT LIMITED
■ Karl Monks, Senior Technician

TESTCONSULT LIMITED
Ruby House, 40A Hardwick Grange, Warrington WA1 4RF
Tel (01925) 286880 Fax (01925) 286881

LABORATORY TEST CERTIFICATE

Contamination Analysis - Waste Acceptance Criteria

Project :	Bengal St, Manchester	**Job No.:**	23314
Client :	Eric Wright Construction	**Lab Ref No.:**	SA25568
		Date Received:	19/07/2016
		Date Tested:	20/07/2016
		Date Reported:	28/07/2016
Originator:	**Peter Harrinson**	**Material:**	Analysed as Soil

Soil Summary	**Units**	**Sample 2**	**Inert Waste Landfill**	**Stable Non-Reactive**	**Hazardous Waste Landfill**
Acid Neutralising Capacity (pH 4)	Mol/kg	<2			
Acid Neutralising Capacity (pH 7)	Mol/kg	<2			
BTEX (Sum)	mg/kg	<0.0040	6.0		
Loss on Ignition	%	14.0			10.0
Moisture	%	18			
Total Organic Carbon	%	6.3	3.0	5.0	6.0
Total Petroleum Hydrocarbons C10-C40	mg/kg	(13) 91	500.0		
PAH (Sum)	mg/kg	18	100.0		
PCB (Congeners)	mg/kg	<0.00035	1.0		
pH		7.9		>6.0	
10:1 Leachate	**Units**	**Leachate 10:1**			
Antimony (Dissolved)	mg/kg	<0.010	0.06	0.7	5.0
Arsenic (Dissolved)	mg/kg	<0.0020	0.5	2.0	25.0
Barium (Dissolved)	mg/kg	0.23	20.0	100.0	300.0
Cadmium (Dissolved)	mg/kg	<0.00020	0.04	1.0	5.0
Chromium (Dissolved)	mg/kg	<0.010	0.5	10.0	70.0
Copper (Dissolved)	mg/kg	<0.0050	2.0	50.0	100.0
Lead (Dissolved)	mg/kg	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	mg/kg	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	mg/kg	0.043	0.5	10.0	30.0
Nickel (Dissolved)	mg/kg	<0.010	0.4	10.0	40.0
Selenium (Dissolved)	mg/kg	<0.0050	0.1	0.5	7.0
Zinc (Dissolved)	mg/kg	<0.020	4.0	50.0	200.0
Chloride	mg/kg	20.0	800.0	15000.0	25000.0
Fluoride	mg/kg	9.8	10.0	150.0	500.0
Sulphate Ion	mg/kg	960	1000.0	20000.0	50000.0
Phenols (Mono)	mg/kg	<1.0	1.0		
Total Dissolved Solids	mg/kg	11	4000.0	60000.0	100000.0
Dissolved Organic Carbon	mg/kg	2100	500.0	800.0	1000.0

K.Monks

Approved Signature
TESTCONSULT LIMITED
■ Karl Monks, Senior Technician

TESTCONSULT LIMITED

Ruby House, 40A Hardwick Grange, Warrington WA1 4RF

Tel (01925) 286880 Fax (01925) 286881

LABORATORY TEST CERTIFICATE

Contamination Analysis - Waste Acceptance Criteria

Project :	Bengal St, Manchester	**Job No.:**	23314
Client :	Eric Wright Construction	**Lab Ref No.:**	SA25568
		Date Received:	19/07/2016
		Date Tested:	20/07/2016
		Date Reported:	28/07/2016
Originator:	**Peter Harrinson**	**Material:**	Analysed as Soil

Soil Summary	**Units**	**Sample 3**	**Inert Waste Landfill**	**Stable Non-Reactive**	**Hazardous Waste Landfill**
Acid Neutralising Capacity (pH 4)	Mol/kg	<2			
Acid Neutralising Capacity (pH 7)	Mol/kg	<2			
BTEX (Sum)	mg/kg	<0.0040	6.0		
Loss on Ignition	%	10.0			10.0
Moisture	%	15			
Total Organic Carbon	%	4.8	3.0	5.0	6.0
Total Petroleum Hydrocarbons C10-C40	mg/kg	(13) 360	500.0		
PAH (Sum)	mg/kg	13	100.0		
PCB (Congeners)	mg/kg	(2) <0.00035	1.0		
pH		7.9		>6.0	
10:1 Leachate	**Units**	**Leachate 10:1**			
Antimony (Dissolved)	mg/kg	0.016	0.06	0.7	5.0
Arsenic (Dissolved)	mg/kg	0.03	0.5	2.0	25.0
Barium (Dissolved)	mg/kg	0.3	20.0	100.0	300.0
Cadmium (Dissolved)	mg/kg	<0.00020	0.04	1.0	5.0
Chromium (Dissolved)	mg/kg	<0.010	0.5	10.0	70.0
Copper (Dissolved)	mg/kg	0.022	2.0	50.0	100.0
Lead (Dissolved)	mg/kg	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	mg/kg	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	mg/kg	0.170	0.5	10.0	30.0
Nickel (Dissolved)	mg/kg	<0.010	0.4	10.0	40.0
Selenium (Dissolved)	mg/kg	0.0220	0.1	0.5	7.0
Zinc (Dissolved)	mg/kg	<0.020	4.0	50.0	200.0
Chloride	mg/kg	42.0	800.0	15000.0	25000.0
Fluoride	mg/kg	6	10.0	150.0	500.0
Sulphate Ion	mg/kg	4700	1000.0	20000.0	50000.0
Phenols (Mono)	mg/kg	<1.0	1.0		
Total Dissolved Solids	mg/kg	35	4000.0	60000.0	100000.0
Dissolved Organic Carbon	mg/kg	6300	500.0	800.0	1000.0

K.Monks

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TESTCONSULT LIMITED

■ Karl Monks, Senior Technician

TESTCONSULT LIMITED
Ruby House, 40A Hardwick Grange, Warrington WA1 4RF
Tel (01925) 286880 Fax (01925) 286881

LABORATORY TEST CERTIFICATE

Contamination Analysis - Waste Acceptance Criteria

Project :	Bengal St, Manchester	**Job No.:**	23314
Client :	Eric Wright Construction	**Lab Ref No.:**	SA25568
		Date Received:	19/07/2016
		Date Tested:	20/07/2016
		Date Reported:	28/07/2016
Originator:	**Peter Harrinson**	**Material:**	Analysed as Soil

Soil Summary	**Units**	**Sample 4**	**Inert Waste Landfill**	**Stable Non-Reactive**	**Hazardous Waste Landfill**
Acid Neutralising Capacity (pH 4)	Mol/kg	<2			
Acid Neutralising Capacity (pH 7)	Mol/kg	<2			
BTEX (Sum)	mg/kg	<0.0040	6.0		
Loss on Ignition	%	9.4			10.0
Moisture	%	26			
Total Organic Carbon	%	3.2	3.0	5.0	6.0
Total Petroleum Hydrocarbons C10-C40	mg/kg	(13) 250	500.0		
PAH (Sum)	mg/kg	6	100.0		
PCB (Congeners)	mg/kg	(2) <0.00035	1.0		
pH		7.8		>6.0	
10:1 Leachate	**Units**	**Leachate 10:1**			
Antimony (Dissolved)	mg/kg	<0.010	0.06	0.7	5.0
Arsenic (Dissolved)	mg/kg	0.0035	0.5	2.0	25.0
Barium (Dissolved)	mg/kg	0.28	20.0	100.0	300.0
Cadmium (Dissolved)	mg/kg	<0.00020	0.04	1.0	5.0
Chromium (Dissolved)	mg/kg	<0.010	0.5	10.0	70.0
Copper (Dissolved)	mg/kg	0.011	2.0	50.0	100.0
Lead (Dissolved)	mg/kg	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	mg/kg	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	mg/kg	0.043	0.5	10.0	30.0
Nickel (Dissolved)	mg/kg	<0.010	0.4	10.0	40.0
Selenium (Dissolved)	mg/kg	0.0073	0.1	0.5	7.0
Zinc (Dissolved)	mg/kg	<0.020	4.0	50.0	200.0
Chloride	mg/kg	30.0	800.0	15000.0	25000.0
Fluoride	mg/kg	10	10.0	150.0	500.0
Sulphate Ion	mg/kg	940	1000.0	20000.0	50000.0
Phenols (Mono)	mg/kg	<1.0	1.0		
Total Dissolved Solids	mg/kg	31	4000.0	60000.0	100000.0
Dissolved Organic Carbon	mg/kg	2300	500.0	800.0	1000.0

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TESTCONSULT LIMITED
■ Karl Monks, Senior Technician

TESTCONSULT LIMITED

Ruby House, 40A Hardwick Grange, Warrington WA1 4RF

Tel (01925) 286880 Fax (01925) 286881

LABORATORY TEST CERTIFICATE

Contamination Analysis - Waste Acceptance Criteria

Project :	Bengal St, Manchester	**Job No.:**	23314
Client :	Eric Wright Construction	**Lab Ref No.:**	SA25568
		Date Received:	19/07/2016
		Date Tested:	20/07/2016
		Date Reported:	28/07/2016
Originator:	**Peter Harrinson**	**Material:**	Analysed as Soil

Soil Summary	**Units**	**Sample 5**	**Inert Waste Landfill**	**Stable Non-Reactive**	**Hazardous Waste Landfill**
Acid Neutralising Capacity (pH 4)	Mol/kg	<2			
Acid Neutralising Capacity (pH 7)	Mol/kg	<2			
BTEX (Sum)	mg/kg	<0.0040	6.0		
Loss on Ignition	%	13.0			10.0
Moisture	%	16			
Total Organic Carbon	%	5.1	3.0	5.0	6.0
Total Petroleum Hydrocarbons C10-C40	mg/kg	(13) 82	500.0		
PAH (Sum)	mg/kg	3	100.0		
PCB (Congeners)	mg/kg	(2) <0.00035	1.0		
pH		7.9		>6.0	
10:1 Leachate	**Units**	**Leachate 10:1**			
Antimony (Dissolved)	mg/kg	0.012	0.06	0.7	5.0
Arsenic (Dissolved)	mg/kg	0.02	0.5	2.0	25.0
Barium (Dissolved)	mg/kg	0.3	20.0	100.0	300.0
Cadmium (Dissolved)	mg/kg	<0.00020	0.04	1.0	5.0
Chromium (Dissolved)	mg/kg	<0.010	0.5	10.0	70.0
Copper (Dissolved)	mg/kg	0.016	2.0	50.0	100.0
Lead (Dissolved)	mg/kg	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	mg/kg	<0.0050	0.01	0.2	2.0
Molybdenum (Dissolved)	mg/kg	0.240	0.5	10.0	30.0
Nickel (Dissolved)	mg/kg	<0.010	0.4	10.0	40.0
Selenium (Dissolved)	mg/kg	0.023	0.1	0.5	7.0
Zinc (Dissolved)	mg/kg	<0.020	4.0	50.0	200.0
Chloride	mg/kg	40	800.0	15000.0	25000.0
Fluoride	mg/kg	6.1	10.0	150.0	500.0
Sulphate Ion	mg/kg	2900	1000.0	20000.0	50000.0
Phenols (Mono)	mg/kg	<1.0	1.0		
Total Dissolved Solids	mg/kg	25	4000.0	60000.0	100000.0
Dissolved Organic Carbon	mg/kg	4700	500.0	800.0	1000.0

K.Monks

Approved Signature

TESTCONSULT LIMITED

■ Karl Monks, Senior Technician

TESTCONSULT LIMITED
Ruby House, 40A Hardwick Grange, Warrington WA1 4RF
Tel (01925) 286880 Fax (01925) 286881

LABORATORY TEST CERTIFICATE

Contamination Analysis - Waste Acceptance Criteria

Project :	Bengal St, Manchester	**Job No.:**	23314
Client :	Eric Wright Construction	**Lab Ref No.:**	SA25568
		Date Received:	19/07/2016
		Date Tested:	20/07/2016
		Date Reported:	28/07/2016
Originator:	**Peter Harrinson**	**Material:**	Analysed as Soil

Soil Summary	**Units**	**Sample 6**	**Inert Waste Landfill**	**Stable Non-Reactive**	**Hazardous Waste Landfill**
Acid Neutralising Capacity (pH 4)	Mol/kg	<2			
Acid Neutralising Capacity (pH 7)	Mol/kg	<2			
BTEX (Sum)	mg/kg	<0.0040	6.0		
Loss on Ignition	%	54.0			10.0
Moisture	%	17			
Total Organic Carbon	%	1.7	3.0	5.0	6.0
Total Petroleum Hydrocarbons C10-C40	mg/kg	[13] 10	500.0		
PAH (Sum)	mg/kg	2	100.0		
PCB (Congeners)	mg/kg	<0.00035	1.0		
pH		7.6		>6.0	
10:1 Leachate	**Units**	**Leachate 10:1**			
Antimony (Dissolved)	mg/kg	<0.010	0.06	0.7	5.0
Arsenic (Dissolved)	mg/kg	0.0085	0.5	2.0	25.0
Barium (Dissolved)	mg/kg	0.24	20.0	100.0	300.0
Cadmium (Dissolved)	mg/kg	<0.00020	0.04	1.0	5.0
Chromium (Dissolved)	mg/kg	<0.010	0.5	10.0	70.0
Copper (Dissolved)	mg/kg	<0.0050	2.0	50.0	100.0
Lead (Dissolved)	mg/kg	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	mg/kg	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	mg/kg	0.110	0.5	10.0	30.0
Nickel (Dissolved)	mg/kg	<0.010	0.4	10.0	40.0
Selenium (Dissolved)	mg/kg	0.0079	0.1	0.5	7.0
Zinc (Dissolved)	mg/kg	<0.020	4.0	50.0	200.0
Chloride	mg/kg	19.0	800.0	15000.0	25000.0
Fluoride	mg/kg	10	10.0	150.0	500.0
Sulphate Ion	mg/kg	330	1000.0	20000.0	50000.0
Phenols (Mono)	mg/kg	<1.0	1.0		
Total Dissolved Solids	mg/kg	25	4000.0	60000.0	100000.0
Dissolved Organic Carbon	mg/kg	1300	500.0	800.0	1000.0

K.Monks

Approved Signature
TESTCONSULT LIMITED
■ Karl Monks, Senior Technician

TESTCONSULT LIMITED

Ruby House, 40A Hardwick Grange, Warrington WA1 4RF

Tel (01925) 286880 Fax (01925) 286881

LABORATORY TEST CERTIFICATE

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Client :	Eric Wright Construction	**Lab Ref No.:**	SA25568
		Date Received:	19/07/2016
		Date Tested:	20/07/2016
		Date Reported:	28/07/2016
Originator:	**Peter Harrinson**	**Material:**	Analysed as Soil

Soil Summary	**Units**	**Sample 7**	**Inert Waste Landfill**	**Stable Non-Reactive**	**Hazardous Waste Landfill**
Acid Neutralising Capacity (pH 4)	Mol/kg	<2			
Acid Neutralising Capacity (pH 7)	Mol/kg	<2			
BTEX (Sum)	mg/kg	<0.0040	6.0		
Loss on Ignition	%	10.0			10.0
Moisture	%	17			
Total Organic Carbon	%	4.4	3.0	5.0	6.0
Total Petroleum Hydrocarbons C10-C40	mg/kg	(13) 22	500.0		
PAH (Sum)	mg/kg	<1.6	100.0		
PCB (Congeners)	mg/kg	<0.00035	1.0		
pH		7.7		>6.0	
10:1 Leachate	**Units**	**Leachate 10:1**			
Antimony (Dissolved)	mg/kg	0.013	0.06	0.7	5.0
Arsenic (Dissolved)	mg/kg	0.02	0.5	2.0	25.0
Barium (Dissolved)	mg/kg	0.3	20.0	100.0	300.0
Cadmium (Dissolved)	mg/kg	<0.00020	0.04	1.0	5.0
Chromium (Dissolved)	mg/kg	0.560	0.5	10.0	70.0
Copper (Dissolved)	mg/kg	0.030	2.0	50.0	100.0
Lead (Dissolved)	mg/kg	0.0034	0.5	10.0	50.0
Mercury (Dissolved)	mg/kg	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	mg/kg	0.110	0.5	10.0	30.0
Nickel (Dissolved)	mg/kg	<0.010	0.4	10.0	40.0
Selenium (Dissolved)	mg/kg	0.0200	0.1	0.5	7.0
Zinc (Dissolved)	mg/kg	<0.020	4.0	50.0	200.0
Chloride	mg/kg	43.0	800.0	15000.0	25000.0
Fluoride	mg/kg	5	10.0	150.0	500.0
Sulphate Ion	mg/kg	3500	1000.0	20000.0	50000.0
Phenols (Mono)	mg/kg	<1.0	1.0		
Total Dissolved Solids	mg/kg	60	4000.0	60000.0	100000.0
Dissolved Organic Carbon	mg/kg	5500	500.0	800.0	1000.0

K.Monks

Approved Signature

TESTCONSULT LIMITED

■ Karl Monks, Senior Technician

TESTCONSULT LIMITED

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LABORATORY TEST CERTIFICATE

Contamination Analysis - Waste Acceptance Criteria

Project :	Bengal St, Manchester	**Job No.:**	23314
Client :	Eric Wright Construction	**Lab Ref No.:**	SA25568
		Date Received:	19/07/2016
		Date Tested:	20/07/2016
		Date Reported:	28/07/2016
Originator:	**Peter Harrinson**	**Material:**	Analysed as Soil

Soil Summary	**Units**	**Sample 8**	**Inert Waste Landfill**	**Stable Non-Reactive**	**Hazardous Waste Landfill**
Acid Neutralising Capacity (pH 4)	Mol/kg	<2			
Acid Neutralising Capacity (pH 7)	Mol/kg	<2			
BTEX (Sum)	mg/kg	<0.0040	6.0		
Loss on Ignition	%	8.6			10.0
Moisture	%	20			
Total Organic Carbon	%	4.8	3.0	5.0	6.0
Total Petroleum Hydrocarbons C10-C40	mg/kg	(13) 110	500.0		
PAH (Sum)	mg/kg	25	100.0		
PCB (Congeners)	mg/kg	<0.00035	1.0		
pH		7.6		>6.0	
10:1 Leachate	**Units**	**Leachate 10:1**			
Antimony (Dissolved)	mg/kg	0.017	0.06	0.7	5.0
Arsenic (Dissolved)	mg/kg	0.0110	0.5	2.0	25.0
Barium (Dissolved)	mg/kg	0.31	20.0	100.0	300.0
Cadmium (Dissolved)	mg/kg	<0.00020	0.04	1.0	5.0
Chromium (Dissolved)	mg/kg	0.012	0.5	10.0	70.0
Copper (Dissolved)	mg/kg	0.013	2.0	50.0	100.0
Lead (Dissolved)	mg/kg	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	mg/kg	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	mg/kg	0.17	0.5	10.0	30.0
Nickel (Dissolved)	mg/kg	<0.010	0.4	10.0	40.0
Selenium (Dissolved)	mg/kg	0.54	0.1	0.5	7.0
Zinc (Dissolved)	mg/kg	<0.020	4.0	50.0	200.0
Chloride	mg/kg	37	800.0	15000.0	25000.0
Fluoride	mg/kg	4.5	10.0	150.0	500.0
Sulphate Ion	mg/kg	11000	1000.0	20000.0	50000.0
Phenols (Mono)	mg/kg	<1.0	1.0		
Total Dissolved Solids	mg/kg	46	4000.0	60000.0	100000.0
Dissolved Organic Carbon	mg/kg	11000	500.0	800.0	1000.0

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TESTCONSULT LIMITED

■ Karl Monks, Senior Technician

TESTCONSULT LIMITED

Ruby House, 40A Hardwick Grange, Warrington WA1 4RF

Tel (01925) 286880 Fax (01925) 286881

LABORATORY TEST CERTIFICATE

Contamination Analysis - Waste Acceptance Criteria

Project :	Bengal St, Manchester	**Job No.:**	23314
Client :	Eric Wright Construction	**Lab Ref No.:**	SA25568
		Date Received:	19/07/2016
		Date Tested:	20/07/2016
		Date Reported:	28/07/2016
Originator:	**Dave Bagley**	**Material:**	Analysed as Soil

PAH (USEPA 16)	**Units**	**Sample 1**	**Sample 2**	**Sample 3**	**Sample 4**
Naphthalene	mg/kg	0.3	1.0	0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.2	0.4	0.2	0.1
Fluorene	mg/kg	0.1	0.4	0.1	<0.1
Phenanthrene	mg/kg	1.2	2.4	2	0.7
Anthracene	mg/kg	0.3	0.4	0.3	0.2
Fluoranthene	mg/kg	2.3	2.5	2	1.3
Pyrene	mg/kg	2.6	2.6	2.2	1.1
Benzo(a)Anthracene	mg/kg	1.6	1.3	1.0	0.5
Chrysene	mg/kg	1.8	1.5	1.3	0.5
Benzo(b/k)Fluoranthene	mg/kg	2.8	2.2	2	0.9
Benzo(a)Pyrene	mg/kg	1.7	1.3	0.9	0.5
Indeno(123-cd)Pyrene	mg/kg	0.7	0.6	0.4	0.2
Dibenzo(ah)Anthracene	mg/kg	0.3	0.2	0.2	<0.1
Benzo(ghi)Perylene	mg/kg	1.0	0.8	0.6	0.3
Coronene	mg/kg	0.2	0.1	0.1	<0.1

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		Date Received:	19/07/2016
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		Date Reported:	28/07/2016
Originator:	**Dave Bagley**	**Material:**	Analysed as Soil

PAH (USEPA 16)	**Units**	**Sample 5**	**Sample 6**	**Sample 7**	**Sample 8**
Naphthalene	mg/kg	0.1	<0.1	<0.1	0.4
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	0.7
Fluorene	mg/kg	<0.1	<0.1	<0.1	0.5
Phenanthrene	mg/kg	0.3	<0.1	<0.1	3.4
Anthracene	mg/kg	<0.1	<0.1	<0.1	0.9
Fluoranthene	mg/kg	0.5	<0.1	0.2	4.2
Pyrene	mg/kg	0.5	<0.1	0.2	3.4
Benzo(a)Anthracene	mg/kg	0.2	<0.1	0.2	1.8
Chrysene	mg/kg	0.3	<0.1	0.2	2.0
Benzo(b/k)Fluoranthene	mg/kg	0.4	<0.1	0.3	3.6
Benzo(a)Pyrene	mg/kg	0.2	<0.1	0.1	1.8
Indeno(123-cd)Pyrene	mg/kg	0.1	<0.1	<0.1	0.9
Dibenzo(ah)Anthracene	mg/kg	<0.1	<0.1	<0.1	0.3
Benzo(ghi)Perylene	mg/kg	0.1	<0.1	<0.1	1.2
Coronene	mg/kg	<0.1	<0.1	<0.1	0.3

K.Monks

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TESTCONSULT LIMITED

■ Karl Monks, Senior Technician

TESTCONSULT LIMITED

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		Date Received:	19/07/2016
		Date Tested:	20/07/2016
		Date Reported:	28/07/2016
Originator:	**Dave Bagley**	**Material:**	Analysed as Soil

Soil - TPH	**Units**	**Sample 1**	**Sample 2**	**Sample 3**	**Sample 4**
Total Petroleum Hydrocarbons (C10-C35)	mg/kg	(13) 47	(13) 583	(13) 320	(13) 230
Total Petroleum Hydrocarbons (C35-C40)	mg/kg	(13) 6	(13) 8	(13) 24	(13) 24
Soil - BTEX	**Units**				
Benzene	µg/kg	(13,110) <2	(13) <1	(13) <1	(13) <1
Toluene	µg/kg	(13,110) <2	(13) <1	(13) <1	(13) <1
Ethylbenzene	µg/kg	(110) <2	<1	<1	<1
Meta/ParaXylene	µg/kg	(110) <2	<1	<1	<1
Ortho-Xylene	µg/kg	(110) <2	<1	<1	<1
Soil - PCB Congeners	**Units**				
Polychlorinated biphenyl BZ#28	µg/kg	<0.05	<0.05	0.60	(2) <0.50
Polychlorinated biphenyl BZ#52	µg/kg	<0.05	<0.05	(2) <0.50	(2) <0.50
Polychlorinated biphenyl BZ#101	µg/kg	<0.05	<0.05	(2) <0.50	(2) <0.50
Polychlorinated biphenyl BZ#118	µg/kg	<0.05	<0.05	(2) <0.50	(2) <0.50
Polychlorinated biphenyl BZ#138	µg/kg	<0.05	<0.05	(2) <0.50	(2) <0.50
Polychlorinated biphenyl BZ#153	µg/kg	<0.05	<0.05	(2) <0.50	(2) <0.50
Polychlorinated biphenyl BZ#180	µg/kg	<0.05	<0.05	(2) <0.50	(2) <0.50

Note: 13 - Results have been blank corrected

Note: 110 - LOD raised due to low internal standard recovery

Note 2 - LOD raised due to matrix Interference

K.Monks

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■ Karl Monks, Senior Technician

TESTCONSULT LIMITED

Ruby House, 40A Hardwick Grange, Warrington WA1 4RF

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Contamination Analysis - Waste Acceptance Criteria

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Client :	Eric Wright Construction	**Lab Ref No.:**	SA25568
		Date Received:	19/07/2016
		Date Tested:	20/07/2016
		Date Reported:	28/07/2016
Originator:	**Dave Bagley**	**Material:**	Analysed as Soil

Soil - TPH	**Units**	**Sample 5**	**Sample 6**	**Sample 7**	**Sample 8**
Total Petroleum Hydrocarbons (C10-C35)	mg/kg	(13) 69	(13) 7	(13) 17	(13) 100
Total Petroleum Hydrocarbons (C35-C40)	mg/kg	(13) 13	(13) 3	(13) 5	(13) 12
Soil - BTEX	**Units**				
Benzene	µg/kg	(13) <1	(13) <1	(13) <1	(13) <1
Toluene	µg/kg	(13) <1	(13) <1	(13) <1	(13) <1
Ethylbenzene	µg/kg	<1	<1	<1	<1
Meta/ParaXylene	µg/kg	<1	<1	<1	<1
Ortho-Xylene	µg/kg	<1	<1	<1	<1
Soil - PCB Congeners	**Units**				
Polychlorinated biphenyl BZ#28	µg/kg	(2) <0.50	<0.05	<0.05	<0.05
Polychlorinated biphenyl BZ#52	µg/kg	(2) <0.50	<0.05	<0.05	<0.05
Polychlorinated biphenyl BZ#101	µg/kg	(2) <0.50	<0.05	<0.05	<0.05
Polychlorinated biphenyl BZ#118	µg/kg	(2) <0.50	<0.05	<0.05	<0.05
Polychlorinated biphenyl BZ#138	µg/kg	(2) <0.50	<0.05	<0.05	<0.05
Polychlorinated biphenyl BZ#153	µg/kg	(2) <0.50	<0.05	<0.05	<0.05
Polychlorinated biphenyl BZ#180	µg/kg	(2) <0.50	<0.05	<0.05	<0.05

Note: 13 - Results have been blank corrected

Note: 110 - LOD raised due to low internal standard recovery

Note 2 - LOD raised due to matrix Interference

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Project :	Bengal St, Manchester	**Job No.:**	23314
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		Date Received:	19/07/2016
		Date Tested:	20/07/2016
		Date Reported:	28/07/2016
Originator:	**Dave Bagley**	**Material:**	Analysed as Soil

Leachate	**Units**	**Sample 1**	**Sample 2**	**Sample 3**	**Sample 4**
Antimony (Dissolved)	µg/l	2	<1	2	<1
Arsenic (Dissolved)	µg/l	1.6	<0.2	3.1	0.4
Barium (Dissolved)	µg/l	33	23	32	28
Cadmium (Dissolved)	µg/l	<0.02	<0.02	<0.02	<0.02
Chromium (Dissolved)	µg/l	<1	<1	<1	<1
Copper (Dissolved)	µg/l	1.9	<0.5	2.2	1.1
Lead (Dissolved)	µg/l	0.9	<0.3	<0.3	<0.3
Mercury (Dissolved)	µg/l	<0.05	<0.05	<0.05	<0.05
Molybdenum (Dissolved)	µg/l	32	4	17	4
Nickel (Dissolved)	µg/l	<1	<1	<1	<1
Selenium (Dissolved)	µg/l	1.1	<0.5	2	0.7
Zinc (Dissolved)	µg/l	3	<2	<2	<2
Chloride	mg/l	2	2	4	3
Fluoride	mg/l	0.59	0.98	0.58	0.96
Sulphate	mg/l	210	96	470	94
Phenolds (Total-Mono)	mg/l	<0.1	<0.1	<0.1	<0.1
Dissolved Organic Carbon	mg/l	2	1	470	3
Electrical Conductivity	µS/cm	610	350	1000	380
Total Dissolved Solids	mg/l	360	210	630	230
Volume	ml	-	-	-	-

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Originator:	**Dave Bagley**	**Material:**	Analysed as Soil

Leachate	Units	Sample 5	Sample 6	Sample 7	Sample 8
Antimony (Dissolved)	µg/l	1	<1	1	2
Arsenic (Dissolved)	µg/l	2.0	0.9	2	1.1
Barium (Dissolved)	µg/l	31	24	27	31
Cadmium (Dissolved)	µg/l	<0.02	<0.02	<0.02	<0.02
Chromium (Dissolved)	µg/l	<1	<1	56	1
Copper (Dissolved)	µg/l	1.6	<0.5	3.0	1.3
Lead (Dissolved)	µg/l	<0.3	<0.3	0.3	<0.3
Mercury (Dissolved)	µg/l	<0.05	<0.05	<0.05	<0.05
Molybdenum (Dissolved)	µg/l	24	11	11	17.0
Nickel (Dissolved)	µg/l	<1	<1	<1	<1
Selenium (Dissolved)	µg/l	2.3	0.8	2.0	54
Zinc (Dissolved)	µg/l	<2	<2	<2	<2
Chloride	mg/l	4	2	4	4
Fluoride	mg/l	0.61	1.0	0.52	0.45
Sulphate	mg/l	290	33.0	350	1100
Phenolds (Total-Mono)	mg/l	<0.1	<0.1	<0.1	<0.1
Dissolved Organic Carbon	mg/l	3	2	6	5
Electrical Conductivity	µS/cm	780	210	910	1900
Total Dissolved Solids	mg/l	470	130	550	1100
Volume	ml	-	-	-	-

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■ Karl Monks, Senior Technician

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Tel (01925) 286880 Fax (01925) 286881

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		Date Received:	19/07/2016
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		Date Reported:	28/07/2016
Originator:	**Dave Bagley**	**Material:**	Analysed as Soil

Leachate	**Units**	**Sample 1**	**Sample 2**	**Sample 3**	**Sample 4**
Arsenic	mg/kg	32	38	37	26
Barium	mg/kg	340	200	260	220
Beryllium	mg/kg	3	4	3	3
Boron (water-soluble)	mg/kg	<1	<1	<1	<1
Cadmium	mg/kg	<1	1	1	<1
Chromium	mg/kg	38	23	31	24
Copper	mg/kg	200	120	140	89
Lead	mg/kg	2000	520	530	460.0
Mercury	mg/kg	10	<1	1	1.0
Nickel	mg/kg	41	33	34	26
Selenium	mg/kg	<3	<3	<3	<3
Vanadium	mg/kg	43	40	43	37
Zinc	mg/kg	250	670	270	210

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		Date Reported:	28/07/2016
Originator:	**Dave Bagley**	**Material:**	Analysed as Soil

Leachate	**Units**	**Sample 5**	**Sample 6**	**Sample 7**	**Sample 8**
Arsenic	mg/kg	42	9	21	22
Barium	mg/kg	320	130	190	200
Beryllium	mg/kg	3	2	2	2
Boron (water-soluble)	mg/kg	<1	<1	<1	<1
Cadmium	mg/kg	1	<1	<1	<1
Chromium	mg/kg	28	23	17	17
Copper	mg/kg	160	30	65	66
Lead	mg/kg	670	98	380	280.0
Mercury	mg/kg	2	<1	<1	<1
Nickel	mg/kg	37	21	24	26
Selenium	mg/kg	<3	<3	<3	<3
Vanadium	mg/kg	44	33	28	29
Zinc	mg/kg	360	67	130	150

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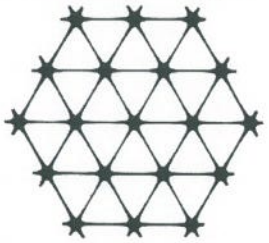
Product Specification - TriAx® TX160 Geogrid

Tensar International Corporation reserves the right to change its product specifications at any time. It is the responsibility of the person specifying the use of this product and of the purchaser to ensure that product specifications relied upon for design or procurement purposes are current and that the product is suitable for its intended use in each instance.

Tensar TriAx® Geogrid



General

1. The geogrid is manufactured from a punched polypropylene sheet, which is then oriented in three substantially equilateral directions so that the resulting ribs shall have a high degree of molecular orientation, which continues at least in part through the mass of the integral node.
2. The properties contributing to the performance of a mechanically stabilized layer include the following:

Index Properties	Longitudinal	Diagonal	Transverse	General
▪ Rib pitch[2], mm (in)	40 (1.60)	40 (1.60)	-	
▪ Mid-rib depth[2], mm (in)	-	1.6 (0.06)	1.4 (0.06)	
▪ Mid-rib width[2], mm (in)	-	1.0 (0.04)	1.2 (0.05)	
▪ Rib shape				rectangular
▪ Aperture shape				triangular

Structural Integrity	
▪ Junction efficiency[3], %	93
▪ Aperture stability[4], kg-cm/deg @ 5.0kg-cm [2]	3.6
▪ Radial stiffness at low strain[5], kN/m @ 0.5% strain	300
(lb/ft @ 0.5% strain)	(20,580)

Durability	
▪ Resistance to chemical degradation[6]	100%
▪ Resistance to ultra-violet light and weathering[7]	100%

Dimensions and Delivery

The TX geogrid shall be delivered to the jobsite in roll form with each roll individually identified and nominally measuring 3.0 meters (9.8 feet) and/or 4.0 meters (13.1feet) in width and 75 meters (246 feet) in length.

Notes

1. Unless indicated otherwise, values shown are minimum average roll values determined in accordance with ASTM D4759-02. Brief descriptions of test procedures are given in the following notes.
2. Nominal dimensions.
3. Load transfer capability determined in accordance with GRI-GG2-87 and GRI-GG1-87 and expressed as a percentage of ultimate tensile strength.
4. In-plane torsional rigidity measured by applying a moment to the central junction of a 225mm x 225mm specimen restrained at its perimeter in accordance with U.S. Army Corps of Engineers Methodology for measurement of Torsional Rigidity, (Kinney, T.C. Aperture stability Modulus ref 3, 3.1.2000).
5. Radial stiffness is determined from tensile stiffness measured in any in-plane axis from testing in accordance with ASTM D6637-01.
6. Resistance to loss of load capacity or structural integrity when subjected to chemically aggressive environments in accordance with EPA 9090 immersion testing.
7. Resistance to loss of load capacity or structural integrity when subjected to 500 hours of ultraviolet light and aggressive weathering in accordance with ASTM D4355-05.

Tensar International Corporation
5883 Glenridge Drive, Suite 200
Atlanta, Georgia 30328-5363
Phone: 800-TENSAR-1
www.tensar-international.com

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