



TIM O'HARE ASSOCIATES

SOIL & LANDSCAPE CONSULTANCY

T. Loughman & Co Ltd
Moatfield House
Highfield Road
Dartford
Kent
DA1 2LH

15th October 2015
Our Ref: TOHA/15/6469/SS

Dear Sirs

Bridgewater Road, QEOP

Imported Soil Analysis – Allotment Topsoil

Source: London Rock

We have completed the analysis of the sample referenced *LR Allotment Topsoil*, recently received from London Rock Supplies Ltd for the Bridgewater Road, Queen Elizabeth Olympic Park project and have pleasure reporting our findings.

The purpose of the analysis was to determine the sample's compliance with the requirements of *Appendix 6/8-16 Allotment Topsoil* of the project specification, *Queen Elizabeth Olympic Park Legacy Transformation – Olympic Park Infrastructure Specification Earthworks Appendix 6* – as listed in the T Loughman & Co Ltd Inspection & Test Plan, (ref: 15/014/12 ITP 01). The results for potential contaminants have been assessed against the Atkins *Site-Specific Assessment Criteria (SSACs) – Human Health Separation Layer for Zone PDZ8/CZ8c, Allotments*.

ANALYTICAL SCHEDULE

The sample was submitted to the laboratory for a range of physical and chemical analyses in accordance with the requirements of the specification. The following parameters were determined:

- Visual examination to record Munsell colour, moisture status, aerobic state, the presence of any deleterious materials, unusual odours (e.g. petroleum hydrocarbons);
- detailed particle size analysis;
- stone content (>2mm, >20mm, >50mm);
- visible contaminants (>2mm) (of which glass/sharps or plastic);
- pH value;
- calcium carbonate;
- electrical conductivity values (water and CaSO₄ extracts);
- exchangeable sodium percentage;
- organic matter content;
- total nitrogen;

Tim O'Hare Associates LLP
Howbery Park Wallingford Oxfordshire OX10 8BA
T:01491 822653 E:info@toha.co.uk
www.toha.co.uk

- carbon:nitrogen ratio;
- extractable phosphorus, potassium and magnesium;
- phytotoxic contaminants (Cu, Ni, Zn);
- water-soluble boron;
- Limiting values for harm to human health (ref: SSACs);

RESULTS OF ANALYSIS

The results of this process are presented on the attached Certificate of Analysis, and a summary of our findings is provided below.

We have cross-referenced the results against *Appendix 6/8-16 Allotment Topsoil* and the *Site-Specific Assessment Criteria (SSACs) for Zone PDZ8/CZ8c*.

Visual Examination

The sample was described as a brown (Munsell Colour 10YR 4/3), dry, friable SANDY LOAM with a weakly developed, fine to coarse granular structure. The sample was moderately stony (flints). No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

Horticultural Parameters

The sample was largely compliant with the requirements of *Appendix 6/8-16 Allotment Topsoil*, with the exception of the following non-compliances:

Parameter	Result	Specified Requirement
Clay content	11%	15 – 25%
Stone content (>2mm)	22%	0 – 20%

These non-compliances are only considered minor when reviewed in the context of all the other results and considering the proposed end-use of this soil. They should not adversely affect the overall quality and function of the topsoil for the proposed end-use.

Chemical Parameters – SSACs

Of the potential contaminants determined so far, none were recorded at levels that exceeded their respective specified maximum permissible values.

The results for **Dioxin (2,3,7,8-tcdd)** will be issued shortly.

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if we can be of further assistance.

Yours sincerely

*BSc MSc PhD
Soil Scientist*

*BSc MSc MSoilSci MBIAC CSci
Principal Consultant*

For & on behalf of Tim O'Hare Associates LLP

Client:	T Loughman & Co Ltd
Project:	Bridgewater Road, QEOP
Job:	Imported Soil Testing
Soil Type:	2.6 Material Selection - Allotment Topsoil
Source:	London Rock
Date:	15/10/15
Job Ref No:	TOHA/15/6469/SS



TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Sample Reference		Accreditation
Clay (<0.002mm)	%	UKAS
Silt (0.002-0.05mm)	%	UKAS
Very Fine Sand (0.05-0.15mm)	%	UKAS
Fine Sand (0.15-0.25mm)	%	UKAS
Medium Sand (0.25-0.50mm)	%	UKAS
Coarse Sand (0.50-1.0mm)	%	UKAS
Very Coarse Sand (1.0-2.0mm)	%	UKAS
Total Sand (0.05-2.0mm)	%	UKAS
Texture Class (UK Classification)	---	UKAS
Stones (>2mm)	% DW	GLP
Stones (>20mm)	% DW	GLP
Stones (>50mm)	% DW	GLP

LR Topsoil	
11	X
23	✓
11	---
8	✓
27	✓
15	---
5	---
66	✓
SL	---
22	X
0	✓
0	✓

pH Value (1:2.5 water extract)	units	UKAS
Calcium Carbonate	%	UKAS
Electrical Conductivity (1:2.5 water extract)	uS/cm	UKAS
Electrical Conductivity (1:2 CaSO4 extract)	uS/cm	UKAS
Exchangeable Sodium Percentage	%	UKAS

7.6	✓
1.5	✓
203	✓
2116	✓
0.5	✓

Organic Matter (LOI)	%	UKAS
Total Nitrogen	%	UKAS
C : N Ratio	ratio	UKAS
Extractable Phosphorus	mg/l	UKAS
Extractable Potassium	mg/l	UKAS
Extractable Magnesium	mg/l	UKAS

4.1	✓
0.21	✓
11	✓
67	✓
252	✓
83	✓

Visible Contaminants >2mm	%	UKAS
Plastics >2mm	%	UKAS
Sharps >2mm	%	UKAS

0	✓
0	✓
0	✓

Total Arsenic (As)	mg/kg	MCERTS
Total Cadmium (Cd)	mg/kg	MCERTS
Total Chromium (Cr)	mg/kg	MCERTS
Chromium (hexavalent)	mg/kg	MCERTS
Total Copper (Cu)	mg/kg	MCERTS
Total Lead (Pb)	mg/kg	MCERTS
Total Mercury (Hg)	mg/kg	MCERTS
Total Nickel (Ni)	mg/kg	MCERTS
Total Selenium (Se)	mg/kg	MCERTS
Total Zinc (Z)	mg/kg	MCERTS
Water Soluble Boron (B)	mg/kg	MCERTS
Total Cyanide (CN)	mg/kg	MCERTS
Free Cyanide	mg/kg	MCERTS
Total (mono) Phenols	mg/kg	MCERTS
Water Soluble Sulphate	g/l	MCERTS
Total Sulphate	mg/kg	MCERTS

7.7	✓
< 0.2	✓
15	✓
< 4.0	✓
9.4	✓
32	✓
< 0.3	✓
11	✓
< 1.0	✓
46	✓
0.9	✓
< 1	✓
< 1	✓
< 1.0	✓
0.026	---
490	---

Naphthalene	mg/kg	MCERTS
Acenaphthylene	mg/kg	MCERTS
Acenaphthene	mg/kg	MCERTS
Fluorene	mg/kg	MCERTS
Phenanthrene	mg/kg	MCERTS
Anthracene	mg/kg	MCERTS
Fluoranthene	mg/kg	MCERTS
Pyrene	mg/kg	MCERTS
Benzo(a)anthracene	mg/kg	MCERTS
Chrysene	mg/kg	MCERTS
Benzo(b)fluoranthene	mg/kg	MCERTS
Benzo(k)fluoranthene	mg/kg	MCERTS
Benzo(a)pyrene	mg/kg	MCERTS
Indeno(1,2,3-cd)pyrene	mg/kg	MCERTS
Dibenzo(a,h)anthracene	mg/kg	MCERTS
Benzo(g,h,i)perylene	mg/kg	MCERTS
Total PAHs (sum USEPA16)	mg/kg	MCERTS

< 0.05	✓
< 0.10	✓
< 0.10	✓
< 0.10	✓
< 0.10	✓
0.28	✓
< 0.10	✓
0.53	✓
0.48	✓
0.21	✓
0.24	✓
0.17	✓
0.2	✓
< 0.10	✓
< 0.10	✓
< 0.10	✓
< 0.05	✓
2.11	✓

Aliphatic TPH >C5 - C6	mg/kg	MCERTS
Aliphatic TPH >C6 - C8	mg/kg	MCERTS
Aliphatic TPH >C8 - C10	mg/kg	MCERTS
Aliphatic TPH >C10 - C12	mg/kg	MCERTS
Aliphatic TPH >C12 - C16	mg/kg	MCERTS
Aliphatic TPH >C16 - C21	mg/kg	MCERTS
Aliphatic TPH >C21 - C35	mg/kg	MCERTS
Aliphatic TPH (C5 - C35)	mg/kg	MCERTS
Aromatic TPH >C5 - C7	mg/kg	MCERTS
Aromatic TPH >C7 - C8	mg/kg	MCERTS
Aromatic TPH >C8 - C10	mg/kg	MCERTS
Aromatic TPH >C10 - C12	mg/kg	MCERTS
Aromatic TPH >C12 - C16	mg/kg	MCERTS
Aromatic TPH >C16 - C21	mg/kg	MCERTS
Aromatic TPH >C21 - C35	mg/kg	MCERTS
Aromatic TPH (C5 - C35)	mg/kg	MCERTS

< 0.1	✓
< 0.1	✓
< 0.1	✓
< 1.0	✓
< 2.0	✓
< 8.0	✓
< 8.0	✓
< 10	✓
< 0.1	✓
< 0.1	✓
< 0.1	✓
< 1.0	✓
< 2.0	✓
< 10	✓
< 10	✓
< 10	✓

Carbon tetrachloride	µg/kg	ISO 17025
Dichloroethene, 1, 2-	µg/kg	ISO 17025
Dioxin (2,3,7,8-tcdd)	µg/kg	ISO 17025
1,1,1-Trichloroethane	µg/kg	ISO 17025
Tetrachloroethene	µg/kg	ISO 17025
1,1,1,2-Tetrachloroethane	µg/kg	ISO 17025
1,1,2,2-Tetrachloroethane	µg/kg	ISO 17025
1,1,1 - Trichloroethane	µg/kg	ISO 17025
Trichloroethene	µg/kg	ISO 17025

< 1.0	✓
< 1.0	✓
to follow	---
< 1.0	✓
< 1.0	✓
< 1.0	✓
< 1.0	✓
< 1.0	✓
< 1.0	✓

Asbestos	N/D	ISO 17025
----------	-----	-----------

Not-detected	✓
--------------	---

Results of analysis should be read in conjunction with the report they were issued with

Visual Examination

The sample was described as a brown (Munsell Colour 10YR 4/3), dry, friable SANDY LOAM with a weakly developed, fine to coarse granular structure. The sample was moderately stony (flints). No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

✓	Compliant with 2.6 Material Selection - Allotment Topsoil Remediation, Bulk Excavation and Fill ITP, Olympic South Park 15/014/12 ITP01 and Capita Symonds Site Specific Assessment Criteria - Human Health - Zone PDZA: Allotments
X	Fails 2.6 Material Selection - Allotment Topsoil Remediation, Bulk Excavation and Fill ITP, Olympic South Park 15/014/12 ITP01 and Capita Symonds Site Specific Assessment Criteria - Human Health - Zone PDZA: Allotments
*	See report comments

Horticultural parameters analysis carried out by Natural Resource Management Ltd - UKAS No. 2334
Contamination analysis carried out by I2 Analytical Ltd. UKAS - No. 4041

BSc MSc MISoilSci MBIAC CSci
Principal

The contents of this certificate shall not be reproduced without the express written permission of Tim O'Hare Associates LLP