Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
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Deeside
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Tel: (01244) 528700
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Website: www.alsenvironmental.co.uk

Minerex Environmental
Taney hall
Eglinton Terrace
Dundrum
Dublin
Dublin 14

**Attention:** Sven Klinkenbergh

# CERTIFICATE OF ANALYSIS

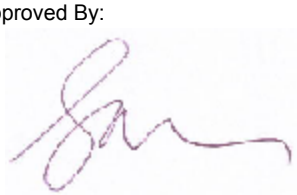
| | |
|---|---|
| **Date:** | 04 July 2017 |
| **Customer:** | D_MINEREX_DUB |
| **Sample Delivery Group (SDG):** | 170624-54 |
| **Your Reference:** | 2793-COC11-F |
| **Location:** | JJ Rhatigan, Charlemont Street, Dublin 2 |
| **Report No:** | 414856 |

We received 1 sample on Saturday June 24, 2017 and 1 of these samples were scheduled for analysis which was completed on Tuesday July 04, 2017. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

Approved By:



**Sonia McWhan**

Operations Manager

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-54 | **Client Reference:** | 2793-COC11-F | **Report Number:** | 414856 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Received Sample Overview

| Lab Sample No(s) | Customer Sample Ref. | AGS Ref. | Depth (m) | Sampled Date |
|---|---|---|---|---|
| 15739885 | 2793-TP111-SS12 | | 5.00 - 8.00 | 15/06/2017 |

**Maximum Sample/Coolbox Temperature (°C) :** **19**

**ISO5667-3 Water quality - Sampling - Part3 -**
During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

**Only received samples which have had analysis scheduled will be shown on the following pages.**

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-54 | **Client Reference:** | 2793-COC11-F | **Report Number:** | 414856 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

**Results Legend**

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

| | | | Lab Sample No(s) | Customer Sample Reference | AGS Reference | Depth (m) | Container | Sample Type |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 250g Amber Jar (ALE210) | S |
| | | | | | | | 400g Tub (ALE214) | S |
| | | | | | | | 60g VOC (ALE215) | S |
| Anions by Kone (w) | All | NDPs: 0 Tests: 1 | | | | | | |
| | | | | | | | X | |
| Asbestos ID in Solid Samples | All | NDPs: 0 Tests: 1 | | | | | | |
| | | | | | | | X | |
| Boron Water Soluble | All | NDPs: 0 Tests: 1 | | | | | | |
| | | | | | | | X | |
| CEN Readings | All | NDPs: 0 Tests: 1 | | | | | | |
| | | | | | | | X | |
| Cyanide Comp/Free/Total/Thiocyanate | All | NDPs: 0 Tests: 1 | | | | | | |
| | | | | | | | X | |
| Dissolved Metals by ICP-MS | All | NDPs: 0 Tests: 1 | | | | | | |
| | | | | | | | X | |
| Dissolved Organic/Inorganic Carbon | All | NDPs: 0 Tests: 1 | | | | | | |
| | | | | | | | X | |
| EPH CWG (Aliphatic) GC (S) | All | NDPs: 0 Tests: 1 | | | | | | |
| | | | | | | | X | |
| EPH CWG (Aromatic) GC (S) | All | NDPs: 0 Tests: 1 | | | | | | |
| | | | | | | | X | |
| Fluoride | All | NDPs: 0 Tests: 1 | | | | | | |
| | | | | | | | X | |
| GRO by GC-FID (S) | All | NDPs: 0 Tests: 1 | | | | | | |
| | | | | | | | | X |
| Hexavalent Chromium (s) | All | NDPs: 0 Tests: 1 | | | | | | |
| | | | | | | | X | |
| Loss on Ignition in soils | All | NDPs: 0 Tests: 1 | | | | | | |
| | | | | | | | X | |
| Mercury Dissolved | All | NDPs: 0 Tests: 1 | | | | | | |
| | | | | | | | X | |
| Metals by iCap-OES Dissolved (W) | All | NDPs: 0 Tests: 1 | | | | | | |
| | | | | | | | X | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-54 | **Client Reference:** | 2793-COC11-F | **Report Number:** | 414856 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

**Results Legend**

X **Test**

N **No Determination Possible**

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

| | | | | | | |
|---|---|---|---|---|---|---|
| **Lab Sample No(s)** | | | 15739885 | | |
| **Customer Sample Reference** | | | 2793-TP111-SS12 | | |
| **AGS Reference** | | | | | |
| **Depth (m)** | | | 5.00 - 8.00 | | |
| **Container** | | | 250g Amber Jar (ALE210) | 400g Tub (ALE214) | 60g VOC (ALE215) |
| **Sample Type** | | | S | S | S |
| Metals in solid samples by OES | All | NDPs: 0 Tests: 1 | X | | |
| Mineral Oil | All | NDPs: 0 Tests: 1 | X | | |
| PAH by GCMS | All | NDPs: 0 Tests: 1 | X | | |
| PCBs by GCMS | All | NDPs: 0 Tests: 1 | X | | |
| pH | All | NDPs: 0 Tests: 1 | X | | |
| Phenols by HPLC (S) | All | NDPs: 0 Tests: 1 | X | | |
| Phenols by HPLC (W) | All | NDPs: 0 Tests: 1 | | X | |
| Sample description | All | NDPs: 0 Tests: 1 | X | | |
| Total Dissolved Solids | All | NDPs: 0 Tests: 1 | | X | |
| Total Organic Carbon | All | NDPs: 0 Tests: 1 | X | | |
| Total Sulphate | All | NDPs: 0 Tests: 1 | X | | |
| Total Sulphur | All | NDPs: 0 Tests: 1 | X | | |
| TPH CWG GC (S) | All | NDPs: 0 Tests: 1 | X | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-54 | **Client Reference:** | 2793-COC11-F | **Report Number:** | 414856 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

# Sample Descriptions

## Grain Sizes

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **very fine** | <0.063mm | **fine** | 0.063mm - 0.1mm | **medium** | 0.1mm - 2mm | **coarse** | 2mm - 10mm | **very coarse** | >10mm |

| Lab Sample No(s) | Customer Sample Ref. | Depth (m) | Colour | Description | Inclusions | Inclusions 2 |
|---|---|---|---|---|---|---|
| 15739885 | 2793-TP111-SS12 | 5.00 - 8.00 | Dark Brown | Sandy Loam | Stones | None |

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-54 | **Client Reference:** | 2793-COC11-F | **Report Number:** | 414856 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| Customer Sample Ref. | 2793-TP111-SS12 |
| Depth (m) | 5.00 - 8.00 |
| Sample Type | Soil/Solid (S) |
| Date Sampled | 15/06/2017 |
| Sampled Time | . |
| Date Received | 24/06/2017 |
| SDG Ref | 170624-54 |
| Lab Sample No.(s) | 15739885 |
| AGS Reference | |

| Component | LOD/Units | Method | |
|---|---|---|---|
| Moisture Content Ratio (% of as received sample) | % | PM024 | 4.8 |
| Loss on ignition | <0.7 % | TM018 | 2.01 M |
| Mineral oil >C10-C40 | <1 mg/kg | TM061 | 79.4 @ |
| Mineral Oil Surrogate % recovery** | % | TM061 | 78.5 @ |
| Phenol | <0.01 mg/kg | TM062 (S) | <0.01 M |
| Organic Carbon, Total | <0.2 % | TM132 | 0.515 M |
| Sulphur, Total | <0.02 % | TM132 | 0.457 |
| Sulphate, Total potential | <0.06 % | TM132 | 1.37 |
| pH | 1 pH Units | TM133 | 8.14 M |
| Chromium, Hexavalent | <0.6 mg/kg | TM151 | <0.6 # |
| Cyanide, Total | <1 mg/kg | TM153 | <1 M |
| Cyanide, Free | <1 mg/kg | TM153 | <1 M |
| PCB congener 28 | <3 µg/kg | TM168 | <3 M |
| PCB congener 52 | <3 µg/kg | TM168 | <3 M |
| PCB congener 101 | <3 µg/kg | TM168 | <3 M |
| PCB congener 118 | <3 µg/kg | TM168 | <3 M |
| PCB congener 138 | <3 µg/kg | TM168 | <3 M |
| PCB congener 153 | <3 µg/kg | TM168 | <3 M |
| PCB congener 180 | <3 µg/kg | TM168 | <3 M |
| Sum of detected PCB 7 Congeners | <21 µg/kg | TM168 | <21 |
| Antimony | <0.6 mg/kg | TM181 | 1.35 # |
| Arsenic | <0.6 mg/kg | TM181 | 10.1 M |
| Barium | <0.6 mg/kg | TM181 | 54.7 # |
| Cadmium | <0.02 mg/kg | TM181 | 1.9 M |
| Chromium | <0.9 mg/kg | TM181 | 5.06 M |
| Copper | <1.4 mg/kg | TM181 | 24.8 M |
| Iron | <1000 mg/kg | TM181 | 17300 # |
| Lead | <0.7 mg/kg | TM181 | 17.2 M |
| Manganese | <0.13 mg/kg | TM181 | 2080 M |
| Mercury | <0.14 mg/kg | TM181 | <0.14 M |
| Molybdenum | <0.1 mg/kg | TM181 | 2.97 # |
| Nickel | <0.2 mg/kg | TM181 | 33.4 M |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-54 | **Client Reference:** | 2793-COC11-F | **Report Number:** | 414856 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

**Results Legend**

| | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| **Customer Sample Ref.** | 2793-TP111-SS12 |
| **Depth (m)** | 5.00 - 8.00 |
| **Sample Type** | Soil/Solid (S) |
| **Date Sampled** | 15/06/2017 |
| **Sampled Time** | - |
| **Date Received** | 24/06/2017 |
| **SDG Ref** | 170624-54 |
| **Lab Sample No.(s)** | 15739885 |
| **AGS Reference** | |

| Component | LOD/Units | Method | |
|---|---|---|---|
| Selenium | <1 mg/kg | TM181 | 2.83 # |
| Zinc | <1.9 mg/kg | TM181 | 76 M |
| Sulphate, Total | <48 mg/kg | TM221 | 1210 M |
| Sulphide, Oxidisable | <0.03 % | TM221 | 1.25 |
| Boron, water soluble | <1 mg/kg | TM222 | <1 M |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-54 | **Client Reference:** | 2793-COC11-F | **Report Number:** | 414856 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## PAH by GCMS

**Results Legend**

| | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| **Customer Sample Ref.** | 2793-TP111-SS12 |
| **Depth (m)** | 5.00 - 8.00 |
| **Sample Type** | Soil/Solid (S) |
| **Date Sampled** | 15/06/2017 |
| **Sampled Time** | . |
| **Date Received** | 24/06/2017 |
| **SDG Ref** | 170624-54 |
| **Lab Sample No.(s)** | 15739885 |
| **AGS Reference** | |

| Component | LOD/Units | Method | | | | | |
|---|---|---|---|---|---|---|---|
| Naphthalene-d8 % recovery** | % | TM218 | 103 | | | | |
| Acenaphthene-d10 % recovery** | % | TM218 | 99 | | | | |
| Phenanthrene-d10 % recovery** | % | TM218 | 96.6 | | | | |
| Chrysene-d12 % recovery** | % | TM218 | 88.3 | | | | |
| Perylene-d12 % recovery** | % | TM218 | 84.3 | | | | |
| Naphthalene | <9 µg/kg | TM218 | 18.8 M | | | | |
| Acenaphthylene | <12 µg/kg | TM218 | <12 M | | | | |
| Acenaphthene | <8 µg/kg | TM218 | <8 M | | | | |
| Fluorene | <10 µg/kg | TM218 | 29.1 M | | | | |
| Phenanthrene | <15 µg/kg | TM218 | 91 M | | | | |
| Anthracene | <16 µg/kg | TM218 | <16 M | | | | |
| Fluoranthene | <17 µg/kg | TM218 | 31.6 M | | | | |
| Pyrene | <15 µg/kg | TM218 | 34.8 M | | | | |
| Benz(a)anthracene | <14 µg/kg | TM218 | 20.4 M | | | | |
| Chrysene | <10 µg/kg | TM218 | 26.1 M | | | | |
| Benzo(b)fluoranthene | <15 µg/kg | TM218 | 26.8 M | | | | |
| Benzo(k)fluoranthene | <14 µg/kg | TM218 | <14 M | | | | |
| Benzo(a)pyrene | <15 µg/kg | TM218 | <15 M | | | | |
| Indeno(1,2,3-cd)pyrene | <18 µg/kg | TM218 | <18 M | | | | |
| Dibenzo(a,h)anthracene | <23 µg/kg | TM218 | <23 M | | | | |
| Benzo(g,h,i)perylene | <24 µg/kg | TM218 | <24 M | | | | |
| Coronene | <200 µg/kg | TM218 | <200 | | | | |
| PAH, Total Detected USEPA 16 | <118 µg/kg | TM218 | 278 | | | | |
| PAH, Total Detected USEPA 16 + Coronene | <318 µg/kg | TM218 | <318 | | | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-54 | **Client Reference:** | 2793-COC11-F | **Report Number:** | 414856 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## TPH CWG (S)

**Results Legend**

| | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| Customer Sample Ref. | 2793-TP111-SS12 |
| Depth (m) | 5.00 - 8.00 |
| Sample Type | Soil/Solid (S) |
| Date Sampled | 15/06/2017 |
| Sampled Time | . |
| Date Received | 24/06/2017 |
| SDG Ref | 170624-54 |
| Lab Sample No.(s) | 15739885 |
| AGS Reference | |

| Component | LOD/Units | Method | |
|---|---|---|---|
| GRO Surrogate % recovery** | % | TM089 | 8 @ |
| GRO TOT (Moisture Corrected) | <44 µg/kg | TM089 | <44 @ M |
| Methyl tertiary butyl ether (MTBE) | <5 µg/kg | TM089 | <5 @ # |
| Benzene | <10 µg/kg | TM089 | <10 @ M |
| Toluene | <2 µg/kg | TM089 | <2 @ M |
| Ethylbenzene | <3 µg/kg | TM089 | <3 @ M |
| m,p-Xylene | <6 µg/kg | TM089 | <6 @ M |
| o-Xylene | <3 µg/kg | TM089 | <3 @ M |
| sum of detected mpo xylene by GC | <9 µg/kg | TM089 | <9 @ |
| sum of detected BTEX by GC | <24 µg/kg | TM089 | <24 @ |
| Aliphatics >C5-C6 | <10 µg/kg | TM089 | <10 @ |
| Aliphatics >C6-C8 | <10 µg/kg | TM089 | <10 @ |
| Aliphatics >C8-C10 | <10 µg/kg | TM089 | <10 @ |
| Aliphatics >C10-C12 | <10 µg/kg | TM089 | <10 @ |
| Aliphatics >C12-C16 | <100 µg/kg | TM173 | 2990 |
| Aliphatics >C16-C21 | <100 µg/kg | TM173 | 5570 |
| Aliphatics >C21-C35 | <100 µg/kg | TM173 | 47900 |
| Aliphatics >C35-C44 | <100 µg/kg | TM173 | 6320 |
| Total Aliphatics >C12-C44 | <100 µg/kg | TM173 | 62700 |
| Aromatics >EC5-EC7 | <10 µg/kg | TM089 | <10 @ |
| Aromatics >EC7-EC8 | <10 µg/kg | TM089 | <10 @ |
| Aromatics >EC8-EC10 | <10 µg/kg | TM089 | <10 @ |
| Aromatics >EC10-EC12 | <10 µg/kg | TM089 | <10 @ |
| Aromatics >EC12-EC16 | <100 µg/kg | TM173 | 1010 |
| Aromatics >EC16-EC21 | <100 µg/kg | TM173 | 2220 |
| Aromatics >EC21-EC35 | <100 µg/kg | TM173 | 8820 |
| Aromatics >EC35-EC44 | <100 µg/kg | TM173 | 3530 |
| Aromatics >EC40-EC44 | <100 µg/kg | TM173 | 1450 |
| Total Aromatics >EC12-EC44 | <100 µg/kg | TM173 | 15600 |
| Total Aliphatics & Aromatics >C5-C44 | <100 µg/kg | TM173 | 78300 |
| | | | |
| | | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-54 | **Client Reference:** | 2793-COC11-F | **Report Number:** | 414856 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Asbestos Identification - Soil

| | | Date of Analysis | Analysed By | Comments | Amosite (Brown) Asbestos | Chrysotile (White) Asbestos | Crocidolite (Blue) Asbestos | Fibrous Actinolite | Fibrous Anthophyllite | Fibrous Tremolite | Non-Asbestos Fibre |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cust. Sample Ref.<br>Depth (m)<br>Sample Type<br>Date Sampled<br>Date Receieved<br>SDG<br>Original Sample<br>Method Number | 2793-TP111-SS12<br>5.00 - 8.00<br>SOLID<br>15/06/2017<br>00:00:00<br>27/06/2017<br>20:19:21<br>170624-54<br>15739885<br>TM048 | 29/06/17 | Christian Hallam | - | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-54 | **Client Reference:** | 2793-COC11-F | **Report Number:** | 414856 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## CEN 10:1 SINGLE STAGE LEACHATE TEST

## CEN ANALYTICAL RESULTS

**REF : BS EN 12457/2**

| | | | |
|---|---|---|---|
| **Client Reference** | | **Site Location** | JJ Rhatigan, Charlemont Street, Du |
| **Mass Sample taken (kg)** | 0.095 | **Natural Moisture Content (%)** | 5.04 |
| **Mass of dry sample (kg)** | 0.090 | **Dry Matter Content (%)** | 95.2 |
| **Particle Size <4mm** | >95% | | |

| | |
|---|---|
| **Case** | |
| **SDG** | 170624-54 |
| **Lab Sample Number(s)** | 15739885 |
| **Sampled Date** | 15-Jun-2017 |
| **Customer Sample Ref.** | 2793-TP111-SS12 |
| **Depth (m)** | 5.00 - 8.00 |

| **Solid Waste Analysis** | **Result** | **Landfill Waste Acceptance Criteria Limits** | | |
|---|---|---|---|---|
| | | **Inert Waste Landfill** | **Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon (%) | 0.515 | 3 | 5 | 6 |
| Loss on Ignition (%) | 2.01 | - | - | 10 |
| Sum of BTEX (mg/kg) | <0.024 | 6 | - | - |
| Sum of 7 PCBs (mg/kg) | <0.021 | 1 | - | - |
| Mineral Oil (mg/kg) | 79.4 | 500 | - | - |
| PAH Sum of 17 (mg/kg) | <10 | 100 | - | - |
| pH (pH Units) | 8.14 | - | >6 | - |
| ANC to pH 6 (mol/kg) | - | - | - | - |
| ANC to pH 4 (mol/kg) | - | - | - | - |

| **Eluate Analysis** | **$C_2$** Conc$^n$ in 10:1 eluate (mg/l) | | **$A_2$** 10:1 conc$^n$ leached (mg/kg) | | **Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg** | | |
|---|---|---|---|---|---|---|---|
| | **Result** | **Limit of Detection** | **Result** | **Limit of Detection** | | | |
| Arsenic | <0.0005 | <0.0005 | <0.005 | <0.005 | 0.5 | 2 | 25 |
| Barium | 0.041 | <0.0002 | 0.41 | <0.002 | 20 | 100 | 300 |
| Cadmium | <0.00008 | <0.00008 | <0.0008 | <0.0008 | 0.04 | 1 | 5 |
| Chromium | <0.001 | <0.001 | <0.01 | <0.01 | 0.5 | 10 | 70 |
| Copper | 0.000513 | <0.0003 | 0.00513 | <0.003 | 2 | 50 | 100 |
| Mercury Dissolved (CVAF) | <0.00001 | <0.00001 | <0.0001 | <0.0001 | 0.01 | 0.2 | 2 |
| Molybdenum | 0.0236 | <0.0005 | 0.236 | <0.005 | 0.5 | 10 | 30 |
| Nickel | 0.000861 | <0.0004 | 0.00861 | <0.004 | 0.4 | 10 | 40 |
| Lead | <0.0002 | <0.0002 | <0.002 | <0.002 | 0.5 | 10 | 50 |
| Antimony | 0.00242 | <0.0001 | 0.0242 | <0.001 | 0.06 | 0.7 | 5 |
| Selenium | 0.0328 | <0.0005 | 0.328 | <0.005 | 0.1 | 0.5 | 7 |
| Zinc | 0.00242 | <0.001 | 0.0242 | <0.01 | 4 | 50 | 200 |
| Chloride | 20.1 | <2 | 201 | <20 | 800 | 15000 | 25000 |
| Fluoride | <0.5 | <0.5 | <5 | <5 | 10 | 150 | 500 |
| Sulphate (soluble) | 62.9 | <2 | 629 | <20 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 181 | <5 | 1810 | <50 | 4000 | 60000 | 100000 |
| Total Monohydric Phenols (W) | <0.016 | <0.016 | <0.16 | <0.16 | 1 | - | - |
| Dissolved Organic Carbon | 5.83 | <3 | 58.3 | <30 | 500 | 800 | 1000 |

## Leach Test Information

| | |
|---|---|
| Date Prepared | 28-Jun-2017 |
| pH (pH Units) | 8.31 |
| Conductivity (µS/cm) | 223.00 |
| Temperature (°C) | 18.40 |
| Volume Leachant (Litres) | 0.895 |

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates

04/07/2017 16:02:09

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-54 | **Client Reference:** | 2793-COC11-F | **Report Number:** | 414856 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Table of Results - Appendix

| Method No | Reference | Description | Wet/Dry Sample [1] | Surrogate Corrected |
|---|---|---|---|---|
| PM001 | | Preparation of Samples for Metals Analysis | | |
| PM024 | Modified BS 1377 | Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material | | |
| PM115 | | Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step | | |
| TM018 | BS 1377: Part 3 1990 | Determination of Loss on Ignition | | |
| TM048 | HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures | Identification of Asbestos in Bulk Material | | |
| TM061 | Method for the Determination of EPH,Massachusetts Dept.of EP, 1998 | Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40) | | |
| TM062 (S) | National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9 | Determination of Phenols in Soils by HPLC | | |
| TM089 | Modified: US EPA Methods 8020 & 602 | Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12) | | |
| TM090 | Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060 | Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water | | |
| TM104 | Method 4500F, AWWA/APHA, 20th Ed., 1999 | Determination of Fluoride using the Kone Analyser | | |
| TM123 | BS 2690: Part 121:1981 | The Determination of Total Dissolved Solids in Water | | |
| TM132 | In - house Method | ELTRA CS800 Operators Guide | | |
| TM133 | BS 1377: Part 3 1990;BS 6068-2.5 | Determination of pH in Soil and Water using the GLpH pH Meter | | |
| TM151 | Method 3500D, AWWA/APHA, 20th Ed., 1999 | Determination of Hexavalent Chromium using Kone analyser | | |
| TM152 | Method 3125B, AWWA/APHA, 20th Ed., 1999 | Analysis of Aqueous Samples by ICP-MS | | |
| TM153 | Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999 | Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser | | |
| TM168 | EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography | Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils | | |
| TM173 | Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria | Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID | | |
| TM181 | US EPA Method 6010B | Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES | | |
| TM183 | BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3 | Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry | | |
| TM184 | EPA Methods 325.1 & 325.2, | The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers | | |
| TM218 | Determination of PAH by GCMS Microwave extraction | The determination of PAH in soil samples by microwave extraction and GC-MS | | |
| TM221 | Inductively Coupled Plasma - Atomic Emission Spectroscopy. An Atlas of Spectral Information: Winge, Fassel, Peterson and Floyd | Determination of Acid extractable Sulphate in Soils by IRIS Emission Spectrometer | | |
| TM222 | In-House Method | Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer | | |
| TM228 | US EPA Method 6010B | Determination of Major Cations in Water by iCap 6500 Duo ICP-OES | | |
| TM259 | by HPLC | Determination of Phenols in Waters and Leachates by HPLC | | |

[1] Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-54 | **Client Reference:** | 2793-COC11-F | **Report Number:** | 414856 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Test Completion Dates

| | |
|---|---|
| **Lab Sample No(s)** | 15739885 |
| **Customer Sample Ref.** | 2793-TP111-SS12 |
| **AGS Ref.** | |
| **Depth** | 5.00 - 8.00 |
| **Type** | Soil/Solid (S) |
| Anions by Kone (w) | 03-Jul-2017 |
| Asbestos ID in Solid Samples | 29-Jun-2017 |
| Boron Water Soluble | 29-Jun-2017 |
| CEN 10:1 Leachate (1 Stage) | 28-Jun-2017 |
| CEN Readings | 30-Jun-2017 |
| Cyanide Comp/Free/Total/Thiocyanate | 29-Jun-2017 |
| Dissolved Metals by ICP-MS | 04-Jul-2017 |
| Dissolved Organic/Inorganic Carbon | 03-Jul-2017 |
| EPH CWG (Aliphatic) GC (S) | 30-Jun-2017 |
| EPH CWG (Aromatic) GC (S) | 30-Jun-2017 |
| Fluoride | 03-Jul-2017 |
| GRO by GC-FID (S) | 04-Jul-2017 |
| Hexavalent Chromium (s) | 29-Jun-2017 |
| Loss on Ignition in soils | 04-Jul-2017 |
| Mercury Dissolved | 04-Jul-2017 |
| Metals by iCap-OES Dissolved (W) | 04-Jul-2017 |
| Metals in solid samples by OES | 03-Jul-2017 |
| Mineral Oil | 03-Jul-2017 |
| PAH by GCMS | 30-Jun-2017 |
| PCBs by GCMS | 03-Jul-2017 |
| pH | 30-Jun-2017 |
| Phenols by HPLC (S) | 29-Jun-2017 |
| Phenols by HPLC (W) | 03-Jul-2017 |
| Sample description | 27-Jun-2017 |
| Total Dissolved Solids | 30-Jun-2017 |
| Total Organic Carbon | 29-Jun-2017 |
| Total Sulphate | 03-Jul-2017 |
| Total Sulphur | 29-Jun-2017 |
| TPH CWG GC (S) | 04-Jul-2017 |

# CERTIFICATE OF ANALYSIS

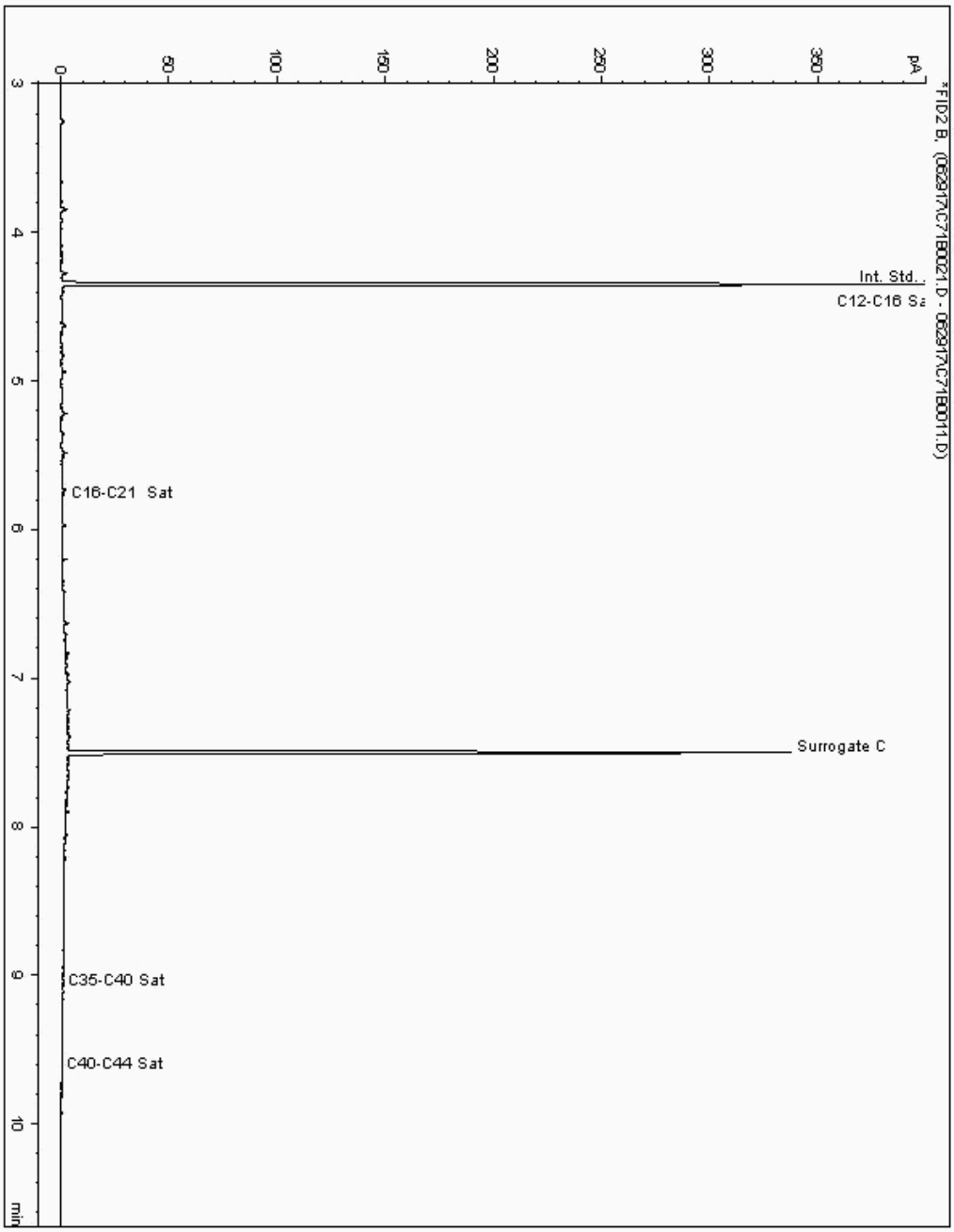
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-54 | **Client Reference:** | 2793-COC11-F | **Report Number:** | 414856 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

**Analysis:** EPH CWG (Aliphatic) GC (S) **Sample No :** 15749834 **Depth :** 5.00 - 8.00
**Sample ID :** 2793-TP111-SS12

Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 14737429-
Date Acquired : 29/06/2017 16:58:44 PM
Units : ppb
Dilution: 2793-TP111-SS12[5.00 - 8.00] ->



# CERTIFICATE OF ANALYSIS

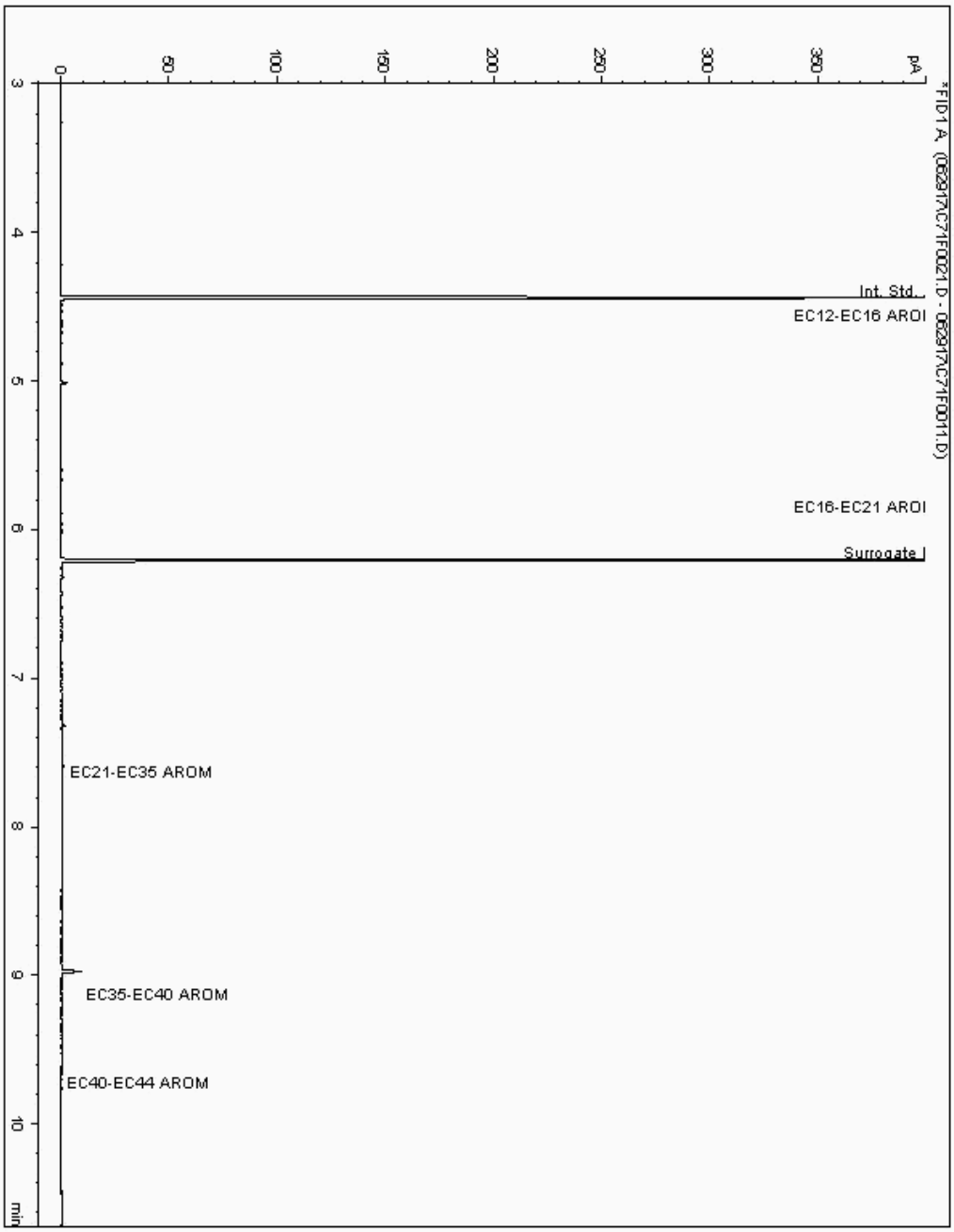
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-54 | **Client Reference:** | 2793-COC11-F | **Report Number:** | 414856 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

# Chromatogram

**Analysis:** EPH CWG (Aromatic) GC (S) **Sample No :** 15749834 **Depth :** 5.00 - 8.00
**Sample ID :** 2793-TP111-SS12

Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 14737430-
Date Acquired : 29/06/2017 16:58:44 PM
Units : ppb
Dilution: 2793-TP111-SS12[5.00 - 8.00] ->



# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-54 | **Client Reference:** | 2793-COC11-F | **Report Number:** | 414856 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

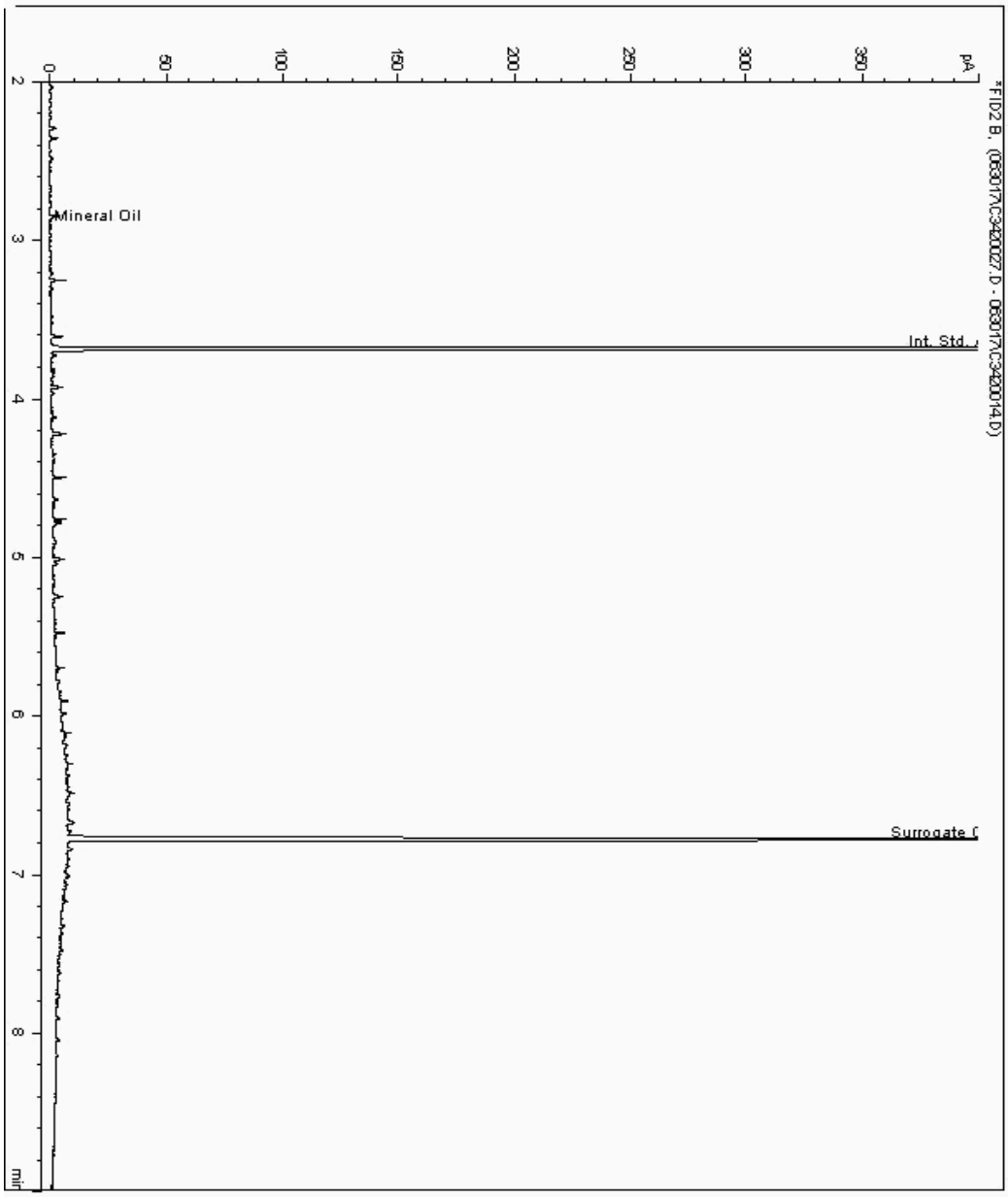
**Analysis:** Mineral Oil

**Sample No :** 15754049
**Sample ID :** 2793-TP111-SS12

**Depth :** 5.00 - 8.00

Mineral Oil Range Organics ( C10 - C40 )

Sample Identity : 14737432-
Date Acquired : 30/06/17 17:17:09 PM
Units : mg/kg
Sample Multiplier : 0.000
Dilution :



# CERTIFICATE OF ANALYSIS

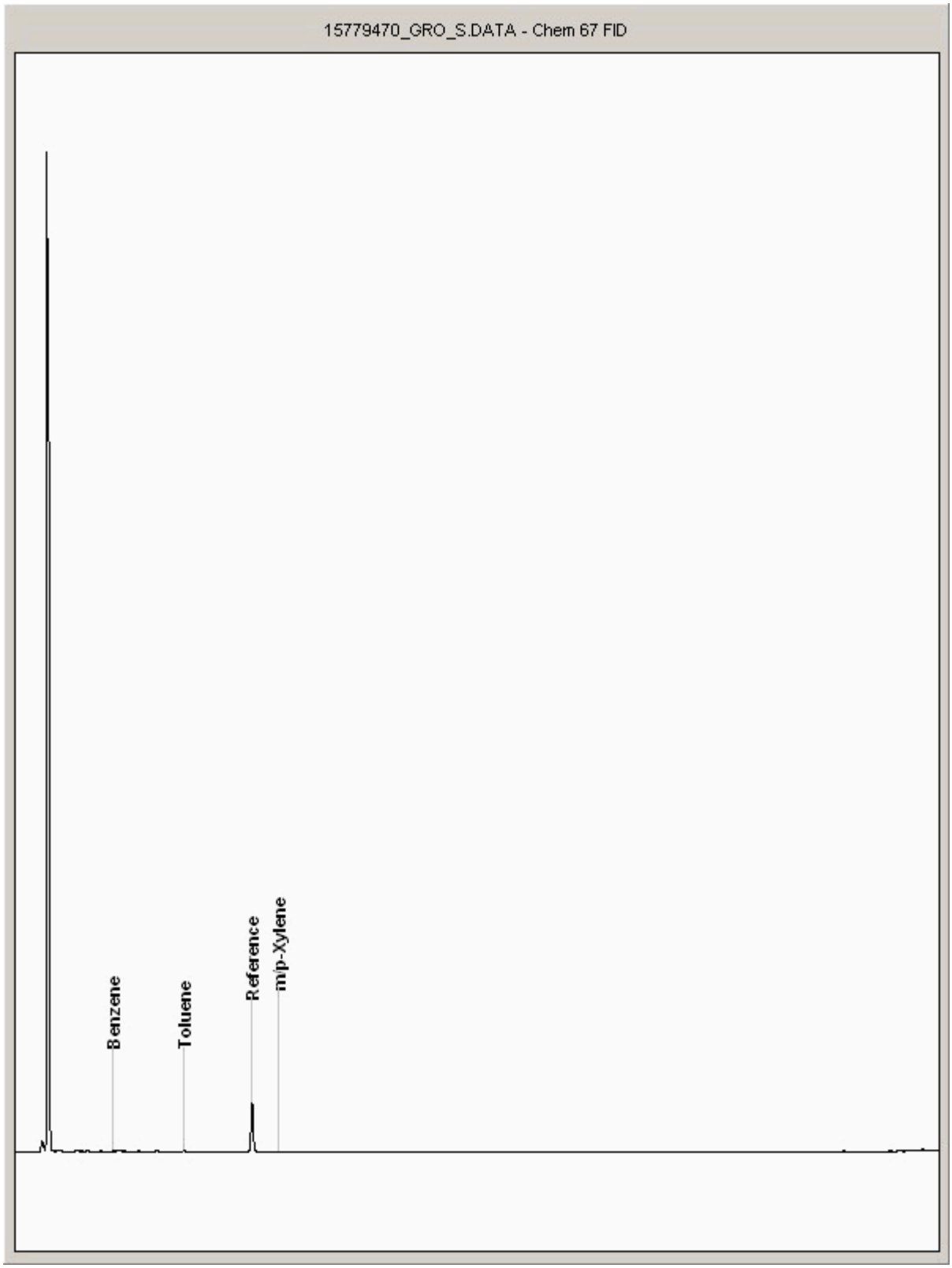
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-54 | **Client Reference:** | 2793-COC11-F | **Report Number:** | 414856 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

**Analysis:** GRO by GC-FID (S)

**Sample No :** 15779470
**Sample ID :** 2793-TP111-SS12

**Depth :** 5.00 - 8.00



# Appendix

## General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

## Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

| | |
|---|---|
| 1 | **Container with Headspace provided for volatiles analysis** |
| 2 | **Incorrect container received** |
| 3 | **Deviation from method** |
| 4 | **Holding time exceeded before sample received** |
| 5 | **Samples exceeded holding time before presevation was performed** |
| § | **Sampled on date not provided** |
| ♦ | **Sample holding time exceeded in laboratory** |
| @ | **Sample holding time exceeded due to sampled on date** |
| & | **Sample Holding Time exceeded - Late arrival of instructions.** |

## Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

| Asbestos Type | Common Name |
|---|---|
| Chrysotile | White Asbestos |
| Amosite | Brown Asbestos |
| Crocidolite | Blue Asbestos |
| Fibrous Actinolite | - |
| Fibrous Anthophyllite | - |
| Fibrous Tremolite | - |

**Visual Estimation Of Fibre Content**

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

**Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.**

**The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.**

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Minerex Environmental
Taney hall
Eglinton Terrace
Dundrum
Dublin
Dublin 14

**Attention:** Sven Klinkenbergh

# CERTIFICATE OF ANALYSIS

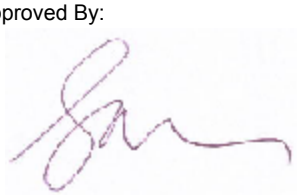
| | |
|---|---|
| **Date:** | 04 July 2017 |
| **Customer:** | D_MINEREX_DUB |
| **Sample Delivery Group (SDG):** | 170624-70 |
| **Your Reference:** | 2793-COC11-I |
| **Location:** | JJ Rhatigan, Charlemont Street, Dublin 2 |
| **Report No:** | 414861 |

We received 1 sample on Saturday June 24, 2017 and 1 of these samples were scheduled for analysis which was completed on Tuesday July 04, 2017. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

Approved By:



**Sonia McWhan**

Operations Manager

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-70 | **Client Reference:** | 2793-COC11-I | **Report Number:** | 414861 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Received Sample Overview

| Lab Sample No(s) | Customer Sample Ref. | AGS Ref. | Depth (m) | Sampled Date |
|---|---|---|---|---|
| 15740309 | 2793-TP112-SS14 | | 6.00 - 8.00 | 15/06/2017 |

**Maximum Sample/Coolbox Temperature (°C) :** **19**

**ISO5667-3 Water quality - Sampling - Part3 -**
During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

**Only received samples which have had analysis scheduled will be shown on the following pages.**

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-70 | **Client Reference:** | 2793-COC11-I | **Report Number:** | 414861 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

**Results Legend**

X **Test**

N **No Determination Possible**

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

| | | | Lab Sample No(s) | Customer Sample Reference | AGS Reference | Depth (m) | Container | Container | Container |
|---|---|---|---|---|---|---|---|---|---|
| | | | 15740309 | 2793-TP112-SS14 | | 6.00 - 8.00 | 250g Amber Jar (ALE210) | 400g Tub (ALE214) | 60g VOC (ALE215) |
| | | | | | | | Sample Type | Sample Type | Sample Type |
| | | | | | | | S | S | S |
| Anions by Kone (w) | All | NDPs: 0 Tests: 1 | | | | | | X | |
| Asbestos ID in Solid Samples | All | NDPs: 0 Tests: 1 | | | | | | X | |
| Boron Water Soluble | All | NDPs: 0 Tests: 1 | | | | | X | | |
| CEN Readings | All | NDPs: 0 Tests: 1 | | | | | | X | |
| Cyanide Comp/Free/Total/Thiocyanate | All | NDPs: 0 Tests: 1 | | | | | X | | |
| Dissolved Metals by ICP-MS | All | NDPs: 0 Tests: 1 | | | | | | X | |
| Dissolved Organic/Inorganic Carbon | All | NDPs: 0 Tests: 1 | | | | | | X | |
| EPH CWG (Aliphatic) GC (S) | All | NDPs: 0 Tests: 1 | | | | | X | | |
| EPH CWG (Aromatic) GC (S) | All | NDPs: 0 Tests: 1 | | | | | X | | |
| Fluoride | All | NDPs: 0 Tests: 1 | | | | | | X | |
| GRO by GC-FID (S) | All | NDPs: 0 Tests: 1 | | | | | | | X |
| Hexavalent Chromium (s) | All | NDPs: 0 Tests: 1 | | | | | X | | |
| Loss on Ignition in soils | All | NDPs: 0 Tests: 1 | | | | | X | | |
| Mercury Dissolved | All | NDPs: 0 Tests: 1 | | | | | | X | |
| Metals by iCap-OES Dissolved (W) | All | NDPs: 0 Tests: 1 | | | | | | X | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-70 | **Client Reference:** | 2793-COC11-I | **Report Number:** | 414861 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

**Results Legend**

X **Test**

N **No Determination Possible**

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

| | | | | | | |
|---|---|---|---|---|---|---|
| **Lab Sample No(s)** | | | 15740309 | | |
| **Customer Sample Reference** | | | 2793-TP112-SS14 | | |
| **AGS Reference** | | | | | |
| **Depth (m)** | | | 6.00 - 8.00 | | |
| **Container** | | | 250g Amber Jar (ALE210) | 400g Tub (ALE214) | 60g VOC (ALE215) |
| **Sample Type** | | | S | S | S |
| Metals in solid samples by OES | All | NDPs: 0 Tests: 1 | X | | |
| Mineral Oil | All | NDPs: 0 Tests: 1 | X | | |
| PAH by GCMS | All | NDPs: 0 Tests: 1 | X | | |
| PCBs by GCMS | All | NDPs: 0 Tests: 1 | X | | |
| pH | All | NDPs: 0 Tests: 1 | X | | |
| Phenols by HPLC (S) | All | NDPs: 0 Tests: 1 | X | | |
| Phenols by HPLC (W) | All | NDPs: 0 Tests: 1 | | X | |
| Sample description | All | NDPs: 0 Tests: 1 | X | | |
| Total Dissolved Solids | All | NDPs: 0 Tests: 1 | | X | |
| Total Organic Carbon | All | NDPs: 0 Tests: 1 | X | | |
| Total Sulphate | All | NDPs: 0 Tests: 1 | X | | |
| Total Sulphur | All | NDPs: 0 Tests: 1 | X | | |
| TPH CWG GC (S) | All | NDPs: 0 Tests: 1 | X | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-70 | **Client Reference:** | 2793-COC11-I | **Report Number:** | 414861 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

# Sample Descriptions

## Grain Sizes

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **very fine** | <0.063mm | **fine** | 0.063mm - 0.1mm | **medium** | 0.1mm - 2mm | **coarse** | 2mm - 10mm | **very coarse** | >10mm |

| Lab Sample No(s) | Customer Sample Ref. | Depth (m) | Colour | Description | Inclusions | Inclusions 2 |
|---|---|---|---|---|---|---|
| 15740309 | 2793-TP112-SS14 | 6.00 - 8.00 | Dark Brown | Loamy Sand | Vegetation | Stones |

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-70 | **Client Reference:** | 2793-COC11-I | **Report Number:** | 414861 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| Customer Sample Ref. | 2793-TP112-SS14 |
| Depth (m) | 6.00 - 8.00 |
| Sample Type | Soil/Solid (S) |
| Date Sampled | 15/06/2017 |
| Sampled Time | . |
| Date Received | 24/06/2017 |
| SDG Ref | 170624-70 |
| Lab Sample No.(s) | 15740309 |
| AGS Reference | |

| Component | LOD/Units | Method | |
|---|---|---|---|
| Moisture Content Ratio (% of as received sample) | % | PM024 | 6.7 |
| Loss on ignition | <0.7 % | TM018 | 1.54 M |
| Mineral oil >C10-C40 | <1 mg/kg | TM061 | 76.6 @ |
| Mineral Oil Surrogate % recovery** | % | TM061 | 80.9 @ |
| Phenol | <0.01 mg/kg | TM062 (S) | <0.01 M |
| Organic Carbon, Total | <0.2 % | TM132 | 1.01 M |
| Sulphur, Total | <0.02 % | TM132 | 0.488 |
| Sulphate, Total potential | <0.06 % | TM132 | 1.46 |
| pH | 1 pH Units | TM133 | 8.28 M |
| Chromium, Hexavalent | <0.6 mg/kg | TM151 | <0.6 # |
| Cyanide, Total | <1 mg/kg | TM153 | <1 M |
| Cyanide, Free | <1 mg/kg | TM153 | <1 M |
| PCB congener 28 | <3 µg/kg | TM168 | <3 M |
| PCB congener 52 | <3 µg/kg | TM168 | <3 M |
| PCB congener 101 | <3 µg/kg | TM168 | <3 M |
| PCB congener 118 | <3 µg/kg | TM168 | <3 M |
| PCB congener 138 | <3 µg/kg | TM168 | <3 M |
| PCB congener 153 | <3 µg/kg | TM168 | <3 M |
| PCB congener 180 | <3 µg/kg | TM168 | <3 M |
| Sum of detected PCB 7 Congeners | <21 µg/kg | TM168 | <21 |
| Antimony | <0.6 mg/kg | TM181 | 1.42 # |
| Arsenic | <0.6 mg/kg | TM181 | 9.82 M |
| Barium | <0.6 mg/kg | TM181 | 50.5 # |
| Cadmium | <0.02 mg/kg | TM181 | 1.19 M |
| Chromium | <0.9 mg/kg | TM181 | 3.85 M |
| Copper | <1.4 mg/kg | TM181 | 20.6 M |
| Iron | <1000 mg/kg | TM181 | 17300 # |
| Lead | <0.7 mg/kg | TM181 | 16.4 M |
| Manganese | <0.13 mg/kg | TM181 | 1080 M |
| Mercury | <0.14 mg/kg | TM181 | 0.373 M |
| Molybdenum | <0.1 mg/kg | TM181 | 3.23 # |
| Nickel | <0.2 mg/kg | TM181 | 28.5 M |

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-70 | **Client Reference:** | 2793-COC11-I | **Report Number:** | 414861 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| Customer Sample Ref. | 2793-TP112-SS14 |
| Depth (m) | 6.00 - 8.00 |
| Sample Type | Soil/Solid (S) |
| Date Sampled | 15/06/2017 |
| Sampled Time | - |
| Date Received | 24/06/2017 |
| SDG Ref | 170624-70 |
| Lab Sample No.(s) | 15740309 |
| AGS Reference | |

| Component | LOD/Units | Method | |
|---|---|---|---|
| Selenium | <1 mg/kg | TM181 | 1.94 # |
| Zinc | <1.9 mg/kg | TM181 | 57.7 M |
| Sulphate, Total | <48 mg/kg | TM221 | 614 M |
| Sulphide, Oxidisable | <0.03 % | TM221 | 1.4 |
| Boron, water soluble | <1 mg/kg | TM222 | <1 M |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-70 | **Client Reference:** | 2793-COC11-I | **Report Number:** | 414861 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## PAH by GCMS

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| Customer Sample Ref. | 2793-TP112-SS14 |
| Depth (m) | 6.00 - 8.00 |
| Sample Type | Soil/Solid (S) |
| Date Sampled | 15/06/2017 |
| Sampled Time | . |
| Date Received | 24/06/2017 |
| SDG Ref | 170624-70 |
| Lab Sample No.(s) | 15740309 |
| AGS Reference | |

| Component | LOD/Units | Method | | | | | |
|---|---|---|---|---|---|---|---|
| Naphthalene-d8 % recovery** | % | TM218 | 101 | | | | |
| Acenaphthene-d10 % recovery** | % | TM218 | 100 | | | | |
| Phenanthrene-d10 % recovery** | % | TM218 | 101 | | | | |
| Chrysene-d12 % recovery** | % | TM218 | 86.8 | | | | |
| Perylene-d12 % recovery** | % | TM218 | 81.8 | | | | |
| Naphthalene | <9 µg/kg | TM218 | 17.9 M | | | | |
| Acenaphthylene | <12 µg/kg | TM218 | <12 M | | | | |
| Acenaphthene | <8 µg/kg | TM218 | <8 M | | | | |
| Fluorene | <10 µg/kg | TM218 | 11.8 M | | | | |
| Phenanthrene | <15 µg/kg | TM218 | 91.2 M | | | | |
| Anthracene | <16 µg/kg | TM218 | <16 M | | | | |
| Fluoranthene | <17 µg/kg | TM218 | 51.8 M | | | | |
| Pyrene | <15 µg/kg | TM218 | 45.5 M | | | | |
| Benz(a)anthracene | <14 µg/kg | TM218 | <14 M | | | | |
| Chrysene | <10 µg/kg | TM218 | <10 M | | | | |
| Benzo(b)fluoranthene | <15 µg/kg | TM218 | 22 M | | | | |
| Benzo(k)fluoranthene | <14 µg/kg | TM218 | <14 M | | | | |
| Benzo(a)pyrene | <15 µg/kg | TM218 | <15 M | | | | |
| Indeno(1,2,3-cd)pyrene | <18 µg/kg | TM218 | <18 M | | | | |
| Dibenzo(a,h)anthracene | <23 µg/kg | TM218 | <23 M | | | | |
| Benzo(g,h,i)perylene | <24 µg/kg | TM218 | <24 M | | | | |
| Coronene | <200 µg/kg | TM218 | <200 | | | | |
| PAH, Total Detected USEPA 16 | <118 µg/kg | TM218 | 240 | | | | |
| PAH, Total Detected USEPA 16 + Coronene | <318 µg/kg | TM218 | <318 | | | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-70 | **Client Reference:** | 2793-COC11-I | **Report Number:** | 414861 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## TPH CWG (S)

**Results Legend**

| | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| Customer Sample Ref. | 2793-TP112-SS14 |
| Depth (m) | 6.00 - 8.00 |
| Sample Type | Soil/Solid (S) |
| Date Sampled | 15/06/2017 |
| Sampled Time | . |
| Date Received | 24/06/2017 |
| SDG Ref | 170624-70 |
| Lab Sample No.(s) | 15740309 |
| AGS Reference | |

| Component | LOD/Units | Method | |
|---|---|---|---|
| GRO Surrogate % recovery** | % | TM089 | 15 |
| GRO TOT (Moisture Corrected) | <44 µg/kg | TM089 | 435 M |
| Methyl tertiary butyl ether (MTBE) | <5 µg/kg | TM089 | <5 # |
| Benzene | <10 µg/kg | TM089 | <10 M |
| Toluene | <2 µg/kg | TM089 | 80.3 M |
| Ethylbenzene | <3 µg/kg | TM089 | 8.57 M |
| m,p-Xylene | <6 µg/kg | TM089 | 32.1 M |
| o-Xylene | <3 µg/kg | TM089 | 13.9 M |
| sum of detected mpo xylene by GC | <9 µg/kg | TM089 | 46 |
| sum of detected BTEX by GC | <24 µg/kg | TM089 | 135 |
| Aliphatics >C5-C6 | <10 µg/kg | TM089 | 76 |
| Aliphatics >C6-C8 | <10 µg/kg | TM089 | 157 |
| Aliphatics >C8-C10 | <10 µg/kg | TM089 | 22.5 |
| Aliphatics >C10-C12 | <10 µg/kg | TM089 | 13.9 |
| Aliphatics >C12-C16 | <100 µg/kg | TM173 | 2140 |
| Aliphatics >C16-C21 | <100 µg/kg | TM173 | 5510 |
| Aliphatics >C21-C35 | <100 µg/kg | TM173 | 54400 |
| Aliphatics >C35-C44 | <100 µg/kg | TM173 | 5430 |
| Total Aliphatics >C12-C44 | <100 µg/kg | TM173 | 67400 |
| Aromatics >EC5-EC7 | <10 µg/kg | TM089 | <10 |
| Aromatics >EC7-EC8 | <10 µg/kg | TM089 | 80.3 |
| Aromatics >EC8-EC10 | <10 µg/kg | TM089 | 69.6 |
| Aromatics >EC10-EC12 | <10 µg/kg | TM089 | <10 |
| Aromatics >EC12-EC16 | <100 µg/kg | TM173 | <100 |
| Aromatics >EC16-EC21 | <100 µg/kg | TM173 | 1660 |
| Aromatics >EC21-EC35 | <100 µg/kg | TM173 | 9240 |
| Aromatics >EC35-EC44 | <100 µg/kg | TM173 | 1650 |
| Aromatics >EC40-EC44 | <100 µg/kg | TM173 | <100 |
| Total Aromatics >EC12-EC44 | <100 µg/kg | TM173 | 12500 |
| Total Aliphatics & Aromatics >C5-C44 | <100 µg/kg | TM173 | 80400 |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-70 | **Client Reference:** | 2793-COC11-I | **Report Number:** | 414861 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Asbestos Identification - Soil

| | | Date of Analysis | Analysed By | Comments | Amosite (Brown) Asbestos | Chrysotile (White) Asbestos | Crocidolite (Blue) Asbestos | Fibrous Actinolite | Fibrous Anthophyllite | Fibrous Tremolite | Non-Asbestos Fibre |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cust. Sample Ref.<br>Depth (m)<br>Sample Type<br>Date Sampled<br>Date Receieved<br>SDG<br>Original Sample<br>Method Number | 2793-TP112-SS14<br>6.00 - 8.00<br>SOLID<br>15/06/2017<br>00:00:00<br>27/06/2017<br>11:07:30<br>170624-70<br>15740309<br>TM048 | 28/06/17 | Chris Swindells | - | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-70 | **Client Reference:** | 2793-COC11-I | **Report Number:** | 414861 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## CEN 10:1 SINGLE STAGE LEACHATE TEST

## CEN ANALYTICAL RESULTS

**REF : BS EN 12457/2**

| | | | |
|---|---|---|---|
| **Client Reference** | | **Site Location** | JJ Rhatigan, Charlemont Street, Du |
| **Mass Sample taken (kg)** | 0.096 | **Natural Moisture Content (%)** | 7.18 |
| **Mass of dry sample (kg)** | 0.090 | **Dry Matter Content (%)** | 93.3 |
| **Particle Size <4mm** | >95% | | |

| | |
|---|---|
| **Case** | |
| **SDG** | 170624-70 |
| **Lab Sample Number(s)** | 15740309 |
| **Sampled Date** | 15-Jun-2017 |
| **Customer Sample Ref.** | 2793-TP112-SS14 |
| **Depth (m)** | 6.00 - 8.00 |

| **Solid Waste Analysis** | **Result** | **Landfill Waste Acceptance Criteria Limits** | | |
|---|---|---|---|---|
| | | **Inert Waste Landfill** | **Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon (%) | 1.01 | 3 | 5 | 6 |
| Loss on Ignition (%) | 1.54 | - | - | 10 |
| Sum of BTEX (mg/kg) | 0.135 | 6 | - | - |
| Sum of 7 PCBs (mg/kg) | <0.021 | 1 | - | - |
| Mineral Oil (mg/kg) | 76.6 | 500 | - | - |
| PAH Sum of 17 (mg/kg) | <10 | 100 | - | - |
| pH (pH Units) | 8.28 | - | >6 | - |
| ANC to pH 6 (mol/kg) | - | - | - | - |
| ANC to pH 4 (mol/kg) | - | - | - | - |

| **Eluate Analysis** | **$C_2$** Conc$^n$ in 10:1 eluate (mg/l) | | **$A_2$** 10:1 conc$^n$ leached (mg/kg) | | **Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg** | | |
|---|---|---|---|---|---|---|---|
| | **Result** | **Limit of Detection** | **Result** | **Limit of Detection** | | | |
| Arsenic | <0.0005 | <0.0005 | <0.005 | <0.005 | 0.5 | 2 | 25 |
| Barium | 0.0281 | <0.0002 | 0.281 | <0.002 | 20 | 100 | 300 |
| Cadmium | <0.00008 | <0.00008 | <0.0008 | <0.0008 | 0.04 | 1 | 5 |
| Chromium | <0.001 | <0.001 | <0.01 | <0.01 | 0.5 | 10 | 70 |
| Copper | <0.0003 | <0.0003 | <0.003 | <0.003 | 2 | 50 | 100 |
| Mercury Dissolved (CVAF) | <0.00001 | <0.00001 | <0.0001 | <0.0001 | 0.01 | 0.2 | 2 |
| Molybdenum | 0.0171 | <0.0005 | 0.171 | <0.005 | 0.5 | 10 | 30 |
| Nickel | 0.00057 | <0.0004 | 0.0057 | <0.004 | 0.4 | 10 | 40 |
| Lead | <0.0002 | <0.0002 | <0.002 | <0.002 | 0.5 | 10 | 50 |
| Antimony | 0.00127 | <0.0001 | 0.0127 | <0.001 | 0.06 | 0.7 | 5 |
| Selenium | 0.0209 | <0.0005 | 0.209 | <0.005 | 0.1 | 0.5 | 7 |
| Zinc | 0.0014 | <0.001 | 0.014 | <0.01 | 4 | 50 | 200 |
| Chloride | 6 | <2 | 60 | <20 | 800 | 15000 | 25000 |
| Fluoride | <0.5 | <0.5 | <5 | <5 | 10 | 150 | 500 |
| Sulphate (soluble) | 75.5 | <2 | 755 | <20 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 174 | <5 | 1740 | <50 | 4000 | 60000 | 100000 |
| Total Monohydric Phenols (W) | <0.016 | <0.016 | <0.16 | <0.16 | 1 | - | - |
| Dissolved Organic Carbon | <3 | <3 | <30 | <30 | 500 | 800 | 1000 |

## Leach Test Information

| | |
|---|---|
| Date Prepared | 28-Jun-2017 |
| pH (pH Units) | 8.43 |
| Conductivity (µS/cm) | 216.00 |
| Temperature (ºC) | 18.00 |
| Volume Leachant (Litres) | 0.894 |

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates

04/07/2017 16:04:43

# Table of Results - Appendix

| Method No | Reference | Description | Wet/Dry Sample [1] | Surrogate Corrected |
|---|---|---|---|---|
| PM001 | | Preparation of Samples for Metals Analysis | | |
| PM024 | Modified BS 1377 | Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material | | |
| PM115 | | Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step | | |
| TM018 | BS 1377: Part 3 1990 | Determination of Loss on Ignition | | |
| TM048 | HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures | Identification of Asbestos in Bulk Material | | |
| TM061 | Method for the Determination of EPH,Massachusetts Dept.of EP, 1998 | Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40) | | |
| TM062 (S) | National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9 | Determination of Phenols in Soils by HPLC | | |
| TM089 | Modified: US EPA Methods 8020 & 602 | Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12) | | |
| TM090 | Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060 | Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water | | |
| TM104 | Method 4500F, AWWA/APHA, 20th Ed., 1999 | Determination of Fluoride using the Kone Analyser | | |
| TM123 | BS 2690: Part 121:1981 | The Determination of Total Dissolved Solids in Water | | |
| TM132 | In - house Method | ELTRA CS800 Operators Guide | | |
| TM133 | BS 1377: Part 3 1990;BS 6068-2.5 | Determination of pH in Soil and Water using the GLpH pH Meter | | |
| TM151 | Method 3500D, AWWA/APHA, 20th Ed., 1999 | Determination of Hexavalent Chromium using Kone analyser | | |
| TM152 | Method 3125B, AWWA/APHA, 20th Ed., 1999 | Analysis of Aqueous Samples by ICP-MS | | |
| TM153 | Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999 | Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser | | |
| TM168 | EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography | Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils | | |
| TM173 | Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria | Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID | | |
| TM181 | US EPA Method 6010B | Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES | | |
| TM183 | BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3 | Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry | | |
| TM184 | EPA Methods 325.1 & 325.2, | The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers | | |
| TM218 | Determination of PAH by GCMS Microwave extraction | The determination of PAH in soil samples by microwave extraction and GC-MS | | |
| TM221 | Inductively Coupled Plasma - Atomic Emission Spectroscopy. An Atlas of Spectral Information: Winge, Fassel, Peterson and Floyd | Determination of Acid extractable Sulphate in Soils by IRIS Emission Spectrometer | | |
| TM222 | In-House Method | Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer | | |
| TM228 | US EPA Method 6010B | Determination of Major Cations in Water by iCap 6500 Duo ICP-OES | | |
| TM259 | by HPLC | Determination of Phenols in Waters and Leachates by HPLC | | |

[1] Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-70 | **Client Reference:** | 2793-COC11-I | **Report Number:** | 414861 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Test Completion Dates

| | |
|---|---|
| **Lab Sample No(s)** | 15740309 |
| **Customer Sample Ref.** | 2793-TP112-SS14 |
| **AGS Ref.** | |
| **Depth** | 6.00 - 8.00 |
| **Type** | Soil/Solid (S) |
| Anions by Kone (w) | 03-Jul-2017 |
| Asbestos ID in Solid Samples | 28-Jun-2017 |
| Boron Water Soluble | 29-Jun-2017 |
| CEN 10:1 Leachate (1 Stage) | 28-Jun-2017 |
| CEN Readings | 30-Jun-2017 |
| Cyanide Comp/Free/Total/Thiocyanate | 29-Jun-2017 |
| Dissolved Metals by ICP-MS | 04-Jul-2017 |
| Dissolved Organic/Inorganic Carbon | 03-Jul-2017 |
| EPH CWG (Aliphatic) GC (S) | 29-Jun-2017 |
| EPH CWG (Aromatic) GC (S) | 29-Jun-2017 |
| Fluoride | 03-Jul-2017 |
| GRO by GC-FID (S) | 30-Jun-2017 |
| Hexavalent Chromium (s) | 29-Jun-2017 |
| Loss on Ignition in soils | 04-Jul-2017 |
| Mercury Dissolved | 04-Jul-2017 |
| Metals by iCap-OES Dissolved (W) | 04-Jul-2017 |
| Metals in solid samples by OES | 03-Jul-2017 |
| Mineral Oil | 03-Jul-2017 |
| PAH by GCMS | 30-Jun-2017 |
| PCBs by GCMS | 03-Jul-2017 |
| pH | 04-Jul-2017 |
| Phenols by HPLC (S) | 29-Jun-2017 |
| Phenols by HPLC (W) | 03-Jul-2017 |
| Sample description | 27-Jun-2017 |
| Total Dissolved Solids | 30-Jun-2017 |
| Total Organic Carbon | 30-Jun-2017 |
| Total Sulphate | 03-Jul-2017 |
| Total Sulphur | 03-Jul-2017 |
| TPH CWG GC (S) | 30-Jun-2017 |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-70 | **Client Reference:** | 2793-COC11-I | **Report Number:** | 414861 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

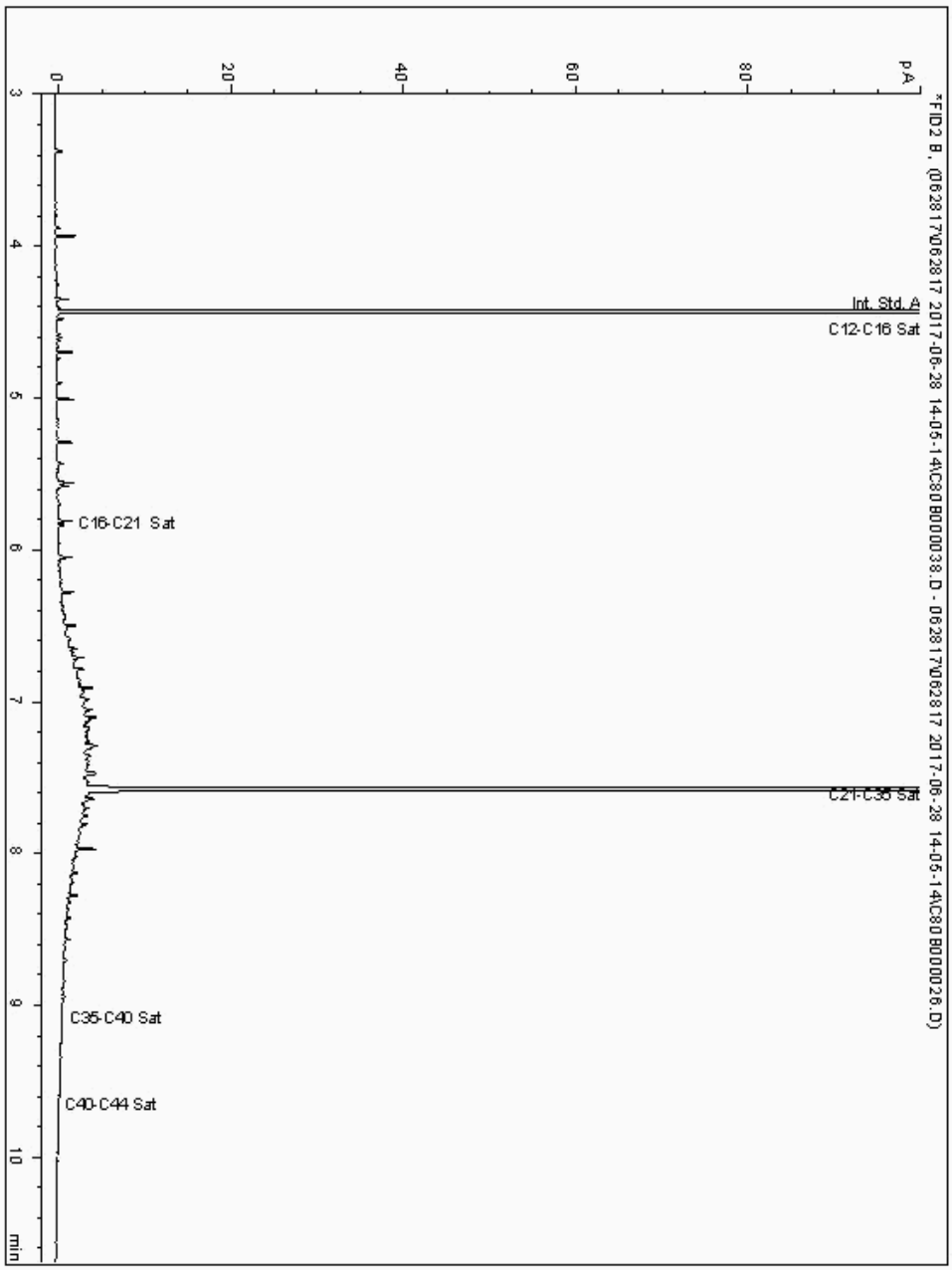
**Analysis:** EPH CWG (Aliphatic) GC (S)

**Sample No :** 15747127
**Sample ID :** 2793-TP112-SS14

**Depth :** 6.00 - 8.00

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 14737004-
Date Acquired : 29/06/17 02:38:04
Units : ppb
Dilution :
CF : 1
Multiplier : 1.000



# CERTIFICATE OF ANALYSIS

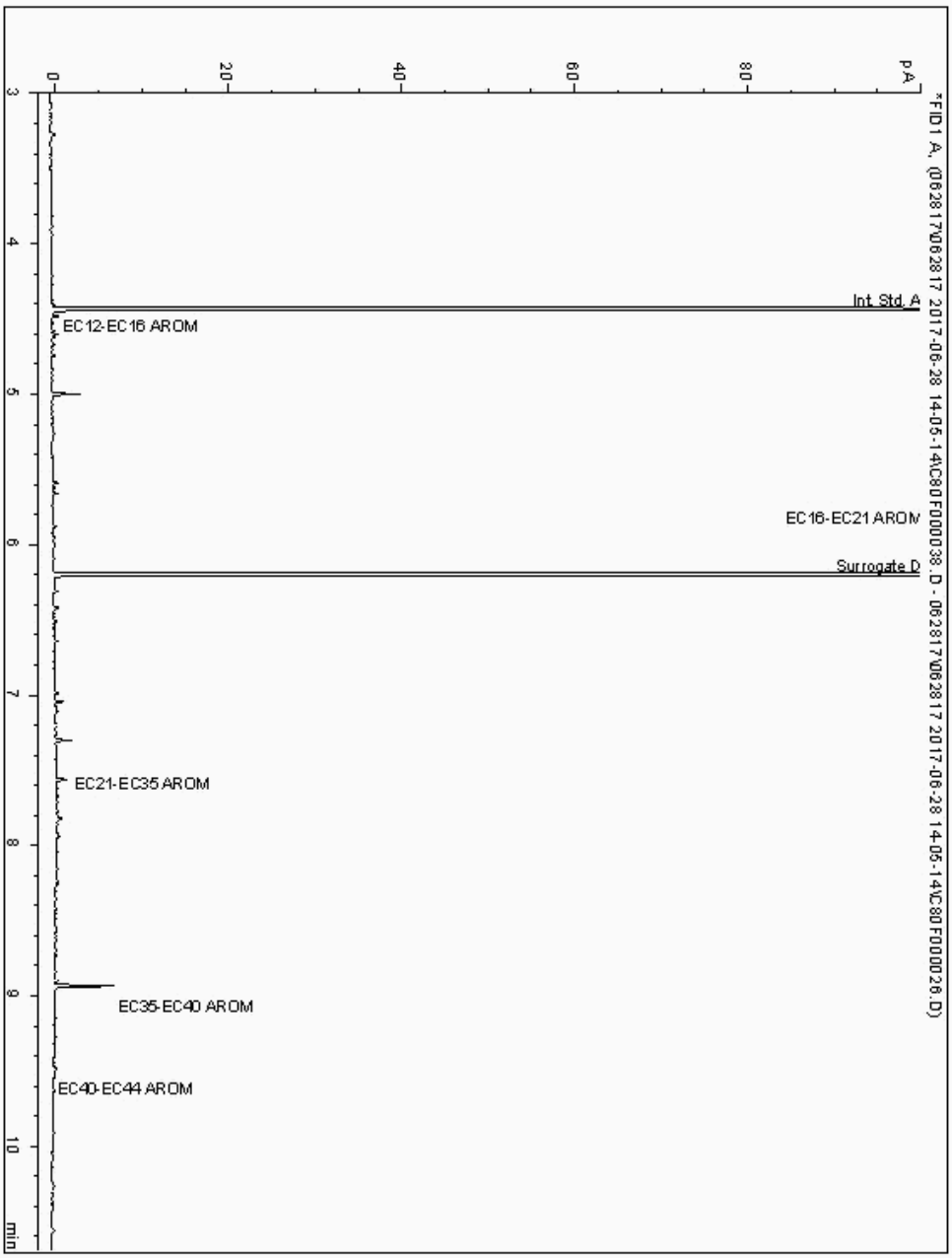
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-70 | **Client Reference:** | 2793-COC11-I | **Report Number:** | 414861 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

**Analysis:** EPH CWG (Aromatic) GC (S) **Sample No :** 15747127 **Depth :** 6.00 - 8.00
**Sample ID :** 2793-TP112-SS14

Speciated TPH - AROMS ( C12 - C44)

Sample Identity: 14737005-
Date Acquired : 29/06/17 02:38:04
Units : ppb
Dilution :
CF : 1
Multiplier : 1.000



# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-70 | **Client Reference:** | 2793-COC11-I | **Report Number:** | 414861 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

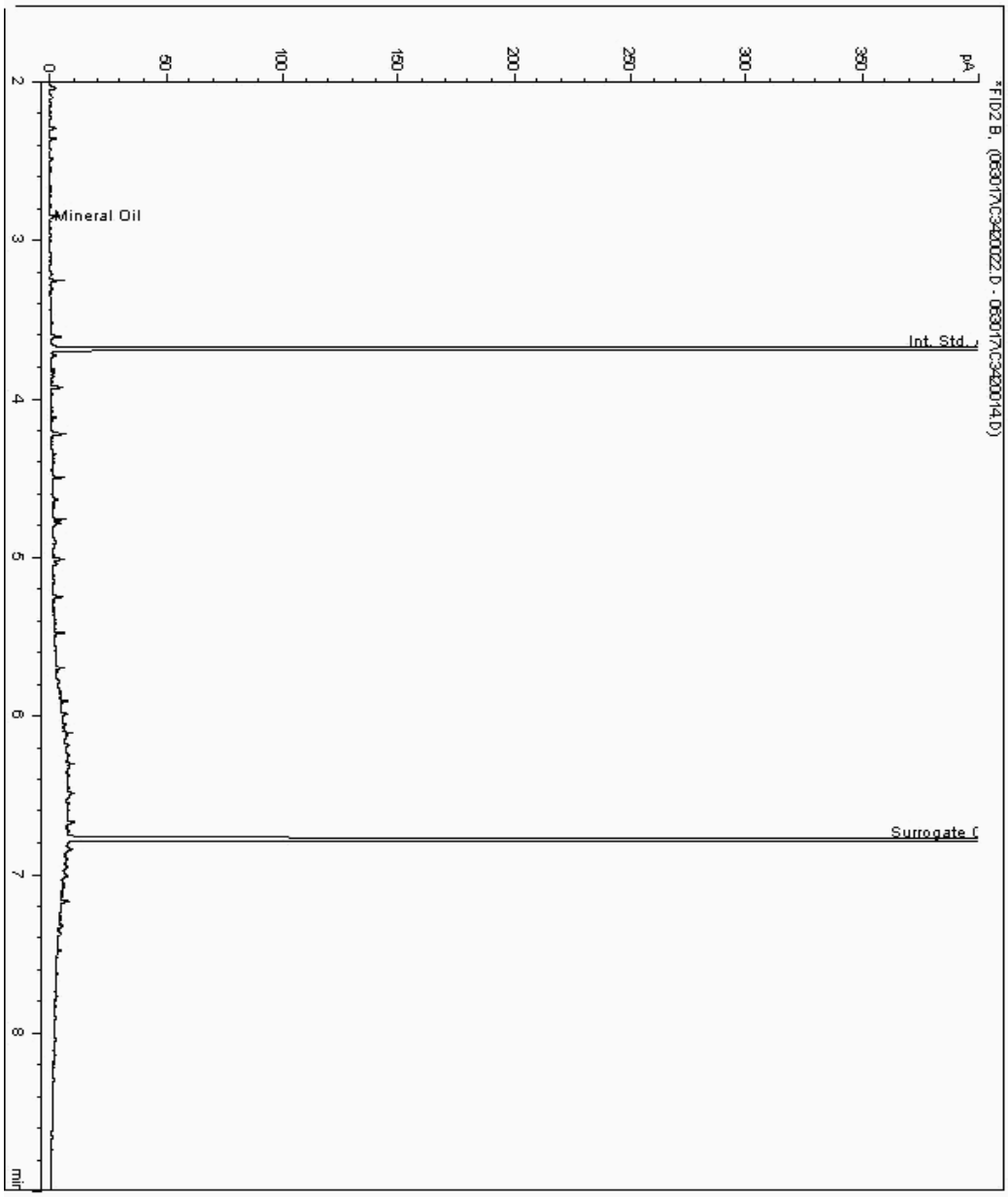
**Analysis:** Mineral Oil

**Sample No :** 15759371
**Sample ID :** 2793-TP112-SS14

**Depth :** 6.00 - 8.00

Mineral Oil Range Organics ( C10 - C40 )

Sample Identity : 14737007-
Date Acquired : 30/06/17 15:26:55 PM
Units : mg/kg
Sample Multiplier : 0.000
Dilution :



# CERTIFICATE OF ANALYSIS

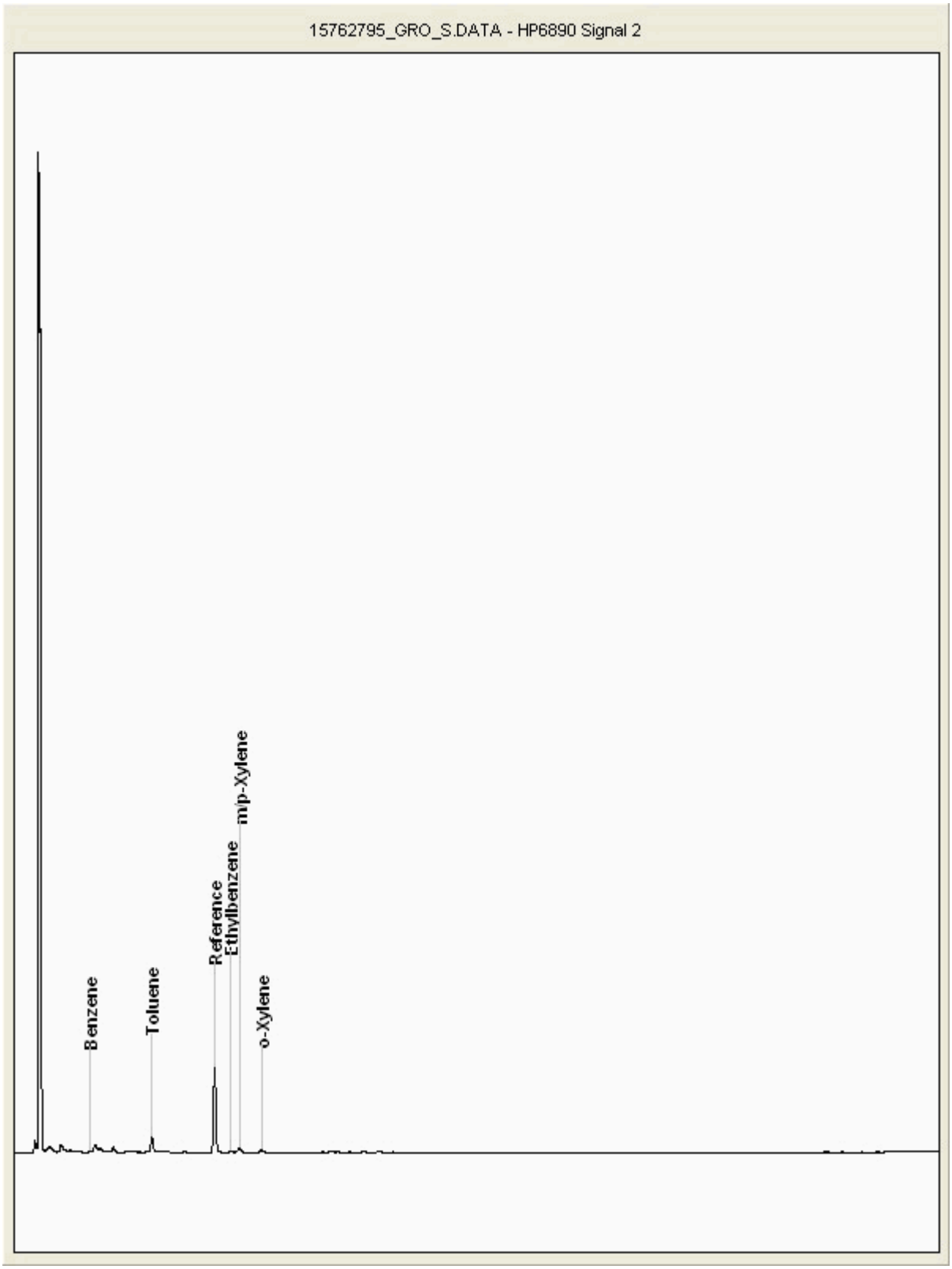
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-70 | **Client Reference:** | 2793-COC11-I | **Report Number:** | 414861 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

**Analysis:** GRO by GC-FID (S)

**Sample No :** 15762795
**Sample ID :** 2793-TP112-SS14

**Depth :** 6.00 - 8.00



# Appendix

## General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

## Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

| | |
|---|---|
| 1 | **Container with Headspace provided for volatiles analysis** |
| 2 | **Incorrect container received** |
| 3 | **Deviation from method** |
| 4 | **Holding time exceeded before sample received** |
| 5 | **Samples exceeded holding time before presevation was performed** |
| § | **Sampled on date not provided** |
| ♦ | **Sample holding time exceeded in laboratory** |
| @ | **Sample holding time exceeded due to sampled on date** |
| & | **Sample Holding Time exceeded - Late arrival of instructions.** |

## Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

| Asbestos Type | Common Name |
|---|---|
| Chrysotile | White Asbestos |
| Amosite | Brown Asbestos |
| Crocidolite | Blue Asbestos |
| Fibrous Actinolite | - |
| Fibrous Anthophyllite | - |
| Fibrous Tremolite | - |

**Visual Estimation Of Fibre Content**

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

**Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.**

**The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.**

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Minerex Environmental
Taney hall
Eglinton Terrace
Dundrum
Dublin
Dublin 14

**Attention:** Sven Klinkenbergh

# CERTIFICATE OF ANALYSIS

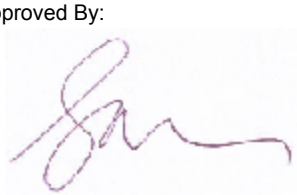
| | |
|---|---|
| **Date:** | 04 July 2017 |
| **Customer:** | D_MINEREX_DUB |
| **Sample Delivery Group (SDG):** | 170624-60 |
| **Your Reference:** | 2793-COC11-J |
| **Location:** | JJ Rhatigan, Charlemont Street, Dublin 2 |
| **Report No:** | 414858 |

We received 1 sample on Saturday June 24, 2017 and 1 of these samples were scheduled for analysis which was completed on Tuesday July 04, 2017. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

Approved By:



**Sonia McWhan**

Operations Manager

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-60 | **Client Reference:** | 2793-COC11-J | **Report Number:** | 414858 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Received Sample Overview

| Lab Sample No(s) | Customer Sample Ref. | AGS Ref. | Depth (m) | Sampled Date |
|---|---|---|---|---|
| 15740078 | 2793-ST1-SS12 | | 5.00 - 8.00 | 13/06/2017 |

**Maximum Sample/Coolbox Temperature (°C) :** **19**

**ISO5667-3 Water quality - Sampling - Part3 -**
During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

**Only received samples which have had analysis scheduled will be shown on the following pages.**

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-60 | **Client Reference:** | 2793-COC11-J | **Report Number:** | 414858 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

**Results Legend**

X **Test**

N **No Determination Possible**

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

| | | | Lab Sample No(s) | Customer Sample Reference | AGS Reference | Depth (m) | Container | Sample Type |
|---|---|---|---|---|---|---|---|---|
| | | | 15740078 | 2793-ST1-SS12 | | 5.00 - 8.00 | 250g Amber Jar (ALE210) / 400g Tub (ALE214) / 60g VOC (ALE215) | S / S / S |
| Anions by Kone (w) | All | NDPs: 0 Tests: 1 | | X | | | | |
| Asbestos ID in Solid Samples | All | NDPs: 0 Tests: 1 | | X | | | | |
| Boron Water Soluble | All | NDPs: 0 Tests: 1 | X | | | | | |
| CEN Readings | All | NDPs: 0 Tests: 1 | | X | | | | |
| Cyanide Comp/Free/Total/Thiocyanate | All | NDPs: 0 Tests: 1 | X | | | | | |
| Dissolved Metals by ICP-MS | All | NDPs: 0 Tests: 1 | | X | | | | |
| Dissolved Organic/Inorganic Carbon | All | NDPs: 0 Tests: 1 | | X | | | | |
| EPH CWG (Aliphatic) GC (S) | All | NDPs: 0 Tests: 1 | X | | | | | |
| EPH CWG (Aromatic) GC (S) | All | NDPs: 0 Tests: 1 | X | | | | | |
| Fluoride | All | NDPs: 0 Tests: 1 | | X | | | | |
| GRO by GC-FID (S) | All | NDPs: 0 Tests: 1 | | | X | | | |
| Hexavalent Chromium (s) | All | NDPs: 0 Tests: 1 | X | | | | | |
| Loss on Ignition in soils | All | NDPs: 0 Tests: 1 | X | | | | | |
| Mercury Dissolved | All | NDPs: 0 Tests: 1 | | X | | | | |
| Metals by iCap-OES Dissolved (W) | All | NDPs: 0 Tests: 1 | | X | | | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-60 | **Client Reference:** | 2793-COC11-J | **Report Number:** | 414858 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

**Results Legend**

X **Test**

N **No Determination Possible**

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

| | | | | | | |
|---|---|---|---|---|---|---|
| **Lab Sample No(s)** | | | 15740078 | | | |
| **Customer Sample Reference** | | | 2793-ST1-SS12 | | | |
| **AGS Reference** | | | | | | |
| **Depth (m)** | | | 5.00 - 8.00 | | | |
| **Container** | | | 250g Amber Jar (ALE210) | 400g Tub (ALE214) | 60g VOC (ALE215) | |
| **Sample Type** | | | S | S | S | |
| Metals in solid samples by OES | All | NDPs: 0 Tests: 1 | X | | | |
| Mineral Oil | All | NDPs: 0 Tests: 1 | X | | | |
| PAH by GCMS | All | NDPs: 0 Tests: 1 | X | | | |
| PCBs by GCMS | All | NDPs: 0 Tests: 1 | X | | | |
| pH | All | NDPs: 0 Tests: 1 | X | | | |
| Phenols by HPLC (S) | All | NDPs: 0 Tests: 1 | X | | | |
| Phenols by HPLC (W) | All | NDPs: 0 Tests: 1 | | X | | |
| Sample description | All | NDPs: 0 Tests: 1 | X | | | |
| Total Dissolved Solids | All | NDPs: 0 Tests: 1 | | X | | |
| Total Organic Carbon | All | NDPs: 0 Tests: 1 | X | | | |
| Total Sulphate | All | NDPs: 0 Tests: 1 | X | | | |
| Total Sulphur | All | NDPs: 0 Tests: 1 | X | | | |
| TPH CWG GC (S) | All | NDPs: 0 Tests: 1 | X | | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-60 | **Client Reference:** | 2793-COC11-J | **Report Number:** | 414858 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

# Sample Descriptions

## Grain Sizes

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **very fine** | <0.063mm | **fine** | 0.063mm - 0.1mm | **medium** | 0.1mm - 2mm | **coarse** | 2mm - 10mm | **very coarse** | >10mm |

| Lab Sample No(s) | Customer Sample Ref. | Depth (m) | Colour | Description | Inclusions | Inclusions 2 |
|---|---|---|---|---|---|---|
| 15740078 | 2793-ST1-SS12 | 5.00 - 8.00 | Dark Brown | Loamy Sand | Crushed Brick | Stones |

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-60 | **Client Reference:** | 2793-COC11-J | **Report Number:** | 414858 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| Customer Sample Ref. | 2793-ST1-SS12 |
| Depth (m) | 5.00 - 8.00 |
| Sample Type | Soil/Solid (S) |
| Date Sampled | 13/06/2017 |
| Sampled Time | . |
| Date Received | 24/06/2017 |
| SDG Ref | 170624-60 |
| Lab Sample No.(s) | 15740078 |
| AGS Reference | |

| Component | LOD/Units | Method | |
|---|---|---|---|
| Moisture Content Ratio (% of as received sample) | % | PM024 | 5.1 |
| Loss on ignition | <0.7 % | TM018 | 2.29 M |
| Mineral oil >C10-C40 | <1 mg/kg | TM061 | 68.2 @ |
| Mineral Oil Surrogate % recovery** | % | TM061 | 83.3 @ |
| Phenol | <0.01 mg/kg | TM062 (S) | <0.01 @ M |
| Organic Carbon, Total | <0.2 % | TM132 | 0.616 M |
| Sulphur, Total | <0.02 % | TM132 | 0.558 |
| Sulphate, Total potential | <0.06 % | TM132 | 1.67 |
| pH | 1 pH Units | TM133 | 8.12 M |
| Chromium, Hexavalent | <0.6 mg/kg | TM151 | <0.6 # |
| Cyanide, Total | <1 mg/kg | TM153 | <1 @ M |
| Cyanide, Free | <1 mg/kg | TM153 | <1 @ M |
| PCB congener 28 | <3 µg/kg | TM168 | <3 M |
| PCB congener 52 | <3 µg/kg | TM168 | <3 M |
| PCB congener 101 | <3 µg/kg | TM168 | <3 M |
| PCB congener 118 | <3 µg/kg | TM168 | <3 M |
| PCB congener 138 | <3 µg/kg | TM168 | <3 M |
| PCB congener 153 | <3 µg/kg | TM168 | <3 M |
| PCB congener 180 | <3 µg/kg | TM168 | <3 M |
| Sum of detected PCB 7 Congeners | <21 µg/kg | TM168 | <21 |
| Antimony | <0.6 mg/kg | TM181 | 1.57 # |
| Arsenic | <0.6 mg/kg | TM181 | 8.28 M |
| Barium | <0.6 mg/kg | TM181 | 56.1 # |
| Cadmium | <0.02 mg/kg | TM181 | 1.76 M |
| Chromium | <0.9 mg/kg | TM181 | 5.85 M |
| Copper | <1.4 mg/kg | TM181 | 21.9 M |
| Iron | <1000 mg/kg | TM181 | 14600 # |
| Lead | <0.7 mg/kg | TM181 | 12.8 M |
| Manganese | <0.13 mg/kg | TM181 | 894 M |
| Mercury | <0.14 mg/kg | TM181 | 0.361 M |
| Molybdenum | <0.1 mg/kg | TM181 | 3.02 # |
| Nickel | <0.2 mg/kg | TM181 | 31.5 M |

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-60 | **Client Reference:** | 2793-COC11-J | **Report Number:** | 414858 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Customer Sample Ref.** | 2793-ST1-SS12 | | | | | | | |
| **Depth (m)** | 5.00 - 8.00 | | | | | | | |
| **Sample Type** | Soil/Solid (S) | | | | | | | |
| **Date Sampled** | 13/06/2017 | | | | | | | |
| **Sampled Time** | - | | | | | | | |
| **Date Received** | 24/06/2017 | | | | | | | |
| **SDG Ref** | 170624-60 | | | | | | | |
| **Lab Sample No.(s)** | 15740078 | | | | | | | |
| **AGS Reference** | | | | | | | | |
| **Component** | **LOD/Units** | **Method** | | | | | | |
| Selenium | <1 mg/kg | TM181 | 1.49 # | | | | | |
| Zinc | <1.9 mg/kg | TM181 | 98.9 M | | | | | |
| Sulphate, Total | <48 mg/kg | TM221 | 1230 M | | | | | |
| Sulphide, Oxidisable | <0.03 % | TM221 | 1.55 | | | | | |
| Boron, water soluble | <1 mg/kg | TM222 | <1 M | | | | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-60 | **Client Reference:** | 2793-COC11-J | **Report Number:** | 414858 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## PAH by GCMS

**Results Legend**

| | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| **Customer Sample Ref.** | 2793-ST1-SS12 |
| **Depth (m)** | 5.00 - 8.00 |
| **Sample Type** | Soil/Solid (S) |
| **Date Sampled** | 13/06/2017 |
| **Sampled Time** | . |
| **Date Received** | 24/06/2017 |
| **SDG Ref** | 170624-60 |
| **Lab Sample No.(s)** | 15740078 |
| **AGS Reference** | |

| Component | LOD/Units | Method | | | | | |
|---|---|---|---|---|---|---|---|
| Naphthalene-d8 % recovery** | % | TM218 | 100 | | | | |
| Acenaphthene-d10 % recovery** | % | TM218 | 101 | | | | |
| Phenanthrene-d10 % recovery** | % | TM218 | 98.6 | | | | |
| Chrysene-d12 % recovery** | % | TM218 | 92 | | | | |
| Perylene-d12 % recovery** | % | TM218 | 98.5 | | | | |
| Naphthalene | <9 µg/kg | TM218 | 19.3 M | | | | |
| Acenaphthylene | <12 µg/kg | TM218 | <12 M | | | | |
| Acenaphthene | <8 µg/kg | TM218 | <8 M | | | | |
| Fluorene | <10 µg/kg | TM218 | 20 M | | | | |
| Phenanthrene | <15 µg/kg | TM218 | 64 M | | | | |
| Anthracene | <16 µg/kg | TM218 | <16 M | | | | |
| Fluoranthene | <17 µg/kg | TM218 | <17 M | | | | |
| Pyrene | <15 µg/kg | TM218 | <15 M | | | | |
| Benz(a)anthracene | <14 µg/kg | TM218 | 21.4 M | | | | |
| Chrysene | <10 µg/kg | TM218 | 14.7 M | | | | |
| Benzo(b)fluoranthene | <15 µg/kg | TM218 | 17.4 M | | | | |
| Benzo(k)fluoranthene | <14 µg/kg | TM218 | <14 M | | | | |
| Benzo(a)pyrene | <15 µg/kg | TM218 | <15 M | | | | |
| Indeno(1,2,3-cd)pyrene | <18 µg/kg | TM218 | <18 M | | | | |
| Dibenzo(a,h)anthracene | <23 µg/kg | TM218 | <23 M | | | | |
| Benzo(g,h,i)perylene | <24 µg/kg | TM218 | <24 M | | | | |
| Coronene | <200 µg/kg | TM218 | <200 | | | | |
| PAH, Total Detected USEPA 16 | <118 µg/kg | TM218 | 157 | | | | |
| PAH, Total Detected USEPA 16 + Coronene | <318 µg/kg | TM218 | <318 | | | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-60 | **Client Reference:** | 2793-COC11-J | **Report Number:** | 414858 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## TPH CWG (S)

**Results Legend**

| | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| Customer Sample Ref. | 2793-ST1-SS12 |
| Depth (m) | 5.00 - 8.00 |
| Sample Type | Soil/Solid (S) |
| Date Sampled | 13/06/2017 |
| Sampled Time | . |
| Date Received | 24/06/2017 |
| SDG Ref | 170624-60 |
| Lab Sample No.(s) | 15740078 |
| AGS Reference | |

| Component | LOD/Units | Method | |
|---|---|---|---|
| GRO Surrogate % recovery** | % | TM089 | 7 @ |
| GRO TOT (Moisture Corrected) | <44 µg/kg | TM089 | <44 @ M |
| Methyl tertiary butyl ether (MTBE) | <5 µg/kg | TM089 | <5 @ # |
| Benzene | <10 µg/kg | TM089 | <10 @ M |
| Toluene | <2 µg/kg | TM089 | 2.11 @ M |
| Ethylbenzene | <3 µg/kg | TM089 | <3 @ M |
| m,p-Xylene | <6 µg/kg | TM089 | <6 @ M |
| o-Xylene | <3 µg/kg | TM089 | <3 @ M |
| sum of detected mpo xylene by GC | <9 µg/kg | TM089 | <9 @ |
| sum of detected BTEX by GC | <24 µg/kg | TM089 | <24 @ |
| Aliphatics >C5-C6 | <10 µg/kg | TM089 | <10 @ |
| Aliphatics >C6-C8 | <10 µg/kg | TM089 | <10 @ |
| Aliphatics >C8-C10 | <10 µg/kg | TM089 | <10 @ |
| Aliphatics >C10-C12 | <10 µg/kg | TM089 | <10 @ |
| Aliphatics >C12-C16 | <100 µg/kg | TM173 | 3510 |
| Aliphatics >C16-C21 | <100 µg/kg | TM173 | 4510 |
| Aliphatics >C21-C35 | <100 µg/kg | TM173 | 15800 |
| Aliphatics >C35-C44 | <100 µg/kg | TM173 | 3070 |
| Total Aliphatics >C12-C44 | <100 µg/kg | TM173 | 26900 |
| Aromatics >EC5-EC7 | <10 µg/kg | TM089 | <10 @ |
| Aromatics >EC7-EC8 | <10 µg/kg | TM089 | <10 @ |
| Aromatics >EC8-EC10 | <10 µg/kg | TM089 | <10 @ |
| Aromatics >EC10-EC12 | <10 µg/kg | TM089 | <10 @ |
| Aromatics >EC12-EC16 | <100 µg/kg | TM173 | 1090 |
| Aromatics >EC16-EC21 | <100 µg/kg | TM173 | 2130 |
| Aromatics >EC21-EC35 | <100 µg/kg | TM173 | 6990 |
| Aromatics >EC35-EC44 | <100 µg/kg | TM173 | 1290 |
| Aromatics >EC40-EC44 | <100 µg/kg | TM173 | <100 |
| Total Aromatics >EC12-EC44 | <100 µg/kg | TM173 | 11500 |
| Total Aliphatics & Aromatics >C5-C44 | <100 µg/kg | TM173 | 38400 |
| | | | |
| | | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-60 | **Client Reference:** | 2793-COC11-J | **Report Number:** | 414858 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Asbestos Identification - Soil

| | | Date of Analysis | Analysed By | Comments | Amosite (Brown) Asbestos | Chrysotile (White) Asbestos | Crocidolite (Blue) Asbestos | Fibrous Actinolite | Fibrous Anthophyllite | Fibrous Tremolite | Non-Asbestos Fibre |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cust. Sample Ref.<br>Depth (m)<br>Sample Type<br>Date Sampled<br>Date Receieved<br>SDG<br>Original Sample<br>Method Number | 2793-ST1-SS12<br>5.00 - 8.00<br>SOLID<br>13/06/2017<br>00:00:00<br>27/06/2017<br>07:12:48<br>170624-60<br>15740078<br>TM048 | 28/06/17 | Chris Swindells | - | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-60 | **Client Reference:** | 2793-COC11-J | **Report Number:** | 414858 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## CEN 10:1 SINGLE STAGE LEACHATE TEST

## CEN ANALYTICAL RESULTS

**REF : BS EN 12457/2**

| | | | |
|---|---|---|---|
| **Client Reference** | | **Site Location** | JJ Rhatigan, Charlemont Street, Du |
| **Mass Sample taken (kg)** | 0.095 | **Natural Moisture Content (%)** | 5.37 |
| **Mass of dry sample (kg)** | 0.090 | **Dry Matter Content (%)** | 94.9 |
| **Particle Size <4mm** | >95% | | |

| | |
|---|---|
| **Case** | |
| **SDG** | 170624-60 |
| **Lab Sample Number(s)** | 15740078 |
| **Sampled Date** | 13-Jun-2017 |
| **Customer Sample Ref.** | 2793-ST1-SS12 |
| **Depth (m)** | 5.00 - 8.00 |

| **Solid Waste Analysis** | **Result** | **Landfill Waste Acceptance Criteria Limits** | | |
|---|---|---|---|---|
| | | **Inert Waste Landfill** | **Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon (%) | 0.616 | 3 | 5 | 6 |
| Loss on Ignition (%) | 2.29 | - | - | 10 |
| Sum of BTEX (mg/kg) | <0.024 | 6 | - | - |
| Sum of 7 PCBs (mg/kg) | <0.021 | 1 | - | - |
| Mineral Oil (mg/kg) | 68.2 | 500 | - | - |
| PAH Sum of 17 (mg/kg) | <10 | 100 | - | - |
| pH (pH Units) | 8.12 | - | >6 | - |
| ANC to pH 6 (mol/kg) | - | - | - | - |
| ANC to pH 4 (mol/kg) | - | - | - | - |

| **Eluate Analysis** | **$C_2$** Conc$^n$ in 10:1 eluate (mg/l) | | **$A_2$** 10:1 conc$^n$ leached (mg/kg) | | **Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg** | | |
|---|---|---|---|---|---|---|---|
| | **Result** | **Limit of Detection** | **Result** | **Limit of Detection** | | | |
| Arsenic | <0.0005 | <0.0005 | <0.005 | <0.005 | 0.5 | 2 | 25 |
| Barium | 0.0331 | <0.0002 | 0.331 | <0.002 | 20 | 100 | 300 |
| Cadmium | <0.00008 | <0.00008 | <0.0008 | <0.0008 | 0.04 | 1 | 5 |
| Chromium | <0.001 | <0.001 | <0.01 | <0.01 | 0.5 | 10 | 70 |
| Copper | <0.0003 | <0.0003 | <0.003 | <0.003 | 2 | 50 | 100 |
| Mercury Dissolved (CVAF) | <0.00001 | <0.00001 | <0.0001 | <0.0001 | 0.01 | 0.2 | 2 |
| Molybdenum | 0.0226 | <0.0005 | 0.226 | <0.005 | 0.5 | 10 | 30 |
| Nickel | 0.00056 | <0.0004 | 0.0056 | <0.004 | 0.4 | 10 | 40 |
| Lead | 0.00781 | <0.0002 | 0.0781 | <0.002 | 0.5 | 10 | 50 |
| Antimony | 0.00109 | <0.0001 | 0.0109 | <0.001 | 0.06 | 0.7 | 5 |
| Selenium | 0.0354 | <0.0005 | 0.354 | <0.005 | 0.1 | 0.5 | 7 |
| Zinc | 0.00368 | <0.001 | 0.0368 | <0.01 | 4 | 50 | 200 |
| Chloride | 20.9 | <2 | 209 | <20 | 800 | 15000 | 25000 |
| Fluoride | <0.5 | <0.5 | <5 | <5 | 10 | 150 | 500 |
| Sulphate (soluble) | 66.8 | <2 | 668 | <20 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 181 | <5 | 1810 | <50 | 4000 | 60000 | 100000 |
| Total Monohydric Phenols (W) | <0.016 | <0.016 | <0.16 | <0.16 | 1 | - | - |
| Dissolved Organic Carbon | <3 | <3 | <30 | <30 | 500 | 800 | 1000 |

## Leach Test Information

| | |
|---|---|
| Date Prepared | 28-Jun-2017 |
| pH (pH Units) | 8.62 |
| Conductivity (µS/cm) | 226.00 |
| Temperature (°C) | 18.30 |
| Volume Leachant (Litres) | 0.895 |

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates

04/07/2017 16:03:17

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-60 | **Client Reference:** | 2793-COC11-J | **Report Number:** | 414858 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Table of Results - Appendix

| Method No | Reference | Description | Wet/Dry Sample [1] | Surrogate Corrected |
|---|---|---|---|---|
| PM001 | | Preparation of Samples for Metals Analysis | | |
| PM024 | Modified BS 1377 | Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material | | |
| PM115 | | Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step | | |
| TM018 | BS 1377: Part 3 1990 | Determination of Loss on Ignition | | |
| TM048 | HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures | Identification of Asbestos in Bulk Material | | |
| TM061 | Method for the Determination of EPH,Massachusetts Dept.of EP, 1998 | Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40) | | |
| TM062 (S) | National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9 | Determination of Phenols in Soils by HPLC | | |
| TM089 | Modified: US EPA Methods 8020 & 602 | Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12) | | |
| TM090 | Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060 | Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water | | |
| TM104 | Method 4500F, AWWA/APHA, 20th Ed., 1999 | Determination of Fluoride using the Kone Analyser | | |
| TM123 | BS 2690: Part 121:1981 | The Determination of Total Dissolved Solids in Water | | |
| TM132 | In - house Method | ELTRA CS800 Operators Guide | | |
| TM133 | BS 1377: Part 3 1990;BS 6068-2.5 | Determination of pH in Soil and Water using the GLpH pH Meter | | |
| TM151 | Method 3500D, AWWA/APHA, 20th Ed., 1999 | Determination of Hexavalent Chromium using Kone analyser | | |
| TM152 | Method 3125B, AWWA/APHA, 20th Ed., 1999 | Analysis of Aqueous Samples by ICP-MS | | |
| TM153 | Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999 | Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser | | |
| TM168 | EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography | Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils | | |
| TM173 | Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria | Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID | | |
| TM181 | US EPA Method 6010B | Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES | | |
| TM183 | BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3 | Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry | | |
| TM184 | EPA Methods 325.1 & 325.2, | The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers | | |
| TM218 | Determination of PAH by GCMS Microwave extraction | The determination of PAH in soil samples by microwave extraction and GC-MS | | |
| TM221 | Inductively Coupled Plasma - Atomic Emission Spectroscopy. An Atlas of Spectral Information: Winge, Fassel, Peterson and Floyd | Determination of Acid extractable Sulphate in Soils by IRIS Emission Spectrometer | | |
| TM222 | In-House Method | Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer | | |
| TM228 | US EPA Method 6010B | Determination of Major Cations in Water by iCap 6500 Duo ICP-OES | | |
| TM259 | by HPLC | Determination of Phenols in Waters and Leachates by HPLC | | |

[1] Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-60 | **Client Reference:** | 2793-COC11-J | **Report Number:** | 414858 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Test Completion Dates

| | |
|---|---|
| **Lab Sample No(s)** | 15740078 |
| **Customer Sample Ref.** | 2793-ST1-SS12 |
| **AGS Ref.** | |
| **Depth** | 5.00 - 8.00 |
| **Type** | Soil/Solid (S) |
| Anions by Kone (w) | 03-Jul-2017 |
| Asbestos ID in Solid Samples | 28-Jun-2017 |
| Boron Water Soluble | 29-Jun-2017 |
| CEN 10:1 Leachate (1 Stage) | 28-Jun-2017 |
| CEN Readings | 30-Jun-2017 |
| Cyanide Comp/Free/Total/Thiocyanate | 29-Jun-2017 |
| Dissolved Metals by ICP-MS | 04-Jul-2017 |
| Dissolved Organic/Inorganic Carbon | 03-Jul-2017 |
| EPH CWG (Aliphatic) GC (S) | 29-Jun-2017 |
| EPH CWG (Aromatic) GC (S) | 29-Jun-2017 |
| Fluoride | 03-Jul-2017 |
| GRO by GC-FID (S) | 04-Jul-2017 |
| Hexavalent Chromium (s) | 29-Jun-2017 |
| Loss on Ignition in soils | 04-Jul-2017 |
| Mercury Dissolved | 04-Jul-2017 |
| Metals by iCap-OES Dissolved (W) | 04-Jul-2017 |
| Metals in solid samples by OES | 03-Jul-2017 |
| Mineral Oil | 03-Jul-2017 |
| PAH by GCMS | 30-Jun-2017 |
| PCBs by GCMS | 03-Jul-2017 |
| pH | 04-Jul-2017 |
| Phenols by HPLC (S) | 29-Jun-2017 |
| Phenols by HPLC (W) | 03-Jul-2017 |
| Sample description | 27-Jun-2017 |
| Total Dissolved Solids | 30-Jun-2017 |
| Total Organic Carbon | 30-Jun-2017 |
| Total Sulphate | 03-Jul-2017 |
| Total Sulphur | 03-Jul-2017 |
| TPH CWG GC (S) | 04-Jul-2017 |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-60 | **Client Reference:** | 2793-COC11-J | **Report Number:** | 414858 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

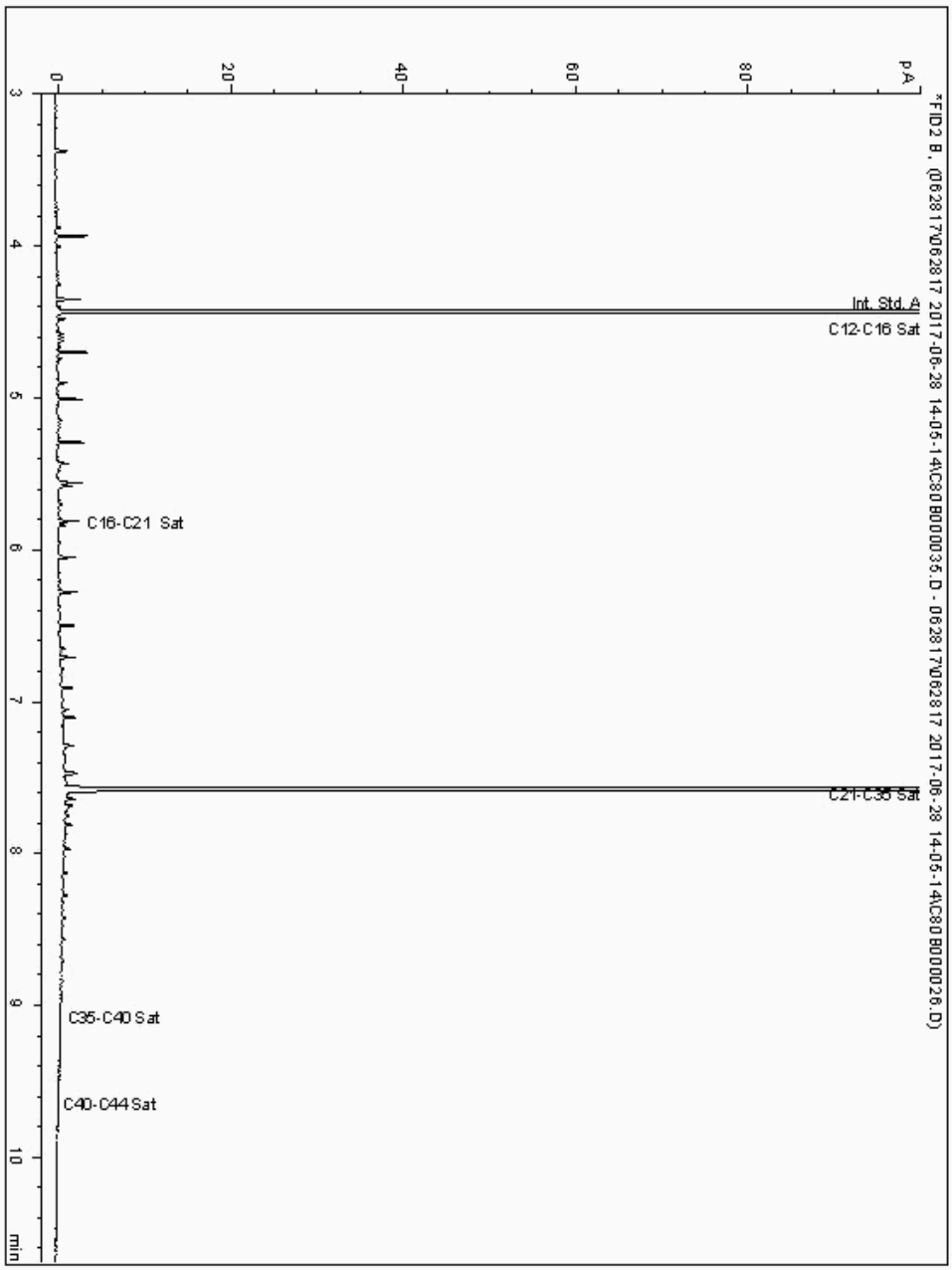
**Analysis:** EPH CWG (Aliphatic) GC (S)

**Sample No :** 15745508
**Sample ID :** 2793-ST1-SS12

**Depth :** 5.00 - 8.00

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 14737173-
Date Acquired : 29/06/17 01:35:42
Units : ppb
Dilution :
CF : 1
Multiplier : 1.020



# CERTIFICATE OF ANALYSIS

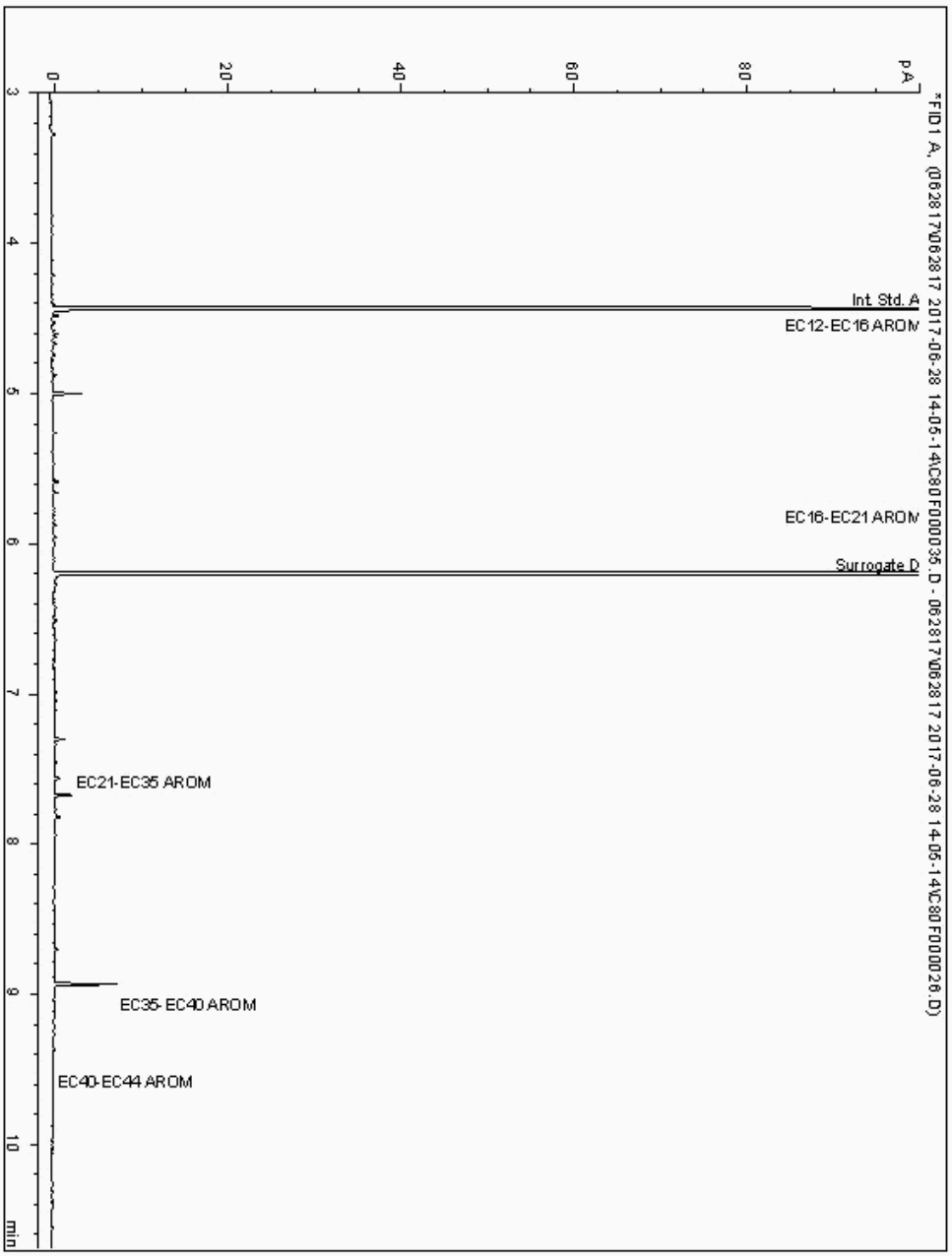
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-60 | **Client Reference:** | 2793-COC11-J | **Report Number:** | 414858 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

**Analysis:** EPH CWG (Aromatic) GC (S) **Sample No :** 15745508 **Depth :** 5.00 - 8.00
**Sample ID :** 2793-ST1-SS12

Speciated TPH - AROMS ( C12 - C44)

Sample Identity: 14737174-
Date Acquired : 29/06/17 01:35:42
Units : ppb
Dilution :
CF : 1
Multiplier : 1.020



# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-60 | **Client Reference:** | 2793-COC11-J | **Report Number:** | 414858 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

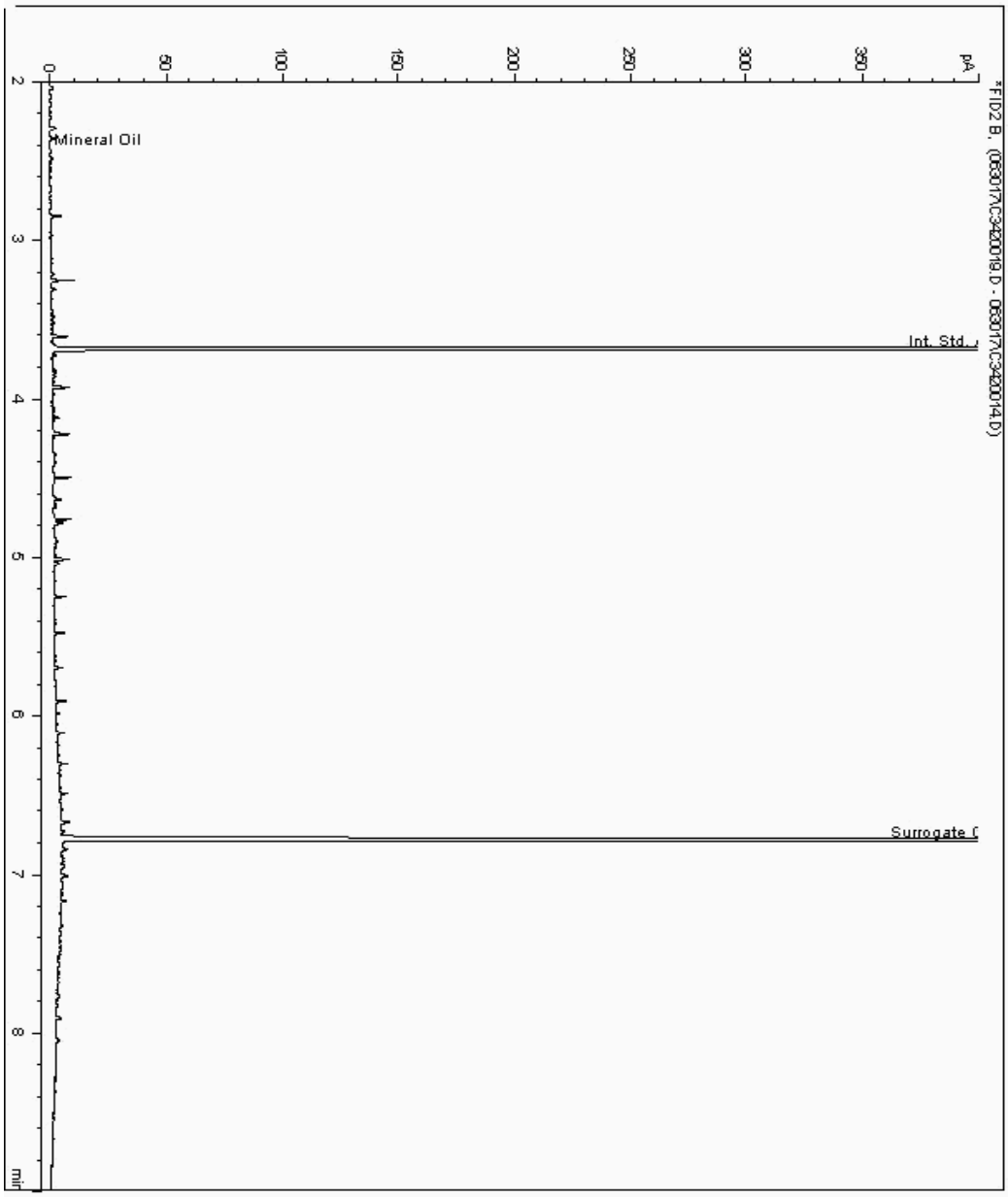
**Analysis:** Mineral Oil

**Sample No :** 15759748
**Sample ID :** 2793-ST1-SS12

**Depth :** 5.00 - 8.00

Mineral Oil Range Organics ( C10 - C40 )

Sample Identity : 14737176-
Date Acquired : 30/06/17 14:20:34 PM
Units : mg/kg
Sample Multiplier : 0.000
Dilution :



# CERTIFICATE OF ANALYSIS

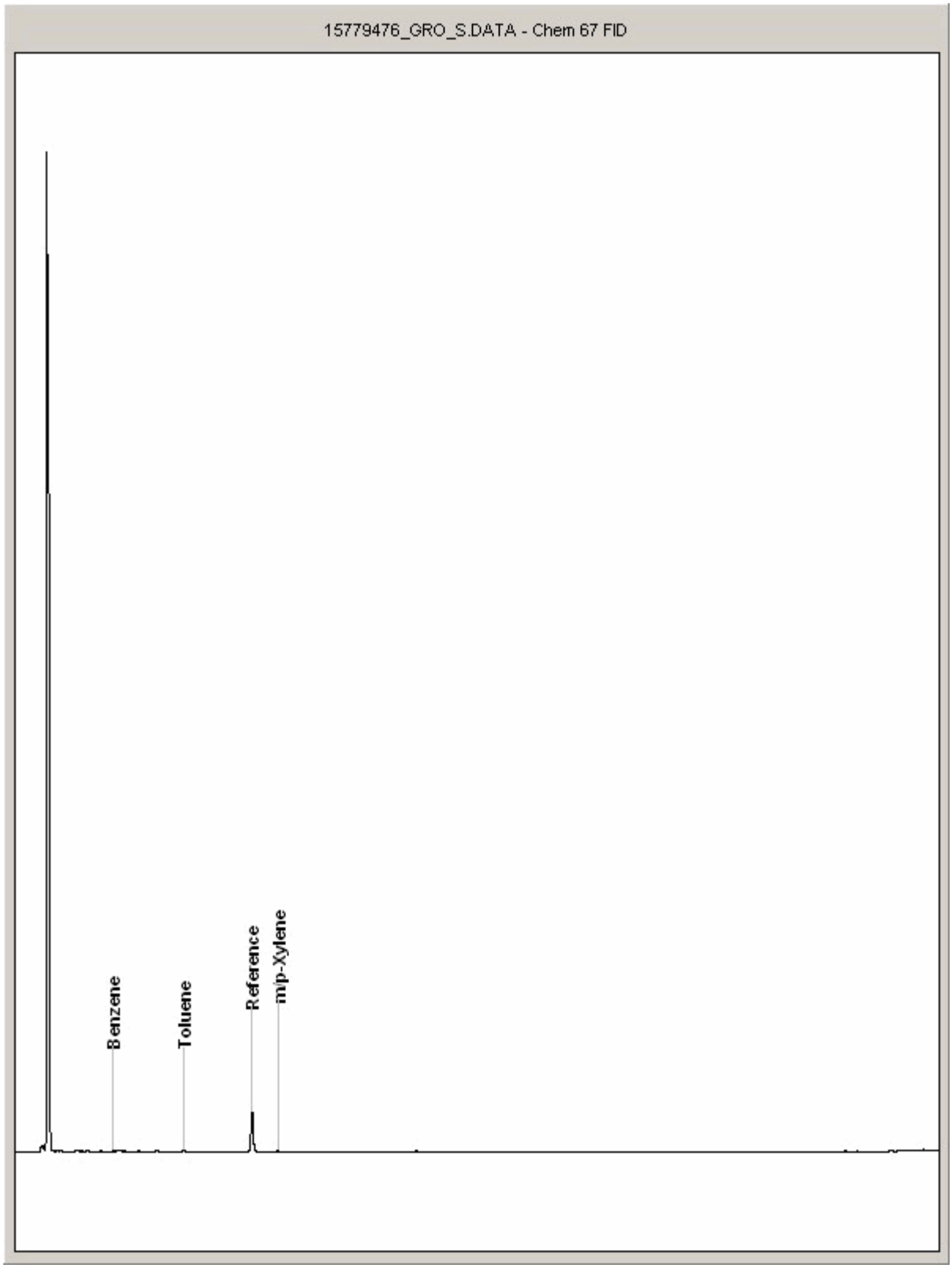
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-60 | **Client Reference:** | 2793-COC11-J | **Report Number:** | 414858 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

**Analysis:** GRO by GC-FID (S)

**Sample No :** 15779476
**Sample ID :** 2793-ST1-SS12

**Depth :** 5.00 - 8.00



# Appendix

## General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

## Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

| | |
|---|---|
| 1 | **Container with Headspace provided for volatiles analysis** |
| 2 | **Incorrect container received** |
| 3 | **Deviation from method** |
| 4 | **Holding time exceeded before sample received** |
| 5 | **Samples exceeded holding time before presevation was performed** |
| § | **Sampled on date not provided** |
| ♦ | **Sample holding time exceeded in laboratory** |
| @ | **Sample holding time exceeded due to sampled on date** |
| & | **Sample Holding Time exceeded - Late arrival of instructions.** |

## Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

| Asbestos Type | Common Name |
|---|---|
| Chrysotile | White Asbestos |
| Amosite | Brown Asbestos |
| Crocidolite | Blue Asbestos |
| Fibrous Actinolite | - |
| Fibrous Anthophyllite | - |
| Fibrous Tremolite | - |

**Visual Estimation Of Fibre Content**

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

**Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.**

**The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.**

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Minerex Environmental
Taney hall
Eglinton Terrace
Dundrum
Dublin
Dublin 14

**Attention:** Sven Klinkenbergh

# CERTIFICATE OF ANALYSIS

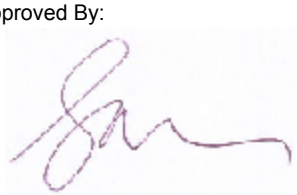
| | |
|---|---|
| **Date:** | 04 July 2017 |
| **Customer:** | D_MINEREX_DUB |
| **Sample Delivery Group (SDG):** | 170624-47 |
| **Your Reference:** | 2793-COC11-L |
| **Location:** | JJ Rhatigan, Charlemont Street, Dublin 2 |
| **Report No:** | 414851 |

We received 1 sample on Saturday June 24, 2017 and 1 of these samples were scheduled for analysis which was completed on Tuesday July 04, 2017. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

Approved By:



**Sonia McWhan**

Operations Manager

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-47 | **Client Reference:** | 2793-COC11-L | **Report Number:** | 414851 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Received Sample Overview

| Lab Sample No(s) | Customer Sample Ref. | AGS Ref. | Depth (m) | Sampled Date |
|---|---|---|---|---|
| 15739669 | 279TP115-SS11 | | 4.80 - 8.00 | 14/06/2017 |

**Maximum Sample/Coolbox Temperature (°C) :** **19**

**ISO5667-3 Water quality - Sampling - Part3 -**
During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

**Only received samples which have had analysis scheduled will be shown on the following pages.**

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-47 | **Client Reference:** | 2793-COC11-L | **Report Number:** | 414851 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

**Results Legend**

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

| | | | Lab Sample No(s) | Customer Sample Reference | AGS Reference | Depth (m) | Container | Sample Type |
|---|---|---|---|---|---|---|---|---|
| | | | 15739669 | 279TP115-SS11 | | 4.80 - 8.00 | 250g Amber Jar (ALE210) / 400g Tub (ALE214) / 60g VOC (ALE215) | S / S / S |
| Anions by Kone (w) | All | NDPs: 0 Tests: 1 | | X | | | | |
| Asbestos ID in Solid Samples | All | NDPs: 0 Tests: 1 | | X | | | | |
| Boron Water Soluble | All | NDPs: 0 Tests: 1 | X | | | | | |
| CEN Readings | All | NDPs: 0 Tests: 1 | | X | | | | |
| Cyanide Comp/Free/Total/Thiocyanate | All | NDPs: 0 Tests: 1 | X | | | | | |
| Dissolved Metals by ICP-MS | All | NDPs: 0 Tests: 1 | | X | | | | |
| Dissolved Organic/Inorganic Carbon | All | NDPs: 0 Tests: 1 | | X | | | | |
| EPH CWG (Aliphatic) GC (S) | All | NDPs: 0 Tests: 1 | X | | | | | |
| EPH CWG (Aromatic) GC (S) | All | NDPs: 0 Tests: 1 | X | | | | | |
| Fluoride | All | NDPs: 0 Tests: 1 | | X | | | | |
| GRO by GC-FID (S) | All | NDPs: 0 Tests: 1 | | | | | X | |
| Hexavalent Chromium (s) | All | NDPs: 0 Tests: 1 | X | | | | | |
| Loss on Ignition in soils | All | NDPs: 0 Tests: 1 | X | | | | | |
| Mercury Dissolved | All | NDPs: 0 Tests: 1 | | X | | | | |
| Metals by iCap-OES Dissolved (W) | All | NDPs: 0 Tests: 1 | | X | | | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-47 | **Client Reference:** | 2793-COC11-L | **Report Number:** | 414851 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

**Results Legend**

X **Test**

N **No Determination Possible**

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

| | | | | | | |
|---|---|---|---|---|---|---|
| **Lab Sample No(s)** | | | 15739669 | | |
| **Customer Sample Reference** | | | 279TP115-SS11 | | |
| **AGS Reference** | | | | | |
| **Depth (m)** | | | 4.80 - 8.00 | | |
| **Container** | | | 250g Amber Jar (ALE210) | 400g Tub (ALE214) | 60g VOC (ALE215) |
| **Sample Type** | | | S | S | S |
| Metals in solid samples by OES | All | NDPs: 0 Tests: 1 | X | | |
| Mineral Oil | All | NDPs: 0 Tests: 1 | X | | |
| PAH by GCMS | All | NDPs: 0 Tests: 1 | X | | |
| PCBs by GCMS | All | NDPs: 0 Tests: 1 | X | | |
| pH | All | NDPs: 0 Tests: 1 | X | | |
| Phenols by HPLC (S) | All | NDPs: 0 Tests: 1 | X | | |
| Phenols by HPLC (W) | All | NDPs: 0 Tests: 1 | | X | |
| Sample description | All | NDPs: 0 Tests: 1 | X | | |
| Total Dissolved Solids | All | NDPs: 0 Tests: 1 | | X | |
| Total Organic Carbon | All | NDPs: 0 Tests: 1 | X | | |
| Total Sulphate | All | NDPs: 0 Tests: 1 | X | | |
| Total Sulphur | All | NDPs: 0 Tests: 1 | X | | |
| TPH CWG GC (S) | All | NDPs: 0 Tests: 1 | X | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-47 | **Client Reference:** | 2793-COC11-L | **Report Number:** | 414851 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

# Sample Descriptions

## Grain Sizes

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **very fine** | <0.063mm | **fine** | 0.063mm - 0.1mm | **medium** | 0.1mm - 2mm | **coarse** | 2mm - 10mm | **very coarse** | >10mm |

| Lab Sample No(s) | Customer Sample Ref. | Depth (m) | Colour | Description | Inclusions | Inclusions 2 |
|---|---|---|---|---|---|---|
| 15739669 | 279TP115-SS11 | 4.80 - 8.00 | Dark Brown | Sandy Loam | Stones | None |

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-47 | **Client Reference:** | 2793-COC11-L | **Report Number:** | 414851 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| Customer Sample Ref. | 279TP115-SS11 |
| Depth (m) | 4.80 - 8.00 |
| Sample Type | Soil/Solid (S) |
| Date Sampled | 14/06/2017 |
| Sampled Time | . |
| Date Received | 24/06/2017 |
| SDG Ref | 170624-47 |
| Lab Sample No.(s) | 15739669 |
| AGS Reference | |

| Component | LOD/Units | Method | |
|---|---|---|---|
| Moisture Content Ratio (% of as received sample) | % | PM024 | 5 |
| Loss on ignition | <0.7 % | TM018 | 2.48 M |
| Mineral oil >C10-C40 | <1 mg/kg | TM061 | 56.5 @ |
| Mineral Oil Surrogate % recovery** | % | TM061 | 79 @ |
| Phenol | <0.01 mg/kg | TM062 (S) | <0.01 M |
| Organic Carbon, Total | <0.2 % | TM132 | 0.651 M |
| Sulphur, Total | <0.02 % | TM132 | 0.399 |
| Sulphate, Total potential | <0.06 % | TM132 | 1.2 |
| pH | 1 pH Units | TM133 | 8.07 M |
| Chromium, Hexavalent | <0.6 mg/kg | TM151 | <0.6 # |
| Cyanide, Total | <1 mg/kg | TM153 | <1 M |
| Cyanide, Free | <1 mg/kg | TM153 | <1 M |
| PCB congener 28 | <3 µg/kg | TM168 | <3 M |
| PCB congener 52 | <3 µg/kg | TM168 | <3 M |
| PCB congener 101 | <3 µg/kg | TM168 | <3 M |
| PCB congener 118 | <3 µg/kg | TM168 | <3 M |
| PCB congener 138 | <3 µg/kg | TM168 | <3 M |
| PCB congener 153 | <3 µg/kg | TM168 | <3 M |
| PCB congener 180 | <3 µg/kg | TM168 | <3 M |
| Sum of detected PCB 7 Congeners | <21 µg/kg | TM168 | <21 |
| Antimony | <0.6 mg/kg | TM181 | 1.36 # |
| Arsenic | <0.6 mg/kg | TM181 | 9.04 M |
| Barium | <0.6 mg/kg | TM181 | 49.1 # |
| Cadmium | <0.02 mg/kg | TM181 | 1.59 M |
| Chromium | <0.9 mg/kg | TM181 | 5.18 M |
| Copper | <1.4 mg/kg | TM181 | 34.8 M |
| Iron | <1000 mg/kg | TM181 | 17100 # |
| Lead | <0.7 mg/kg | TM181 | 18.4 M |
| Manganese | <0.13 mg/kg | TM181 | 1190 M |
| Mercury | <0.14 mg/kg | TM181 | 0.3 M |
| Molybdenum | <0.1 mg/kg | TM181 | 3.55 # |
| Nickel | <0.2 mg/kg | TM181 | 30.5 M |

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-47 | **Client Reference:** | 2793-COC11-L | **Report Number:** | 414851 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

**Results Legend**

| | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| **Customer Sample Ref.** | 279TP115-SS11 |
| **Depth (m)** | 4.80 - 8.00 |
| **Sample Type** | Soil/Solid (S) |
| **Date Sampled** | 14/06/2017 |
| **Sampled Time** | - |
| **Date Received** | 24/06/2017 |
| **SDG Ref** | 170624-47 |
| **Lab Sample No.(s)** | 15739669 |
| **AGS Reference** | |

| Component | LOD/Units | Method | |
|---|---|---|---|
| Selenium | <1 mg/kg | TM181 | 2.31 # |
| Zinc | <1.9 mg/kg | TM181 | 65.8 M |
| Sulphate, Total | <48 mg/kg | TM221 | 1310 M |
| Sulphide, Oxidisable | <0.03 % | TM221 | 1.07 |
| Boron, water soluble | <1 mg/kg | TM222 | <1 M |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-47 | **Client Reference:** | 2793-COC11-L | **Report Number:** | 414851 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## PAH by GCMS

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| Customer Sample Ref. | 279TP115-SS11 |
| Depth (m) | 4.80 - 8.00 |
| Sample Type | Soil/Solid (S) |
| Date Sampled | 14/06/2017 |
| Sampled Time | . |
| Date Received | 24/06/2017 |
| SDG Ref | 170624-47 |
| Lab Sample No.(s) | 15739669 |
| AGS Reference | |

| Component | LOD/Units | Method | | | | | |
|---|---|---|---|---|---|---|---|
| Naphthalene-d8 % recovery** | % | TM218 | 103 | | | | |
| Acenaphthene-d10 % recovery** | % | TM218 | 98.3 | | | | |
| Phenanthrene-d10 % recovery** | % | TM218 | 97 | | | | |
| Chrysene-d12 % recovery** | % | TM218 | 88.5 | | | | |
| Perylene-d12 % recovery** | % | TM218 | 86.3 | | | | |
| Naphthalene | <9 µg/kg | TM218 | 22.5 M | | | | |
| Acenaphthylene | <12 µg/kg | TM218 | <12 M | | | | |
| Acenaphthene | <8 µg/kg | TM218 | 9.83 M | | | | |
| Fluorene | <10 µg/kg | TM218 | 26 M | | | | |
| Phenanthrene | <15 µg/kg | TM218 | 120 M | | | | |
| Anthracene | <16 µg/kg | TM218 | <16 M | | | | |
| Fluoranthene | <17 µg/kg | TM218 | 89.1 M | | | | |
| Pyrene | <15 µg/kg | TM218 | 85.5 M | | | | |
| Benz(a)anthracene | <14 µg/kg | TM218 | 48.8 M | | | | |
| Chrysene | <10 µg/kg | TM218 | 50 M | | | | |
| Benzo(b)fluoranthene | <15 µg/kg | TM218 | 50.2 M | | | | |
| Benzo(k)fluoranthene | <14 µg/kg | TM218 | 22.4 M | | | | |
| Benzo(a)pyrene | <15 µg/kg | TM218 | 30.3 M | | | | |
| Indeno(1,2,3-cd)pyrene | <18 µg/kg | TM218 | <18 M | | | | |
| Dibenzo(a,h)anthracene | <23 µg/kg | TM218 | <23 M | | | | |
| Benzo(g,h,i)perylene | <24 µg/kg | TM218 | 37.2 M | | | | |
| Coronene | <200 µg/kg | TM218 | <200 | | | | |
| PAH, Total Detected USEPA 16 | <118 µg/kg | TM218 | 592 | | | | |
| PAH, Total Detected USEPA 16 + Coronene | <318 µg/kg | TM218 | 592 | | | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-47 | **Client Reference:** | 2793-COC11-L | **Report Number:** | 414851 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## TPH CWG (S)

**Results Legend**

| | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| Customer Sample Ref. | 279TP115-SS11 |
| Depth (m) | 4.80 - 8.00 |
| Sample Type | Soil/Solid (S) |
| Date Sampled | 14/06/2017 |
| Sampled Time | . |
| Date Received | 24/06/2017 |
| SDG Ref | 170624-47 |
| Lab Sample No.(s) | 15739669 |
| AGS Reference | |

| Component | LOD/Units | Method | |
|---|---|---|---|
| GRO Surrogate % recovery** | % | TM089 | 9 @ |
| GRO TOT (Moisture Corrected) | <44 µg/kg | TM089 | <44 @ M |
| Methyl tertiary butyl ether (MTBE) | <5 µg/kg | TM089 | <5 @ # |
| Benzene | <10 µg/kg | TM089 | <10 @ M |
| Toluene | <2 µg/kg | TM089 | 2.1 @ M |
| Ethylbenzene | <3 µg/kg | TM089 | <3 @ M |
| m,p-Xylene | <6 µg/kg | TM089 | <6 @ M |
| o-Xylene | <3 µg/kg | TM089 | <3 @ M |
| sum of detected mpo xylene by GC | <9 µg/kg | TM089 | <9 @ |
| sum of detected BTEX by GC | <24 µg/kg | TM089 | <24 @ |
| Aliphatics >C5-C6 | <10 µg/kg | TM089 | <10 @ |
| Aliphatics >C6-C8 | <10 µg/kg | TM089 | <10 @ |
| Aliphatics >C8-C10 | <10 µg/kg | TM089 | <10 @ |
| Aliphatics >C10-C12 | <10 µg/kg | TM089 | <10 @ |
| Aliphatics >C12-C16 | <100 µg/kg | TM173 | 4150 |
| Aliphatics >C16-C21 | <100 µg/kg | TM173 | 7180 |
| Aliphatics >C21-C35 | <100 µg/kg | TM173 | 43000 |
| Aliphatics >C35-C44 | <100 µg/kg | TM173 | 6360 |
| Total Aliphatics >C12-C44 | <100 µg/kg | TM173 | 60700 |
| Aromatics >EC5-EC7 | <10 µg/kg | TM089 | <10 @ |
| Aromatics >EC7-EC8 | <10 µg/kg | TM089 | <10 @ |
| Aromatics >EC8-EC10 | <10 µg/kg | TM089 | <10 @ |
| Aromatics >EC10-EC12 | <10 µg/kg | TM089 | <10 @ |
| Aromatics >EC12-EC16 | <100 µg/kg | TM173 | 1320 |
| Aromatics >EC16-EC21 | <100 µg/kg | TM173 | 3210 |
| Aromatics >EC21-EC35 | <100 µg/kg | TM173 | 13000 |
| Aromatics >EC35-EC44 | <100 µg/kg | TM173 | 5860 |
| Aromatics >EC40-EC44 | <100 µg/kg | TM173 | 2430 |
| Total Aromatics >EC12-EC44 | <100 µg/kg | TM173 | 23400 |
| Total Aliphatics & Aromatics >C5-C44 | <100 µg/kg | TM173 | 84000 |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-47 | **Client Reference:** | 2793-COC11-L | **Report Number:** | 414851 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Asbestos Identification - Soil

| | | Date of Analysis | Analysed By | Comments | Amosite (Brown) Asbestos | Chrysotile (White) Asbestos | Crocidolite (Blue) Asbestos | Fibrous Actinolite | Fibrous Anthophyllite | Fibrous Tremolite | Non-Asbestos Fibre |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cust. Sample Ref.<br>Depth (m)<br>Sample Type<br>Date Sampled<br>Date Receieved<br>SDG<br>Original Sample<br>Method Number | 279TP115-SS11<br>4.80 - 8.00<br>SOLID<br>14/06/2017<br>00:00:00<br>27/06/2017<br>20:28:47<br>170624-47<br>15739669<br>TM048 | 29/06/17 | Christian Hallam | - | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-47 | **Client Reference:** | 2793-COC11-L | **Report Number:** | 414851 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## CEN 10:1 SINGLE STAGE LEACHATE TEST

## CEN ANALYTICAL RESULTS

**REF : BS EN 12457/2**

| | | | |
|---|---|---|---|
| **Client Reference** | | **Site Location** | JJ Rhatigan, Charlemont Street, Du |
| **Mass Sample taken (kg)** | 0.094 | **Natural Moisture Content (%)** | 5.26 |
| **Mass of dry sample (kg)** | 0.090 | **Dry Matter Content (%)** | 95 |
| **Particle Size <4mm** | >95% | | |

| | |
|---|---|
| **Case** | |
| **SDG** | 170624-47 |
| **Lab Sample Number(s)** | 15739669 |
| **Sampled Date** | 14-Jun-2017 |
| **Customer Sample Ref.** | 279TP115-SS11 |
| **Depth (m)** | 4.80 - 8.00 |

| **Solid Waste Analysis** | **Result** | **Landfill Waste Acceptance Criteria Limits** | | |
|---|---|---|---|---|
| | | **Inert Waste Landfill** | **Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon (%) | 0.651 | 3 | 5 | 6 |
| Loss on Ignition (%) | 2.48 | - | - | 10 |
| Sum of BTEX (mg/kg) | <0.024 | 6 | - | - |
| Sum of 7 PCBs (mg/kg) | <0.021 | 1 | - | - |
| Mineral Oil (mg/kg) | 56.5 | 500 | - | - |
| PAH Sum of 17 (mg/kg) | <10 | 100 | - | - |
| pH (pH Units) | 8.07 | - | >6 | - |
| ANC to pH 6 (mol/kg) | - | - | - | - |
| ANC to pH 4 (mol/kg) | - | - | - | - |

| **Eluate Analysis** | **$C_2$** Conc$^n$ in 10:1 eluate (mg/l) | | **$A_2$** 10:1 conc$^n$ leached (mg/kg) | | **Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg** | | |
|---|---|---|---|---|---|---|---|
| | **Result** | **Limit of Detection** | **Result** | **Limit of Detection** | | | |
| Arsenic | <0.0005 | <0.0005 | <0.005 | <0.005 | 0.5 | 2 | 25 |
| Barium | 0.0374 | <0.0002 | 0.374 | <0.002 | 20 | 100 | 300 |
| Cadmium | <0.00008 | <0.00008 | <0.0008 | <0.0008 | 0.04 | 1 | 5 |
| Chromium | <0.001 | <0.001 | <0.01 | <0.01 | 0.5 | 10 | 70 |
| Copper | 0.00121 | <0.0003 | 0.0121 | <0.003 | 2 | 50 | 100 |
| Mercury Dissolved (CVAF) | <0.00001 | <0.00001 | <0.0001 | <0.0001 | 0.01 | 0.2 | 2 |
| Molybdenum | 0.0284 | <0.0005 | 0.284 | <0.005 | 0.5 | 10 | 30 |
| Nickel | 0.00101 | <0.0004 | 0.0101 | <0.004 | 0.4 | 10 | 40 |
| Lead | <0.0002 | <0.0002 | <0.002 | <0.002 | 0.5 | 10 | 50 |
| Antimony | 0.00133 | <0.0001 | 0.0133 | <0.001 | 0.06 | 0.7 | 5 |
| Selenium | 0.0308 | <0.0005 | 0.308 | <0.005 | 0.1 | 0.5 | 7 |
| Zinc | <0.001 | <0.001 | <0.01 | <0.01 | 4 | 50 | 200 |
| Chloride | 19.6 | <2 | 196 | <20 | 800 | 15000 | 25000 |
| Fluoride | <0.5 | <0.5 | <5 | <5 | 10 | 150 | 500 |
| Sulphate (soluble) | 66.1 | <2 | 661 | <20 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 191 | <5 | 1910 | <50 | 4000 | 60000 | 100000 |
| Total Monohydric Phenols (W) | <0.016 | <0.016 | <0.16 | <0.16 | 1 | - | - |
| Dissolved Organic Carbon | <3 | <3 | <30 | <30 | 500 | 800 | 1000 |

## Leach Test Information

| | |
|---|---|
| Date Prepared | 28-Jun-2017 |
| pH (pH Units) | 8.69 |
| Conductivity (µS/cm) | 226.00 |
| Temperature (°C) | 18.70 |
| Volume Leachant (Litres) | 0.895 |

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates

04/07/2017 15:57:20

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-47 | **Client Reference:** | 2793-COC11-L | **Report Number:** | 414851 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Table of Results - Appendix

| Method No | Reference | Description | Wet/Dry Sample [1] | Surrogate Corrected |
|---|---|---|---|---|
| PM001 | | Preparation of Samples for Metals Analysis | | |
| PM024 | Modified BS 1377 | Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material | | |
| PM115 | | Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step | | |
| TM018 | BS 1377: Part 3 1990 | Determination of Loss on Ignition | | |
| TM048 | HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures | Identification of Asbestos in Bulk Material | | |
| TM061 | Method for the Determination of EPH,Massachusetts Dept.of EP, 1998 | Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40) | | |
| TM062 (S) | National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9 | Determination of Phenols in Soils by HPLC | | |
| TM089 | Modified: US EPA Methods 8020 & 602 | Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12) | | |
| TM090 | Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060 | Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water | | |
| TM104 | Method 4500F, AWWA/APHA, 20th Ed., 1999 | Determination of Fluoride using the Kone Analyser | | |
| TM123 | BS 2690: Part 121:1981 | The Determination of Total Dissolved Solids in Water | | |
| TM132 | In - house Method | ELTRA CS800 Operators Guide | | |
| TM133 | BS 1377: Part 3 1990;BS 6068-2.5 | Determination of pH in Soil and Water using the GLpH pH Meter | | |
| TM151 | Method 3500D, AWWA/APHA, 20th Ed., 1999 | Determination of Hexavalent Chromium using Kone analyser | | |
| TM152 | Method 3125B, AWWA/APHA, 20th Ed., 1999 | Analysis of Aqueous Samples by ICP-MS | | |
| TM153 | Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999 | Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser | | |
| TM168 | EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography | Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils | | |
| TM173 | Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria | Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID | | |
| TM181 | US EPA Method 6010B | Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES | | |
| TM183 | BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3 | Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry | | |
| TM184 | EPA Methods 325.1 & 325.2, | The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers | | |
| TM218 | Determination of PAH by GCMS Microwave extraction | The determination of PAH in soil samples by microwave extraction and GC-MS | | |
| TM221 | Inductively Coupled Plasma - Atomic Emission Spectroscopy. An Atlas of Spectral Information: Winge, Fassel, Peterson and Floyd | Determination of Acid extractable Sulphate in Soils by IRIS Emission Spectrometer | | |
| TM222 | In-House Method | Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer | | |
| TM228 | US EPA Method 6010B | Determination of Major Cations in Water by iCap 6500 Duo ICP-OES | | |
| TM259 | by HPLC | Determination of Phenols in Waters and Leachates by HPLC | | |

[1] Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-47 | **Client Reference:** | 2793-COC11-L | **Report Number:** | 414851 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Test Completion Dates

| | |
|---|---|
| **Lab Sample No(s)** | 15739669 |
| **Customer Sample Ref.** | 279TP115-SS11 |
| **AGS Ref.** | |
| **Depth** | 4.80 - 8.00 |
| **Type** | Soil/Solid (S) |
| Anions by Kone (w) | 03-Jul-2017 |
| Asbestos ID in Solid Samples | 29-Jun-2017 |
| Boron Water Soluble | 29-Jun-2017 |
| CEN 10:1 Leachate (1 Stage) | 28-Jun-2017 |
| CEN Readings | 30-Jun-2017 |
| Cyanide Comp/Free/Total/Thiocyanate | 29-Jun-2017 |
| Dissolved Metals by ICP-MS | 04-Jul-2017 |
| Dissolved Organic/Inorganic Carbon | 03-Jul-2017 |
| EPH CWG (Aliphatic) GC (S) | 29-Jun-2017 |
| EPH CWG (Aromatic) GC (S) | 29-Jun-2017 |
| Fluoride | 03-Jul-2017 |
| GRO by GC-FID (S) | 04-Jul-2017 |
| Hexavalent Chromium (s) | 29-Jun-2017 |
| Loss on Ignition in soils | 04-Jul-2017 |
| Mercury Dissolved | 04-Jul-2017 |
| Metals by iCap-OES Dissolved (W) | 04-Jul-2017 |
| Metals in solid samples by OES | 03-Jul-2017 |
| Mineral Oil | 03-Jul-2017 |
| PAH by GCMS | 30-Jun-2017 |
| PCBs by GCMS | 03-Jul-2017 |
| pH | 03-Jul-2017 |
| Phenols by HPLC (S) | 29-Jun-2017 |
| Phenols by HPLC (W) | 03-Jul-2017 |
| Sample description | 27-Jun-2017 |
| Total Dissolved Solids | 30-Jun-2017 |
| Total Organic Carbon | 29-Jun-2017 |
| Total Sulphate | 03-Jul-2017 |
| Total Sulphur | 29-Jun-2017 |
| TPH CWG GC (S) | 04-Jul-2017 |

# CERTIFICATE OF ANALYSIS

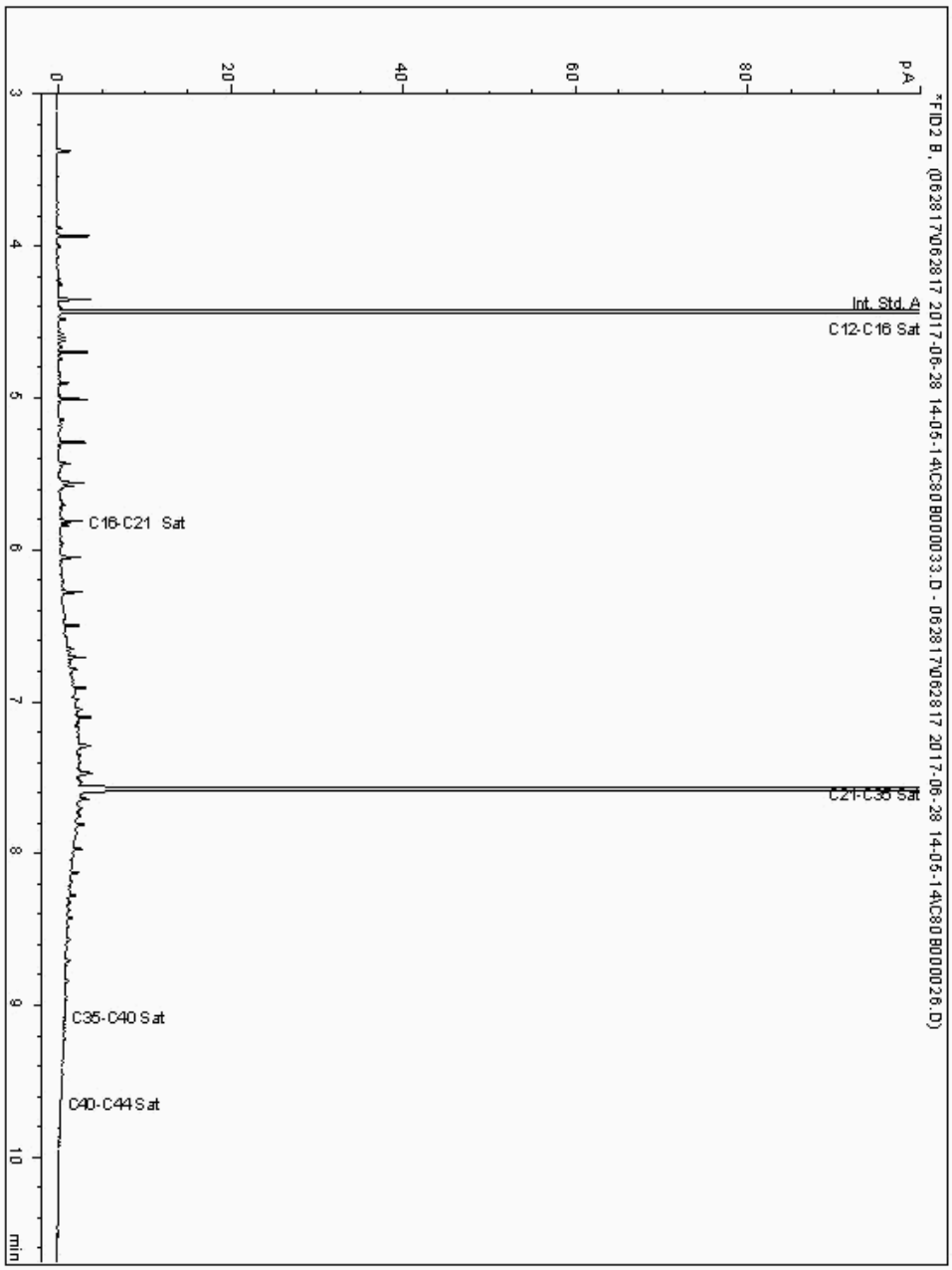
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-47 | **Client Reference:** | 2793-COC11-L | **Report Number:** | 414851 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

**Analysis:** EPH CWG (Aliphatic) GC (S) **Sample No :** 15749848 **Depth :** 4.80 - 8.00
**Sample ID :** 279TP115-SS11

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 14737285-
Date Acquired : 29/06/17 00:54:07
Units : ppb
Dilution :
CF : 1
Multiplier : 1.050



# CERTIFICATE OF ANALYSIS

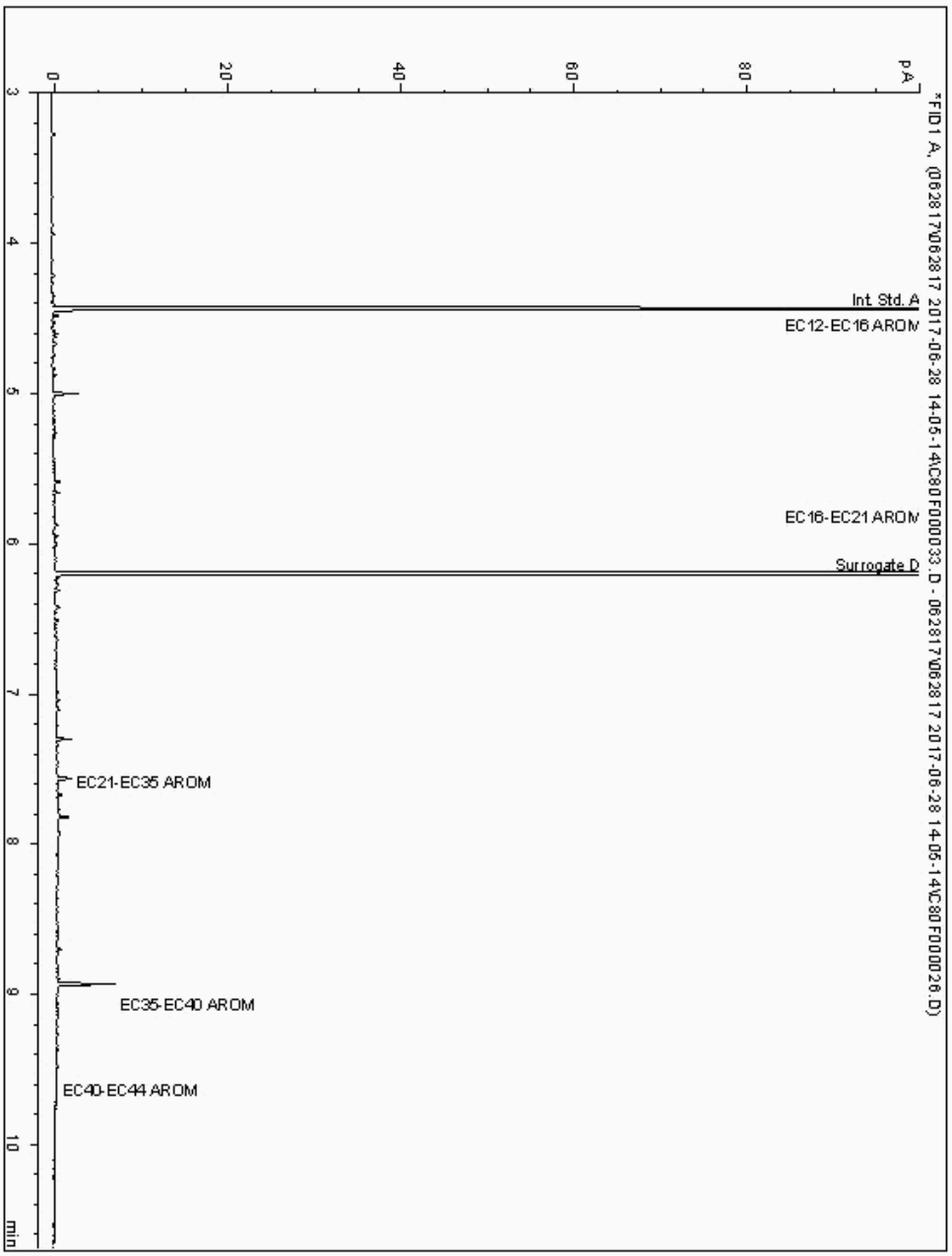
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-47 | **Client Reference:** | 2793-COC11-L | **Report Number:** | 414851 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

**Analysis:** EPH CWG (Aromatic) GC (S) **Sample No :** 15749848 **Depth :** 4.80 - 8.00
**Sample ID :** 279TP115-SS11

Speciated TPH - AROMS ( C12 - C44)

Sample Identity: 14737286-
Date Acquired : 29/06/17 00:54:07
Units : ppb
Dilution :
CF : 1
Multiplier : 1.050



# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-47 | **Client Reference:** | 2793-COC11-L | **Report Number:** | 414851 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

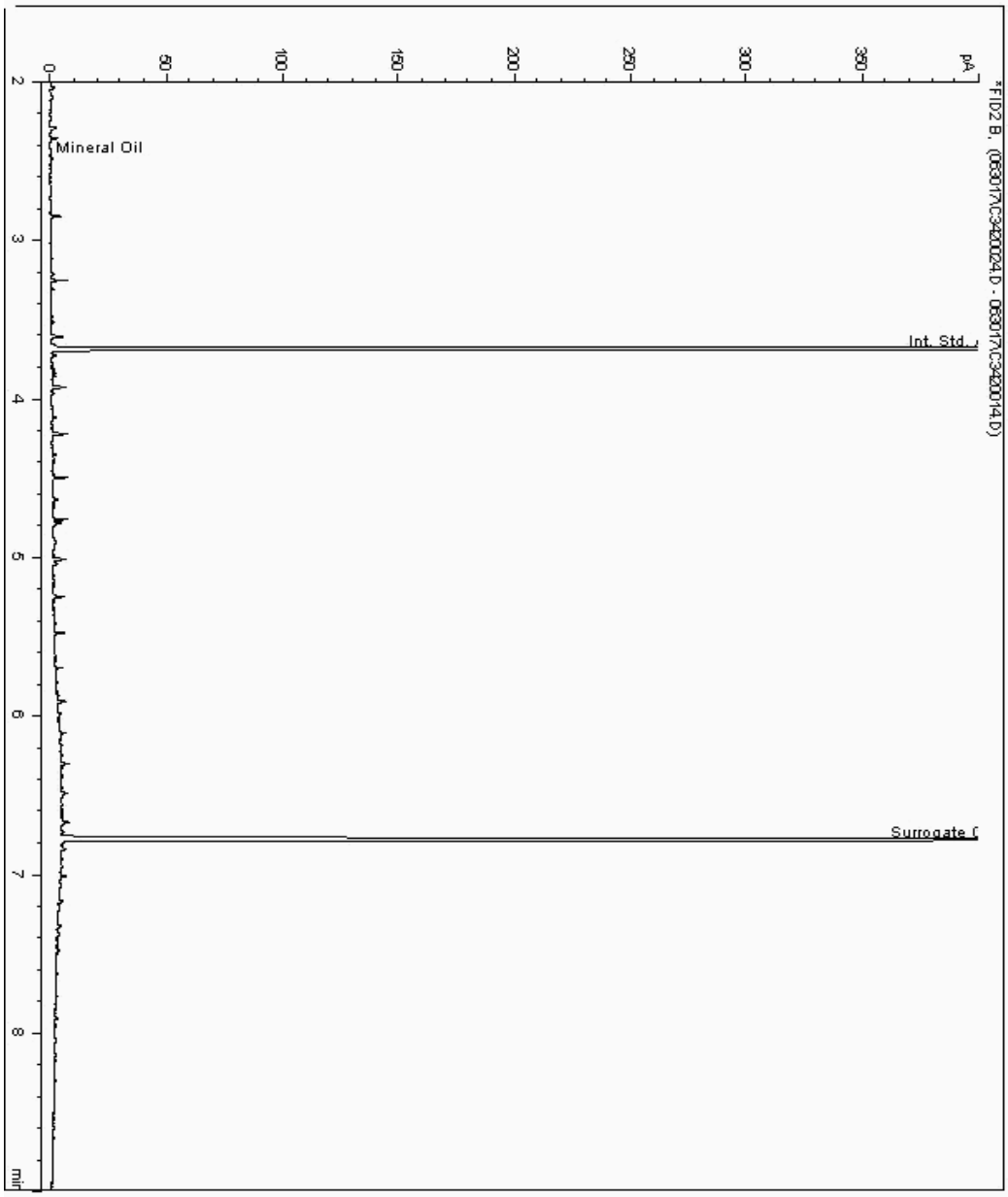
**Analysis:** Mineral Oil

**Sample No :** 15753873
**Sample ID :** 279TP115-SS11

**Depth :** 4.80 - 8.00

Mineral Oil Range Organics ( C10 - C40 )

Sample Identity : 14737288-
Date Acquired : 30/06/17 16:11:08 PM
Units : mg/kg
Sample Multiplier : 0.000
Dilution :



# CERTIFICATE OF ANALYSIS

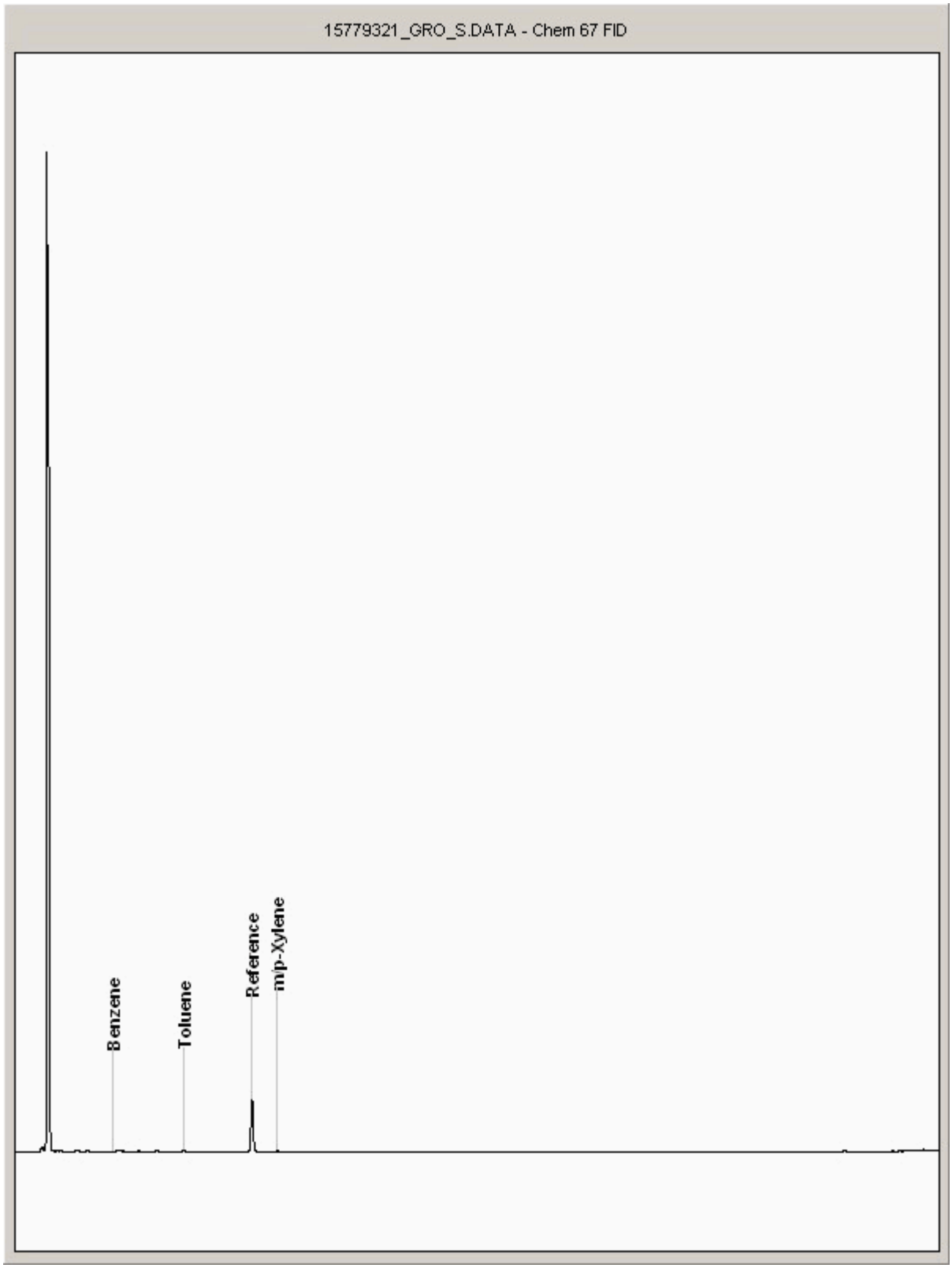
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-47 | **Client Reference:** | 2793-COC11-L | **Report Number:** | 414851 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

**Analysis:** GRO by GC-FID (S)

**Sample No :** 15779321
**Sample ID :** 279TP115-SS11

**Depth :** 4.80 - 8.00



# Appendix

## General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

## Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

| | |
|---|---|
| 1 | **Container with Headspace provided for volatiles analysis** |
| 2 | **Incorrect container received** |
| 3 | **Deviation from method** |
| 4 | **Holding time exceeded before sample received** |
| 5 | **Samples exceeded holding time before presevation was performed** |
| § | **Sampled on date not provided** |
| ♦ | **Sample holding time exceeded in laboratory** |
| @ | **Sample holding time exceeded due to sampled on date** |
| & | **Sample Holding Time exceeded - Late arrival of instructions.** |

## Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

| Asbestos Type | Common Name |
|---|---|
| Chrysotile | White Asbestos |
| Amosite | Brown Asbestos |
| Crocidolite | Blue Asbestos |
| Fibrous Actinolite | - |
| Fibrous Anthophyllite | - |
| Fibrous Tremolite | - |

**Visual Estimation Of Fibre Content**

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

**Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.**

**The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.**

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Minerex Environmental
Taney hall
Eglinton Terrace
Dundrum
Dublin
Dublin 14

**Attention:** Sven Klinkenbergh

# CERTIFICATE OF ANALYSIS

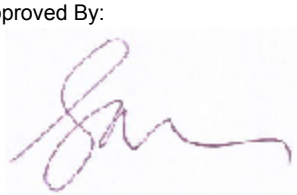
| | |
|---|---|
| **Date:** | 04 July 2017 |
| **Customer:** | D_MINEREX_DUB |
| **Sample Delivery Group (SDG):** | 170624-74 |
| **Your Reference:** | 2793-COC11-N |
| **Location:** | JJ Rhatigan, Charlemont Street, Dublin 2 |
| **Report No:** | 414863 |

We received 1 sample on Saturday June 24, 2017 and 1 of these samples were scheduled for analysis which was completed on Tuesday July 04, 2017. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

Approved By:



**Sonia McWhan**

Operations Manager

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-74 | **Client Reference:** | 2793-COC11-N | **Report Number:** | 414863 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Received Sample Overview

| Lab Sample No(s) | Customer Sample Ref. | AGS Ref. | Depth (m) | Sampled Date |
|---|---|---|---|---|
| 15740423 | 2793-TP114-SS15 | | 5.00 - 8.00 | 13/06/2017 |

**Maximum Sample/Coolbox Temperature (°C) :** **19**

**ISO5667-3 Water quality - Sampling - Part3 -**
During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

**Only received samples which have had analysis scheduled will be shown on the following pages.**

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-74 | **Client Reference:** | 2793-COC11-N | **Report Number:** | 414863 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

**Results Legend**

X **Test**

N **No Determination Possible**

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

| | | | Lab Sample No(s) | Customer Sample Reference | AGS Reference | Depth (m) | Container | Container | Container |
|---|---|---|---|---|---|---|---|---|---|
| | | | 15740423 | 2793-TP114-SS15 | | 5.00 - 8.00 | 250g Amber Jar (ALE210) | 400g Tub (ALE214) | 60g VOC (ALE215) |
| | | | | | | | S | S | S |
| Anions by Kone (w) | All | NDPs: 0 Tests: 1 | | | | | | X | |
| Asbestos ID in Solid Samples | All | NDPs: 0 Tests: 1 | | | | | | X | |
| Boron Water Soluble | All | NDPs: 0 Tests: 1 | | | | | X | | |
| CEN Readings | All | NDPs: 0 Tests: 1 | | | | | | X | |
| Cyanide Comp/Free/Total/Thiocyanate | All | NDPs: 0 Tests: 1 | | | | | X | | |
| Dissolved Metals by ICP-MS | All | NDPs: 0 Tests: 1 | | | | | | X | |
| Dissolved Organic/Inorganic Carbon | All | NDPs: 0 Tests: 1 | | | | | | X | |
| EPH CWG (Aliphatic) GC (S) | All | NDPs: 0 Tests: 1 | | | | | X | | |
| EPH CWG (Aromatic) GC (S) | All | NDPs: 0 Tests: 1 | | | | | X | | |
| Fluoride | All | NDPs: 0 Tests: 1 | | | | | | X | |
| GRO by GC-FID (S) | All | NDPs: 0 Tests: 1 | | | | | | | X |
| Hexavalent Chromium (s) | All | NDPs: 0 Tests: 1 | | | | | X | | |
| Loss on Ignition in soils | All | NDPs: 0 Tests: 1 | | | | | X | | |
| Mercury Dissolved | All | NDPs: 0 Tests: 1 | | | | | | X | |
| Metals by iCap-OES Dissolved (W) | All | NDPs: 0 Tests: 1 | | | | | | X | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-74 | **Client Reference:** | 2793-COC11-N | **Report Number:** | 414863 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

**Results Legend**

X **Test**

N **No Determination Possible**

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

| | | | | | | |
|---|---|---|---|---|---|---|
| **Lab Sample No(s)** | | | 15740423 | | |
| **Customer Sample Reference** | | | 2793-TP114-SS15 | | |
| **AGS Reference** | | | | | |
| **Depth (m)** | | | 5.00 - 8.00 | | |
| **Container** | | | 250g Amber Jar (ALE210) | 400g Tub (ALE214) | 60g VOC (ALE215) |
| **Sample Type** | | | S | S | S |
| Metals in solid samples by OES | All | NDPs: 0 Tests: 1 | X | | |
| Mineral Oil | All | NDPs: 0 Tests: 1 | X | | |
| PAH by GCMS | All | NDPs: 0 Tests: 1 | X | | |
| PCBs by GCMS | All | NDPs: 0 Tests: 1 | X | | |
| pH | All | NDPs: 0 Tests: 1 | X | | |
| Phenols by HPLC (S) | All | NDPs: 0 Tests: 1 | X | | |
| Phenols by HPLC (W) | All | NDPs: 0 Tests: 1 | | X | |
| Sample description | All | NDPs: 0 Tests: 1 | X | | |
| Total Dissolved Solids | All | NDPs: 0 Tests: 1 | | X | |
| Total Organic Carbon | All | NDPs: 0 Tests: 1 | X | | |
| Total Sulphate | All | NDPs: 0 Tests: 1 | X | | |
| Total Sulphur | All | NDPs: 0 Tests: 1 | X | | |
| TPH CWG GC (S) | All | NDPs: 0 Tests: 1 | X | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-74 | **Client Reference:** | 2793-COC11-N | **Report Number:** | 414863 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

# Sample Descriptions

## Grain Sizes

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **very fine** | <0.063mm | **fine** | 0.063mm - 0.1mm | **medium** | 0.1mm - 2mm | **coarse** | 2mm - 10mm | **very coarse** | >10mm |

| Lab Sample No(s) | Customer Sample Ref. | Depth (m) | Colour | Description | Inclusions | Inclusions 2 |
|---|---|---|---|---|---|---|
| 15740423 | 2793-TP114-SS15 | 5.00 - 8.00 | Dark Brown | Loamy Sand | Stones | Crushed Brick |

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-74 | **Client Reference:** | 2793-COC11-N | **Report Number:** | 414863 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| Customer Sample Ref. | 2793-TP114-SS15 |
| Depth (m) | 5.00 - 8.00 |
| Sample Type | Soil/Solid (S) |
| Date Sampled | 13/06/2017 |
| Sampled Time | . |
| Date Received | 24/06/2017 |
| SDG Ref | 170624-74 |
| Lab Sample No.(s) | 15740423 |
| AGS Reference | |

| Component | LOD/Units | Method | |
|---|---|---|---|
| Moisture Content Ratio (% of as received sample) | % | PM024 | 4.2 |
| Loss on ignition | <0.7 % | TM018 | 1.8 M |
| Mineral oil >C10-C40 | <1 mg/kg | TM061 | 49.7 @ |
| Mineral Oil Surrogate % recovery** | % | TM061 | 87.5 @ |
| Phenol | <0.01 mg/kg | TM062 (S) | <0.01 @ M |
| Organic Carbon, Total | <0.2 % | TM132 | 0.597 M |
| Sulphur, Total | <0.02 % | TM132 | 0.415 |
| Sulphate, Total potential | <0.06 % | TM132 | 1.25 |
| pH | 1 pH Units | TM133 | 8.2 M |
| Chromium, Hexavalent | <0.6 mg/kg | TM151 | <0.6 # |
| Cyanide, Total | <1 mg/kg | TM153 | <1 @ M |
| Cyanide, Free | <1 mg/kg | TM153 | <1 @ M |
| PCB congener 28 | <3 µg/kg | TM168 | <3 M |
| PCB congener 52 | <3 µg/kg | TM168 | <3 M |
| PCB congener 101 | <3 µg/kg | TM168 | <3 M |
| PCB congener 118 | <3 µg/kg | TM168 | <3 M |
| PCB congener 138 | <3 µg/kg | TM168 | <3 M |
| PCB congener 153 | <3 µg/kg | TM168 | <3 M |
| PCB congener 180 | <3 µg/kg | TM168 | <3 M |
| Sum of detected PCB 7 Congeners | <21 µg/kg | TM168 | <21 |
| Antimony | <0.6 mg/kg | TM181 | 0.944 # |
| Arsenic | <0.6 mg/kg | TM181 | 6.84 M |
| Barium | <0.6 mg/kg | TM181 | 151 # |
| Cadmium | <0.02 mg/kg | TM181 | 0.813 M |
| Chromium | <0.9 mg/kg | TM181 | 3.56 M |
| Copper | <1.4 mg/kg | TM181 | 14.9 M |
| Iron | <1000 mg/kg | TM181 | 16600 # |
| Lead | <0.7 mg/kg | TM181 | 10.7 M |
| Manganese | <0.13 mg/kg | TM181 | 3250 M |
| Mercury | <0.14 mg/kg | TM181 | <0.14 M |
| Molybdenum | <0.1 mg/kg | TM181 | 2.21 # |
| Nickel | <0.2 mg/kg | TM181 | 20.9 M |

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-74 | **Client Reference:** | 2793-COC11-N | **Report Number:** | 414863 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| Customer Sample Ref. | 2793-TP114-SS15 |
| Depth (m) | 5.00 - 8.00 |
| Sample Type | Soil/Solid (S) |
| Date Sampled | 13/06/2017 |
| Sampled Time | - |
| Date Received | 24/06/2017 |
| SDG Ref | 170624-74 |
| Lab Sample No.(s) | 15740423 |
| AGS Reference | |

| Component | LOD/Units | Method | |
|---|---|---|---|
| Selenium | <1 mg/kg | TM181 | 2.27 # |
| Zinc | <1.9 mg/kg | TM181 | 42.9 M |
| Sulphate, Total | <48 mg/kg | TM221 | 1020 M |
| Sulphide, Oxidisable | <0.03 % | TM221 | 1.15 |
| Boron, water soluble | <1 mg/kg | TM222 | <1 M |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-74 | **Client Reference:** | 2793-COC11-N | **Report Number:** | 414863 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## PAH by GCMS

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| Customer Sample Ref. | 2793-TP114-SS15 |
| Depth (m) | 5.00 - 8.00 |
| Sample Type | Soil/Solid (S) |
| Date Sampled | 13/06/2017 |
| Sampled Time | . |
| Date Received | 24/06/2017 |
| SDG Ref | 170624-74 |
| Lab Sample No.(s) | 15740423 |
| AGS Reference | |

| Component | LOD/Units | Method | | | | | |
|---|---|---|---|---|---|---|---|
| Naphthalene-d8 % recovery** | % | TM218 | 101 | | | | |
| Acenaphthene-d10 % recovery** | % | TM218 | 96.8 | | | | |
| Phenanthrene-d10 % recovery** | % | TM218 | 96.9 | | | | |
| Chrysene-d12 % recovery** | % | TM218 | 93.3 | | | | |
| Perylene-d12 % recovery** | % | TM218 | 95.5 | | | | |
| Naphthalene | <9 µg/kg | TM218 | 16.9 M | | | | |
| Acenaphthylene | <12 µg/kg | TM218 | <12 M | | | | |
| Acenaphthene | <8 µg/kg | TM218 | <8 M | | | | |
| Fluorene | <10 µg/kg | TM218 | 19.8 M | | | | |
| Phenanthrene | <15 µg/kg | TM218 | 60.5 M | | | | |
| Anthracene | <16 µg/kg | TM218 | <16 M | | | | |
| Fluoranthene | <17 µg/kg | TM218 | <17 M | | | | |
| Pyrene | <15 µg/kg | TM218 | <15 M | | | | |
| Benz(a)anthracene | <14 µg/kg | TM218 | <14 M | | | | |
| Chrysene | <10 µg/kg | TM218 | <10 M | | | | |
| Benzo(b)fluoranthene | <15 µg/kg | TM218 | <15 M | | | | |
| Benzo(k)fluoranthene | <14 µg/kg | TM218 | <14 M | | | | |
| Benzo(a)pyrene | <15 µg/kg | TM218 | <15 M | | | | |
| Indeno(1,2,3-cd)pyrene | <18 µg/kg | TM218 | <18 M | | | | |
| Dibenzo(a,h)anthracene | <23 µg/kg | TM218 | <23 M | | | | |
| Benzo(g,h,i)perylene | <24 µg/kg | TM218 | <24 M | | | | |
| Coronene | <200 µg/kg | TM218 | <200 | | | | |
| PAH, Total Detected USEPA 16 | <118 µg/kg | TM218 | <118 | | | | |
| PAH, Total Detected USEPA 16 + Coronene | <318 µg/kg | TM218 | <318 | | | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-74 | **Client Reference:** | 2793-COC11-N | **Report Number:** | 414863 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## TPH CWG (S)

**Results Legend**

| | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| Customer Sample Ref. | 2793-TP114-SS15 |
| Depth (m) | 5.00 - 8.00 |
| Sample Type | Soil/Solid (S) |
| Date Sampled | 13/06/2017 |
| Sampled Time | . |
| Date Received | 24/06/2017 |
| SDG Ref | 170624-74 |
| Lab Sample No.(s) | 15740423 |
| AGS Reference | |

| Component | LOD/Units | Method | |
|---|---|---|---|
| GRO Surrogate % recovery** | % | TM089 | 9 @ |
| GRO TOT (Moisture Corrected) | <44 µg/kg | TM089 | <44 @ M |
| Methyl tertiary butyl ether (MTBE) | <5 µg/kg | TM089 | <5 @ # |
| Benzene | <10 µg/kg | TM089 | <10 @ M |
| Toluene | <2 µg/kg | TM089 | 3.13 @ M |
| Ethylbenzene | <3 µg/kg | TM089 | <3 @ M |
| m,p-Xylene | <6 µg/kg | TM089 | <6 @ M |
| o-Xylene | <3 µg/kg | TM089 | <3 @ M |
| sum of detected mpo xylene by GC | <9 µg/kg | TM089 | <9 @ |
| sum of detected BTEX by GC | <24 µg/kg | TM089 | <24 @ |
| Aliphatics >C5-C6 | <10 µg/kg | TM089 | <10 @ |
| Aliphatics >C6-C8 | <10 µg/kg | TM089 | <10 @ |
| Aliphatics >C8-C10 | <10 µg/kg | TM089 | <10 @ |
| Aliphatics >C10-C12 | <10 µg/kg | TM089 | <10 @ |
| Aliphatics >C12-C16 | <100 µg/kg | TM173 | 2330 |
| Aliphatics >C16-C21 | <100 µg/kg | TM173 | 5840 |
| Aliphatics >C21-C35 | <100 µg/kg | TM173 | 29200 |
| Aliphatics >C35-C44 | <100 µg/kg | TM173 | 3510 |
| Total Aliphatics >C12-C44 | <100 µg/kg | TM173 | 40900 |
| Aromatics >EC5-EC7 | <10 µg/kg | TM089 | <10 @ |
| Aromatics >EC7-EC8 | <10 µg/kg | TM089 | <10 @ |
| Aromatics >EC8-EC10 | <10 µg/kg | TM089 | <10 @ |
| Aromatics >EC10-EC12 | <10 µg/kg | TM089 | <10 @ |
| Aromatics >EC12-EC16 | <100 µg/kg | TM173 | <100 |
| Aromatics >EC16-EC21 | <100 µg/kg | TM173 | 1750 |
| Aromatics >EC21-EC35 | <100 µg/kg | TM173 | 4920 |
| Aromatics >EC35-EC44 | <100 µg/kg | TM173 | 741 |
| Aromatics >EC40-EC44 | <100 µg/kg | TM173 | <100 |
| Total Aromatics >EC12-EC44 | <100 µg/kg | TM173 | 7410 |
| Total Aliphatics & Aromatics >C5-C44 | <100 µg/kg | TM173 | 48300 |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-74 | **Client Reference:** | 2793-COC11-N | **Report Number:** | 414863 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Asbestos Identification - Soil

| | | Date of Analysis | Analysed By | Comments | Amosite (Brown) Asbestos | Chrysotile (White) Asbestos | Crocidolite (Blue) Asbestos | Fibrous Actinolite | Fibrous Anthophyllite | Fibrous Tremolite | Non-Asbestos Fibre |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cust. Sample Ref.<br>Depth (m)<br>Sample Type<br>Date Sampled<br>Date Receieved<br>SDG<br>Original Sample<br>Method Number | 2793-TP114-SS15<br>5.00 - 8.00<br>SOLID<br>13/06/2017<br>00:00:00<br>27/06/2017<br>06:44:35<br>170624-74<br>15740423<br>TM048 | 28/06/17 | Renata Hatos | - | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-74 | **Client Reference:** | 2793-COC11-N | **Report Number:** | 414863 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## CEN 10:1 SINGLE STAGE LEACHATE TEST

## CEN ANALYTICAL RESULTS

**REF : BS EN 12457/2**

| | | | |
|---|---|---|---|
| **Client Reference** | | **Site Location** | JJ Rhatigan, Charlemont Street, Du |
| **Mass Sample taken (kg)** | 0.094 | **Natural Moisture Content (%)** | 4.38 |
| **Mass of dry sample (kg)** | 0.090 | **Dry Matter Content (%)** | 95.8 |
| **Particle Size <4mm** | >95% | | |

| | |
|---|---|
| **Case** | |
| **SDG** | 170624-74 |
| **Lab Sample Number(s)** | 15740423 |
| **Sampled Date** | 13-Jun-2017 |
| **Customer Sample Ref.** | 2793-TP114-SS15 |
| **Depth (m)** | 5.00 - 8.00 |

| **Solid Waste Analysis** | **Result** | **Landfill Waste Acceptance Criteria Limits** | | |
|---|---|---|---|---|
| | | **Inert Waste Landfill** | **Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon (%) | 0.597 | 3 | 5 | 6 |
| Loss on Ignition (%) | 1.8 | - | - | 10 |
| Sum of BTEX (mg/kg) | <0.024 | 6 | - | - |
| Sum of 7 PCBs (mg/kg) | <0.021 | 1 | - | - |
| Mineral Oil (mg/kg) | 49.7 | 500 | - | - |
| PAH Sum of 17 (mg/kg) | <10 | 100 | - | - |
| pH (pH Units) | 8.2 | - | >6 | - |
| ANC to pH 6 (mol/kg) | - | - | - | - |
| ANC to pH 4 (mol/kg) | - | - | - | - |

| **Eluate Analysis** | **$C_2$ Conc$^n$ in 10:1 eluate (mg/l)** | | **$A_2$ 10:1 conc$^n$ leached (mg/kg)** | | **Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg** | | |
|---|---|---|---|---|---|---|---|
| | **Result** | **Limit of Detection** | **Result** | **Limit of Detection** | | | |
| Arsenic | <0.0005 | <0.0005 | <0.005 | <0.005 | 0.5 | 2 | 25 |
| Barium | 0.0333 | <0.0002 | 0.333 | <0.002 | 20 | 100 | 300 |
| Cadmium | <0.00008 | <0.00008 | <0.0008 | <0.0008 | 0.04 | 1 | 5 |
| Chromium | <0.001 | <0.001 | <0.01 | <0.01 | 0.5 | 10 | 70 |
| Copper | 0.000391 | <0.0003 | 0.00391 | <0.003 | 2 | 50 | 100 |
| Mercury Dissolved (CVAF) | <0.00001 | <0.00001 | <0.0001 | <0.0001 | 0.01 | 0.2 | 2 |
| Molybdenum | 0.0198 | <0.0005 | 0.198 | <0.005 | 0.5 | 10 | 30 |
| Nickel | <0.0004 | <0.0004 | <0.004 | <0.004 | 0.4 | 10 | 40 |
| Lead | <0.0002 | <0.0002 | <0.002 | <0.002 | 0.5 | 10 | 50 |
| Antimony | 0.000977 | <0.0001 | 0.00977 | <0.001 | 0.06 | 0.7 | 5 |
| Selenium | 0.0272 | <0.0005 | 0.272 | <0.005 | 0.1 | 0.5 | 7 |
| Zinc | <0.001 | <0.001 | <0.01 | <0.01 | 4 | 50 | 200 |
| Chloride | 16.6 | <2 | 166 | <20 | 800 | 15000 | 25000 |
| Fluoride | <0.5 | <0.5 | <5 | <5 | 10 | 150 | 500 |
| Sulphate (soluble) | 53.4 | <2 | 534 | <20 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 149 | <5 | 1490 | <50 | 4000 | 60000 | 100000 |
| Total Monohydric Phenols (W) | <0.016 | <0.016 | <0.16 | <0.16 | 1 | - | - |
| Dissolved Organic Carbon | <3 | <3 | <30 | <30 | 500 | 800 | 1000 |

## Leach Test Information

| | |
|---|---|
| Date Prepared | 28-Jun-2017 |
| pH (pH Units) | 8.45 |
| Conductivity (µS/cm) | 188.00 |
| Temperature (°C) | 18.40 |
| Volume Leachant (Litres) | 0.896 |

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates

04/07/2017 16:05:58

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-74 | **Client Reference:** | 2793-COC11-N | **Report Number:** | 414863 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Table of Results - Appendix

| Method No | Reference | Description | Wet/Dry Sample [1] | Surrogate Corrected |
|---|---|---|---|---|
| PM001 | | Preparation of Samples for Metals Analysis | | |
| PM024 | Modified BS 1377 | Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material | | |
| PM115 | | Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step | | |
| TM018 | BS 1377: Part 3 1990 | Determination of Loss on Ignition | | |
| TM048 | HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures | Identification of Asbestos in Bulk Material | | |
| TM061 | Method for the Determination of EPH,Massachusetts Dept.of EP, 1998 | Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40) | | |
| TM062 (S) | National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9 | Determination of Phenols in Soils by HPLC | | |
| TM089 | Modified: US EPA Methods 8020 & 602 | Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12) | | |
| TM090 | Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060 | Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water | | |
| TM104 | Method 4500F, AWWA/APHA, 20th Ed., 1999 | Determination of Fluoride using the Kone Analyser | | |
| TM123 | BS 2690: Part 121:1981 | The Determination of Total Dissolved Solids in Water | | |
| TM132 | In - house Method | ELTRA CS800 Operators Guide | | |
| TM133 | BS 1377: Part 3 1990;BS 6068-2.5 | Determination of pH in Soil and Water using the GLpH pH Meter | | |
| TM151 | Method 3500D, AWWA/APHA, 20th Ed., 1999 | Determination of Hexavalent Chromium using Kone analyser | | |
| TM152 | Method 3125B, AWWA/APHA, 20th Ed., 1999 | Analysis of Aqueous Samples by ICP-MS | | |
| TM153 | Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999 | Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser | | |
| TM168 | EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography | Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils | | |
| TM173 | Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria | Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID | | |
| TM181 | US EPA Method 6010B | Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES | | |
| TM183 | BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3 | Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry | | |
| TM184 | EPA Methods 325.1 & 325.2, | The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers | | |
| TM218 | Determination of PAH by GCMS Microwave extraction | The determination of PAH in soil samples by microwave extraction and GC-MS | | |
| TM221 | Inductively Coupled Plasma - Atomic Emission Spectroscopy. An Atlas of Spectral Information: Winge, Fassel, Peterson and Floyd | Determination of Acid extractable Sulphate in Soils by IRIS Emission Spectrometer | | |
| TM222 | In-House Method | Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer | | |
| TM228 | US EPA Method 6010B | Determination of Major Cations in Water by iCap 6500 Duo ICP-OES | | |
| TM259 | by HPLC | Determination of Phenols in Waters and Leachates by HPLC | | |

[1] Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-74 | **Client Reference:** | 2793-COC11-N | **Report Number:** | 414863 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Test Completion Dates

| | |
|---|---|
| **Lab Sample No(s)** | 15740423 |
| **Customer Sample Ref.** | 2793-TP114-SS15 |
| **AGS Ref.** | |
| **Depth** | 5.00 - 8.00 |
| **Type** | Soil/Solid (S) |
| Anions by Kone (w) | 03-Jul-2017 |
| Asbestos ID in Solid Samples | 28-Jun-2017 |
| Boron Water Soluble | 29-Jun-2017 |
| CEN 10:1 Leachate (1 Stage) | 28-Jun-2017 |
| CEN Readings | 30-Jun-2017 |
| Cyanide Comp/Free/Total/Thiocyanate | 29-Jun-2017 |
| Dissolved Metals by ICP-MS | 04-Jul-2017 |
| Dissolved Organic/Inorganic Carbon | 03-Jul-2017 |
| EPH CWG (Aliphatic) GC (S) | 29-Jun-2017 |
| EPH CWG (Aromatic) GC (S) | 29-Jun-2017 |
| Fluoride | 03-Jul-2017 |
| GRO by GC-FID (S) | 04-Jul-2017 |
| Hexavalent Chromium (s) | 29-Jun-2017 |
| Loss on Ignition in soils | 04-Jul-2017 |
| Mercury Dissolved | 04-Jul-2017 |
| Metals by iCap-OES Dissolved (W) | 04-Jul-2017 |
| Metals in solid samples by OES | 03-Jul-2017 |
| Mineral Oil | 30-Jun-2017 |
| PAH by GCMS | 30-Jun-2017 |
| PCBs by GCMS | 03-Jul-2017 |
| pH | 04-Jul-2017 |
| Phenols by HPLC (S) | 29-Jun-2017 |
| Phenols by HPLC (W) | 03-Jul-2017 |
| Sample description | 27-Jun-2017 |
| Total Dissolved Solids | 30-Jun-2017 |
| Total Organic Carbon | 30-Jun-2017 |
| Total Sulphate | 03-Jul-2017 |
| Total Sulphur | 03-Jul-2017 |
| TPH CWG GC (S) | 04-Jul-2017 |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-74 | **Client Reference:** | 2793-COC11-N | **Report Number:** | 414863 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

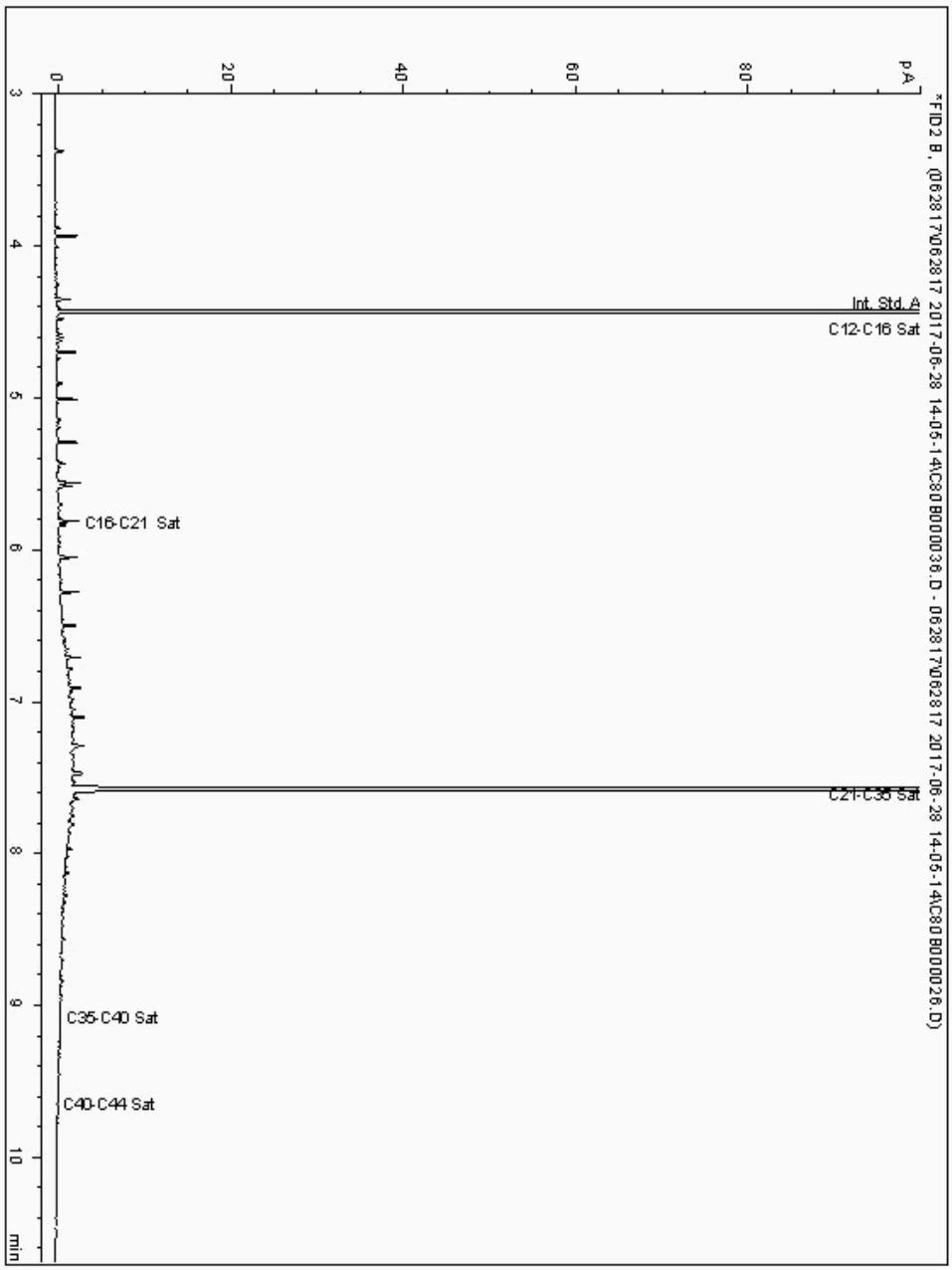
**Analysis:** EPH CWG (Aliphatic) GC (S)

**Sample No :** 15745282
**Sample ID :** 2793-TP114-SS15

**Depth :** 5.00 - 8.00

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 14736934-
Date Acquired : 29/06/17 01:56:24
Units : ppb
Dilution :
CF : 1
Multiplier : 1.010



# CERTIFICATE OF ANALYSIS

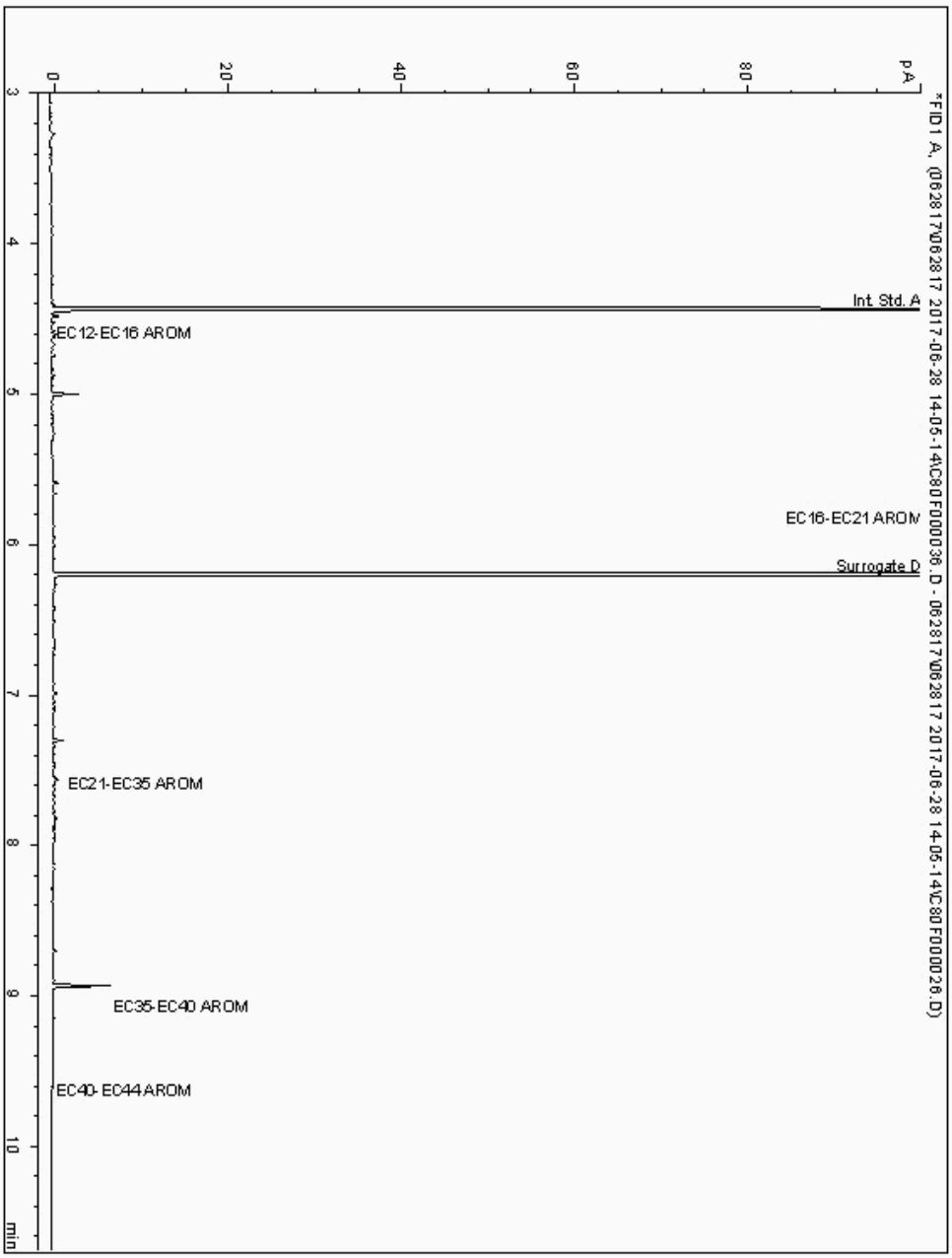
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-74 | **Client Reference:** | 2793-COC11-N | **Report Number:** | 414863 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

**Analysis:** EPH CWG (Aromatic) GC (S) **Sample No :** 15745282 **Depth :** 5.00 - 8.00
**Sample ID :** 2793-TP114-SS15

Speciated TPH - AROMS ( C12 - C44)

Sample Identity: 14736935-
Date Acquired : 29/06/17 01:56:24
Units : ppb
Dilution :
CF : 1
Multiplier : 1.010



# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-74 | **Client Reference:** | 2793-COC11-N | **Report Number:** | 414863 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

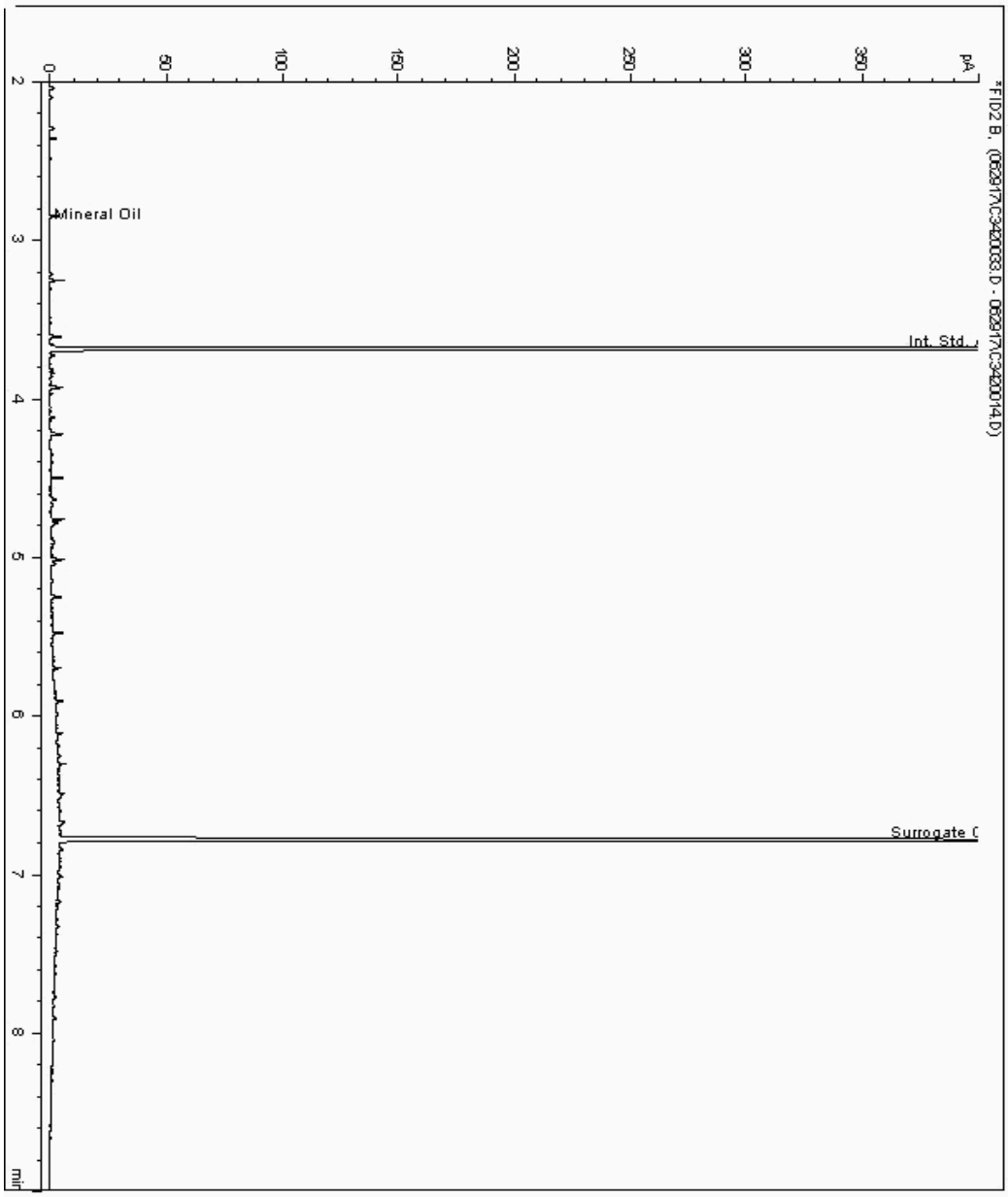
**Analysis:** Mineral Oil

**Sample No :** 15758944
**Sample ID :** 2793-TP114-SS15

**Depth :** 5.00 - 8.00

Mineral Oil Range Organics ( C10 - C40 )

Sample Identity : 14736937-
Date Acquired : 29/06/17 21:00:14 PM
Units : mg/kg
Sample Multiplier : 0.000
Dilution :



# CERTIFICATE OF ANALYSIS

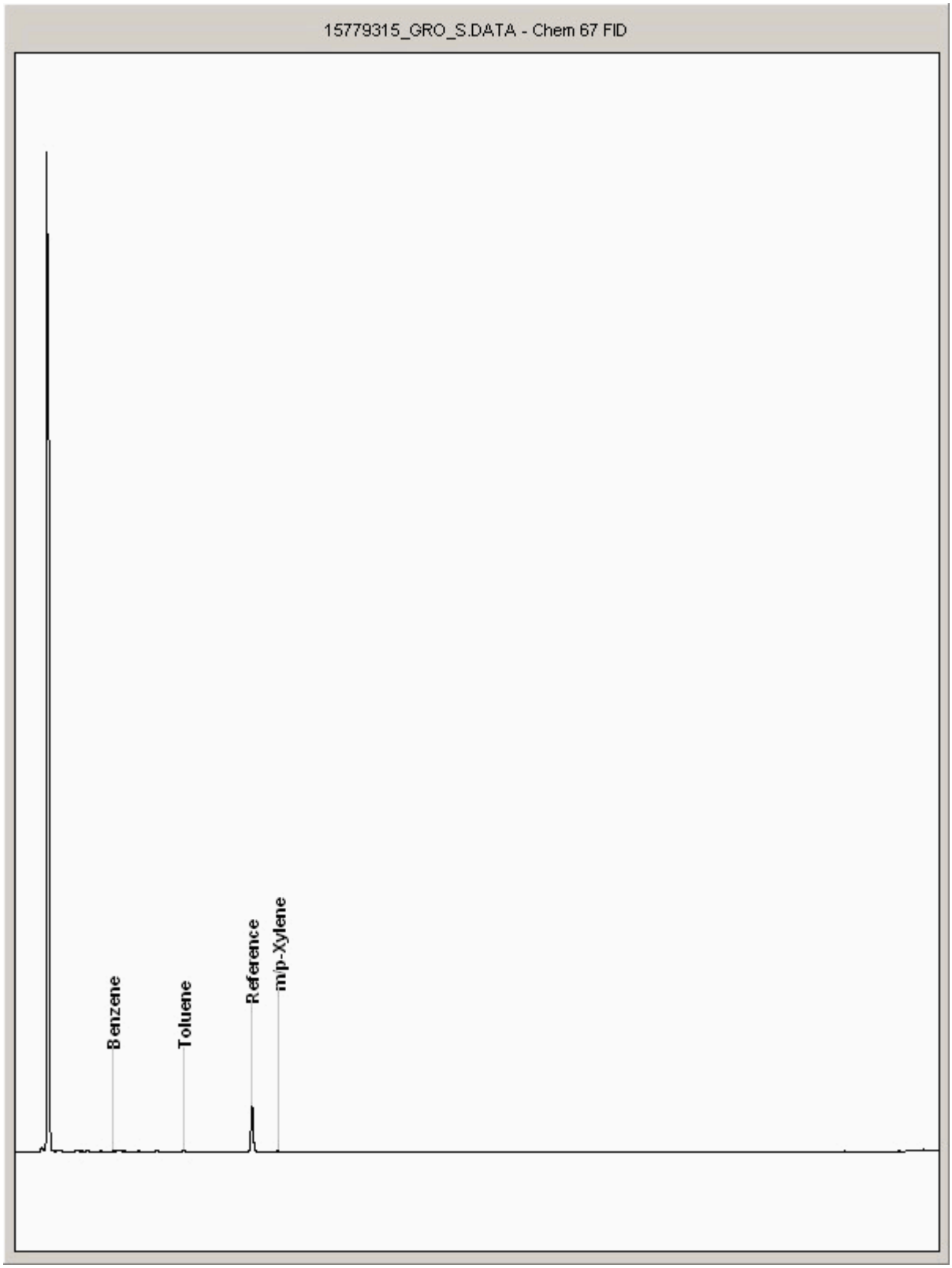
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 170624-74 | **Client Reference:** | 2793-COC11-N | **Report Number:** | 414863 |
| **Location:** | JJ Rhatigan, Charlemont S | **Order Number:** | | **Superseded Report:** | |

## Chromatogram

**Analysis:** GRO by GC-FID (S)

**Sample No :** 15779315
**Sample ID :** 2793-TP114-SS15

**Depth :** 5.00 - 8.00



# Appendix

## General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

## Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

| | |
|---|---|
| 1 | **Container with Headspace provided for volatiles analysis** |
| 2 | **Incorrect container received** |
| 3 | **Deviation from method** |
| 4 | **Holding time exceeded before sample received** |
| 5 | **Samples exceeded holding time before presevation was performed** |
| § | **Sampled on date not provided** |
| ♦ | **Sample holding time exceeded in laboratory** |
| @ | **Sample holding time exceeded due to sampled on date** |
| & | **Sample Holding Time exceeded - Late arrival of instructions.** |

## Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

| Asbestos Type | Common Name |
|---|---|
| Chrysotile | White Asbestos |
| Amosite | Brown Asbestos |
| Crocidolite | Blue Asbestos |
| Fibrous Actinolite | - |
| Fibrous Anthophyllite | - |
| Fibrous Tremolite | - |

**Visual Estimation Of Fibre Content**

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

**Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.**

**The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.**

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8PL

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Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781


Minerex Environmental Ltd
Taney Hall
Eglinton Terrace
Dundrum
Dublin 14
Ireland

| | |
|---|---|
| **Attention :** | Jen Caleno |
| **Date :** | 4th July, 2018 |
| **Your reference :** | 2793-COC34 |
| **Our reference :** | Test Report 18/9910 Batch 1 |
| **Location :** | JJ Rhatigan, Charlemont Street, Dublin 2 |
| **Date samples received :** | 25th June, 2018 |
| **Status :** | Final report |
| **Issue :** | 1 |

Three samples were received for analysis on 25th June, 2018 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Where Waste Acceptance Criteria Suite (EC Decision of 19 December 2002 (2003/33/EC)) has been requested, all analyses have been performed using the relevant EN methods where they exist.

**Compiled By:**

**Bruce Leslie**
**Project Co-ordinator**

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC34
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno
**JE Job No.:** 18/9910

**Report : Solid**

**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

| J E Sample No. | 1-3 | 4-6 | 7-9 | | | | | | | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | 2793-TP201-SS1 | 2793-TP202-SS1 | 2793-TP203-SS1 | | | | | | | | | | |
| Depth | 0.00-2.10 | 0.00-2.00 | 0.00-2.00 | | | | | | | | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V J T | V J T | V J T | | | | | | | | | | |
| Sample Date | 29/05/2018 | 29/05/2018 | 29/05/2018 | | | | | | | | | | |
| Sample Type | Soil | Soil | Soil | | | | | | | | | | |
| Batch Number | 1 | 1 | 1 | | | | | | | | | | |
| Date of Receipt | 25/06/2018 | 25/06/2018 | 25/06/2018 | | | | | | | | | | |
| Antimony | 2 | 3 | 3 | | | | | | | | <1 | mg/kg | TM30/PM15 |
| Arsenic # | 8.7 | 8.4 | 9.7 | | | | | | | | <0.5 | mg/kg | TM30/PM15 |
| Barium # | 101 | 89 | 73 | | | | | | | | <1 | mg/kg | TM30/PM15 |
| Cadmium # | 1.5 | 1.9 | 1.3 | | | | | | | | <0.1 | mg/kg | TM30/PM15 |
| Chromium # | 48.8 | 73.6 | 61.7 | | | | | | | | <0.5 | mg/kg | TM30/PM15 |
| Copper # | 23 | 25 | 20 | | | | | | | | <1 | mg/kg | TM30/PM15 |
| Lead # | 16 | 17 | 18 | | | | | | | | <5 | mg/kg | TM30/PM15 |
| Manganese # | 1381 | 1271 | 884 | | | | | | | | <1 | mg/kg | TM30/PM15 |
| Mercury # | <0.1 | <0.1 | <0.1 | | | | | | | | <0.1 | mg/kg | TM30/PM15 |
| Molybdenum # | 5.3 | 7.7 | 6.3 | | | | | | | | <0.1 | mg/kg | TM30/PM15 |
| Nickel # | 35.7 | 33.1 | 32.3 | | | | | | | | <0.7 | mg/kg | TM30/PM15 |
| Selenium # | 2 | 2 | 2 | | | | | | | | <1 | mg/kg | TM30/PM15 |
| Water Soluble Boron # | 0.8 | 0.7 | 0.7 | | | | | | | | <0.1 | mg/kg | TM74/PM32 |
| Zinc # | 69 | 81 | 67 | | | | | | | | <5 | mg/kg | TM30/PM15 |
| | | | | | | | | | | | | | |
| PAH MS | | | | | | | | | | | | | |
| Naphthalene # | <0.04 | <0.04 | <0.04 | | | | | | | | <0.04 | mg/kg | TM4/PM8 |
| Acenaphthylene | <0.03 | <0.03 | <0.03 | | | | | | | | <0.03 | mg/kg | TM4/PM8 |
| Acenaphthene # | <0.05 | <0.05 | <0.05 | | | | | | | | <0.05 | mg/kg | TM4/PM8 |
| Fluorene # | <0.04 | <0.04 | <0.04 | | | | | | | | <0.04 | mg/kg | TM4/PM8 |
| Phenanthrene # | 0.05 | 0.04 | 0.03 | | | | | | | | <0.03 | mg/kg | TM4/PM8 |
| Anthracene # | <0.04 | <0.04 | <0.04 | | | | | | | | <0.04 | mg/kg | TM4/PM8 |
| Fluoranthene # | <0.03 | <0.03 | <0.03 | | | | | | | | <0.03 | mg/kg | TM4/PM8 |
| Pyrene # | <0.03 | <0.03 | <0.03 | | | | | | | | <0.03 | mg/kg | TM4/PM8 |
| Benzo(a)anthracene # | <0.06 | <0.06 | <0.06 | | | | | | | | <0.06 | mg/kg | TM4/PM8 |
| Chrysene # | 0.04 | 0.04 | 0.03 | | | | | | | | <0.02 | mg/kg | TM4/PM8 |
| Benzo(bk)fluoranthene # | <0.07 | <0.07 | <0.07 | | | | | | | | <0.07 | mg/kg | TM4/PM8 |
| Benzo(a)pyrene # | <0.04 | <0.04 | <0.04 | | | | | | | | <0.04 | mg/kg | TM4/PM8 |
| Indeno(123cd)pyrene # | <0.04 | <0.04 | <0.04 | | | | | | | | <0.04 | mg/kg | TM4/PM8 |
| Dibenzo(ah)anthracene # | <0.04 | <0.04 | <0.04 | | | | | | | | <0.04 | mg/kg | TM4/PM8 |
| Benzo(ghi)perylene # | <0.04 | <0.04 | <0.04 | | | | | | | | <0.04 | mg/kg | TM4/PM8 |
| Coronene | <0.04 | <0.04 | <0.04 | | | | | | | | <0.04 | mg/kg | TM4/PM8 |
| PAH 6 Total # | <0.22 | <0.22 | <0.22 | | | | | | | | <0.22 | mg/kg | TM4/PM8 |
| PAH 16 Total | <0.6 | <0.6 | <0.6 | | | | | | | | <0.6 | mg/kg | TM4/PM8 |
| PAH 17 Total | <0.64 | <0.64 | <0.64 | | | | | | | | <0.64 | mg/kg | TM4/PM8 |
| Benzo(b)fluoranthene | <0.05 | <0.05 | <0.05 | | | | | | | | <0.05 | mg/kg | TM4/PM8 |
| Benzo(k)fluoranthene | <0.02 | <0.02 | <0.02 | | | | | | | | <0.02 | mg/kg | TM4/PM8 |
| PAH Surrogate % Recovery | 95 | 94 | 92 | | | | | | | | <0 | % | TM4/PM8 |
| | | | | | | | | | | | | | |
| EPH (C8-C40) # | <30 | <30 | <30 | | | | | | | | <30 | mg/kg | TM5/PM8 |
| Mineral Oil (C10-C40) | <30 | <30 | <30 | | | | | | | | <30 | mg/kg | TM5/PM8/PM16 |

Please see attached notes for all abbreviations and acronyms

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC34
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno
**JE Job No.:** 18/9910

**Report : Solid**

**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

| J E Sample No. | 1-3 | 4-6 | 7-9 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | 2793-TP201-SS1 | 2793-TP202-SS1 | 2793-TP203-SS1 | | | | | | | | | |
| Depth | 0.00-2.10 | 0.00-2.00 | 0.00-2.00 | | | | | | | | | |
| COC No / misc | | | | | | | | | | | | |
| Containers | V J T | V J T | V J T | | | | | | | | | |
| Sample Date | 29/05/2018 | 29/05/2018 | 29/05/2018 | | | | | | | | | |
| Sample Type | Soil | Soil | Soil | | | | | | | | | |
| Batch Number | 1 | 1 | 1 | | | | | | | | | |
| Date of Receipt | 25/06/2018 | 25/06/2018 | 25/06/2018 | | | | | | | | | |

Please see attached notes for all abbreviations and acronyms

| | | | | | | | | | | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TPH CWG | | | | | | | | | | | | | |
| **Aliphatics** | | | | | | | | | | | | | |
| >C5-C6 # | <0.1 SV | <0.1 SV | <0.1 SV | | | | | | | | <0.1 | mg/kg | TM36/PM12 |
| >C6-C8 # | <0.1 SV | <0.1 SV | <0.1 SV | | | | | | | | <0.1 | mg/kg | TM36/PM12 |
| >C8-C10 | <0.1 SV | <0.1 SV | <0.1 SV | | | | | | | | <0.1 | mg/kg | TM36/PM12 |
| >C10-C12 # | <0.2 | <0.2 | <0.2 | | | | | | | | <0.2 | mg/kg | TM5/PM8/PM16 |
| >C12-C16 # | <4 | <4 | <4 | | | | | | | | <4 | mg/kg | TM5/PM8/PM16 |
| >C16-C21 # | <7 | <7 | <7 | | | | | | | | <7 | mg/kg | TM5/PM8/PM16 |
| >C21-C35 # | <7 | <7 | <7 | | | | | | | | <7 | mg/kg | TM5/PM8/PM16 |
| Total aliphatics C5-35 | <19 | <19 | <19 | | | | | | | | <19 | mg/kg | TM5/TM36/PM8/PM12/PM16 |
| **Aromatics** | | | | | | | | | | | | | |
| >C5-EC7 # | <0.1 SV | <0.1 SV | <0.1 SV | | | | | | | | <0.1 | mg/kg | TM36/PM12 |
| >EC7-EC8 # | <0.1 SV | <0.1 SV | <0.1 SV | | | | | | | | <0.1 | mg/kg | TM36/PM12 |
| >EC8-EC10 # | <0.1 SV | <0.1 SV | <0.1 SV | | | | | | | | <0.1 | mg/kg | TM36/PM12 |
| >EC10-EC12 # | <0.2 | <0.2 | <0.2 | | | | | | | | <0.2 | mg/kg | TM5/PM8/PM16 |
| >EC12-EC16 # | <4 | <4 | <4 | | | | | | | | <4 | mg/kg | TM5/PM8/PM16 |
| >EC16-EC21 # | <7 | <7 | <7 | | | | | | | | <7 | mg/kg | TM5/PM8/PM16 |
| >EC21-EC35 # | <7 | <7 | <7 | | | | | | | | <7 | mg/kg | TM5/PM8/PM16 |
| Total aromatics C5-35 # | <19 | <19 | <19 | | | | | | | | <19 | mg/kg | TM5/TM36/PM8/PM12/PM16 |
| Total aliphatics and aromatics(C5-35) | <38 | <38 | <38 | | | | | | | | <38 | mg/kg | TM5/TM36/PM8/PM12/PM16 |
| | | | | | | | | | | | | | |
| MTBE # | <5 SV | <5 SV | <5 SV | | | | | | | | <5 | ug/kg | TM31/PM12 |
| Benzene # | <5 SV | <5 SV | <5 SV | | | | | | | | <5 | ug/kg | TM31/PM12 |
| Toluene # | 14 SV | 10 SV | 7 SV | | | | | | | | <5 | ug/kg | TM31/PM12 |
| Ethylbenzene # | <5 SV | <5 SV | <5 SV | | | | | | | | <5 | ug/kg | TM31/PM12 |
| m/p-Xylene # | <5 SV | <5 SV | <5 SV | | | | | | | | <5 | ug/kg | TM31/PM12 |
| o-Xylene # | <5 SV | <5 SV | <5 SV | | | | | | | | <5 | ug/kg | TM31/PM12 |
| | | | | | | | | | | | | | |
| PCB 28 # | <5 | <5 | <5 | | | | | | | | <5 | ug/kg | TM17/PM8 |
| PCB 52 # | <5 | <5 | <5 | | | | | | | | <5 | ug/kg | TM17/PM8 |
| PCB 101 # | <5 | <5 | <5 | | | | | | | | <5 | ug/kg | TM17/PM8 |
| PCB 118 # | <5 | <5 | <5 | | | | | | | | <5 | ug/kg | TM17/PM8 |
| PCB 138 # | <5 | <5 | <5 | | | | | | | | <5 | ug/kg | TM17/PM8 |
| PCB 153 # | <5 | <5 | <5 | | | | | | | | <5 | ug/kg | TM17/PM8 |
| PCB 180 # | <5 | <5 | <5 | | | | | | | | <5 | ug/kg | TM17/PM8 |
| Total 7 PCBs # | <35 | <35 | <35 | | | | | | | | <35 | ug/kg | TM17/PM8 |
| | | | | | | | | | | | | | |
| Phenol # | <0.01 | <0.01 | <0.01 | | | | | | | | <0.01 | mg/kg | TM26/PM21 |
| | | | | | | | | | | | | | |
| Natural Moisture Content | 6.8 | 6.4 | 7.0 | | | | | | | | <0.1 | % | PM4/PM0 |
| | | | | | | | | | | | | | |
| Hexavalent Chromium # | <0.3 | <0.3 | <0.3 | | | | | | | | <0.3 | mg/kg | TM38/PM20 |
| Chromium III | 48.8 | 73.6 | 61.7 | | | | | | | | <0.5 | mg/kg | NONE/NONE |

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC34
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno
**JE Job No.:** 18/9910

**Report : Solid**

**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

| J E Sample No. | 1-3 | 4-6 | 7-9 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample ID** | 2793-TP201-SS1 | 2793-TP202-SS1 | 2793-TP203-SS1 | | | | | | | | | |
| **Depth** | 0.00-2.10 | 0.00-2.00 | 0.00-2.00 | | | | | | | | | |
| **COC No / misc** | | | | | | | | | | | | |
| **Containers** | V J T | V J T | V J T | | | | | | | | | |
| **Sample Date** | 29/05/2018 | 29/05/2018 | 29/05/2018 | | | | | | | | | |
| **Sample Type** | Soil | Soil | Soil | | | | | | | | | |
| **Batch Number** | 1 | 1 | 1 | | | | | | | | | |
| **Date of Receipt** | 25/06/2018 | 25/06/2018 | 25/06/2018 | | | | | | | | | |

Please see attached notes for all abbreviations and acronyms

| | | | | | | | | | | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Free Cyanide | <0.5 | <0.5 | <0.5 | | | | | | | | <0.5 | mg/kg | TM89/PM45 |
| Total Cyanide # | <0.5 | <0.5 | <0.5 | | | | | | | | <0.5 | mg/kg | TM89/PM45 |
| Total Organic Carbon # | 0.51 | 0.49 | 0.44 | | | | | | | | <0.02 | % | TM21/PM24 |
| Loss on Ignition # | 1.7 | 1.6 | 1.5 | | | | | | | | <1.0 | % | TM22/PM0 |
| pH # | 7.62 | 8.06 | 8.12 | | | | | | | | <0.01 | pH units | TM73/PM11 |

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC34
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno
**JE Job No.:** 18/9910

**Report : CEN 10:1 1 Batch**

**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

| J E Sample No. | 1-3 | 4-6 | 7-9 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | 2793-TP201-SS1 | 2793-TP202-SS1 | 2793-TP203-SS1 | | | | | | | | | |
| Depth | 0.00-2.10 | 0.00-2.00 | 0.00-2.00 | | | | | | | | | |
| COC No / misc | | | | | | | | | | | | |
| Containers | V J T | V J T | V J T | | | | | | | | | |
| Sample Date | 29/05/2018 | 29/05/2018 | 29/05/2018 | | | | | | | | | |
| Sample Type | Soil | Soil | Soil | | | | | | | | | |
| Batch Number | 1 | 1 | 1 | | | | | | | | | |
| Date of Receipt | 25/06/2018 | 25/06/2018 | 25/06/2018 | | | | | | | | | |

Please see attached notes for all abbreviations and acronyms

| | | | | | | | | | | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dissolved Antimony # | <0.002 | <0.002 | <0.002 | | | | | | | | <0.002 | mg/l | TM30/PM17 |
| Dissolved Antimony (A10) # | <0.02 | <0.02 | <0.02 | | | | | | | | <0.02 | mg/kg | TM30/PM17 |
| Dissolved Arsenic # | <0.0025 | <0.0025 | <0.0025 | | | | | | | | <0.0025 | mg/l | TM30/PM17 |
| Dissolved Arsenic (A10) # | <0.025 | <0.025 | <0.025 | | | | | | | | <0.025 | mg/kg | TM30/PM17 |
| Dissolved Barium # | 0.041 | 0.042 | 0.046 | | | | | | | | <0.003 | mg/l | TM30/PM17 |
| Dissolved Barium (A10) # | 0.41 | 0.42 | 0.46 | | | | | | | | <0.03 | mg/kg | TM30/PM17 |
| Dissolved Cadmium # | <0.0005 | <0.0005 | <0.0005 | | | | | | | | <0.0005 | mg/l | TM30/PM17 |
| Dissolved Cadmium (A10) # | <0.005 | <0.005 | <0.005 | | | | | | | | <0.005 | mg/kg | TM30/PM17 |
| Dissolved Chromium # | <0.0015 | <0.0015 | <0.0015 | | | | | | | | <0.0015 | mg/l | TM30/PM17 |
| Dissolved Chromium (A10) # | <0.015 | <0.015 | <0.015 | | | | | | | | <0.015 | mg/kg | TM30/PM17 |
| Dissolved Copper # | <0.007 | <0.007 | <0.007 | | | | | | | | <0.007 | mg/l | TM30/PM17 |
| Dissolved Copper (A10) # | <0.07 | <0.07 | <0.07 | | | | | | | | <0.07 | mg/kg | TM30/PM17 |
| Dissolved Iron # | <20 | <20 | <20 | | | | | | | | <20 | ug/l | TM30/PM14 |
| Dissolved Lead # | <0.005 | <0.005 | <0.005 | | | | | | | | <0.005 | mg/l | TM30/PM17 |
| Dissolved Lead (A10) # | <0.05 | <0.05 | <0.05 | | | | | | | | <0.05 | mg/kg | TM30/PM17 |
| Dissolved Manganese # | 59 | 46 | 38 | | | | | | | | <2 | ug/l | TM30/PM14 |
| Dissolved Mercury # | <0.001 | <0.001 | <0.001 | | | | | | | | <0.001 | mg/l | TM30/PM17 |
| Dissolved Mercury (A10) # | <0.01 | <0.01 | <0.01 | | | | | | | | <0.01 | mg/kg | TM30/PM17 |
| Dissolved Molybdenum # | 0.023 | 0.023 | 0.020 | | | | | | | | <0.002 | mg/l | TM30/PM17 |
| Dissolved Molybdenum (A10) # | 0.23 | 0.23 | 0.20 | | | | | | | | <0.02 | mg/kg | TM30/PM17 |
| Dissolved Nickel # | <0.002 | <0.002 | <0.002 | | | | | | | | <0.002 | mg/l | TM30/PM17 |
| Dissolved Nickel (A10) # | <0.02 | <0.02 | <0.02 | | | | | | | | <0.02 | mg/kg | TM30/PM17 |
| Dissolved Selenium # | 0.040 | 0.036 | 0.032 | | | | | | | | <0.003 | mg/l | TM30/PM17 |
| Dissolved Selenium (A10) # | 0.40 | 0.36 | 0.32 | | | | | | | | <0.03 | mg/kg | TM30/PM17 |
| Dissolved Zinc # | <0.003 | <0.003 | <0.003 | | | | | | | | <0.003 | mg/l | TM30/PM17 |
| Dissolved Zinc (A10) # | <0.03 | <0.03 | <0.03 | | | | | | | | <0.03 | mg/kg | TM30/PM17 |
| | | | | | | | | | | | | | |
| Phenol | <0.01 | <0.01 | <0.01 | | | | | | | | <0.01 | mg/l | TM26/PM0 |
| Phenol | <0.1 | <0.1 | <0.1 | | | | | | | | <0.1 | mg/kg | TM26/PM0 |
| | | | | | | | | | | | | | |
| Fluoride | <0.3 | <0.3 | <0.3 | | | | | | | | <0.3 | mg/l | TM173/PM0 |
| Fluoride | <3 | <3 | <3 | | | | | | | | <3 | mg/kg | TM173/PM0 |
| | | | | | | | | | | | | | |
| Sulphate as SO4 # | 173.77 | 166.26 | 134.82 | | | | | | | | <0.05 | mg/l | TM38/PM0 |
| Sulphate as SO4 # | 1737.2 | 1663.4 | 1348.8 | | | | | | | | <0.5 | mg/kg | TM38/PM0 |
| Chloride # | 0.7 | 0.5 | 0.7 | | | | | | | | <0.3 | mg/l | TM38/PM0 |
| Chloride # | 7 | 5 | 7 | | | | | | | | <3 | mg/kg | TM38/PM0 |
| | | | | | | | | | | | | | |
| Dissolved Organic Carbon | <2 | <2 | <2 | | | | | | | | <2 | mg/l | TM60/PM0 |
| Dissolved Organic Carbon | <20 | <20 | <20 | | | | | | | | <20 | mg/kg | TM60/PM0 |
| Total Dissolved Solids # | 273 | 324 | 234 | | | | | | | | <35 | mg/l | TM20/PM0 |
| Total Dissolved Solids # | 2729 | 3242 | 2341 | | | | | | | | <350 | mg/kg | TM20/PM0 |
| | | | | | | | | | | | | | |

| | | | |
|---|---|---|---|
| Mass of sample taken (kg) | - | Dry Matter Content Ratio (%) = | 91.1 |
| Mass of dry sample (kg) = | 0.09 | Leachant Volume (l) | - |
| Particle Size <4mm = | >95% | Eluate Volume (l) | - |

| | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|
| **JEFL Job No** | **18/9910** | | | |
| **Sample No** | **3** | | | |
| **Client Sample No** | **2793-TP201-SS1** | | | |
| **Depth/Other** | **0.00-2.10** | **Inert** | **Stable Non-reactive** | **Hazardous** |
| **Sample Date** | **29/05/2018** | | | |
| **Batch No** | **1** | | | |
| **Solid Waste Analysis** | | | | |
| Total Organic Carbon (%) | 0.51 | 3 | 5 | 6 |
| Sum of BTEX (mg/kg) | - | 6 | - | - |
| Sum of 7 PCBs (mg/kg) | - | 1 | - | - |
| Mineral Oil (mg/kg) | - | 500 | - | - |
| PAH Sum of 6 (mg/kg) | - | - | - | - |
| PAH Sum of 17 (mg/kg) | - | 100 | - | - |
| | | | | |
| | | | | |
| | | | | |
| **Eluate Analysis** | **10:1 concn leached** | **Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg** | | |
| | **A10** | | | |
| | **mg/kg** | **mg/kg** | | |
| Arsenic | <0.025 | 0.5 | 2 | 25 |
| Barium | 0.41 | 20 | 100 | 300 |
| Cadmium | <0.005 | 0.04 | 1 | 5 |
| Chromium | <0.015 | 0.5 | 10 | 70 |
| Copper | <0.07 | 2 | 50 | 100 |
| Mercury | <0.01 | 0.01 | 0.2 | 2 |
| Molybdenum | 0.23 | 0.5 | 10 | 30 |
| Nickel | <0.02 | 0.4 | 10 | 40 |
| Lead | <0.05 | 0.5 | 10 | 50 |
| Antimony | <0.02 | 0.06 | 0.7 | 5 |
| Selenium | 0.40 | 0.1 | 0.5 | 7 |
| Zinc | <0.03 | 4 | 50 | 200 |
| Chloride | 7 | 800 | 15000 | 25000 |
| Fluoride | <3 | 10 | 150 | 500 |
| Sulphate as SO4 | 1737.2 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 2729 | 4000 | 60000 | 100000 |
| Phenol | <0.1 | 1 | - | - |
| Dissolved Organic Carbon | <20 | 500 | 800 | 1000 |

| | | | |
|---|---|---|---|
| Mass of sample taken (kg) | - | Dry Matter Content Ratio (%) = | 91.4 |
| Mass of dry sample (kg) = | 0.09 | Leachant Volume (l) | - |
| Particle Size <4mm = | >95% | Eluate Volume (l) | - |

| | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|
| **JEFL Job No** | **18/9910** | | | |
| **Sample No** | **6** | | | |
| **Client Sample No** | **2793-TP202-SS1** | | | |
| **Depth/Other** | **0.00-2.00** | **Inert** | **Stable Non-reactive** | **Hazardous** |
| **Sample Date** | **29/05/2018** | | | |
| **Batch No** | **1** | | | |
| **Solid Waste Analysis** | | | | |
| Total Organic Carbon (%) | 0.49 | 3 | 5 | 6 |
| Sum of BTEX (mg/kg) | - | 6 | - | - |
| Sum of 7 PCBs (mg/kg) | - | 1 | - | - |
| Mineral Oil (mg/kg) | - | 500 | - | - |
| PAH Sum of 6 (mg/kg) | - | - | - | - |
| PAH Sum of 17 (mg/kg) | - | 100 | - | - |
| | | | | |
| | | | | |
| | | | | |
| **Eluate Analysis** | **10:1 concn leached** | **Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg** | | |
| | **A10** | | | |
| | **mg/kg** | **mg/kg** | | |
| Arsenic | <0.025 | 0.5 | 2 | 25 |
| Barium | 0.42 | 20 | 100 | 300 |
| Cadmium | <0.005 | 0.04 | 1 | 5 |
| Chromium | <0.015 | 0.5 | 10 | 70 |
| Copper | <0.07 | 2 | 50 | 100 |
| Mercury | <0.01 | 0.01 | 0.2 | 2 |
| Molybdenum | 0.23 | 0.5 | 10 | 30 |
| Nickel | <0.02 | 0.4 | 10 | 40 |
| Lead | <0.05 | 0.5 | 10 | 50 |
| Antimony | <0.02 | 0.06 | 0.7 | 5 |
| Selenium | 0.36 | 0.1 | 0.5 | 7 |
| Zinc | <0.03 | 4 | 50 | 200 |
| Chloride | 5 | 800 | 15000 | 25000 |
| Fluoride | <3 | 10 | 150 | 500 |
| Sulphate as SO4 | 1663.4 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 3242 | 4000 | 60000 | 100000 |
| Phenol | <0.1 | 1 | - | - |
| Dissolved Organic Carbon | <20 | 500 | 800 | 1000 |

| | | | |
|---|---|---|---|
| Mass of sample taken (kg) | - | Dry Matter Content Ratio (%) = | 93.3 |
| Mass of dry sample (kg) = | 0.09 | Leachant Volume (l) | - |
| Particle Size <4mm = | >95% | Eluate Volume (l) | - |

| | | | | |
|---|---|---|---|---|
| **JEFL Job No** | **18/9910** | **Landfill Waste Acceptance Criteria Limits** | | |
| **Sample No** | **9** | | | |
| **Client Sample No** | **2793-TP203-SS1** | **Inert** | **Stable Non-reactive** | **Hazardous** |
| **Depth/Other** | **0.00-2.00** | | | |
| **Sample Date** | **29/05/2018** | | | |
| **Batch No** | **1** | | | |
| **Solid Waste Analysis** | | | | |
| Total Organic Carbon (%) | 0.44 | 3 | 5 | 6 |
| Sum of BTEX (mg/kg) | - | 6 | - | - |
| Sum of 7 PCBs (mg/kg) | - | 1 | - | - |
| Mineral Oil (mg/kg) | - | 500 | - | - |
| PAH Sum of 6 (mg/kg) | - | - | - | - |
| PAH Sum of 17 (mg/kg) | - | 100 | - | - |
| | | | | |
| | | | | |
| | | | | |

| **Eluate Analysis** | **10:1 concn leached** | **Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg** | | |
|---|---|---|---|---|
| | **A10** | | | |
| | **mg/kg** | **mg/kg** | | |
| Arsenic | <0.025 | 0.5 | 2 | 25 |
| Barium | 0.46 | 20 | 100 | 300 |
| Cadmium | <0.005 | 0.04 | 1 | 5 |
| Chromium | <0.015 | 0.5 | 10 | 70 |
| Copper | <0.07 | 2 | 50 | 100 |
| Mercury | <0.01 | 0.01 | 0.2 | 2 |
| Molybdenum | 0.20 | 0.5 | 10 | 30 |
| Nickel | <0.02 | 0.4 | 10 | 40 |
| Lead | <0.05 | 0.5 | 10 | 50 |
| Antimony | <0.02 | 0.06 | 0.7 | 5 |
| Selenium | 0.32 | 0.1 | 0.5 | 7 |
| Zinc | <0.03 | 4 | 50 | 200 |
| Chloride | 7 | 800 | 15000 | 25000 |
| Fluoride | <3 | 10 | 150 | 500 |
| Sulphate as SO4 | 1348.8 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 2341 | 4000 | 60000 | 100000 |
| Phenol | <0.1 | 1 | - | - |
| Dissolved Organic Carbon | <20 | 500 | 800 | 1000 |

**Client Name:** Minerex Environmental Ltd **Matrix : Solid**
**Reference:** 2793-COC34
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno

| J E Job No. | Batch | Sample ID | Depth | J E Sample No. | EPH Interpretation |
|---|---|---|---|---|---|
| 18/9910 | 1 | 2793-TP201-SS1 | 0.00-2.10 | 1-3 | No interpretation possible |
| 18/9910 | 1 | 2793-TP202-SS1 | 0.00-2.00 | 4-6 | No interpretation possible |
| 18/9910 | 1 | 2793-TP203-SS1 | 0.00-2.00 | 7-9 | No interpretation possible |

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC34
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno

**Note:**

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth
Asbestos Team Leader

| J E Job No. | Batch | Sample ID | Depth | J E Sample No. | Date Of Analysis | Analysis | Result |
|---|---|---|---|---|---|---|---|
| 18/9910 | 1 | 2793-TP201-SS1 | 0.00-2.10 | 2 | 28/06/2018 | **General Description (Bulk Analysis)** | Soil/Stone |
| | | | | | 28/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 28/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 28/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 28/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 28/06/2018 | **Asbestos Type** | NAD |
| | | | | | 28/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 28/06/2018 | **Asbestos Level Screen** | NAD |
| | | | | | | | |
| 18/9910 | 1 | 2793-TP202-SS1 | 0.00-2.00 | 5 | 28/06/2018 | **General Description (Bulk Analysis)** | Soil/Stone |
| | | | | | 28/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 28/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 28/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 28/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 28/06/2018 | **Asbestos Type** | NAD |
| | | | | | 28/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 28/06/2018 | **Asbestos Level Screen** | NAD |
| | | | | | | | |
| 18/9910 | 1 | 2793-TP203-SS1 | 0.00-2.00 | 8 | 28/06/2018 | **General Description (Bulk Analysis)** | Soil/Stone |
| | | | | | 28/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 28/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 28/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 28/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 28/06/2018 | **Asbestos Type** | NAD |
| | | | | | 28/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 28/06/2018 | **Asbestos Level Screen** | NAD |

**Client Name:** Minerex Environmental Ltd

**Matrix : Solid**

**Reference:** 2793-COC34

**Location:** JJ Rhatigan, Charlemont Street, Dublin 2

**Contact:** Jen Caleno

| J E Job No. | Batch | Sample ID | Depth | J E Sample No. | Analysis | Reason |
|---|---|---|---|---|---|---|
| 18/9910 | 1 | 2793-TP201-SS1 | 0.00-2.10 | 1-3 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded prior to receipt |
| 18/9910 | 1 | 2793-TP201-SS1 | 0.00-2.10 | 1-3 | GRO | Solid Samples were received at a temperature above 9°C. |
| 18/9910 | 1 | 2793-TP201-SS1 | 0.00-2.10 | 1-3 | LOI, TOC | Sample holding time exceeded |
| 18/9910 | 1 | 2793-TP202-SS1 | 0.00-2.00 | 4-6 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded prior to receipt |
| 18/9910 | 1 | 2793-TP202-SS1 | 0.00-2.00 | 4-6 | GRO | Solid Samples were received at a temperature above 9°C. |
| 18/9910 | 1 | 2793-TP202-SS1 | 0.00-2.00 | 4-6 | LOI, TOC | Sample holding time exceeded |
| 18/9910 | 1 | 2793-TP203-SS1 | 0.00-2.00 | 7-9 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded prior to receipt |
| 18/9910 | 1 | 2793-TP203-SS1 | 0.00-2.00 | 7-9 | GRO | Solid Samples were received at a temperature above 9°C. |
| 18/9910 | 1 | 2793-TP203-SS1 | 0.00-2.00 | 7-9 | LOI, TOC | Sample holding time exceeded |

**Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.**

**Only analyses which are accredited are recorded as deviating if set criteria are not met.**

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

***JE Job No.:*** 18/9910

**SOILS**

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

**WATERS**

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

**DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

**SURROGATES**

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

**DILUTIONS**

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

**BLANKS**

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

**NOTE**

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

**REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

**ABBREVIATIONS and ACRONYMS USED**

| | |
|---|---|
| # | ISO17025 (UKAS Ref No. 4225) accredited - UK. |
| SA | ISO17025 (SANAS Ref No.T0729) accredited - South Africa. |
| B | Indicates analyte found in associated method blank. |
| DR | Dilution required. |
| M | MCERTS accredited. |
| NA | Not applicable |
| NAD | No Asbestos Detected. |
| ND | None Detected (usually refers to VOC and/SVOC TICs). |
| NDP | No Determination Possible |
| SS | Calibrated against a single substance |
| SV | Surrogate recovery outside performance criteria. This may be due to a matrix effect. |
| W | Results expressed on as received basis. |
| + | AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page. |
| ++ | Result outside calibration range, results should be considered as indicative only and are not accredited. |
| * | Analysis subcontracted to an Exova Jones Environmental approved laboratory. |
| AD | Samples are dried at 35°C ±5°C |
| CO | Suspected carry over |
| LOD/LOR | Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS |
| ME | Matrix Effect |
| NFD | No Fibres Detected |
| BS | AQC Sample |
| LB | Blank Sample |
| N | Client Sample |
| TB | Trip Blank Sample |
| OC | Outside Calibration Range |

**JE Job No:** 18/9910

| Test Method No. | Description | Prep Method No. (if appropriate) | Description | ISO 17025 (UKAS/SANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|---|---|---|---|---|---|---|---|
| PM4 | Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377. | PM0 | No preparation is required. | | | AR | |
| TM4 | Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS. | PM8 | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required. | | | AR | Yes |
| TM4 | Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS. | PM8 | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required. | Yes | | AR | Yes |
| TM5 | Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID. | PM8 | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required. | | | AR | Yes |
| TM5 | Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID. | PM8 | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required. | Yes | | AR | Yes |
| TM5 | Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID. | PM8/PM16 | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE. | | | AR | Yes |
| TM5 | Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID. | PM8/PM16 | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE. | Yes | | AR | Yes |
| TM5/TM36 | please refer to TM5 and TM36 for method details | PM8/PM12/PM16 | please refer to PM8/PM16 and PM12 for method details | | | AR | Yes |
| TM5/TM36 | please refer to TM5 and TM36 for method details | PM8/PM12/PM16 | please refer to PM8/PM16 and PM12 for method details | Yes | | AR | Yes |
| TM17 | Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS. | PM8 | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required. | Yes | | AR | Yes |

**JE Job No:** 18/9910

| Test Method No. | Description | Prep Method No. (if appropriate) | Description | ISO 17025 (UKAS/SANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|---|---|---|---|---|---|---|---|
| TM20 | Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids | PM0 | No preparation is required. | Yes | | AR | Yes |
| TM21 | Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4. | PM24 | Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis. | Yes | | AD | Yes |
| TM22 | Modified USEPA 160.4. Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (450°C) | PM0 | No preparation is required. | Yes | | AD | Yes |
| TM26 | Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection. | PM0 | No preparation is required. | | | AR | Yes |
| TM26 | Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection. | PM21 | As received solid or water samples are extracted in Methanol: Sodium Hydroxide (0.1M NaOH) (60:40) by orbital shaker. | Yes | | AR | Yes |
| TM30 | Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009 | PM14 | Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required. | Yes | | AR | Yes |
| TM30 | Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009 | PM15 | Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground. | | | AD | Yes |
| TM30 | Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009 | PM15 | Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground. | Yes | | AD | Yes |
| TM30 | Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009 | PM17 | Modified method EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio. | Yes | | AR | Yes |
| TM31 | Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID. | PM12 | Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis. | Yes | | AR | Yes |

**JE Job No:** 18/9910

| Test Method No. | Description | Prep Method No. (if appropriate) | Description | ISO 17025 (UKAS/SANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|---|---|---|---|---|---|---|---|
| TM36 | Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. | PM12 | Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis. | | | AR | Yes |
| TM36 | Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. | PM12 | Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis. | Yes | | AR | Yes |
| TM38 | Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+), 7196A (Hex Cr) | PM0 | No preparation is required. | Yes | | AR | Yes |
| TM38 | Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+), 7196A (Hex Cr) | PM20 | Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker. | Yes | | AR | Yes |
| TM60 | Modified USEPA 9060. Determination of TOC by calculation from Total Carbon and Inorganic Carbon using a TOC analyser, the carbon in the sample is converted to CO2 and then passed through a non-dispersive infrared gas analyser (NDIR). | PM0 | No preparation is required. | | | AR | Yes |
| TM65 | Asbestos Bulk Identification method based on HSG 248. | PM42 | Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065. | Yes | | AR | |
| TM73 | Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser. | PM11 | Extraction of as received solid samples using one part solid to 2.5 parts deionised water. | Yes | | AR | No |
| TM74 | Analysis of water soluble boron (20:1 extract) by ICP-OES. | PM32 | Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio. | Yes | | AD | Yes |
| TM89 | Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis. | PM45 | As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis. | | | AR | Yes |
| TM89 | Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis. | PM45 | As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis. | Yes | | AR | Yes |

**JE Job No:** 18/9910

| Test Method No. | Description | Prep Method No. (if appropriate) | Description | ISO 17025 (UKAS/SANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|---|---|---|---|---|---|---|---|
| TM173 | Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2 | PM0 | No preparation is required. | | | AR | Yes |
| NONE | No Method Code | NONE | No Method Code | | | AR | Yes |
| NONE | No Method Code | PM4 | Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377. | | | AR | |
| | | | | | | | |
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# Appendix - Methods used for WAC (2003/33/EC)

| | |
|---|---|
| **Leachate tests** | |
| 10l/kg; 4mm | I.S. EN 12457-2:2002 Specified particle size; water added to L/S ratio; capped; agitated for 24 ± 0.5 hours; eluate settled and filtered over 0.45 μm membrane filter. |
| **Eluate analysis** | |
| As | I.S. EN 12506 : EN ISO 11885 (ICP-OES) |
| Ba | I.S. EN 12506 : EN ISO 11885 (ICP-OES) |
| Cd | I.S. EN 12506 : EN ISO 11885 (ICP-OES) |
| Cr total | I.S. EN 12506 : EN ISO 11885 (ICP-OES) |
| Cu | I.S. EN 12506 : EN ISO 11885 (ICP-OES) |
| Hg | I.S. EN 13370 rec. EN 1483 (CVAAS) |
| Mo | I.S. EN 12506 : EN ISO 11885 (ICP-OES) |
| Ni | I.S. EN 12506 : EN ISO 11885 (ICP-OES) |
| Pb | I.S. EN 12506 : EN ISO 11885 (ICP-OES) |
| Sb | I.S. EN 12506 : EN ISO 11885 (ICP-OES) |
| Se | I.S. EN 12506 : EN ISO 11885 (ICP-OES) |
| Zn | I.S. EN 12506 : EN ISO 11885 (ICP-OES) |
| Chloride | I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions) |
| Fluoride | I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions) |
| Sulphate | I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions) |
| Phenol index | I.S. EN 13370 rec. ISO 6439 (4-Aminoantipyrine spectrometic methods after distillation)* ( BY HPLC - Jones Env) |
| DOC | I.S. EN 1484 |
| TDS | I.S. EN 15216 |
| **Compositional analysis** | |
| TOC | I.S. EN 13137 Method B: carbonates removed with acid; TOC by combustion. |
| BTEX | GC-FID |
| PCB7** | I.S. EN 15308 analysis by GC-ECD. |
| Mineral oil | I.S. EN 14039 C10 to C40 analysis by GC-FID. |
| PAH17*** | I.S. EN 15527 PAH17 analysis by GC-MS |
| Metals | I.S. EN 13657 - Aqua regia digestion: EN ISO 11885 ( ICP-OES) |
| | |
| **Other** | |
| Dry matter | I.S. EN 14346 sample is dried to a constant mass in an oven at 105 ± 3 °C; Method B Water content by direct Karl-Fischer-titration and either volumetric or coulometric detection. |
| LOI | I.S. EN 15169 Difference in mass after heating in a furnace up to 550 ± 25 °C. |
| ANC | CEN/TS 15364 Determined by amouns of acid or base needed to cover the pH range |

**Notes:**

*If not suitable due to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS

**PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180

***Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene.

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8PL

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Minerex Environmental Ltd
Taney Hall
Eglinton Terrace
Dundrum
Dublin 14
Ireland

| | |
|---|---|
| **Attention :** | Jen Caleno |
| **Date :** | 29th June, 2018 |
| **Your reference :** | 2793-COC33 |
| **Our reference :** | Test Report 18/9619 Batch 1 |
| **Location :** | JJ Rhatigan, Charlemont Street, Dublin 2 |
| **Date samples received :** | 20th June, 2018 |
| **Status :** | Final report |
| **Issue :** | 1 |

Seventeen samples were received for analysis on 20th June, 2018 of which seventeen were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

**Compiled By:**

**Lucas Halliwell**
**Project Co-ordinator**

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC33
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno
**JE Job No.:** 18/9619

**Report : Solid**

**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

| J E Sample No. | 1-3 | 4-6 | 7-9 | 10-12 | 13-15 | 16-18 | 19-21 | 22-24 | 25-27 | 28-30 | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | TP204-SS1 | TP205-SS1 | TP206-SS1 | TP207-SS1 | TP208-SS1 | TP209-SS1 | TP210-SS1 | TP211-SS1 | TP212-SS1 | TP213-SS1 | | | |
| Depth | 0.00-2.10 | 0.00-2.80 | 0.00-2.70 | 0.00-2.70 | 0.00-2.70 | 0.00-2.80 | 0.00-2.80 | 0.00-2.80 | 0.00-2.80 | 0.00-2.80 | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V J T | V J T | V J T | V J T | V J T | V J T | V J T | V J T | V J T | V J T | | | |
| Sample Date | 29/05/2018 | 30/05/2018 | 30/05/2018 | 30/05/2018 | 30/05/2018 | 30/05/2018 | 30/05/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | | | |
| Sample Type | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil | | | |
| Batch Number | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Date of Receipt | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | | | |
| Antimony | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | <1 | mg/kg | TM30/PM15 |
| Arsenic # | 10.3 | 10.1 | 8.5 | 10.4 | 9.9 | 11.9 | 9.8 | 12.4 | 9.3 | 7.4 | <0.5 | mg/kg | TM30/PM15 |
| Barium # | 71 | 69 | 74 | 103 | 71 | 84 | 89 | 58 | 79 | 65 | <1 | mg/kg | TM30/PM15 |
| Cadmium # | 1.9 | 1.7 | 1.4 | 2.4 | 2.3 | 1.8 | 1.9 | 1.9 | 2.2 | 1.9 | <0.1 | mg/kg | TM30/PM15 |
| Chromium # | 66.7 | 68.4 | 54.2 | 43.3 | 49.1 | 59.4 | 53.5 | 60.8 | 47.1 | 59.0 | <0.5 | mg/kg | TM30/PM15 |
| Copper # | 25 | 22 | 22 | 29 | 28 | 27 | 29 | 23 | 25 | 22 | <1 | mg/kg | TM30/PM15 |
| Iron | 20000 | 20340 | 16540 | 20230 | 18900 | 21640 | 20830 | 21260 | 21040 | 15830 | <20 | mg/kg | TM30/PM15 |
| Lead # | 15 | 15 | 14 | 19 | 15 | 15 | 23 | 20 | 16 | 14 | <5 | mg/kg | TM30/PM15 |
| Manganese # | 956 | 1222 | 1195 | 1072 | 1173 | 1082 | 1027 | 1007 | 915 | 902 | <1 | mg/kg | TM30/PM15 |
| Mercury # | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | mg/kg | TM30/PM15 |
| Molybdenum # | 4.6 | 4.4 | 4.2 | 5.6 | 6.0 | 6.6 | 6.2 | 6.9 | 5.3 | 6.8 | <0.1 | mg/kg | TM30/PM15 |
| Nickel # | 38.2 | 38.9 | 33.8 | 40.1 | 37.0 | 39.3 | 42.1 | 45.0 | 37.3 | 29.7 | <0.7 | mg/kg | TM30/PM15 |
| Selenium # | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | <1 | mg/kg | TM30/PM15 |
| Water Soluble Boron # | 0.9 | 0.9 | 0.9 | 0.7 | 0.5 | 0.6 | 0.8 | 0.9 | 0.8 | 0.6 | <0.1 | mg/kg | TM74/PM32 |
| Zinc # | 75 | 76 | 66 | 125 | 79 | 78 | 84 | 79 | 76 | 67 | <5 | mg/kg | TM30/PM15 |
| | | | | | | | | | | | | | |
| PAH MS | | | | | | | | | | | | | |
| Naphthalene # | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | mg/kg | TM4/PM8 |
| Acenaphthylene | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | mg/kg | TM4/PM8 |
| Acenaphthene # | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | mg/kg | TM4/PM8 |
| Fluorene # | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | mg/kg | TM4/PM8 |
| Phenanthrene # | 0.05 | 0.06 | 0.06 | 0.08 | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.06 | <0.03 | mg/kg | TM4/PM8 |
| Anthracene # | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | mg/kg | TM4/PM8 |
| Fluoranthene # | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | mg/kg | TM4/PM8 |
| Pyrene # | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | mg/kg | TM4/PM8 |
| Benzo(a)anthracene # | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | mg/kg | TM4/PM8 |
| Chrysene # | 0.03 | 0.04 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.03 | 0.04 | <0.02 | mg/kg | TM4/PM8 |
| Benzo(bk)fluoranthene # | <0.07 | <0.07 | <0.07 | <0.07 | <0.07 | <0.07 | <0.07 | <0.07 | <0.07 | <0.07 | <0.07 | mg/kg | TM4/PM8 |
| Benzo(a)pyrene # | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | mg/kg | TM4/PM8 |
| Indeno(123cd)pyrene # | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | mg/kg | TM4/PM8 |
| Dibenzo(ah)anthracene # | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | mg/kg | TM4/PM8 |
| Benzo(ghi)perylene # | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | mg/kg | TM4/PM8 |
| Coronene | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | mg/kg | TM4/PM8 |
| PAH 17 Total | <0.64 | <0.64 | <0.64 | <0.64 | <0.64 | <0.64 | <0.64 | <0.64 | <0.64 | <0.64 | <0.64 | mg/kg | TM4/PM8 |
| Benzo(b)fluoranthene | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | mg/kg | TM4/PM8 |
| Benzo(k)fluoranthene | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | mg/kg | TM4/PM8 |
| PAH Surrogate % Recovery | 97 | 95 | 98 | 93 | 96 | 101 | 94 | 98 | 94 | 100 | <0 | % | TM4/PM8 |
| | | | | | | | | | | | | | |
| EPH (C8-C40) # | <30 | <30 | <30 | <30 | <30 | <30 | <30 | <30 | <30 | <30 | <30 | mg/kg | TM5/PM8 |
| Mineral Oil (C10-C40) | <30 | <30 | <30 | <30 | <30 | <30 | <30 | <30 | <30 | <30 | <30 | mg/kg | TM5/PM8/PM16 |

Please see attached notes for all abbreviations and acronyms

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC33
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno
**JE Job No.:** 18/9619

**Report : Solid**

**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

| J E Sample No. | 1-3 | 4-6 | 7-9 | 10-12 | 13-15 | 16-18 | 19-21 | 22-24 | 25-27 | 28-30 | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | TP204-SS1 | TP205-SS1 | TP206-SS1 | TP207-SS1 | TP208-SS1 | TP209-SS1 | TP210-SS1 | TP211-SS1 | TP212-SS1 | TP213-SS1 | | | |
| Depth | 0.00-2.10 | 0.00-2.80 | 0.00-2.70 | 0.00-2.70 | 0.00-2.70 | 0.00-2.80 | 0.00-2.80 | 0.00-2.80 | 0.00-2.80 | 0.00-2.80 | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V J T | V J T | V J T | V J T | V J T | V J T | V J T | V J T | V J T | V J T | | | |
| Sample Date | 29/05/2018 | 30/05/2018 | 30/05/2018 | 30/05/2018 | 30/05/2018 | 30/05/2018 | 30/05/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | | | |
| Sample Type | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil | | | |
| Batch Number | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Date of Receipt | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | | | |
| TPH CWG | | | | | | | | | | | | | |
| **Aliphatics** | | | | | | | | | | | | | |
| >C5-C6 # | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 | <0.1 | mg/kg | TM36/PM12 |
| >C6-C8 # | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 | <0.1 | mg/kg | TM36/PM12 |
| >C8-C10 | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 | <0.1 | mg/kg | TM36/PM12 |
| >C10-C12 # | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | mg/kg | TM5/PM8/PM16 |
| >C12-C16 # | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | mg/kg | TM5/PM8/PM16 |
| >C16-C21 # | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | mg/kg | TM5/PM8/PM16 |
| >C21-C35 # | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | mg/kg | TM5/PM8/PM16 |
| Total aliphatics C5-35 | <19 | <19 | <19 | <19 | <19 | <19 | <19 | <19 | <19 | <19 | <19 | mg/kg | TM5/TM36/PM8/PM12/PM16 |
| **Aromatics** | | | | | | | | | | | | | |
| >C5-EC7 # | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 | <0.1 | mg/kg | TM36/PM12 |
| >EC7-EC8 # | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 | <0.1 | mg/kg | TM36/PM12 |
| >EC8-EC10 # | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 | <0.1 | mg/kg | TM36/PM12 |
| >EC10-EC12 # | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | mg/kg | TM5/PM8/PM16 |
| >EC12-EC16 # | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | mg/kg | TM5/PM8/PM16 |
| >EC16-EC21 # | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | mg/kg | TM5/PM8/PM16 |
| >EC21-EC35 # | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | mg/kg | TM5/PM8/PM16 |
| Total aromatics C5-35 # | <19 | <19 | <19 | <19 | <19 | <19 | <19 | <19 | <19 | <19 | <19 | mg/kg | TM5/TM36/PM8/PM12/PM16 |
| Total aliphatics and aromatics(C5-35) | <38 | <38 | <38 | <38 | <38 | <38 | <38 | <38 | <38 | <38 | <38 | mg/kg | TM5/TM36/PM8/PM12/PM16 |
| MTBE # | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 | <5 | ug/kg | TM31/PM12 |
| Benzene # | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 | <5 | ug/kg | TM31/PM12 |
| Toluene # | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 | <5 | ug/kg | TM31/PM12 |
| Ethylbenzene # | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 | <5 | ug/kg | TM31/PM12 |
| m/p-Xylene # | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 | <5 | ug/kg | TM31/PM12 |
| o-Xylene # | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 | <5 | ug/kg | TM31/PM12 |
| PCB 28 # | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | ug/kg | TM17/PM8 |
| PCB 52 # | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | ug/kg | TM17/PM8 |
| PCB 101 # | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | ug/kg | TM17/PM8 |
| PCB 118 # | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | ug/kg | TM17/PM8 |
| PCB 138 # | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | ug/kg | TM17/PM8 |
| PCB 153 # | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | ug/kg | TM17/PM8 |
| PCB 180 # | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | ug/kg | TM17/PM8 |
| Total 7 PCBs # | <35 | <35 | <35 | <35 | <35 | <35 | <35 | <35 | <35 | <35 | <35 | ug/kg | TM17/PM8 |
| Phenol # | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | mg/kg | TM26/PM21 |
| Natural Moisture Content | 8.0 | 6.7 | 7.0 | 7.5 | 5.9 | 6.6 | 8.6 | 6.2 | 7.7 | 6.6 | <0.1 | % | PM4/PM0 |
| Hexavalent Chromium # | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | mg/kg | TM38/PM20 |
| Free Cyanide | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | mg/kg | TM89/PM45 |

Please see attached notes for all abbreviations and acronyms

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC33
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno
**JE Job No.:** 18/9619

**Report : Solid**

**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

| J E Sample No. | 1-3 | 4-6 | 7-9 | 10-12 | 13-15 | 16-18 | 19-21 | 22-24 | 25-27 | 28-30 | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample ID** | TP204-SS1 | TP205-SS1 | TP206-SS1 | TP207-SS1 | TP208-SS1 | TP209-SS1 | TP210-SS1 | TP211-SS1 | TP212-SS1 | TP213-SS1 | | | |
| **Depth** | 0.00-2.10 | 0.00-2.80 | 0.00-2.70 | 0.00-2.70 | 0.00-2.70 | 0.00-2.80 | 0.00-2.80 | 0.00-2.80 | 0.00-2.80 | 0.00-2.80 | | | |
| **COC No / misc** | | | | | | | | | | | | | |
| **Containers** | V J T | V J T | V J T | V J T | V J T | V J T | V J T | V J T | V J T | V J T | | | |
| **Sample Date** | 29/05/2018 | 30/05/2018 | 30/05/2018 | 30/05/2018 | 30/05/2018 | 30/05/2018 | 30/05/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | | | |
| **Sample Type** | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil | | | |
| **Batch Number** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| **Date of Receipt** | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | | | |
| Total Cyanide # | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | mg/kg | TM89/PM45 |
| Total Organic Carbon # | 0.50 | 0.45 | 0.43 | 0.57 | 0.56 | 0.52 | 0.51 | 0.57 | 0.48 | 0.45 | <0.02 | % | TM21/PM24 |
| Organic Matter | 0.9 | 0.8 | 0.7 | 1.0 | 1.0 | 0.9 | 0.9 | 1.0 | 0.8 | 0.8 | <0.2 | % | TM21/PM24 |
| Sulphide | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | mg/kg | TM106/PM119 |
| Loss on Ignition # | 1.5 | 1.5 | 1.5 | 1.8 | 1.5 | 1.7 | 1.4 | 1.5 | 1.3 | 1.4 | <1.0 | % | TM22/PM0 |
| pH # | 7.95 | 8.04 | 8.26 | 7.82 | 7.87 | 8.04 | 7.90 | 8.19 | 8.07 | 7.98 | <0.01 | pH units | TM73/PM11 |

Please see attached notes for all abbreviations and acronyms

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC33
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno
**JE Job No.:** 18/9619

**Report : Solid**

**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

| J E Sample No. | 31-33 | 34-36 | 37-39 | 40-42 | 43-45 | 46-48 | 49-51 | | | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | TP214-SS1 | TP215-SS1 | TP216-SS1 | TP217-SS1 | TP218-SS1 | TP219-SS1 | TP220-SS1 | | | | | | |
| Depth | | 0.00-2.70 | | 0.00-2.90 | 0.00-2.80 | 0.00-2.80 | 0.00-2.90 | | | | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V J T | V J T | V J T | V J T | V J T | V J T | V J T | | | | | | |
| Sample Date | 06/06/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | | | | | | |
| Sample Type | Soil | Soil | Soil | Soil | Soil | Soil | Soil | | | | | | |
| Batch Number | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | |
| Date of Receipt | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | | | | | | |
| Antimony | 3 | 2 | 2 | 2 | 2 | 2 | 2 | | | | <1 | mg/kg | TM30/PM15 |
| Arsenic # | 10.8 | 8.7 | 11.4 | 9.3 | 10.1 | 8.0 | 9.2 | | | | <0.5 | mg/kg | TM30/PM15 |
| Barium # | 79 | 89 | 96 | 84 | 77 | 79 | 73 | | | | <1 | mg/kg | TM30/PM15 |
| Cadmium # | 2.1 | 1.6 | 2.3 | 2.0 | 1.9 | 1.3 | 1.8 | | | | <0.1 | mg/kg | TM30/PM15 |
| Chromium # | 59.5 | 38.1 | 49.0 | 53.3 | 45.2 | 56.8 | 54.7 | | | | <0.5 | mg/kg | TM30/PM15 |
| Copper # | 27 | 24 | 30 | 29 | 28 | 20 | 23 | | | | <1 | mg/kg | TM30/PM15 |
| Iron | 19030 | 17990 | 20270 | 18170 | 18990 | 40250 | 16620 | | | | <20 | mg/kg | TM30/PM15 |
| Lead # | 16 | 18 | 18 | 16 | 20 | 14 | 16 | | | | <5 | mg/kg | TM30/PM15 |
| Manganese # | 1108 | 1223 | 1013 | 1032 | 1140 | 3316$_{AA}$ | 1242 | | | | <1 | mg/kg | TM30/PM15 |
| Mercury # | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | | | <0.1 | mg/kg | TM30/PM15 |
| Molybdenum # | 6.8 | 6.9 | 5.6 | 5.4 | 6.3 | 6.1 | 6.1 | | | | <0.1 | mg/kg | TM30/PM15 |
| Nickel # | 38.4 | 30.4 | 44.0 | 35.4 | 38.5 | 31.8 | 31.9 | | | | <0.7 | mg/kg | TM30/PM15 |
| Selenium # | 3 | 3 | 3 | 3 | 3 | 4 | 2 | | | | <1 | mg/kg | TM30/PM15 |
| Water Soluble Boron # | 0.8 | 0.6 | 1.0 | 0.9 | 0.8 | 0.7 | 0.7 | | | | <0.1 | mg/kg | TM74/PM32 |
| Zinc # | 85 | 68 | 86 | 74 | 71 | 65 | 74 | | | | <5 | mg/kg | TM30/PM15 |
| | | | | | | | | | | | | | |
| PAH MS | | | | | | | | | | | | | |
| Naphthalene # | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | | | | <0.04 | mg/kg | TM4/PM8 |
| Acenaphthylene | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | | | | <0.03 | mg/kg | TM4/PM8 |
| Acenaphthene # | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | | | | <0.05 | mg/kg | TM4/PM8 |
| Fluorene # | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | | | | <0.04 | mg/kg | TM4/PM8 |
| Phenanthrene # | 0.05 | 0.05 | 0.05 | 0.08 | 0.06 | 0.04 | 0.06 | | | | <0.03 | mg/kg | TM4/PM8 |
| Anthracene # | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | | | | <0.04 | mg/kg | TM4/PM8 |
| Fluoranthene # | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | | | | <0.03 | mg/kg | TM4/PM8 |
| Pyrene # | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | | | | <0.03 | mg/kg | TM4/PM8 |
| Benzo(a)anthracene # | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | | | | <0.06 | mg/kg | TM4/PM8 |
| Chrysene # | 0.03 | 0.04 | 0.03 | 0.04 | 0.04 | 0.03 | 0.03 | | | | <0.02 | mg/kg | TM4/PM8 |
| Benzo(bk)fluoranthene # | <0.07 | <0.07 | <0.07 | <0.07 | <0.07 | <0.07 | <0.07 | | | | <0.07 | mg/kg | TM4/PM8 |
| Benzo(a)pyrene # | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | | | | <0.04 | mg/kg | TM4/PM8 |
| Indeno(123cd)pyrene # | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | | | | <0.04 | mg/kg | TM4/PM8 |
| Dibenzo(ah)anthracene # | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | | | | <0.04 | mg/kg | TM4/PM8 |
| Benzo(ghi)perylene # | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | | | | <0.04 | mg/kg | TM4/PM8 |
| Coronene | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | | | | <0.04 | mg/kg | TM4/PM8 |
| PAH 17 Total | <0.64 | <0.64 | <0.64 | <0.64 | <0.64 | <0.64 | <0.64 | | | | <0.64 | mg/kg | TM4/PM8 |
| Benzo(b)fluoranthene | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | | | | <0.05 | mg/kg | TM4/PM8 |
| Benzo(k)fluoranthene | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | | | | <0.02 | mg/kg | TM4/PM8 |
| PAH Surrogate % Recovery | 99 | 96 | 96 | 95 | 101 | 97 | 98 | | | | <0 | % | TM4/PM8 |
| | | | | | | | | | | | | | |
| EPH (C8-C40) # | <30 | <30 | <30 | <30 | <30 | <30 | <30 | | | | <30 | mg/kg | TM5/PM8 |
| Mineral Oil (C10-C40) | <30 | <30 | <30 | <30 | <30 | <30 | <30 | | | | <30 | mg/kg | TM5/PM8/PM16 |

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC33
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno
**JE Job No.:** 18/9619

**Report : Solid**

**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

| J E Sample No. | 31-33 | 34-36 | 37-39 | 40-42 | 43-45 | 46-48 | 49-51 | | | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | TP214-SS1 | TP215-SS1 | TP216-SS1 | TP217-SS1 | TP218-SS1 | TP219-SS1 | TP220-SS1 | | | | | | |
| Depth | | 0.00-2.70 | | 0.00-2.90 | 0.00-2.80 | 0.00-2.80 | 0.00-2.90 | | | | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V J T | V J T | V J T | V J T | V J T | V J T | V J T | | | | | | |
| Sample Date | 06/06/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | | | | | | |
| Sample Type | Soil | Soil | Soil | Soil | Soil | Soil | Soil | | | | | | |
| Batch Number | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | |
| Date of Receipt | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | | | | | | |
| TPH CWG | | | | | | | | | | | | | |
| **Aliphatics** | | | | | | | | | | | | | |
| >C5-C6 # | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | | | | <0.1 | mg/kg | TM36/PM12 |
| >C6-C8 # | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | | | | <0.1 | mg/kg | TM36/PM12 |
| >C8-C10 | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | | | | <0.1 | mg/kg | TM36/PM12 |
| >C10-C12 # | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | | | | <0.2 | mg/kg | TM5/PM8/PM16 |
| >C12-C16 # | <4 | <4 | <4 | <4 | <4 | <4 | <4 | | | | <4 | mg/kg | TM5/PM8/PM16 |
| >C16-C21 # | <7 | <7 | <7 | <7 | <7 | <7 | <7 | | | | <7 | mg/kg | TM5/PM8/PM16 |
| >C21-C35 # | <7 | <7 | <7 | <7 | <7 | <7 | <7 | | | | <7 | mg/kg | TM5/PM8/PM16 |
| Total aliphatics C5-35 | <19 | <19 | <19 | <19 | <19 | <19 | <19 | | | | <19 | mg/kg | TM5/TM36/PM8/PM12/PM16 |
| **Aromatics** | | | | | | | | | | | | | |
| >C5-EC7 # | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | | | | <0.1 | mg/kg | TM36/PM12 |
| >EC7-EC8 # | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | | | | <0.1 | mg/kg | TM36/PM12 |
| >EC8-EC10 # | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | <0.1 SV | | | | <0.1 | mg/kg | TM36/PM12 |
| >EC10-EC12 # | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | | | | <0.2 | mg/kg | TM5/PM8/PM16 |
| >EC12-EC16 # | <4 | <4 | <4 | <4 | <4 | <4 | <4 | | | | <4 | mg/kg | TM5/PM8/PM16 |
| >EC16-EC21 # | <7 | <7 | <7 | <7 | <7 | <7 | <7 | | | | <7 | mg/kg | TM5/PM8/PM16 |
| >EC21-EC35 # | <7 | <7 | <7 | <7 | <7 | <7 | <7 | | | | <7 | mg/kg | TM5/PM8/PM16 |
| Total aromatics C5-35 # | <19 | <19 | <19 | <19 | <19 | <19 | <19 | | | | <19 | mg/kg | TM5/TM36/PM8/PM12/PM16 |
| Total aliphatics and aromatics(C5-35) | <38 | <38 | <38 | <38 | <38 | <38 | <38 | | | | <38 | mg/kg | TM5/TM36/PM8/PM12/PM16 |
| MTBE # | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | | | | <5 | ug/kg | TM31/PM12 |
| Benzene # | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | | | | <5 | ug/kg | TM31/PM12 |
| Toluene # | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | | | | <5 | ug/kg | TM31/PM12 |
| Ethylbenzene # | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | | | | <5 | ug/kg | TM31/PM12 |
| m/p-Xylene # | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | | | | <5 | ug/kg | TM31/PM12 |
| o-Xylene # | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | <5 SV | | | | <5 | ug/kg | TM31/PM12 |
| PCB 28 # | <5 | <5 | <5 | <5 | <5 | <5 | <5 | | | | <5 | ug/kg | TM17/PM8 |
| PCB 52 # | <5 | <5 | <5 | <5 | <5 | <5 | <5 | | | | <5 | ug/kg | TM17/PM8 |
| PCB 101 # | <5 | <5 | <5 | <5 | <5 | <5 | <5 | | | | <5 | ug/kg | TM17/PM8 |
| PCB 118 # | <5 | <5 | <5 | <5 | <5 | <5 | <5 | | | | <5 | ug/kg | TM17/PM8 |
| PCB 138 # | <5 | <5 | <5 | <5 | <5 | <5 | <5 | | | | <5 | ug/kg | TM17/PM8 |
| PCB 153 # | <5 | <5 | <5 | <5 | <5 | <5 | <5 | | | | <5 | ug/kg | TM17/PM8 |
| PCB 180 # | <5 | <5 | <5 | <5 | <5 | <5 | <5 | | | | <5 | ug/kg | TM17/PM8 |
| Total 7 PCBs # | <35 | <35 | <35 | <35 | <35 | <35 | <35 | | | | <35 | ug/kg | TM17/PM8 |
| Phenol # | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | | | | <0.01 | mg/kg | TM26/PM21 |
| Natural Moisture Content | 8.6 | 6.9 | 7.5 | 7.2 | 7.5 | 7.6 | 7.6 | | | | <0.1 | % | PM4/PM0 |
| Hexavalent Chromium # | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | | | | <0.3 | mg/kg | TM38/PM20 |
| Free Cyanide | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | | | | <0.5 | mg/kg | TM89/PM45 |

Please see attached notes for all abbreviations and acronyms

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC33
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno
**JE Job No.:** 18/9619

**Report : Solid**

**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

| J E Sample No. | 31-33 | 34-36 | 37-39 | 40-42 | 43-45 | 46-48 | 49-51 | | | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | TP214-SS1 | TP215-SS1 | TP216-SS1 | TP217-SS1 | TP218-SS1 | TP219-SS1 | TP220-SS1 | | | | | | |
| Depth | | 0.00-2.70 | | 0.00-2.90 | 0.00-2.80 | 0.00-2.80 | 0.00-2.90 | | | | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V J T | V J T | V J T | V J T | V J T | V J T | V J T | | | | | | |
| Sample Date | 06/06/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | | | | | | |
| Sample Type | Soil | Soil | Soil | Soil | Soil | Soil | Soil | | | | | | |
| Batch Number | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | |
| Date of Receipt | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | | | | | | |
| Total Cyanide # | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | | | | <0.5 | mg/kg | TM89/PM45 |
| Total Organic Carbon # | 0.57 | 0.49 | 0.60 | 0.53 | 0.56 | 0.39 | 0.46 | | | | <0.02 | % | TM21/PM24 |
| Organic Matter | 1.0 | 0.8 | 1.0 | 0.9 | 1.0 | 0.7 | 0.8 | | | | <0.2 | % | TM21/PM24 |
| Sulphide | <10 | <10 | <10 | <10 | <10 | <10 | <10 | | | | <10 | mg/kg | TM106/PM119 |
| Loss on Ignition # | 1.8 | 1.5 | 1.8 | 1.5 | 1.8 | 2.5 | 1.6 | | | | <1.0 | % | TM22/PM0 |
| pH # | 8.01 | 8.27 | 8.05 | 8.14 | 8.31 | 8.16 | 8.01 | | | | <0.01 | pH units | TM73/PM11 |

Please see attached notes for all abbreviations and acronyms

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC33
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno
**JE Job No.:** 18/9619

**Report : CEN 10:1 1 Batch**

**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

| J E Sample No. | 1-3 | 4-6 | 7-9 | 10-12 | 13-15 | 16-18 | 19-21 | 22-24 | 25-27 | 28-30 | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | TP204-SS1 | TP205-SS1 | TP206-SS1 | TP207-SS1 | TP208-SS1 | TP209-SS1 | TP210-SS1 | TP211-SS1 | TP212-SS1 | TP213-SS1 | | | |
| Depth | 0.00-2.10 | 0.00-2.80 | 0.00-2.70 | 0.00-2.70 | 0.00-2.70 | 0.00-2.80 | 0.00-2.80 | 0.00-2.80 | 0.00-2.80 | 0.00-2.80 | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V J T | V J T | V J T | V J T | V J T | V J T | V J T | V J T | V J T | V J T | | | |
| Sample Date | 29/05/2018 | 30/05/2018 | 30/05/2018 | 30/05/2018 | 30/05/2018 | 30/05/2018 | 30/05/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | | | |
| Sample Type | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil | | | |
| Batch Number | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Date of Receipt | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | | | |
| Dissolved Antimony # | <2 | <2 | <2 | <2 | 4 | <2 | <2 | <2 | 2 | <2 | <2 | ug/l | TM30/PM14 |
| Dissolved Arsenic # | <2.5 | <2.5 | <2.5 | <2.5 | <2.5 | <2.5 | <2.5 | <2.5 | <2.5 | <2.5 | <2.5 | ug/l | TM30/PM14 |
| Dissolved Barium # | 43 | 45 | 41 | 37 | 35 | 44 | 36 | 50 | 59 | 44 | <3 | ug/l | TM30/PM14 |
| Dissolved Cadmium # | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | ug/l | TM30/PM14 |
| Dissolved Chromium # | <1.5 | <1.5 | <1.5 | <1.5 | <1.5 | <1.5 | <1.5 | <1.5 | <1.5 | <1.5 | <1.5 | ug/l | TM30/PM14 |
| Dissolved Copper # | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | <7 | ug/l | TM30/PM14 |
| Dissolved Iron # | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | ug/l | TM30/PM14 |
| Dissolved Lead # | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | ug/l | TM30/PM14 |
| Dissolved Manganese # | 232 | 154 | 52 | 126 | 58 | 117 | 111 | 27 | 83 | 88 | <2 | ug/l | TM30/PM14 |
| Dissolved Mercury # | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | ug/l | TM30/PM14 |
| Dissolved Molybdenum # | 19 | 19 | 19 | 18 | 22 | 20 | 19 | 20 | 20 | 19 | <2 | ug/l | TM30/PM14 |
| Dissolved Nickel # | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ug/l | TM30/PM14 |
| Dissolved Selenium # | 32 | 29 | 33 | 30 | 30 | 30 | 21 | 32 | 23 | 23 | <3 | ug/l | TM30/PM14 |
| Dissolved Zinc # | 3 | 3 | 3 | 3 | <3 | <3 | <3 | <3 | <3 | <3 | <3 | ug/l | TM30/PM14 |
| Phenol | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | mg/l | TM26/PM0 |
| Fluoride | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | mg/l | TM173/PM0 |
| Sulphate as SO4 # | 95.46 | 89.62 | 50.61 | 97.47 | 72.09 | 93.03 | 100.29 | 46.67 | 66.07 | 68.43 | <0.05 | mg/l | TM38/PM0 |
| Chloride # | 0.8 | 1.2 | 14.9 | 0.6 | 17.1 | 9.1 | <0.3 | 17.9 | 0.5 | <0.3 | <0.3 | mg/l | TM38/PM0 |
| Dissolved Organic Carbon | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | mg/l | TM60/PM0 |
| Total Dissolved Solids # | 193 | 178 | 127 | 181 | 171 | 166 | 185 | 120 | 131 | 129 | <35 | mg/l | TM20/PM0 |

Please see attached notes for all abbreviations and acronyms

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC33
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno
**JE Job No.:** 18/9619

**Report : CEN 10:1 1 Batch**

**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

| J E Sample No. | 31-33 | 34-36 | 37-39 | 40-42 | 43-45 | 46-48 | 49-51 | | | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | TP214-SS1 | TP215-SS1 | TP216-SS1 | TP217-SS1 | TP218-SS1 | TP219-SS1 | TP220-SS1 | | | | | | |
| Depth | | 0.00-2.70 | | 0.00-2.90 | 0.00-2.80 | 0.00-2.80 | 0.00-2.90 | | | | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V J T | V J T | V J T | V J T | V J T | V J T | V J T | | | | | | |
| Sample Date | 06/06/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | 06/06/2018 | | | | | | |
| Sample Type | Soil | Soil | Soil | Soil | Soil | Soil | Soil | | | | | | |
| Batch Number | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | |
| Date of Receipt | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | 20/06/2018 | | | | | | |
| Dissolved Antimony # | 3 | 6 | <2 | <2 | <2 | <2 | <2 | | | | <2 | ug/l | TM30/PM14 |
| Dissolved Arsenic # | <2.5 | <2.5 | <2.5 | <2.5 | <2.5 | <2.5 | <2.5 | | | | <2.5 | ug/l | TM30/PM14 |
| Dissolved Barium # | 53 | 56 | 43 | 45 | 51 | 57 | 41 | | | | <3 | ug/l | TM30/PM14 |
| Dissolved Cadmium # | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | | | | <0.5 | ug/l | TM30/PM14 |
| Dissolved Chromium # | <1.5 | <1.5 | <1.5 | <1.5 | <1.5 | <1.5 | <1.5 | | | | <1.5 | ug/l | TM30/PM14 |
| Dissolved Copper # | <7 | <7 | <7 | <7 | <7 | <7 | <7 | | | | <7 | ug/l | TM30/PM14 |
| Dissolved Iron # | <20 | <20 | <20 | <20 | <20 | <20 | <20 | | | | <20 | ug/l | TM30/PM14 |
| Dissolved Lead # | <5 | <5 | <5 | <5 | <5 | <5 | <5 | | | | <5 | ug/l | TM30/PM14 |
| Dissolved Manganese # | 68 | 88 | 97 | 93 | 65 | 86 | 130 | | | | <2 | ug/l | TM30/PM14 |
| Dissolved Mercury # | <1 | <1 | <1 | <1 | <1 | <1 | <1 | | | | <1 | ug/l | TM30/PM14 |
| Dissolved Molybdenum # | 20 | 19 | 20 | 19 | 21 | 17 | 19 | | | | <2 | ug/l | TM30/PM14 |
| Dissolved Nickel # | <2 | <2 | <2 | <2 | <2 | <2 | <2 | | | | <2 | ug/l | TM30/PM14 |
| Dissolved Selenium # | 31 | 24 | 27 | 18 | 33 | 19 | 21 | | | | <3 | ug/l | TM30/PM14 |
| Dissolved Zinc # | <3 | <3 | <3 | 3 | <3 | <3 | <3 | | | | <3 | ug/l | TM30/PM14 |
| Phenol | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | | | | <0.01 | mg/l | TM26/PM0 |
| Fluoride | <0.3 | <0.3 | 0.3 | <0.3 | <0.3 | <0.3 | <0.3 | | | | <0.3 | mg/l | TM173/PM0 |
| Sulphate as SO4 # | 57.06 | 47.82 | 71.34 | 63.33 | 41.53 | 50.66 | 76.04 | | | | <0.05 | mg/l | TM38/PM0 |
| Chloride # | 6.7 | 10.0 | 13.0 | 0.6 | 12.0 | 0.9 | 3.6 | | | | <0.3 | mg/l | TM38/PM0 |
| Dissolved Organic Carbon | <2 | <2 | <2 | <2 | <2 | <2 | <2 | | | | <2 | mg/l | TM60/PM0 |
| Total Dissolved Solids # | 135 | 126 | 144 | 110 | 99 | 113 | 152 | | | | <35 | mg/l | TM20/PM0 |

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC33
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno

**Note:**

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth
Asbestos Team Leader

| J E Job No. | Batch | Sample ID | Depth | J E Sample No. | Date Of Analysis | Analysis | Result |
|---|---|---|---|---|---|---|---|
| 18/9619 | 1 | TP204-SS1 | 0.00-2.10 | 2 | 25/06/2018 | **General Description (Bulk Analysis)** | Soil/Stone |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 25/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |
| 18/9619 | 1 | TP205-SS1 | 0.00-2.80 | 5 | 25/06/2018 | **General Description (Bulk Analysis)** | Soil/Stone |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 25/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |
| 18/9619 | 1 | TP206-SS1 | 0.00-2.70 | 8 | 25/06/2018 | **General Description (Bulk Analysis)** | Soil/Stone |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 25/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |
| 18/9619 | 1 | TP207-SS1 | 0.00-2.70 | 11 | 25/06/2018 | **General Description (Bulk Analysis)** | soil.stones |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 25/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |
| 18/9619 | 1 | TP208-SS1 | 0.00-2.70 | 14 | 25/06/2018 | **General Description (Bulk Analysis)** | soil.stones |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 25/06/2018 | **Asbestos Fibres (2)** | NAD |

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC33
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno

| J E Job No. | Batch | Sample ID | Depth | J E Sample No. | Date Of Analysis | Analysis | Result |
|---|---|---|---|---|---|---|---|
| 18/9619 | 1 | TP208-SS1 | 0.00-2.70 | 14 | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |
| | | | | | | | |
| 18/9619 | 1 | TP209-SS1 | 0.00-2.80 | 17 | 25/06/2018 | **General Description (Bulk Analysis)** | Soil/Stones |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 25/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |
| | | | | | | | |
| 18/9619 | 1 | TP210-SS1 | 0.00-2.80 | 20 | 25/06/2018 | **General Description (Bulk Analysis)** | Soil/Stone |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 25/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |
| | | | | | | | |
| 18/9619 | 1 | TP211-SS1 | 0.00-2.80 | 23 | 25/06/2018 | **General Description (Bulk Analysis)** | Soil/Stone |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 25/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |
| | | | | | | | |
| 18/9619 | 1 | TP212-SS1 | 0.00-2.80 | 26 | 25/06/2018 | **General Description (Bulk Analysis)** | Soil/Stone |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 25/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |
| | | | | | | | |
| 18/9619 | 1 | TP213-SS1 | 0.00-2.80 | 29 | 25/06/2018 | **General Description (Bulk Analysis)** | Soil/Stone |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 25/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |
| | | | | | | | |
| 18/9619 | 1 | TP214-SS1 | | 32 | 25/06/2018 | **General Description (Bulk Analysis)** | Soil/Stone |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC33
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno

| J E Job No. | Batch | Sample ID | Depth | J E Sample No. | Date Of Analysis | Analysis | Result |
|---|---|---|---|---|---|---|---|
| 18/9619 | 1 | TP214-SS1 | | 32 | 25/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |
| 18/9619 | 1 | TP215-SS1 | 0.00-2.70 | 35 | 25/06/2018 | **General Description (Bulk Analysis)** | Soil/Stone |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 25/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |
| 18/9619 | 1 | TP216-SS1 | | 38 | 25/06/2018 | **General Description (Bulk Analysis)** | soil.stones |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 25/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |
| 18/9619 | 1 | TP217-SS1 | 0.00-2.90 | 41 | 25/06/2018 | **General Description (Bulk Analysis)** | soil.stones |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 25/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |
| 18/9619 | 1 | TP218-SS1 | 0.00-2.80 | 44 | 25/06/2018 | **General Description (Bulk Analysis)** | soil.stones |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 25/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |
| 18/9619 | 1 | TP219-SS1 | 0.00-2.80 | 47 | 25/06/2018 | **General Description (Bulk Analysis)** | Soil/Stone |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 25/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |

**Client Name:** Minerex Environmental Ltd
**Reference:** 2793-COC33
**Location:** JJ Rhatigan, Charlemont Street, Dublin 2
**Contact:** Jen Caleno

| J E Job No. | Batch | Sample ID | Depth | J E Sample No. | Date Of Analysis | Analysis | Result |
|---|---|---|---|---|---|---|---|
| 18/9619 | 1 | TP220-SS1 | 0.00-2.90 | 50 | 25/06/2018 | **General Description (Bulk Analysis)** | Soil/Stone |
| | | | | | 25/06/2018 | **Asbestos Fibres** | NAD |
| | | | | | 25/06/2018 | **Asbestos Fibres (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM** | NAD |
| | | | | | 25/06/2018 | **Asbestos ACM (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type** | NAD |
| | | | | | 25/06/2018 | **Asbestos Type (2)** | NAD |
| | | | | | 25/06/2018 | **Asbestos Level Screen** | NAD |

**Client Name:** Minerex Environmental Ltd

**Matrix : Solid**

**Reference:** 2793-COC33

**Location:** JJ Rhatigan, Charlemont Street, Dublin 2

**Contact:** Jen Caleno

| J E Job No. | Batch | Sample ID | Depth | J E Sample No. | Analysis | Reason |
|---|---|---|---|---|---|---|
| 18/9619 | 1 | TP204-SS1 | 0.00-2.10 | 1-3 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded prior to receipt |
| 18/9619 | 1 | TP205-SS1 | 0.00-2.80 | 4-6 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded prior to receipt |
| 18/9619 | 1 | TP206-SS1 | 0.00-2.70 | 7-9 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded prior to receipt |
| 18/9619 | 1 | TP207-SS1 | 0.00-2.70 | 10-12 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded prior to receipt |
| 18/9619 | 1 | TP208-SS1 | 0.00-2.70 | 13-15 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded prior to receipt |
| 18/9619 | 1 | TP209-SS1 | 0.00-2.80 | 16-18 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded prior to receipt |
| 18/9619 | 1 | TP210-SS1 | 0.00-2.80 | 19-21 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded prior to receipt |
| 18/9619 | 1 | TP211-SS1 | 0.00-2.80 | 22-24 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded |
| 18/9619 | 1 | TP212-SS1 | 0.00-2.80 | 25-27 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded |
| 18/9619 | 1 | TP213-SS1 | 0.00-2.80 | 28-30 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded |
| 18/9619 | 1 | TP214-SS1 | | 31-33 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded |
| 18/9619 | 1 | TP215-SS1 | 0.00-2.70 | 34-36 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded |
| 18/9619 | 1 | TP216-SS1 | | 37-39 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded |
| 18/9619 | 1 | TP217-SS1 | 0.00-2.90 | 40-42 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded |
| 18/9619 | 1 | TP218-SS1 | 0.00-2.80 | 43-45 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded |
| 18/9619 | 1 | TP219-SS1 | 0.00-2.80 | 46-48 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded |
| 18/9619 | 1 | TP220-SS1 | 0.00-2.90 | 49-51 | Cyanide, EPH, GRO, PAH, PCB, Phenols | Sample holding time exceeded |
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**Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.**

**Only analyses which are accredited are recorded as deviating if set criteria are not met.**

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

***JE Job No.:*** 18/9619

**SOILS**

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

**WATERS**

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

**DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

**SURROGATES**

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

**DILUTIONS**

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

**BLANKS**

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

**NOTE**

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

**REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

**ABBREVIATIONS and ACRONYMS USED**

| | |
|---|---|
| # | ISO17025 (UKAS Ref No. 4225) accredited - UK. |
| SA | ISO17025 (SANAS Ref No.T0729) accredited - South Africa. |
| B | Indicates analyte found in associated method blank. |
| DR | Dilution required. |
| M | MCERTS accredited. |
| NA | Not applicable |
| NAD | No Asbestos Detected. |
| ND | None Detected (usually refers to VOC and/SVOC TICs). |
| NDP | No Determination Possible |
| SS | Calibrated against a single substance |
| SV | Surrogate recovery outside performance criteria. This may be due to a matrix effect. |
| W | Results expressed on as received basis. |
| + | AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page. |
| ++ | Result outside calibration range, results should be considered as indicative only and are not accredited. |
| * | Analysis subcontracted to an Exova Jones Environmental approved laboratory. |
| AD | Samples are dried at 35°C ±5°C |
| CO | Suspected carry over |
| LOD/LOR | Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS |
| ME | Matrix Effect |
| NFD | No Fibres Detected |
| BS | AQC Sample |
| LB | Blank Sample |
| N | Client Sample |
| TB | Trip Blank Sample |
| OC | Outside Calibration Range |
| AA | x5 Dilution |

**JE Job No:** 18/9619

| Test Method No. | Description | Prep Method No. (if appropriate) | Description | ISO 17025 (UKAS/SANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|---|---|---|---|---|---|---|---|
| PM4 | Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377. | PM0 | No preparation is required. | | | AR | |
| TM4 | Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS. | PM8 | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required. | | | AR | Yes |
| TM4 | Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS. | PM8 | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required. | Yes | | AR | Yes |
| TM5 | Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID. | PM8 | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required. | Yes | | AR | Yes |
| TM5 | Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID. | PM8/PM16 | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE. | | | AR | Yes |
| TM5 | Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID. | PM8/PM16 | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE. | Yes | | AR | Yes |
| TM5/TM36 | please refer to TM5 and TM36 for method details | PM8/PM12/PM16 | please refer to PM8/PM16 and PM12 for method details | | | AR | Yes |
| TM5/TM36 | please refer to TM5 and TM36 for method details | PM8/PM12/PM16 | please refer to PM8/PM16 and PM12 for method details | Yes | | AR | Yes |
| TM17 | Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS. | PM8 | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required. | Yes | | AR | Yes |
| TM20 | Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids | PM0 | No preparation is required. | Yes | | AR | Yes |

**JE Job No:** 18/9619

| Test Method No. | Description | Prep Method No. (if appropriate) | Description | ISO 17025 (UKAS/SANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|---|---|---|---|---|---|---|---|
| TM21 | Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4. | PM24 | Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis. | | | AD | Yes |
| TM21 | Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4. | PM24 | Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis. | Yes | | AD | Yes |
| TM22 | Modified USEPA 160.4. Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (450°C) | PM0 | No preparation is required. | Yes | | AD | Yes |
| TM26 | Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection. | PM0 | No preparation is required. | | | AR | Yes |
| TM26 | Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection. | PM21 | As received solid or water samples are extracted in Methanol: Sodium Hydroxide (0.1M NaOH) (60:40) by orbital shaker. | Yes | | AR | Yes |
| TM30 | Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009 | PM14 | Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required. | Yes | | AR | Yes |
| TM30 | Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009 | PM15 | Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground. | | | AD | Yes |
| TM30 | Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009 | PM15 | Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground. | Yes | | AD | Yes |
| TM31 | Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID. | PM12 | Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis. | Yes | | AR | Yes |
| TM36 | Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. | PM12 | Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis. | | | AR | Yes |

**JE Job No:** 18/9619

| Test Method No. | Description | Prep Method No. (if appropriate) | Description | ISO 17025 (UKAS/SANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|---|---|---|---|---|---|---|---|
| TM36 | Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. | PM12 | Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis. | Yes | | AR | Yes |
| TM38 | Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1 | PM0 | No preparation is required. | Yes | | AR | Yes |
| TM38 | Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1 | PM20 | Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker. | Yes | | AR | Yes |
| TM60 | Modified USEPA 9060. Determination of TOC by calculation from Total Carbon and Inorganic Carbon using a TOC analyser, the carbon in the sample is converted to CO2 and then passed through a non-dispersive infrared gas analyser (NDIR). | PM0 | No preparation is required. | | | AR | Yes |
| TM65 | Asbestos Bulk Identification method based on HSG 248. | PM42 | Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065. | Yes | | AR | |
| TM73 | Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser. | PM11 | Extraction of as received solid samples using one part solid to 2.5 parts deionised water. | Yes | | AR | No |
| TM74 | Analysis of water soluble boron (20:1 extract) by ICP-OES. | PM32 | Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio. | Yes | | AD | Yes |
| TM89 | Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis. | PM45 | As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis. | | | AR | Yes |
| TM89 | Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis. | PM45 | As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis. | Yes | | AR | Yes |
| TM106 | Determination of Sulphide by Skalar Continuous Flow Analyser | PM119 | As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis. | | | AR | Yes |

**JE Job No:** 18/9619

| Test Method No. | Description | Prep Method No. (if appropriate) | Description | ISO 17025 (UKAS/SANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|---|---|---|---|---|---|---|---|
| TM173 | Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2 | PM0 | No preparation is required. | | | AR | Yes |
| NONE | No Method Code | PM4 | Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377. | | | AR | |
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