

**REMEDiation STRATEGY
AND VERIFICATION PLAN
FOR A SITE
AT
BARLOW MOOR ROAD,
CHORLTON**



REPORT STATUS SHEET

Client:	RP Tyson Construction Ltd
Report Title:	Remediation Strategy and Verification Plan for a site at Barlow Moor Road, Chorlton
Report Number:	AG3093A-20-AK99
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		Date	Signed for and on behalf of Applied Geology
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CONTENTS

1.0	INTRODUCTION.....	1
2.0	BACKGROUND INFORMATION	1
3.0	SCOPE OF REMEDIATION WORKS.....	2
3.1	Reasons and Objectives for Undertaking the Remediation	2
3.2	Remedial Methods	3
4.0	VERIFICATION	3
4.1	Testing of the Imported Topsoil Material.....	3
4.2	Verification of Clean Cover Layer Thickness	3
5.0	REPORTING	4
6.0	UNEXPECTED CONDITIONS.....	4
7.0	THIRD PARTY CONTACTS.....	4

GENERAL NOTES

APPENDICES

APPENDIX A	DRAWINGS Proposed Layout Drawing, DV Architects, Dwg No: PL 0002
APPENDIX B	TESTING CRITERIA Imported Topsoil/ Subsoil Acceptance Criteria

1.0 INTRODUCTION

An area of land adjacent to Barlow Moor Road, Chorlton (the site) is being redeveloped. The proposals for the site comprise demolition of existing buildings and construction of two new 3 to 5 storey residential apartments containing 39No apartments with associated car parking and communal amenity gardens. The proposals are shown on a proposed site plan (Drawing No: PL 0002), by DV Architects, dated 26th June 2019, a copy of which is presented in Appendix A.

A previous Phase I Geo-Environmental Assessment was carried out for the Client by Jomas Associates Ltd, Report Ref: P1358J1321, dated March 2018, a copy of which was provided by Scott Hughes Design (the Engineer). A Phase 2 Ground Investigation was undertaken at the site by Applied Geology in February 2020 (Report Ref: AG3093-19-AJ73).

The site is located adjacent to Barlow Moor Road, Chorlton, approximately 5.15km southwest of Manchester City centre. The Ordnance Survey grid reference for the centre of the site is 381903, 393141.

The site is irregular in plan shape with dimensions of approximately 50m by 70m, tapering to 40m towards the east. Topographically, the site is relatively flat at approx. 57m AOD. The site is bounded to the north by a Shell petrol station, to the west by residential properties, to the south by commercial and residential buildings and to the east by Barlow Moor Road.

In order to develop the site safely, (with respect to soil contamination) it has been necessary to incorporate measures to protect proposed end users. This Remediation Strategy and Verification Plan has been prepared to document the method to be used for placing and verifying the installation of a cover layer in landscaped areas and if encountered, the removal and verification of areas of currently unidentified contamination, which may include possible underground fuel storage tanks/ associated infrastructure associated with historical buildings on site (as set out in the above referenced Phase 2 report).

This report has been written in accordance with CLR11 (Model Procedures for the Management of Land Contamination) and has been produced to satisfy Manchester City Council and support the discharge of Planning Condition 11 (Planning Permission Ref. 124237/FO/2019), dated 16th July 2019.

2.0 BACKGROUND INFORMATION

Site History

Historical maps show the site to comprise agricultural fields in 1849. By the 1920s, a 'laundry' is shown in the south of the site and several smaller unlabelled buildings in the north. During the 1930s, the 'laundry' becomes a printing works and in 1984, the west of the site is redeveloped to include two large unlabelled rectangular structures. The surrounding area generally comprised agricultural fields until residential development is shown during the 1930s. A garage is shown adjacent to the southern boundary from the 1950s and a petrol forecourt is present immediately to the northern boundary from the 1980s.

Ground Conditions

The Phase 2 investigation undertaken by Applied Geology in December 2019 identified Made Ground to depths of between 0.15m and 3.4m below ground level (bgl), generally increasing in thickness towards the west of the site. The Made Ground was underlain by natural strata comprising Alluvium and predominantly cohesive Glacial Deposits. Solid strata of the Wilmslow Sandstone Formation were encountered between 11.2m and 12.2m bgl. Subsequent monitoring of groundwater installations recorded standing groundwater levels between 0.65m and 2.3m bgl.

Hydrogeology

The Superficial Alluvium and Glacial Deposits are classified as Secondary 'A' and Secondary (undifferentiated) Aquifers respectively. Bedrock of the Wilmslow Sandstone Formation is classified as a Principal Aquifer, however is not within a Source Protection Zone.

Hydrology

The nearest watercourse is the Chorlton Brook, located 25m to the north/northwest of site.

Soil Contamination

Soil chemical test results from the 2019 Applied Geology Phase 2 investigation indicated exceedances of benzo[a]pyrene (up to 64mg/kg), lead (up to 1,100mg/kg), arsenic (up to 48mg/kg), beryllium (up to 2.2mg/kg), and aromatic TPH C₂₁ – C₃₅ (2,900mg/kg) at multiple locations throughout the Made Ground when compared to screening criteria for a residential without plant uptake end use. The exceedances were all noted in Made Ground containing ash and clinker, with chromatogram profiles consistent with PAHs. Considering the proposed areas of communal gardens, a low risk to human health receptors via ingestion and dermal pathways was identified due to potential contaminants in the Made Ground.

Controlled Waters

The results of leachate testing on two samples of Made Ground in DCS1 and CP1B, both at 0.5m bgl, recorded concentrations below their relevant screening values and/or less than detection limit, except lead in DCS1, which was recorded at 16µg/l, a minor exceedance above the UK Drinking Water Standards screening value of 10µg/l. All PAHs recorded values less than the laboratory detection limit (i.e. <0.01µg/l).

Based on the context of the site and the proposed development (which will include limited landscaping and therefore reduce the infiltration and leaching potential), the significant thickness of low permeability of cohesive Glacial Deposits, there was considered to be a low risk to Controlled Waters.

3.0 SCOPE OF REMEDIATION WORKS

3.1 Reasons and Objectives for Undertaking the Remediation

While the Made Ground does not pose a risk to the end-user across the majority of the site due to pathways being effectively broken by the proposed building or

hardstanding, elevated concentrations of determinands related to ash and clinker in the Made Ground may pose a potential risk to end users by ingestion and dermal contact pathways in the proposed areas of communal soft landscaping. Since the elevated concentrations of contaminants are not considered to pose a risk to Controlled Waters, the most pragmatic way to break the source-pathway-receptor linkage to Human Health receptors is either to remove the source or eliminate the pathways.

3.2 Remedial Methods

Due to the nature of the Made Ground which contains ash and clinker throughout, it is not considered practical or cost effective to remove all Made Ground soils and is not warranted to minimise risks to Controlled Waters. Instead, a cover layer system across the areas of proposed communal landscaping is considered the most practical and cost-effective solution to protect the end-users at the development. We have assumed that this approach can be accommodated when setting proposed final site/floor levels.

A thickness of clean cover for the proposed soft standing/landscaped areas of 450mm is considered appropriate, subject to agreement with the Local Authority. It should be noted that a thicker layer may be required for landscaping requirements, such as in areas of tree/shrub planting.

4.0 VERIFICATION

4.1 Testing of the Imported Topsoil Material

Given the absence of clean topsoil on site, it will need to be imported. The source of the imported topsoil is not known at the time of writing. Although the Manchester City Council Guidance does not accept off-site validation of import material, the proposed Topsoil shall be confirmed prior to import and regardless of the source, it will need to be described and tested. The imported topsoil shall be tested for a range of potential contaminants as given in the Imported Topsoil/Subsoil Acceptance Criteria Table included in Appendix B. Three tests shall be taken at source to confirm suitability of the topsoil prior to import.

Once imported to site, one soil sample shall be tested per the Manchester City Council guidance on proposed sampling frequency (i.e. 1 sample per 150m³, if from an unknown source). The topsoil results will be compared to the criteria in Appendix B, based on Applied Geology screening values derived using CLEA v.1.06 and published data or LQM Generic Assessment Criteria (GAC) for a residential with plant uptake end use and BS3882. The screening values are based on 6% Soil Organic Matter (SOM). Should the SOM of the topsoil imported be below 6%, the screening values may need to be altered.

If all concentrations are less than the criteria, the topsoil will 'pass'. If any of the concentrations are above the criteria, the soil will be rejected or, if marginal, the results will be discussed with the Local Authority to agree the required action.

4.2 Verification of Clean Cover Layer Thickness

Confirmation that the required depth of cover layer has been placed will be via the excavation of hand dug pits in the imported topsoil material by a suitably qualified geo-environmental engineer, with photographs also taken for inclusion in a Verification

Report. In accordance with the testing frequency for the imported topsoil, it is anticipated at this stage that approximately 5 evenly spaced hand dug pits shall be undertaken across the areas of proposed landscaping.

5.0 REPORTING

A Verification Report will be produced on completion of the verification of the clean topsoil layer.

Should any Made Ground be removed from the site, it will need to be appropriately classified in accordance with waste management legislation. All consignment/waste transfer notes from the Made Ground removed from site and soils imported (i.e. topsoil) onto site will be made available for inspection by third parties and available for inclusion within the site Verification Report.

The topsoil cover layer results will be confirmed as complying with the Imported Topsoil/ Subsoil Acceptance Criteria and copies will be provided within the Verification Report. Laboratory test results for the imported soils will be included within the Verification Report.

Any necessary plans/drawings, site diaries and photographs in support of the verification will be provided in the Verification Report. This will include photographs to demonstrate that an appropriate thickness of cover layer has been placed over a geotextile membrane.

Once the cover layer is installed, no post-treatment management or monitoring is envisaged to be necessary for soil contamination issues.

6.0 UNEXPECTED CONDITIONS

Should any additional, previously unidentified gross contamination be encountered during construction, Applied Geology and the Local Authority should be notified. It would be anticipated that any previously unidentified contamination would be removed from site under a watching brief.

If any concentrations of the imported topsoil fail the required criteria, the results will be discussed with the Contaminated Land Officer at Manchester City Council to agree the required action. It should, however, be noted that other testing may be required, depending on the origin and nature of the source material.

7.0 THIRD PARTY CONTACTS

Contaminated Land Section
Environmental Services
Manchester City Council
Hammerstone Road
Gorton
Manchester
M18 8EQ

Tel: 0161 234 1363

**Applied Geology Limited
First Floor, Lowton Business Park
Newton Road
Lowton St. Mary'
Warrington
WA3 2AN**

Tel: 01925 738599

GENERAL NOTES

- A) This report is based on the site terrain and ground conditions revealed by the various field investigations undertaken and also any other relevant data for the site including previous site investigation reports (if available) and desk study data. There may be special conditions appertaining to the site, however, which have not been revealed by the investigations and which have not, therefore, been taken into account in the report. The report may be subject to amendment in the light of additional information becoming available.
- B) Where any data supplied by the Client or other external source has been used it has been assumed that the information is correct. No responsibility can be accepted by Applied Geology for inaccuracies within this data.
- C) The copyright of this report and other plans and documents prepared by Applied Geology is owned by Applied Geology and no such report, plan or document may be reproduced, published or adapted without the written consent of Applied Geology. Complete copies of the report may, however, be made and distributed by the Client as an expedient in dealing with matters related to its submission.
- D) This report is prepared and written in the context of the proposals stated in the introduction to the report and should not be used in a differing context. Furthermore, new information, improved practices and legislation may necessitate an alteration to the report in whole or in part after its submission. Therefore with any change in circumstances or after the expiry of one year from the date of the report, the report should be referred to Applied Geology for re-assessment and if necessary, re-appraisal.
- E) The work was undertaken and this report was prepared for the sole internal use and reliance of the Client. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Applied Geology. If an unauthorised third party comes into possession of this report they rely on it at their peril and Applied Geology owes them no duty of care and skill.
- F) Ground conditions should be monitored during the construction of the works and the recommendations of the report re-evaluated in the light of this data by the supervising geotechnical or geo-environmental engineers.

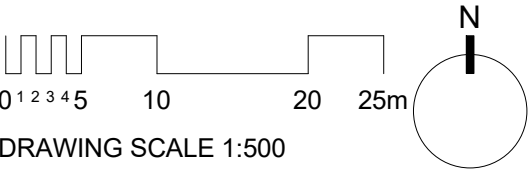
APPENDIX

A

Key

-  SITE BOUNDARY
-  PROPOSED BUILDING
-  EXISITING BUILDING RETAINED
-  SEWER RUN
-  6m EASEMENT
-  COMMUNAL AMENITY GARDENS
-  ENTRANCES
-  CGI VIEWS

24No Car Park Spaces (incl 3No DDA (61.5%)
39No Covered Cycle Store (100%)



REV.	DATE	COMMENT
☐ CONCEPT	☒ PLANNING	☐ BUILDING CONTROL
☐ COMMENT	☐ TENDER	☐ CONSTRUCTION

UNIT 4
BOTANIC ESTATE
198 EDGE LANE
LIVERPOOL
L7 9PL

T: 0151 228 4666
F: 0151 228 8666
E: admin@dvarchitects.co.uk

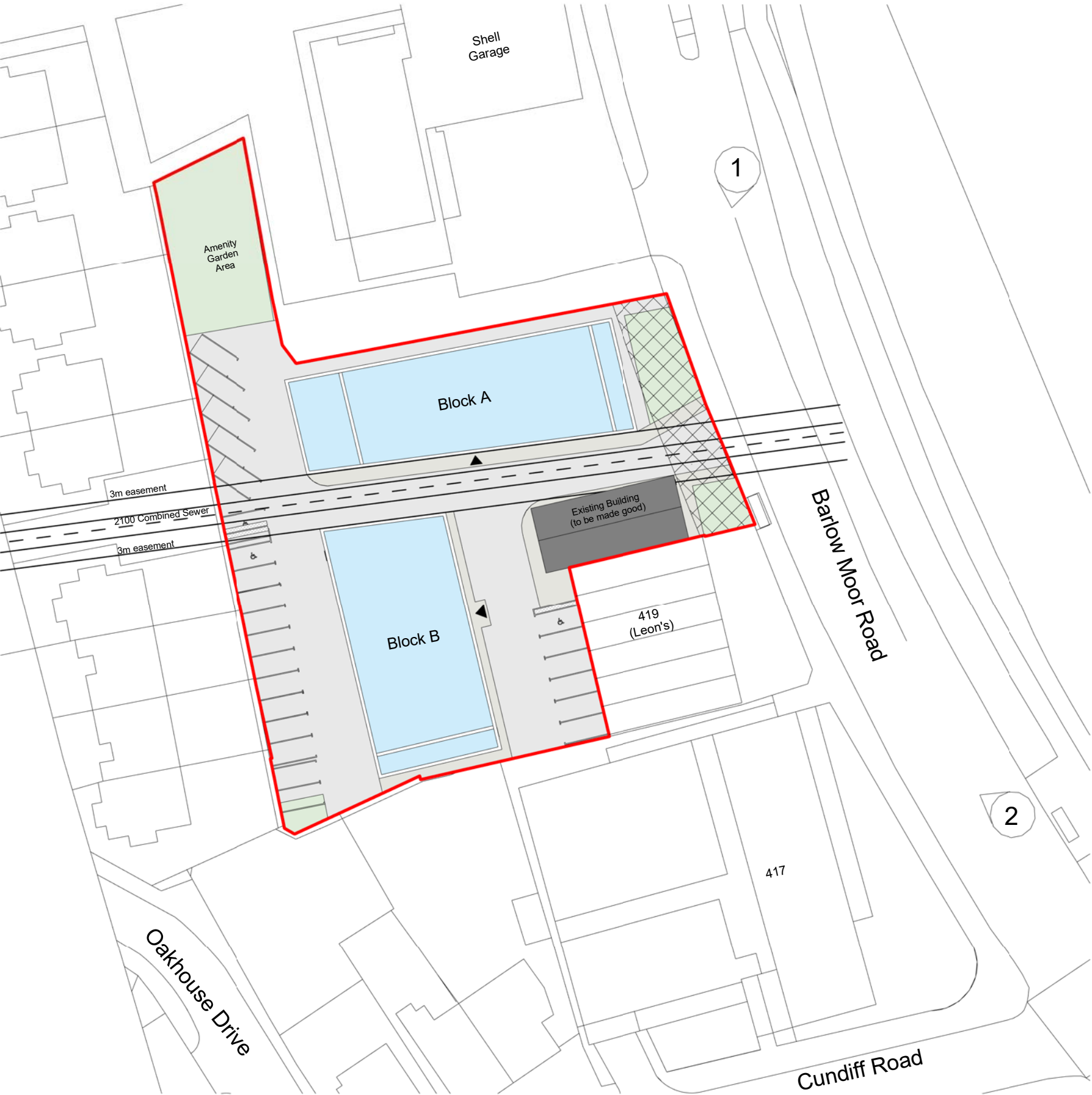


CLIENT:
-

PROJECT:
421 BARLOW MOOR ROAD, M218ER

DRAWING:
PROPOSED SITE PLAN

PROJECT N°:	DRAWING N°:	REV:	SCALE: As indicated	DRAWN: JB
1479	PL 0002		SHEET: A3	CHECKED: BH
			DATE: 26.06.19	



1 Site Plan - Proposed
1 : 500

APPENDIX B

Imported Topsoil/Subsoil Acceptance Criteria

Site: Barlow Moor Road, Chorlton
Job No: AG3093A-20
Land Use: Residential with plant uptake

Exploratory Hole Reference Depth (m) Strata	Units	Soil Screening Value (6% SOM)	Source/Justification
Arsenic	mg/kg	37	LQM/CIEH S4UL (2015)
Boron	mg/kg	290	LQM/CIEH S4UL (2015)
Cadmium	mg/kg	11	LQM/CIEH S4UL (2015)
Chromium	mg/kg	910	LQM/CIEH S4UL (2015)
Chromium (Hexavalent)	mg/kg	6	LQM/CIEH S4UL (2015)
Copper	mg/kg	2400	LQM/CIEH S4UL (2015) + BS3882: 2015
Lead	mg/kg	200	C4SL (2014)
Mercury	mg/kg	40	LQM/CIEH S4UL (2015)
Nickel	mg/kg	130	LQM/CIEH S4UL (2015)
Selenium	mg/kg	250	LQM/CIEH S4UL (2015)
Vanadium	mg/kg	410	LQM/CIEH S4UL (2015)
Zinc	mg/kg	3700	LQM/CIEH S4UL (2015) + BS3882: 2015
Naphthalene	mg/kg	13	LQM/CIEH S4UL (2015)
Acenaphthylene	mg/kg	*	LQM/CIEH S4UL (2015)
Acenaphthene	mg/kg	920	LQM/CIEH S4UL (2015)
Fluorene	mg/kg	860	LQM/CIEH S4UL (2015)
Phenanthrene	mg/kg	440	LQM/CIEH S4UL (2015)
Anthracene	mg/kg	*	-
Fluoranthene	mg/kg	890	LQM/CIEH S4UL (2015)
Pyrene	mg/kg	*	LQM/CIEH S4UL (2015)
Benzo[a]anthracene	mg/kg	13	LQM/CIEH S4UL (2015)
Chrysene	mg/kg	27	LQM/CIEH S4UL (2015)
Benzo[b]fluoranthene	mg/kg	3.7	LQM/CIEH S4UL (2015)
Benzo[k]fluoranthene	mg/kg	100	LQM/CIEH S4UL (2015)
Benzo[a]pyrene	mg/kg	3.0	LQM/CIEH S4UL (2015)
Dibenzo[a,h]anthracene	mg/kg	0.30	LQM/CIEH S4UL (2015)
Indeno[1,2,3-cd]pyrene	mg/kg	41	LQM/CIEH S4UL (2015)
Benzo[g,h,i]perylene	mg/kg	350	LQM/CIEH S4UL (2015)
Total PAH	mg/kg	1000	-
Phenols	mg/kg	380	LQM/CIEH S4UL (2015)
Benzene	mg/kg	0.37	LQM/CIEH S4UL (2015)
Toluene	mg/kg	660	LQM/CIEH S4UL (2015)
Ethylbenzene	mg/kg	260	LQM/CIEH S4UL (2015)
m&p Xylene	mg/kg	310	LQM/CIEH S4UL (2015)
o-Xylene	mg/kg	330	LQM/CIEH S4UL (2015)
Aliphatic TPH >C5-C6	mg/kg	160	LQM/CIEH S4UL (2015)
Aliphatic TPH >C6-C8	mg/kg	530	LQM/CIEH S4UL (2015)
Aliphatic TPH >C8-C10	mg/kg	150	LQM/CIEH S4UL (2015)
Aliphatic TPH >C10-C12	mg/kg	760	LQM/CIEH S4UL (2015)
Aliphatic TPH >C12-C16	mg/kg	*	-
Aliphatic TPH >C16-C21	mg/kg	*	-
Aliphatic TPH >C21-C35	mg/kg	*	-
Aliphatic TPH >C35-C44	mg/kg	*	-
Aromatic TPH >C5-C7	mg/kg	300	LQM/CIEH S4UL (2015)
Aromatic TPH >C7-C8	mg/kg	660	LQM/CIEH S4UL (2015)
Aromatic TPH >C8-C10	mg/kg	190	LQM/CIEH S4UL (2015)
Aromatic TPH >C10-C12	mg/kg	380	LQM/CIEH S4UL (2015)
Aromatic TPH >C12-C16	mg/kg	660	LQM/CIEH S4UL (2015)
Aromatic TPH >C16-C21	mg/kg	930	LQM/CIEH S4UL (2015)
Aromatic TPH >C21-C35	mg/kg	*	-
Aromatic TPH >C35-C44	mg/kg	*	-
Total Petroleum Hydrocarbons	mg/kg	1000	-
Asbestos		Below Detection Limit of Test	-
VOCs (other than BTEX)	µg/kg	Below Detection Limit of Test	Any values above detection to be assessed in more detail to determine suitability for end use. Ideally VOCs to be below detection.

Testing should be based on the donor site and its historical use.

* Individual PAH compounds and TPH fractions have S4UL's in excess of 1000mg/kg, therefore no specific limits are proposed as overall limits of 1000mg/kg TPH and 1000mg/kg PAH are to be adhered to.

LQM/CIEH S4UL Reference No. S4UL3159 (2015)