While the Department is not legally obligated to provide a summary of the data in Appendix A, a summary is provided below to aid in understanding the collected data and observed outcomes.

Data Summary

Since Autumn 2018, a programme of water analysis has been undertaken across the River Neb Catchment. A series of sites were identified and refined over time. Each retained site has been analysed monthly or more frequently. Concentrations of heavy metals have been combined with average flow rate to give a total load number. This indicates how much of the heavy metal is transported downstream at a particular site per year. This is achieved by combining monthly data. Samples post 2019 have been further categorised as Total, Dissolved and Particulate.

Total= Whole sample acidified and then analysed.
Dissolved= Sample filtered through a 0.45µm filter, the filtrate is then acidified and analysed.
Particulate= The difference between Total and Dissolved.

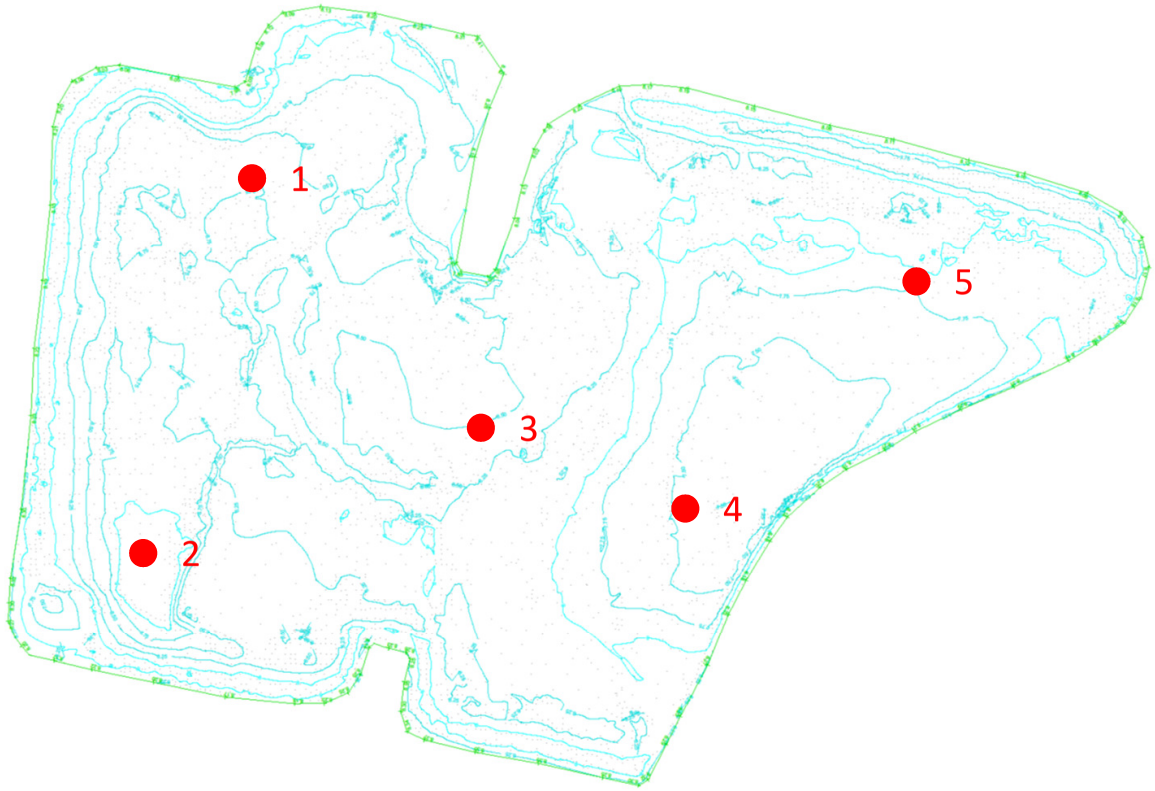
Sampling data prior to the closure of the Cross Vein Mine site to unauthorised off-road bikes and 4x4s in March 2020 is limited. However, data for Kerrowdhoo Farm Ford is available and shows the following:

| Date | Lead Total Load (kg/year) | Lead Total Load (Dissolved) (kg/year) | Lead Total Load (Particulate) (kg/year) | Zinc Total Load (kg/year) | Zinc Total Load (Dissolved) (kg/year) | Zinc Total Load (Particulate) (kg/year) |
|---|---|---|---|---|---|---|
| October 2018-May 2019 | 372 | | | 160 | | |
| May 2020-August 2024 | 114 | 55 | 59 | 58 | 56 | 2 |
| % Change 2018-19 to 2020-24 | -69.4% | | | -63.8% | | |

The significant reduction in lead and zinc total load indicates the effectiveness of the three stages of the Cross Vein Mine works already undertaken (closing the site to off-road bikes and 4x4's, cleaning of roadside ditches above the site to reduce surface water flows onto the site and installation of leaky dams below Cross Vein Mine).

# Peel Marina Lagoon, Isle of Man

## 07/01/2022 Sample Location Plan




Notes / Survey Key:
As built survey scan recorded - 30-06-2021
Total fill Volume = 16234.5m³ as of 30/06/2021

Base Model for Volumetric Analysis A800-AB-03
Previous Fill Volume = 7325.9m³ as of 17/05/2021

Survey Datum: Ordnance OSGB36 (15)

Client: Land & Water Services Ltd

Job Title: Peel Silt Lagoon

MULLEN CONSULTING
SURVEYING & CLERK OF WORKS SERVICES

Web: www.mullenconsulting.im
E-mail: enquiries@mullenconsulting.im
Tel: 01624 639188
10A Beech House
Elm Tree Road, Onchan
Isle of Man
IM3 4EF

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Job Number: A800
Scale: 1:200
Sheet Size: ISO A1
Date: 25-08-2021
Drawn By: AMD

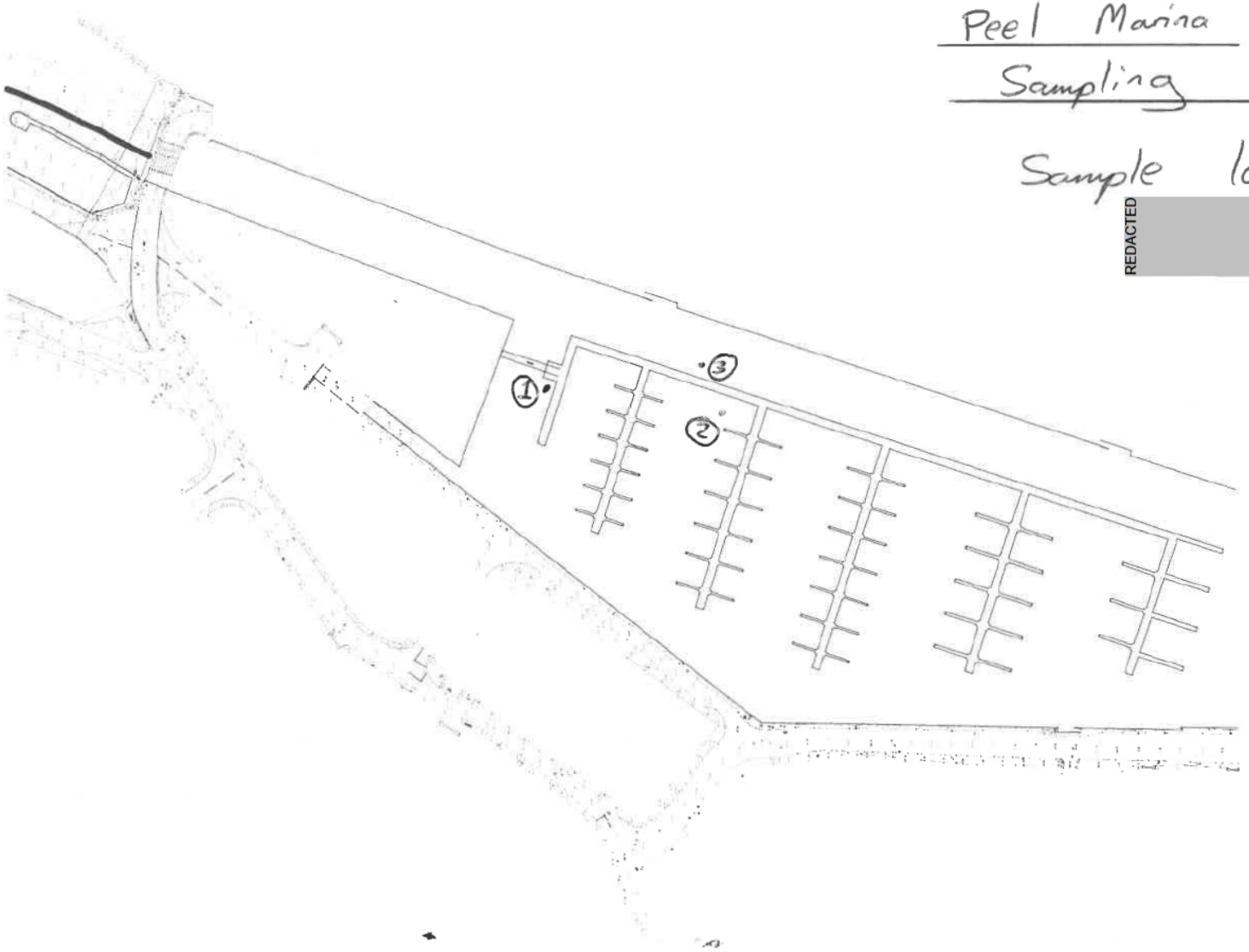
Drawing Number: A800-AB-05
Revision: -
Drawing Title: As Built Survey Record
Silt Storage 30-06-2021

Peel Marina

Sampling 13/1/22

Sample locations

REDACTED



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| | | |
|---|---|---|
| **Test Report ID** | **MAR01275** | |
| Issue Version | 1 | |
| Customer | Isle of Man Government, 1st Floor Sea terminal Building, Douglas, Isle of Man, IM1 2RF | |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis | |
| Date Sampled | 13-Jan-22 | |
| Date Received | 18-Jan-22 | |
| Date Reported | 15-Feb-22 | |
| Condition of samples | Ambient | Satisfactory |

REDACTED

Authorised by: Marya Hubbard

Position: Laboratory Manager

Any additional opinions or interpretations found in this report, are outside the scope of UKAS accreditation.

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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | % M/M | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) |
|---|---|---|---|---|---|---|---|---|
| | | Method No | SOCOTEC Env Chem* | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 |
| | | Accreditation | UKAS/MMO | MMO | MMO | MMO | MMO | MMO |
| | | | Total Organic Carbon | 45mm | 31.5mm | 22.4mm | 16mm | 11.2mm |
| Client Reference: | SOCOTEC Ref: | Matrix | – | -5.5 | -5.0 | -4.5 | -4.0 | -3.5 |
| 1.00 | MAR01275.001 | Sediment | 8.18 | 0.00 | 0.00 | 0.00 | 0.33 | 0.81 |
| 2.00 | MAR01275.002 | Sediment | 19.30 | 0.18 | 0.30 | 0.00 | 4.44 | 4.79 |
| 3.00 | MAR01275.003 | Sediment | >25.0* | 0.00 | 0.00 | 0.00 | 0.34 | 0.39 |

* See Report Notes

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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) |
|---|---|---|---|---|---|---|---|---|
| | | Method No | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 |
| | | Accreditation | MMO | MMO | MMO | MMO | MMO | MMO |
| | | | 8mm | 5.6mm | 4mm | 2.8mm | 2mm | 1.4mm |
| Client Reference: | SOCOTEC Ref: | Matrix | -3.0 | -2.5 | -2.0 | -1.5 | -1.0 | -0.5 |
| 1.00 | MAR01275.001 | Sediment | 0.75 | 1.36 | 1.86 | 2.01 | 1.27 | 1.11 |
| 2.00 | MAR01275.002 | Sediment | 3.54 | 5.19 | 5.34 | 4.58 | 3.49 | 3.23 |
| 3.00 | MAR01275.003 | Sediment | 1.79 | 2.65 | 2.88 | 1.95 | 1.59 | 1.59 |

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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) |
|---|---|---|---|---|---|---|---|---|
| | | Method No | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 |
| | | Accreditation | MMO | MMO | MMO | MMO | MMO | MMO |
| | | | 1mm | 707µm | 500µm | 353.6µm | 250µm | 176.8µm |
| Client Reference: | SOCOTEC Ref: | Matrix | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 |
| 1.00 | MAR01275.001 | Sediment | 0.69 | 1.69 | 2.47 | 4.32 | 4.90 | 7.43 |
| 2.00 | MAR01275.002 | Sediment | 2.17 | 0.92 | 3.09 | 4.11 | 4.30 | 6.33 |
| 3.00 | MAR01275.003 | Sediment | 1.22 | 2.59 | 5.66 | 8.90 | 12.65 | 14.40 |

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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) |
|---|---|---|---|---|---|---|---|---|
| | | Method No | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 |
| | | Accreditation | MMO | MMO | MMO | MMO | MMO | MMO |
| | | | 125µm | 88.39µm | 63µm | 44.2µm | 31.3µm | 22.1µm |
| Client Reference: | SOCOTEC Ref: | Matrix | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 |
| 1.00 | MAR01275.001 | Sediment | 8.66 | 8.55 | 8.98 | 8.62 | 8.23 | 7.21 |
| 2.00 | MAR01275.002 | Sediment | 6.82 | 6.00 | 5.54 | 5.03 | 4.77 | 4.23 |
| 3.00 | MAR01275.003 | Sediment | 10.39 | 6.27 | 4.89 | 4.09 | 3.66 | 3.14 |

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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) |
|---|---|---|---|---|---|---|---|---|
| | | Method No | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 |
| | | Accreditation | MMO | MMO | MMO | MMO | MMO | MMO |
| | | | **15.6µm** | **11µm** | **7.8µm** | **5.5µm** | **3.9µm** | **2.75µm** |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **6.0** | **6.5** | **7.0** | **7.5** | **8.0** | **8.5** |
| 1.00 | MAR01275.001 | Sediment | 5.63 | 4.30 | 3.13 | 2.16 | 1.28 | 0.67 |
| 2.00 | MAR01275.002 | Sediment | 3.36 | 2.59 | 1.91 | 1.35 | 0.83 | 0.45 |
| 3.00 | MAR01275.003 | Sediment | 2.50 | 1.97 | 1.46 | 1.03 | 0.64 | 0.36 |

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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) |
|---|---|---|---|---|---|---|---|
| | | Method No | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 |
| | | Accreditation | MMO | MMO | MMO | MMO | MMO |
| | | | 1.95µm | 1.38µm | 0.98µm | 0.69µm | 0.49µm |
| Client Reference: | SOCOTEC Ref: | Matrix | 9.0 | 9.5 | 10.0 | 10.5 | 11.0 |
| 1.00 | MAR01275.001 | Sediment | 0.33 | 0.20 | 0.18 | 0.18 | 0.17 |
| 2.00 | MAR01275.002 | Sediment | 0.23 | 0.14 | 0.12 | 0.13 | 0.12 |
| 3.00 | MAR01275.003 | Sediment | 0.19 | 0.12 | 0.11 | 0.11 | 0.11 |

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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) |
|---|---|---|---|---|---|---|---|
| | | Method No | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 |
| | | Accreditation | MMO | MMO | MMO | MMO | MMO |
| | | | **0.34µm** | **0.24µm** | **0.17µm** | **0.12µm** | **0.09µm** |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **11.5** | **12.0** | **12.5** | **13.0** | **13.5** |
| 1.00 | MAR01275.001 | Sediment | 0.15 | 0.13 | 0.10 | 0.07 | 0.04 |
| 2.00 | MAR01275.002 | Sediment | 0.11 | 0.09 | 0.07 | 0.05 | 0.03 |
| 3.00 | MAR01275.003 | Sediment | 0.10 | 0.09 | 0.07 | 0.05 | 0.03 |

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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) |
|---|---|---|---|---|---|
| | | Method No | *SUB_01 | *SUB_01 | *SUB_01 |
| | | Accreditation | MMO | MMO | MMO |
| | | | 0.06µm | 0.04µm | <0.04µm |
| Client Reference: | SOCOTEC Ref: | Matrix | 14.0 | 14.5 | >14.5 |
| 1.00 | MAR01275.001 | Sediment | 0.02 | 0.00 | 0.00 |
| 2.00 | MAR01275.002 | Sediment | 0.01 | 0.00 | 0.00 |
| 3.00 | MAR01275.003 | Sediment | 0.01 | 0.00 | 0.00 |

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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | mg/Kg (Dry Weight) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Method No | SOCOTEC Env Chem* | | | | | | | |
| | | Limit of Detection | 0.5 | 0.04 | 0.5 | 0.5 | 0.01 | 0.5 | 0.5 | 2 |
| | | Accreditation | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **Arsenic (As)** | **Cadmium (Cd)** | **Chromium (Cr)** | **Copper (Cu)** | **Mercury (Hg)** | **Nickel (Ni)** | **Lead (Pb)** | **Zinc (Zn)** |
| 1.00 | MAR01275.001 | Sediment | 24.8 | 4.25 | 16.2 | 69.5 | 0.07 | 20.2 | 1235 | 849 |
| 2.00 | MAR01275.002 | Sediment | 18.6 | 3.31 | 10.5 | 44.3 | 0.09 | 15.7 | 797 | 637 |
| 3.00 | MAR01275.003 | Sediment | 19.4 | 2.91 | 7.2 | 32.2 | 0.04 | 15.3 | 492 | 568 |
| Certified Reference Material SETOC 774 (% Recovery) | | | 100 | 105 | 104 | 100 | 93 | 104 | 97 | 101 |
| QC Blank | | | <0.5 | <0.04 | <0.5 | <0.5 | <0.01 | <0.5 | <0.5 | <2 |

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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) |
|---|---|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 |
| | | Limit of Detection | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Accreditation | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **ACENAPTH** | **ACENAPHY** | **ANTHRACN** | **BAA** | **BAP** | **BBF** |
| 1.00 | MAR01275.001 | Sediment | 53.5 | 69.9 | 248 | 855 | 912 | 793 |
| 2.00 | MAR01275.002 | Sediment | 28.9 | 10.6 | 49.9 | 135 | 170 | 160 |
| 3.00 | MAR01275.003 | Sediment | 43.9 | 11.8 | 65.8 | 87.2 | 107 | 97.9 |
| Certified Reference Material Quasimeme QPH105MS (% Recovery) | | | 86 | 116 | 109 | 89 | 94 | 72 |
| QC Blank | | | <1 | <1 | <1 | <1 | <1 | <1 |

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are available.
For full analyte name see method summaries

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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) |
|---|---|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 |
| | | Limit of Detection | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Accreditation | UKAS/MMO | UKAS/MMO | UKAS/MMO | MMO | MMO | MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **BENZGHIP** | **BEP** | **BKF** | **C1N** | **C1PHEN** | **C2N** |
| 1.00 | MAR01275.001 | Sediment | 624 | 684 | 461 | 55.3 | 366 | 102 |
| 2.00 | MAR01275.002 | Sediment | 147 | 142 | 88.5 | 23.6 | 86.9 | 186 |
| 3.00 | MAR01275.003 | Sediment | 84.4 | 92.8 | 66.5 | 25.3 | 98.8 | 220 |
| Certified Reference Material Quasimeme QPH105MS (% Recovery) | | | 95 | 95 | 109 | 101 | 121 | 84 |
| QC Blank | | | <1 | <1 | <1 | <1 | <1 | <1 |

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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) |
|---|---|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 |
| | | Limit of Detection | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Accreditation | MMO | MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **C3N** | **CHRYSENE** | **DBENZAH** | **FLUORANT** | **FLUORENE** | **INDPYR** |
| 1.00 | MAR01275.001 | Sediment | 84.0 | 679 | 98.7 | 1720 | 84.0 | 686 |
| 2.00 | MAR01275.002 | Sediment | 83.7 | 131 | 27.3 | 301 | 45.0 | 148 |
| 3.00 | MAR01275.003 | Sediment | 70.3 | 88.0 | 17.6 | 265 | 51.0 | 81.4 |
| Certified Reference Material Quasimeme QPH105MS (% Recovery) | | | 65 | 91 | 87 | 94 | 81 | 86 |
| QC Blank | | | <1 | <1 | <1 | <1 | <1 | <1 |

~ Indicates result is for an In-house Reference Material as
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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | mg/Kg |
|---|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/305 |
| | | Limit of Detection | 1 | 1 | 1 | 1 | 1 |
| | | Accreditation | UKAS/MMO | MMO | UKAS/MMO | UKAS/MMO | MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **NAPTH** | **PERYLENE** | **PHENANT** | **PYRENE** | **THC** |
| 1.00 | MAR01275.001 | Sediment | 50.0 | 429 | 694 | 1580 | 44.5 |
| 2.00 | MAR01275.002 | Sediment | 31.3 | 72.8 | 127 | 280 | 42.6 |
| 3.00 | MAR01275.003 | Sediment | 15.9 | 53.1 | 206 | 246 | 28.0 |
| Certified Reference Material Quasimeme QPH105MS (% Recovery) | | | 101 | 81 | 96 | 100 | 98~ |
| QC Blank | | | <1 | <1 | <1 | <1 | <1 |

~ Indicates result is for an In-house Reference Material as
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For full analyte name see method summaries

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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 |
| | | Limit of Detection | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 |
| | | Accreditation | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **PCB 101** | **PCB 105** | **PCB 110** | **PCB 118** | **PCB 128** | **PCB 138** | **PCB 141** | **PCB 149** |
| 1.00 | MAR01275.001 | Sediment | <0.00008 | <0.00008 | 0.00027 | 0.00035 | 0.00015 | 0.00040 | <0.00008 | 0.00018 |
| 2.00 | MAR01275.002 | Sediment | 0.00009 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | 0.00013 | <0.00008 | <0.00008 |
| 3.00 | MAR01275.003 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | 0.00009 | <0.00008 | <0.00008 |
| Certified Reference Material Quasimeme QOR146MS (% Recovery) | | | 105 | 124 | 98~ | 107 | 95~ | 107 | 97~ | 58 |
| QC Blank | | | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are available.
* See report notes

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Results contained herewith only apply to the samples tested

# Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) |
|---|---|---|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 |
| | | Limit of Detection | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 |
| | | Accreditation | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | MMO* | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **PCB 151** | **PCB 153** | **PCB 156** | **PCB 158** | **PCB 170** | **PCB 18** | **PCB 180** |
| 1.00 | MAR01275.001 | Sediment | <0.00008 | 0.00042 | 0.00009 | <0.00008 | <0.00008 | 0.00013 | 0.00020 |
| 2.00 | MAR01275.002 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | 0.00010 | <0.00008 |
| 3.00 | MAR01275.003 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | 0.00009 | <0.00008 |
| Certified Reference Material Quasimeme QOR146MS (% Recovery) | | | 96~ | 92 | 100~ | 103~ | 96~ | 94~ | 69 |
| QC Blank | | | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |

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# Certificate of Analysis

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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) |
|---|---|---|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 |
| | | Limit of Detection | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 |
| | | Accreditation | UKAS/MMO | MMO* | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **PCB 183** | **PCB 187** | **PCB 194** | **PCB 28** | **PCB 31** | **PCB 44** | **PCB 47** |
| 1.00 | MAR01275.001 | Sediment | <0.00008 | <0.00008 | <0.00008 | 0.00013 | 0.00020 | <0.00008 | <0.00008 |
| 2.00 | MAR01275.002 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | 0.00009 | <0.00008 | <0.00008 |
| 3.00 | MAR01275.003 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | 0.00016 | <0.00008 | <0.00008 |
| Certified Reference Material Quasimeme QOR146MS (% Recovery) | | | 89 | 57 | 93~ | 86 | 149 | 76 | 98~ |
| QC Blank | | | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |

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* See report notes

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# Certificate of Analysis

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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| | | Units | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) |
|---|---|---|---|---|---|
| | | Method No | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 |
| | | Limit of Detection | 0.00008 | 0.00008 | 0.00008 |
| | | Accreditation | UKAS/MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **PCB 49** | **PCB 52** | **PCB 66** |
| 1.00 | MAR01275.001 | Sediment | 0.00010 | 0.00022 | 0.00009 |
| 2.00 | MAR01275.002 | Sediment | <0.00008 | <0.00008 | <0.00008 |
| 3.00 | MAR01275.003 | Sediment | <0.00008 | 0.00011 | <0.00008 |
| Certified Reference Material Quasimeme QOR146MS (% Recovery) | | | 120 | 122 | 108 |
| QC Blank | | | <0.00008 | <0.00008 | <0.00008 |

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

* See report notes

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# Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR01275
Issue Version 1
Customer Reference Peel Marine MMO Marine Sediment Analysis

## REPORT NOTES

| Method Code | Sample ID | The following information should be taken into consideration when using the data contained within this report |
|---|---|---|
| *SUB_01 | MAR01275.001-003 | Analysis was conducted by an approved subcontracted laboratory. |
| SOCOTEC Env Chem* | MAR01275.001-003 | Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252. |
| SOCOTEC Env Chem* (TOC) | MAR01275.003 | Due to recoveries beyond our calibration range and following the maximum size of dilution allowed, the result cannot be quantified and as such the result will appear as a greater than symbol (>) with the accreditation removed. This data should be used for indicative purposes only. |
| ASC/SOP/302 | MAR01275.001-003 | The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected.However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (PCB170, PCB187) . These circumstances should be taken into consideration when utilising the data. |
| ASC/SOP/303/304 | MAR01275.001-003 | Chrysene is known to coelute with Triphenylene and these peaks can not be resolved in the PAHSED UKAS accredited method. Chrysene and Triphenylene are resolved for MMO but this is currently not UKAS accredited therefore Chrysene is reported without this acccreditation. |

## DEVIATING SAMPLE STATEMENT

| Deviation Code | Deviation Definition | Sample ID | Deviation Details. The following information should be taken into consideration when using the data contained within this report |
|---|---|---|---|
| D1 | Holding Time Exceeded | N/A | N/A |
| D2 | Handling Time Exceeded | N/A | N/A |
| D3 | Sample Contaminated through Damaged Packaging | N/A | N/A |
| D4 | Sample Contaminated through Sampling | N/A | N/A |
| D5 | Inappropriate Container/Packaging | N/A | N/A |
| D6 | Damaged in Transit | N/A | N/A |
| D7 | Insufficient Quantity of Sample | N/A | N/A |
| D8 | Inappropriate Headspace | N/A | N/A |
| D9 | Retained at Incorrect Temperature | N/A | N/A |
| D10 | Lack of Date & Time of Sampling | N/A | N/A |
| D11 | Insufficient Sample Details | N/A | N/A |
| D12 | Sample integrity compromised or not suitable for analysis | N/A | N/A |

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# Certificate of Analysis

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| | |
|---|---|
| Test Report ID | MAR01275 |
| Issue Version | 1 |
| Customer Reference | Peel Marine MMO Marine Sediment Analysis |

| Method | Sample and Fraction Size | Method Summary |
|---|---|---|
| Particle Size Analysis | Wet Sediment | Wet and dry sieving followed by laser diffraction analysis. |
| Total Organic Carbon (TOC) | Air dried | Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR. |
| Metals | Air dried | Aqua-regia extraction followed by ICP analysis. |
| Organotins | Wet Sediment | Solvent extraction and derivatisation followed by GC-MS analysis. |
| Polyaromatic Hydrocarbons (PAH) | Wet Sediment | Solvent extraction and clean up followed by GC-MS analysis. |
| Total Hydrocarbon Content (THC) | Wet Sediment | Ultra-violet fluorescence spectroscopy |
| Polychlorinated Biphenyls (PCBs) | Air dried and seived to <2mm | Solvent extraction and clean up followed by GC-MS-MS analysis. |

**Analyte Definitions**

| Analyte Abbreviation | Full Analyte name | Analyte Abbreviation | Full Analyte name | Analyte Abbreviation | Full Analyte name |
|---|---|---|---|---|---|
| ACENAPTH | Acenaphthene | C2N | C2-naphthalenes | THC | Total Hydrocarbon Content |
| ACENAPHY | Acenaphthylene | C3N | C3-naphthalenes | AHCH | alpha-Hexachlorocyclohexane |
| ANTHRACN | Anthracene | CHRYSENE | Chrysene | BHCH | beta-Hexachlorocyclohexane |
| BAA | Benzo[a]anthracene | DBENZAH | Dibenzo[ah]anthracene | GHCH | gamma-Hexachlorocyclohexane |
| BAP | Benzo[a]pyrene | FLUORANT | Fluoranthene | DIELDRIN | Dieldrin |
| BBF | Benzo[b]fluoranthene | FLUORENE | Fluorene | HCB | Hexachlorobenzene |
| BEP | Benzo[e]pyrene | INDPYR | Indeno[1,2,3-cd]pyrene | PPDDE | p,p'-Dichlorodiphenyldichloroethylene |
| BENZGHIP | Benzo[ghi]perylene | NAPTH | Naphthalene | PPDDT | p,p'-Dichlorodiphenyltrichloroethane |
| BKF | Benzo[k]fluoranthene | PERYLENE | Perylene | PPTDE | p,p'-Dichlorodiphenyldichloroethane |
| C1N | C1-naphthalenes | PHENANT | Phenanthrene | | |
| C1PHEN | C1-phenanthrene | PYRENE | Pyrene | | |

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## Physical characteristics data

**Instructions:**

1. Record the laboratory/contractor responsible for analysis
2. Record the date the samples were analysed.
3. Enter full dataset for each sample in the analysis results table
4. Where copying and pasting entries please use paste values only
5. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

**Analysis information:**

| | |
|---|---|
| Laboratory/contractor: | Ocean Ecology Ltd |
| Date of analysis: | 24/01/2022 |

**Physical characteristics analysis outputs:**

| Laboratory sample number | Dredge Area | Sample ID(s) | Visual appearance* | Exempt from chemical analysis- | Total Solids (% total sediments) | Organic matter (total organic carbon) |
|---|---|---|---|---|---|---|
| MAR01275.001 | | 1 | ddy Organic Matter with Shell Fragments and an Anoxic Odour | | 27.50 | 8.1800 |
| MAR01275.002 | | 2 | Black Muddy Organic Matter with an Anoxic Odour | | 31.30 | 19.3000 |
| MAR01275.003 | | 3 | ddy Organic Matter with Shell Fragments and an Anoxic Odour | | 21.80 | >25.0* |

Particle size distribution (% at 0.5 phi intervals)

| Laboratory sample number | -5.5 | -5.0 | -4.5 | -4.0 | -3.5 | -3.0 | -2.5 | -2.0 | -1.5 | -1.0 | -0.5 | 0.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAR01275.001 | 0.00 | 0.00 | 0.00 | 0.33 | 0.81 | 0.75 | 1.36 | 1.86 | 2.01 | 1.27 | 1.11 | 0.69 |
| MAR01275.002 | 0.18 | 0.30 | 0.00 | 4.44 | 4.79 | 3.54 | 5.19 | 5.34 | 4.58 | 3.49 | 3.23 | 2.17 |
| MAR01275.003 | 0.00 | 0.00 | 0.00 | 0.34 | 0.39 | 1.79 | 2.65 | 2.88 | 1.95 | 1.59 | 1.59 | 1.22 |

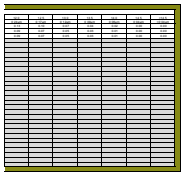
| Laboratory sample number | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAR01275.001 | 1.69 | 2.47 | 4.32 | 4.90 | 7.43 | 8.66 | 8.55 | 8.98 | 8.62 | 8.23 | 7.21 | 5.63 |
| MAR01275.002 | 0.92 | 3.09 | 4.11 | 4.30 | 6.33 | 6.82 | 6.00 | 5.54 | 5.03 | 4.77 | 4.23 | 3.36 |
| MAR01275.003 | 2.59 | 5.66 | 8.90 | 12.65 | 14.40 | 10.39 | 6.27 | 4.89 | 4.09 | 3.66 | 3.14 | 2.50 |

| Laboratory sample number | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | 9.0 | 9.5 | 10.0 | 10.5 | 11.0 | 11.5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MAR01275.001 | 4.30 | 3.13 | 2.16 | 1.28 | 0.67 | 0.33 | 0.20 | 0.18 | 0.18 | 0.17 | 0.15 |
| MAR01275.002 | 2.59 | 1.91 | 1.35 | 0.83 | 0.45 | 0.23 | 0.14 | 0.12 | 0.13 | 0.12 | 0.11 |
| MAR01275.003 | 1.97 | 1.46 | 1.03 | 0.64 | 0.36 | 0.19 | 0.12 | 0.11 | 0.11 | 0.11 | 0.10 |

* **Visual appearance**: Incude a description of what the material looks like and what it contains, e.g. sandy material containing brick fragments, or black silt, or foreign man made matter caught in the sample.

- **Exempt from chemical analysis:** enter 'y' where sediment samples contain glacial material or are too coarse and thus exempt from chemical analysis.

y



## Trace metal data

**Instructions:**

1. Record the laboratory/contractor responsible for trace metal analysis
2. Record the date the samples were analysed.
3. Enter full dataset for each sample in the analysis results table
4. Trace metal analysis results should be reported in mg/kg (ppm) dry weight
5. Enter methdological limit of detection for each trace metal prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<LOD"
7. Where copying and pasting entries please use paste values only
8. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

**Analysis information:**

| | |
|---|---|
| Laboratory/contractor: | SOCOTEC |
| Date of analysis: | 07/02/2022 |

**Determinand analysis outputs:**

| Laboratory sample number | Dredge Area | Sample ID(s) | Total solids (%) | Metals as mg/kg dry weight | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Arsenic (As) | Cadmium (Cd) | Chromium (Cr) | Copper (Cu) | Mercury (Hg) | Nickel (Ni) | Lead (Pb) | Zinc (Zn) |
| MAR01275.001 | | 1 | 27.5 | 24.8 | 4.25 | 16.2 | 69.5 | 0.07 | 20.2 | 1235 | 849 |
| MAR01275.002 | | 2 | 31.3 | 18.6 | 3.31 | 10.5 | 44.3 | 0.09 | 15.7 | 797 | 637 |
| MAR01275.003 | | 3 | 21.8 | 19.4 | 2.91 | 7.2 | 32.2 | 0.04 | 15.3 | 492 | 568 |
| **Limits of detection (mg/kg dry weight):** | | | | 0.5 | 0.04 | 0.5 | 0.5 | 0.01 | 0.5 | 0.5 | 2 |

## Organotin data

**Instructions:**

1. Record the laboratory/contractor responsible for organotin analysis
2. Record the date the samples were analysed.
3. Enter full dataset for each sample in the analysis results table
4. Organotin analysis results should be reported in mg/kg (ppm) dry weight
5. Enter methdological limit of detection for each organotin prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<LOD"
7. Where copying and pasting entries please use paste values only
8. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

**Analysis information:**

| | |
|---|---|
| Laboratory/contractor: | |
| Date of analysis: | |

**determinand analysis outputs:**

| Laboratory sample number | Dredge Area | Sample ID(s) | Total solids (%) | Organotins as mg/kg dry weight | |
|---|---|---|---|---|---|
| | | | | Dibutyltine (DBT) | Tributyltin (TBT) |
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| Limits of detection (mg/kg dry weight): | | | | | |

## Polyaromatic hydrocarbon data

**Instructions:**

1. Record the laboratory or contractor responsible for PAH analysis
2. Record the date the samples were analysed
3. Enter the results for individual PAHs as per the analysis results table
4. Enter zero results for individual PAHs should be reported in µg/kg (ppb) dry weight. TAH should be reported as mg/kg (ppm)
5. Enter methodological limit of detection for each PAH prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter "<LOD"
7. Where analysis outputs are greater than the limits of detection enter ">LOD"
8. Where entering multiple Sample IDs please use this pop up form. IDs should be separated by a comma

**Sample Information**

| | |
|---|---|
| Laboratory undertaking analysis | Alcontrol |
| Date of analysis | 19/04/2021 |

Alcontrol report analysis methods

| Laboratory reference number | Sample ID | Sample ID(s) | Total Solids (%) | PAHs as dry weight (µg/kg dry weight) | | | | | | | | | | | | | | | | | | | | | | | | Total Eight-component mixture (dry µg/kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Acenaphthene | Acenaphthylene | Anthracene | Benz(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(ghi)perylene | Benzo(k)fluoranthene | Chrysene | Dibenz(ah)anthracene | Fluoranthene | Fluorene | Indeno(123-cd)pyrene | Naphthalene | Phenanthrene | Pyrene | 1-methyl-2-(4-chlorobenzyl)benzene | 1-methylnaphthalene | 2-methylnaphthalene | Benzo(j)fluoranthene | Perylene | Quinoline | | | |
| Lab Reference Limit | | | | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | | | |
| Lab Reference Limit | | | | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | | | |
| 1 | | | 87.8 | 4600 | 1100 | 4400 | 1200 | 1000 | 1600 | 1000 | 1100 | 1200 | 500 | 2400 | 4600 | 1000 | 1100 | 2400 | 2400 | 1100 | 1100 | 1100 | 500 | 1100 | 1100 | 1100 | 1100 | 1100 | 1100 |
| 2 | | | 87.8 | 4600 | 1100 | 4400 | 1200 | 1000 | 1600 | 1000 | 1100 | 1200 | 500 | 2400 | 4600 | 1000 | 1100 | 2400 | 2400 | 1100 | 1100 | 1100 | 500 | 1100 | 1100 | 1100 | 1100 | 1100 | 1100 |
| 3 | | | 87.8 | 4600 | 1100 | 4400 | 1200 | 1000 | 1600 | 1000 | 1100 | 1200 | 500 | 2400 | 4600 | 1000 | 1100 | 2400 | 2400 | 1100 | 1100 | 1100 | 500 | 1100 | 1100 | 1100 | 1100 | 1100 | 1100 |
| Total (dry weight) | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

## Polychlorinated biphenyl data

**Instructions:**

1. Record the laboratory/contractor responsible for PCB analysis
2. Record the date the samples were analysed.
3. Enter full dataset for each sample in the analysis results table
4. Analysis results should be reported in mg/kg (ppm) dry weight.
5. Enter methdological limit of detection for each PCB prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<L
7. ICES 7 PCBs are highlighted in bold
8. Where copying and pasting entries please use paste values only
9. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

**Analysis information:**

| | |
|---|---|
| Laboratory/contractor: | SOCOTEC |
| Date of analysis: | 02/02/2022 |

**determinand analysis outputs:**

| Laboratory sample number | Dredge Area | Sample ID(s) | Total Solids (%) | PCBs as mg/kg dry weight | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2,2',4,5,5'-Pentachlorobiphenyl CB101 | 2,3,3',4,4'-Pentachlorobiphenyl CB105 | 2,3,3',4',6-Pentachlorobiphenyl CB110 | 2,3',4,4',5-Pentachlorobiphenyl CB118 | 2,2',3,3',4,4'-Hexachlorobiphenyl CB128 | 2,2',3,4,4',5'-Hexachlorobiphenyl CB138 | 2,2',3,4,5,5'-Hexachlorobiphenyl CB141 | 2,2',3,4',5',6-Hexachlorobiphenyl CB149 | 2,2',3,5,5',6-Hexachlorobiphenyl CB151 | 2,2',4,4',5,5'-Hexachlorobiphenyl CB153 | 2,3,3',4,4',5-Hexachlorobiphenyl CB156 | 2,3,3',4,4',6-Hexachlorobiphenyl CB158 | 2,2',3,3',4,4',5-Heptachlorobiphenyl CB170 |
| MAR01275.001 | | 1 | 27.5 | <LOD | <LOD | 0.00027 | 0.00035 | 0.00015 | 0.0004 | <LOD | 0.00018 | <LOD | 0.00042 | 0.00009 | <LOD | <LOD |
| MAR01275.002 | | 2 | 31.3 | 0.00009 | <LOD | <LOD | <LOD | <LOD | 0.00013 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| MAR01275.003 | | 3 | 21.8 | <LOD | <LOD | <LOD | <LOD | <LOD | 0.00009 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Limits of detection (mg/kg dry weight): | | | | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 |

| Laboratory sample number | 2,2',5-Trichlorobiphenyl CB18 | 2,2',3,4,4',5,5'-Heptachlorobiphenyl CB180 | 2,2',3,4,4',5',6-Heptachlorobiphenyl CB183 | 2,2',3,4',5,5',6-Heptachlorobiphenyl CB187 | 2,2',3,3',4,4',5,5'-Octachlorobiphenyl CB194 | 2,4,4'-Trichlorobiphenyl CB28 | 2,4',5-Trichlorobiphenyl CB31 | 2,2',3,5'-Tetrachlorobiphenyl CB44 | 2,2',4,4'-Tetrachlorobiphenyl CB47 | 2,2',4,5'-Tetrachlorobiphenyl CB49 | 2,2',5,5'-Tetrachlorobiphenyl CB52 | 2,3',4,4'-Tetrachlorobiphenyl CB66 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAR01275.001 | 0.00013 | 0.0002 | <LOD | <LOD | <LOD | 0.00013 | 0.0002 | <LOD | <LOD | 0.0001 | 0.00022 | 0.00009 |
| MAR01275.002 | 0.0001 | <LOD | <LOD | <LOD | <LOD | <LOD | 0.00009 | <LOD | <LOD | <LOD | <LOD | <LOD |
| MAR01275.003 | 0.00009 | <LOD | <LOD | <LOD | <LOD | <LOD | 0.00016 | <LOD | <LOD | <LOD | 0.00011 | <LOD |
| Limits of detection (mg/kg dry weight): | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 |

## Organochlorine data

**Instructions:**

1. Record the laboratory/contractor responsible for analysis
2. Record the date the samples were analysed.

3. Enter full dataset for each sample in the analysis results table

4. Analysis results should be reported in mg/kg (ppm) dry weight.
5. Enter methdological limit of detection for each Organochlorine prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<LOD"
7. Where copying and pasting entries please use paste values only
8. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

**Analysis information:**

| | |
|---|---|
| Laboratory/contractor: | |
| Date of analysis: | |

**determinand analysis outputs:**

| Laboratory sample number | Dredge Area | Sample ID(s) | Total Solids (%) | Organochlorine pesticides as mg/kg dry weight | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | alpha-hexachlorocyclohexane (AHCH) | beta-hexachlorocyclohexane (BHCH) | gamma-hexachlorocyclohexane (GHCH) | Dieldrin | Hexachlorobenzene (HCB) | 1,1-Dichloro-2,2-bis(p-chlorophenyl) ethylene (PPDDE) | Dichlorodiphenyltrichloroethane (PPDDT) | 1,1-dichloro-2,2-bis(p-chlorophenyl)ethane (PPTDE) |
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| Limits of detection (mg/kg dry weight): | | | | | | | | | | | |

## Brominated flame retardant data

**Instructions:**

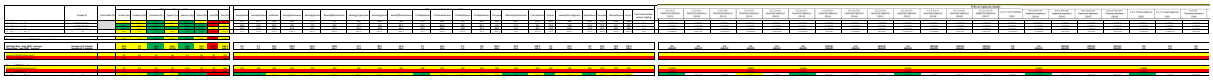
1. Record the laboratory/contractor responsible for analysis
2. Record the date the samples were analysed.
3. Enter full dataset for each sample in the analysis results table
4. Analysis results should be reported in mg/kg (ppm) dry weight.
5. Enter methdological limit of detection for each BDE prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<LOD"
7. Where copying and pasting entries please use paste values only
8. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

**Analysis information:**

| | |
|---|---|
| Laboratory/contractor: | |
| Date of analysis: | |

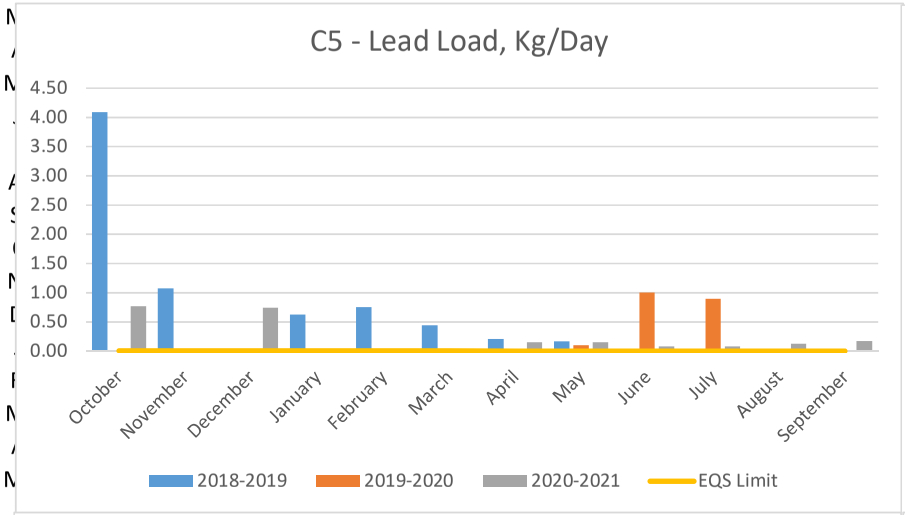
**determinand analysis outputs:**

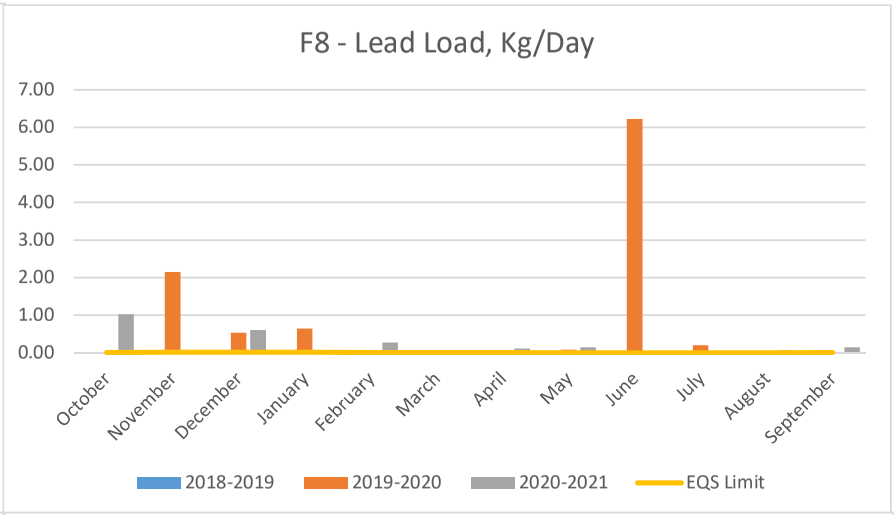
| Laboratory sample number | Dredge Area | Sample ID(s) | Total Solids (%) | Brominated flame retardants as mg/kg dry weight | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2,2',4,4',6-penta-bromodiphenyl ether (BDE100) | Hexabromodiphenyl ether (BDE138) | 2,2',4,4',5,5'-hexa-bromodiphenyl ether (BDE153) | 2,2',4,4',5,6'-hexa-bromodiphenyl ether (BDE154) | 2,2´,4-tri-bromodiphenylether (BDE17) | 2,2',3,4,4',5',6-heptabromodiphenyl ether (BDE183) | 2,2',3,3',4,4',5,5',6,6'-decabrominated diphenyl ether (BDE 209) | 2,4,4'-tribromodiphenyl ether (BDE28) | 2,2',4,4'-Tetrabromodiphenyl ether (BDE47) | 2,3',4,4'-Tetrabromodiphenyl ether (BDE66) | 2,2',3,4,4'-Pentabromodiphenyl ether (BDE85) | 2,2',4,4',5-pentabromodiphenyl ether (BDE99) |
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| Limits of detection (mg/kg dry weight): | | | | | | | | | | | | | | | |

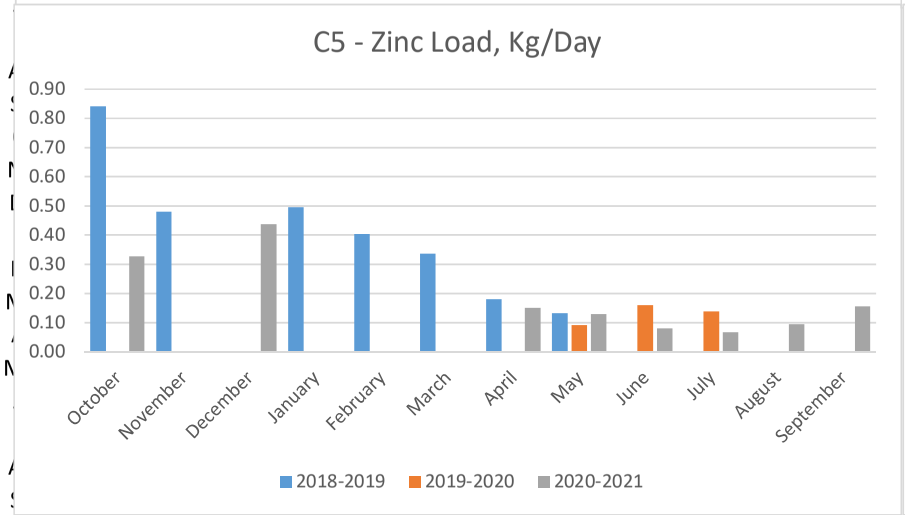


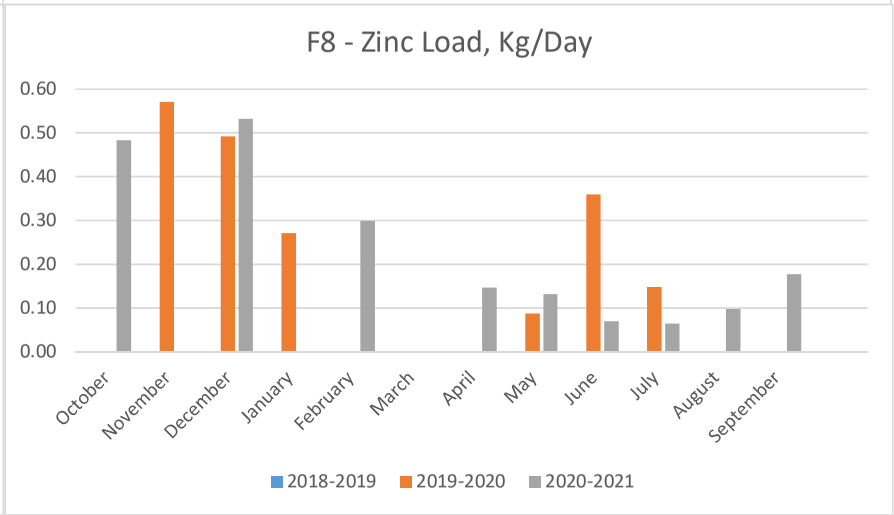


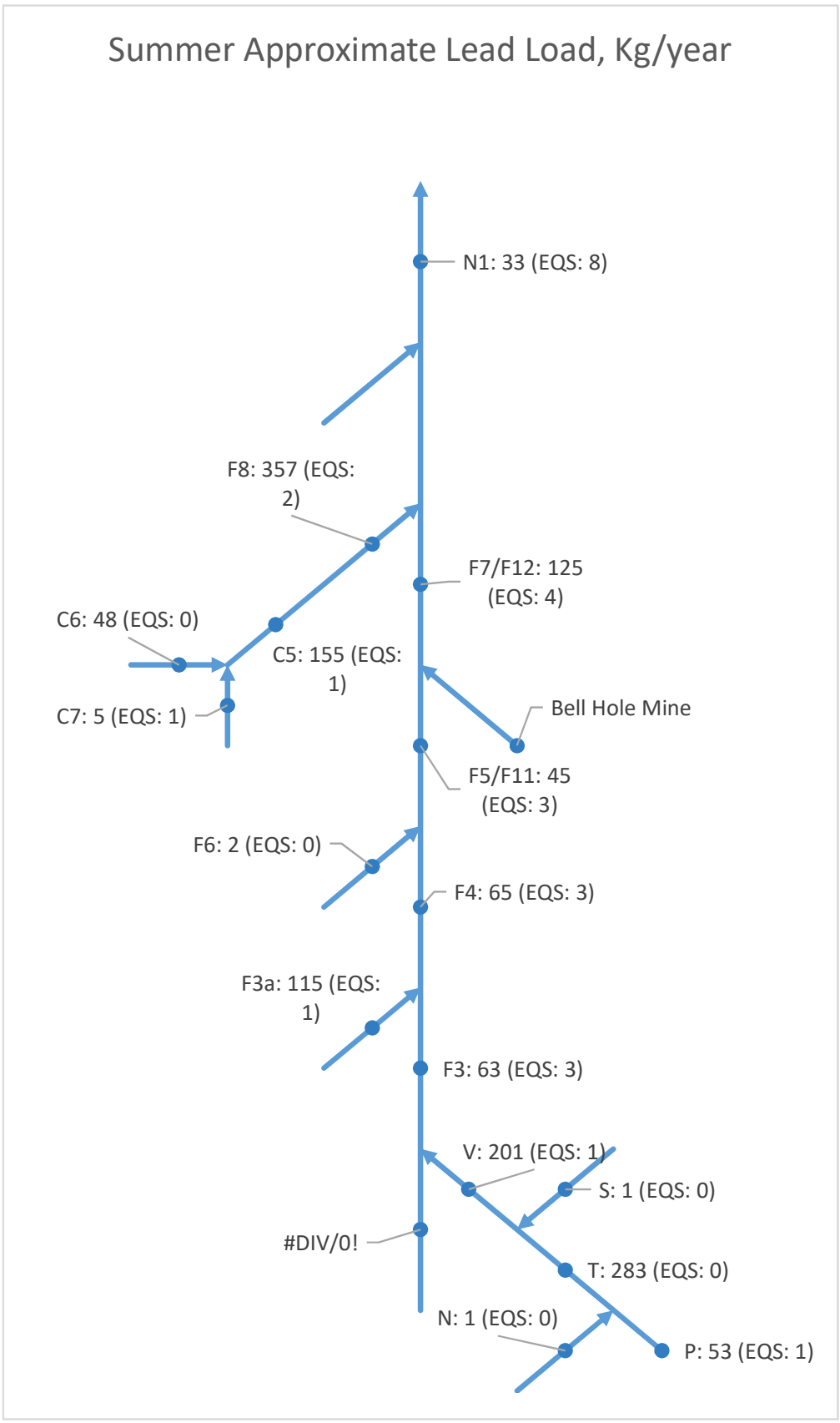


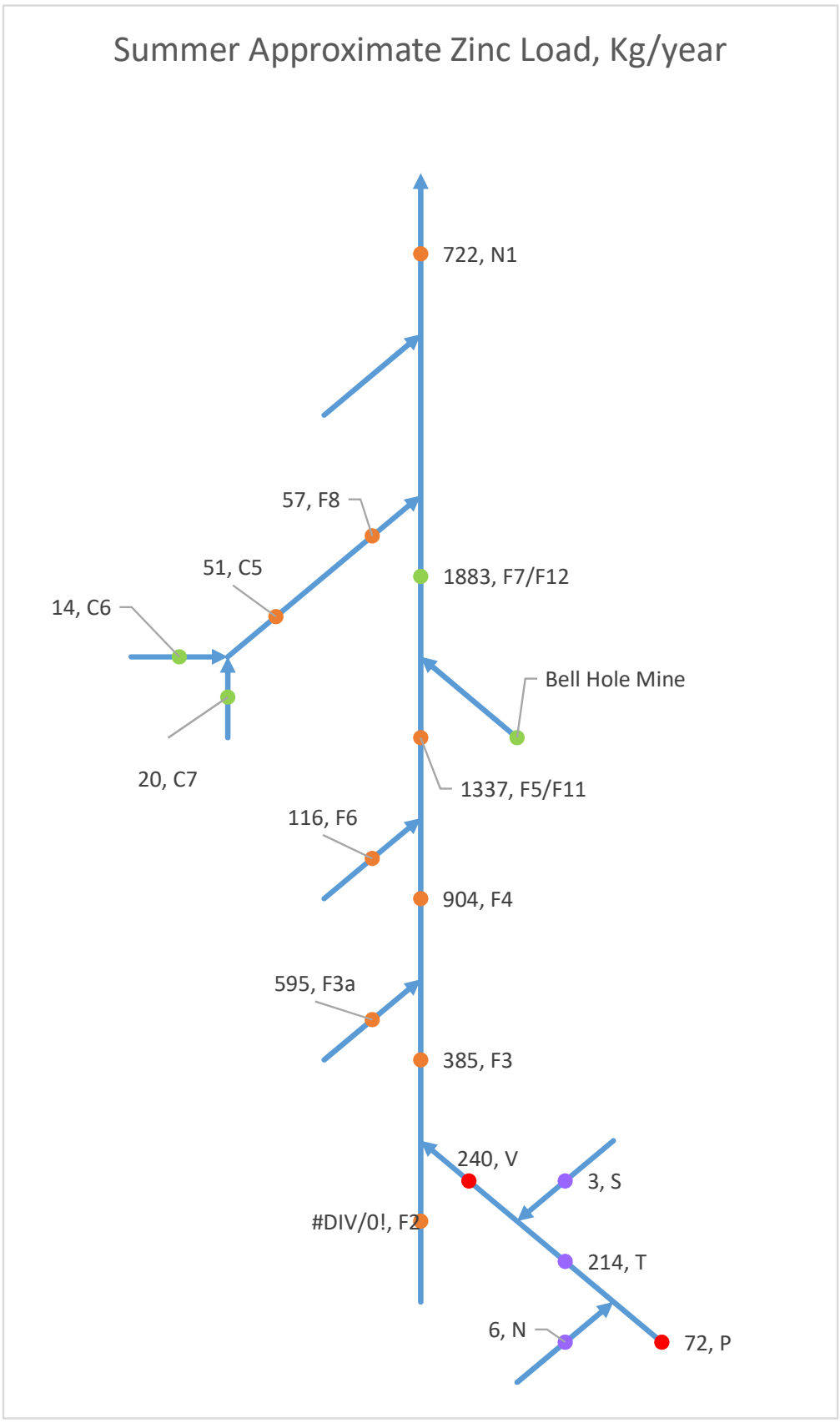

C5 - Lead Load, Kg/Day
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
October
November
December
January
February
March
April
May
June
July
August
September
2018-2019
2019-2020
2020-2021
EQS Limit

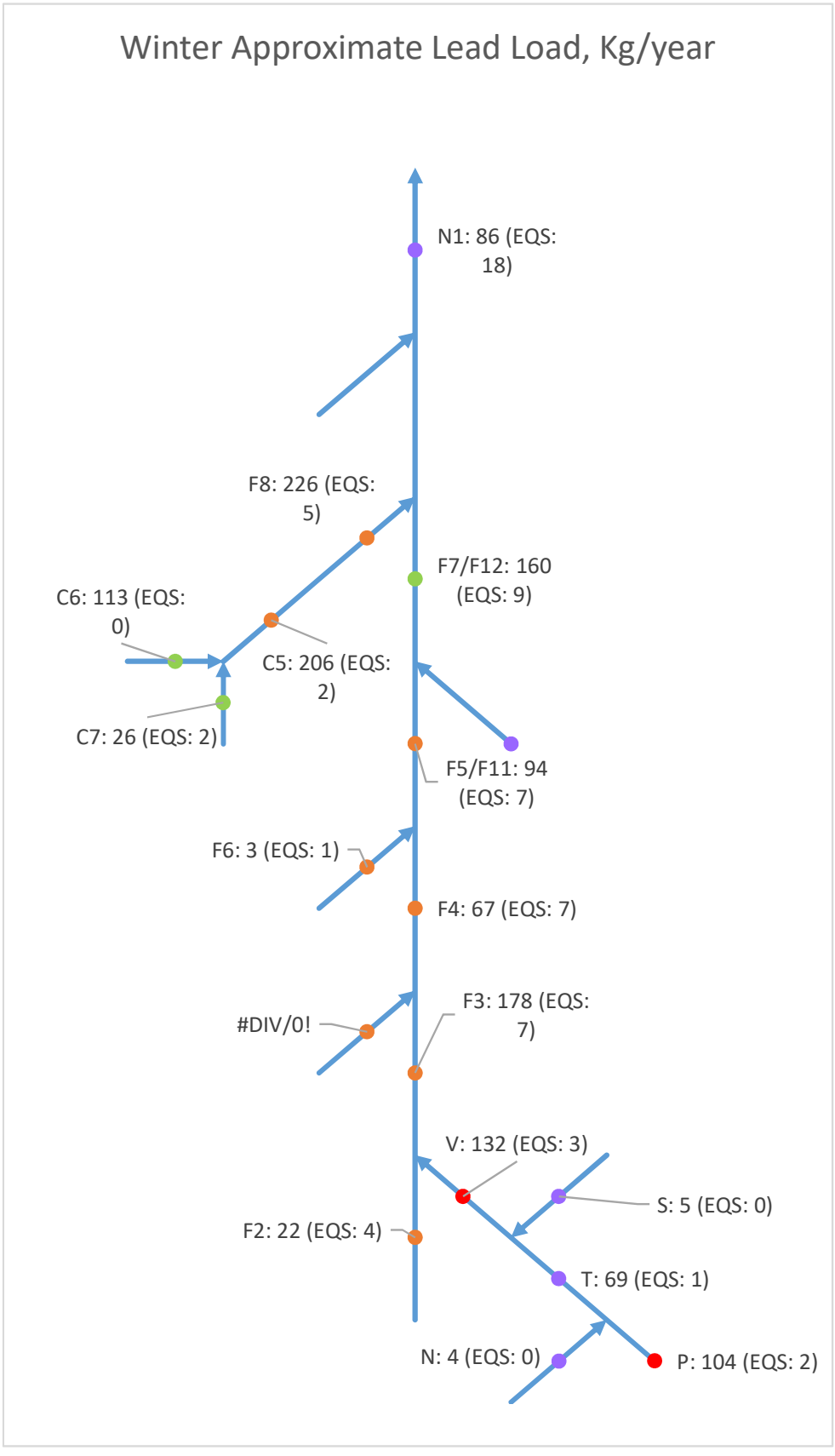

F8 - Lead Load, Kg/Day
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
October
November
December
January
February
March
April
May
June
July
August
September
2018-2019
2019-2020
2020-2021
EQS Limit

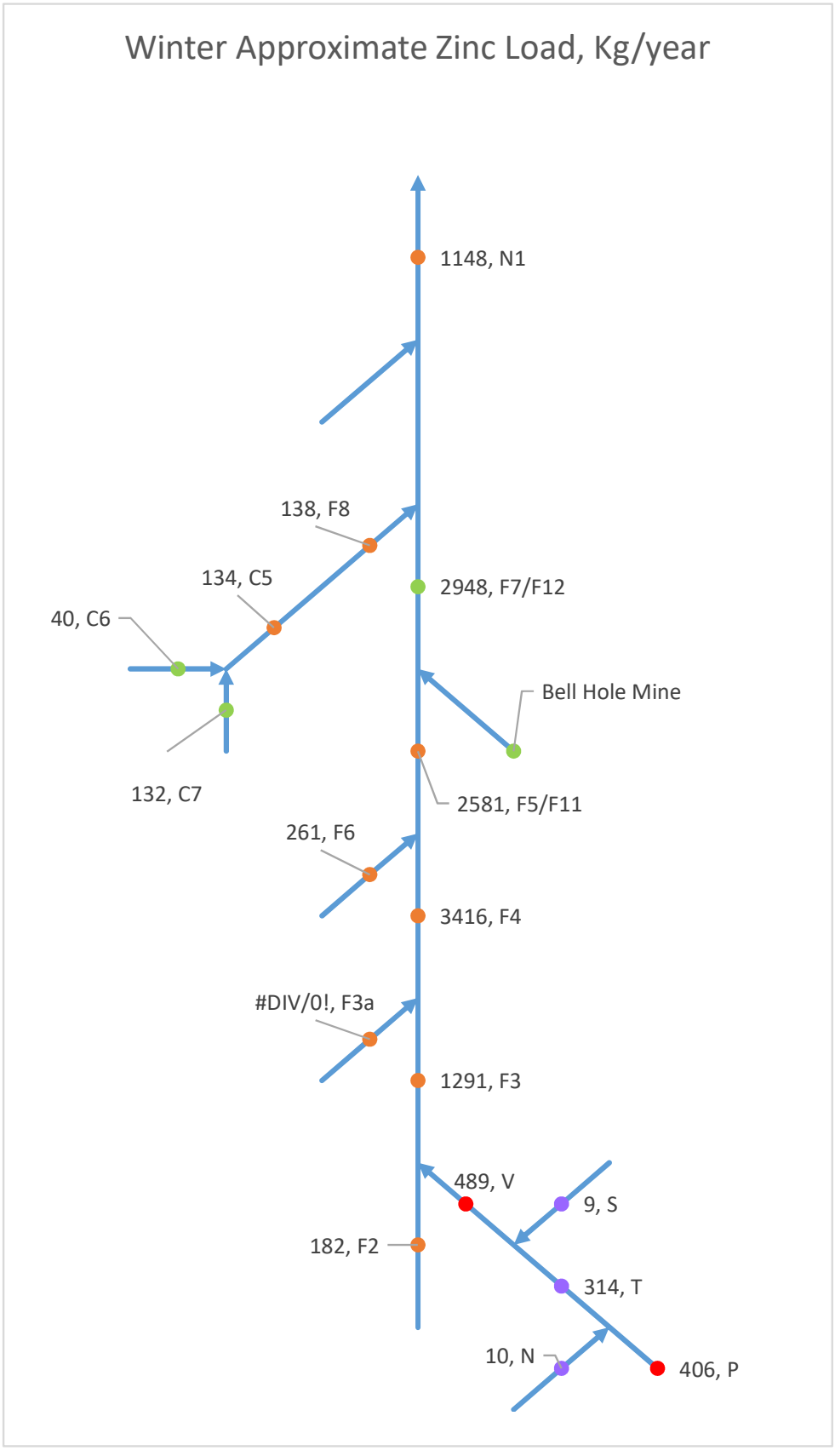

C5 - Zinc Load, Kg/Day
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
October
November
December
January
February
March
April
May
June
July
August
September
2018-2019
2019-2020
2020-2021


F8 - Zinc Load, Kg/Day
0.60
0.50
0.40
0.30
0.20
0.10
0.00
October
November
December
January
February
March
April
May
June
July
August
September
2018-2019
2019-2020
2020-2021

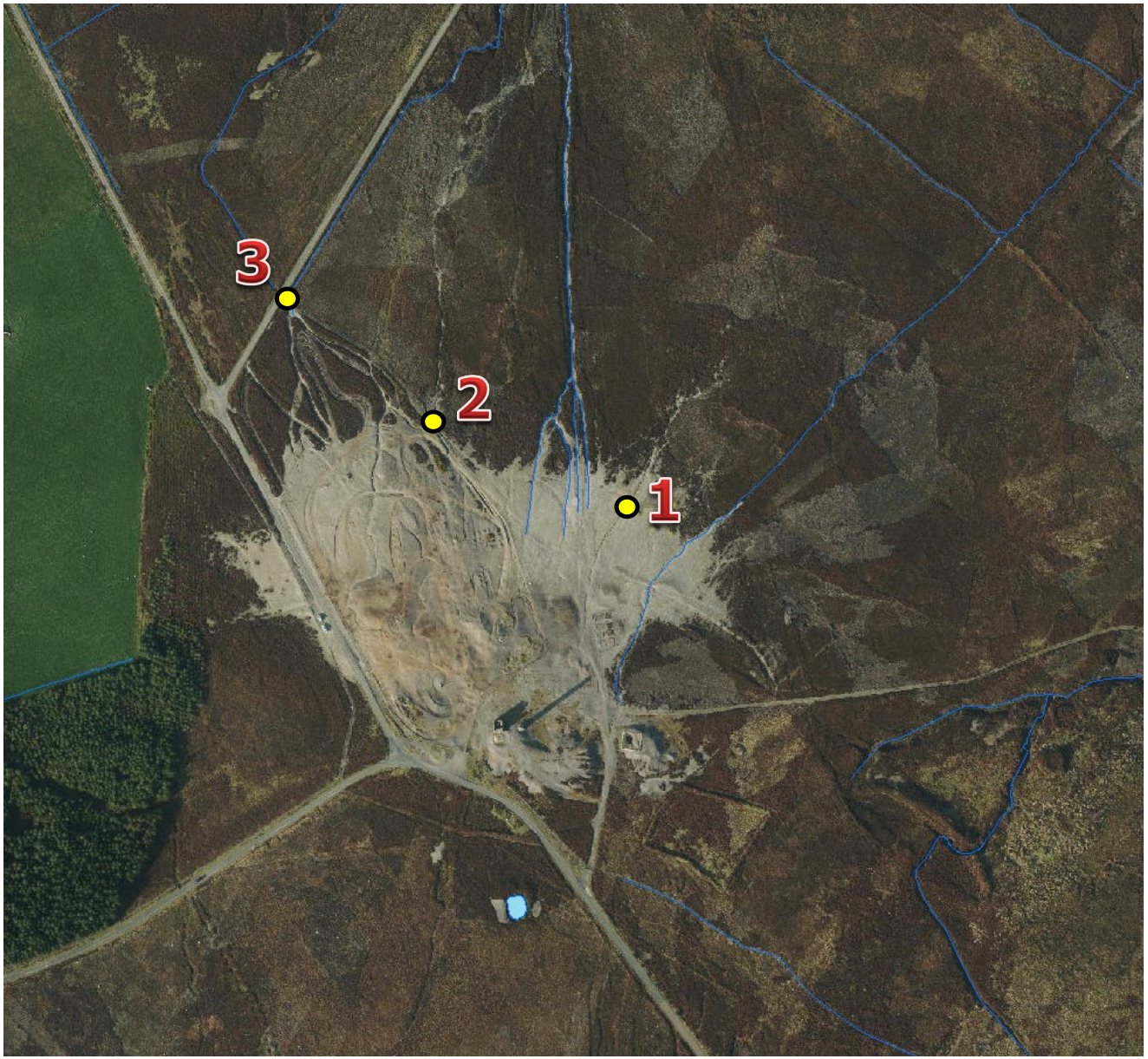

Summer Approximate Lead Load, Kg/year
N1: 33 (EQS: 8)
F8: 357 (EQS: 2)
F7/F12: 125 (EQS: 4)
C6: 48 (EQS: 0)
C5: 155 (EQS: 1)
C7: 5 (EQS: 1)
Bell Hole Mine
F5/F11: 45 (EQS: 3)
F6: 2 (EQS: 0)
F4: 65 (EQS: 3)
F3a: 115 (EQS: 1)
F3: 63 (EQS: 3)
V: 201 (EQS: 1)
S: 1 (EQS: 0)
#DIV/0!
T: 283 (EQS: 0)
N: 1 (EQS: 0)
P: 53 (EQS: 1)


Summer Approximate Zinc Load, Kg/year
722, N1
57, F8
51, C5
14, C6
1883, F7/F12
Bell Hole Mine
20, C7
1337, F5/F11
116, F6
904, F4
595, F3a
385, F3
240, V
3, S
#DIV/0!, F2
214, T
6, N
72, P


Winter Approximate Lead Load, Kg/year
N1: 86 (EQS: 18)
F8: 226 (EQS: 5)
F7/F12: 160 (EQS: 9)
C6: 113 (EQS: 0)
C5: 206 (EQS: 2)
C7: 26 (EQS: 2)
F5/F11: 94 (EQS: 7)
F6: 3 (EQS: 1)
F4: 67 (EQS: 7)
F3: 178 (EQS: 7)
#DIV/0!
V: 132 (EQS: 3)
S: 5 (EQS: 0)
F2: 22 (EQS: 4)
T: 69 (EQS: 1)
N: 4 (EQS: 0)
P: 104 (EQS: 2)


Winter Approximate Zinc Load, Kg/year
1148, N1
138, F8
134, C5
2948, F7/F12
40, C6
Bell Hole Mine
132, C7
2581, F5/F11
261, F6
3416, F4
#DIV/0!, F3a
1291, F3
489, V
9, S
182, F2
314, T
10, N
406, P

Cross Vein Mines Water Samples



# Cross Vein Mines Water Samples

| Map Reference | Date Submitted | Your Ref. | Sample Temp | pH | Conductivity µS/cm | BOD mg/l | Dissolved $O_2$ % | Dissolved $O_2$ mg/l | SS | Alkalinity $HCO_3$ mg/l | $NH_4$ mg/l | Al µg/L | Cd µg/l | Cr µg/l | Cu µg/l | Fe µg/l | Mn µg/l | Ni µg/l | Pb µg/l | Zn µg/l | Na mg/l | K mg/l | Mg mg/l | Ca mg/l | $NO_3$ mg/l | $PO_4$ mg/l |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15-Mar-18 | Cross Vein Deads - Site 1 | 5.7 | 6.4 | 63.9 | <2 | 86.9 | 10.9 | <10 | 6.57 | 0.221 | 21.2 | 14.98 | <5 | <20 | 31.6 | 56.6 | <5 | 2153 | 2849 | 4.38 | <0.50 | 1.41 | 1.49 | 2.13 | <0.07 |
| 2 | 15-Mar-18 | Cross Vein Deads - Site 2 | 5.8 | 5.9 | 666 | <2 | 87.6 | 11 | 288 | 4.42 | 0.824 | 633 | 24.6 | <5 | 23.4 | 1276 | 646 | 7.1 | 10940 | 2986 | 2.59 | 0.69 | 1.11 | 2.8 | 3.6 | <0.07 |
| 3 | 15-Mar-18 | Cross Vein Deads - Site 3 | 5.7 | 5.8 | 55.8 | <2 | 87.3 | 11 | 192 | 5.09 | 0.638 | 666 | 14.5 | <5 | <20 | 1348 | 488 | <5 | 8525 | 1611 | 3.29 | 0.86 | 0.93 | 2.05 | 2.69 | <0.07 |

- The water samples were collected during heavy rainfall to assess whether the disturbed area of cross vein mine is increasing the sediment loading into the catchment and potentially heavy metals.

- Site 1 - run off from an undisturbed area of cross vein mines
- Site 2 - run off from a disturbed area of cross vein mines (disturbance from motor cross)
- Site 3 - run off adjacent to the road collects water from a larger area of disturbance from the motor cross on cross vein mines

- As you can see from the results above at sites 2 and 3 where the water originates from the disturbed area of cross vein mines there is a high concentration of suspended solids; 288 mg/l and 192 mg/l respectively. Whereas site 1 which is from an undisturbed area of cross vein mines the suspended solid concentration is 10mg/l. As a reference for other discharges across the island a baseline suspended solid concentration of 60 mg/l is applied.
- For most of the parameters stated above the concentrations are greater at sites 2 and 3 than site 1. This is likely to be due to the disturbed area of land which allows the metals to become mobilised in the water and transported downstream towards Peel Marina.

Summary tables for Kerrowdhoo Farm Ford and Ballanass.

| C5 | | | Load | | | |
|---|---|---|---|---|---|---|
| | | | Lead | | Zinc | |
| Location | Trial | Date | Pb total Load Kg/year | Pb dissolved Load Kg/year | Zn total Load Kg/year | Zn dissolved Load Kg/year |
| | Pre MB | Winter | 282.1 | #DIV/0! | 155.5 | #DIV/0! |
| | Pre MB | Summer | 777.8 | #DIV/0! | 177.6 | #DIV/0! |
| | Post MB | Winter | 120.3 | 60.1 | 109.2 | 100.8 |
| | Post MB | Summer | 115.6 | 51.3 | 42.7 | 41.7 |

| F8 | | | Load | | | |
|---|---|---|---|---|---|---|
| | | | Lead | | Zinc | |
| Location | Trial | Date | Pb total Load Kg/year | Pb dissolved Load Kg/year | Zn total Load Kg/year | Zn dissolved Load Kg/year |
| | Pre MB | Winter | 431.1 | 204.1 | 191.2 | 166.7 |
| | Pre MB | Summer | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| | Post MB | Winter | 112.7 | 65.7 | 108.5 | 104.7 |
| | Post MB | Summer | 356.7 | 47.0 | 56.7 | 47.2 |

Below is a key to location names

## Cross Vein Mine

| | |
|---|---|
| CV M1 | Run off from an undisturbed area of Cross Vein mines |
| CV M2 | Run off from a disturbed area of cross vein mines (disturbance from motor cross) |
| CV M3 | Run off adjacent to the road collects water from a larger area of disturbance from the motor cross on cross vein mines |
| C0 | Carnagrie Stream |
| C1 | Bridge at Dixon's Mine West |
| C2 | Outfall from Dixon's Adit |
| C3 | River below CVM Washfloor up stream |
| C4 | River below CVM Washfloor down stream |
| C4a | Bottom of CVM Deads |
| C5 | Kerroodhoo Farm Ford |
| C5a | KFF below Silt Trap |
| C6 | Kerrowdhoo stream west-side feeder, below Cross Vein Mine |

| | |
|---|---|
| C7 | Kerrowdhoo stream south-side feeder, below Dixons Mine |

## Foxdale

| | |
|---|---|
| F1 | Opposite Heathlands - SAME AS Kionslieu V |
| F1.5 | Upstream of Clocktower Ind Est |
| F2 | Upstream of foxdale culvert, behind Betterage Motors |
| F3 | Up stream of Adit (behind school) - SAME AS Kionslieu C |
| F3a | Direct from Adit ('Tomato Soup Factory') |
| F4 | Down stream of adit |
| F5 | Downstream of rain water drain (steps) - SAME AS F11 |
| F6 | Rain water drain (steps) |
| F7 | Down stream of Bell Hole Mine - Possible same as F12? |
| F8 | Ballanass |
| F9 | Slieau Whallian Rd Gleneedle Farm |
| F10 | Slieau Whallian Rd Gleneedle Ford |
| F11 | Downstream of rain water drain (steps) - SAME AS F5 |
| F12 | Ballamoar Cottage - Possible same as F7? |
| F13 | Down Stream of the Kerredhoo stream join |

## Bell Hole Mine

| | |
|---|---|
| BH1 | Bell Hole Mine adit - adit mouth |
| BH2 | Bell Hole Mine adit - at stream level |

## Eairy Dam

| | |
|---|---|
| E1 | Eairy dam egress |

## Shoulder Road

| | |
|---|---|
| S1 | Shoulder Road |

## Kionslieu

| | |
|---|---|
| K1 | Kionslieu North 1 |
| K2 | Kionslieu North 2 |
| K3 | Kionslieu North 3 |
| K4 | Kionslieu North 4 |
| K5 | Kionslieu egress - SAME AS P, K6 |
| K6 | Kionslieu outfall pipe - SAME AS P, K5 |
| K7 | Kionslieu South ingress - SAME AS D |
| K8 | Kionslieu south before Louisa - SAME AS B |
| A | Bridge at junction of A6 & A36 Foxdale |
| B | Bridge on back road of Louisa House Foxdale Map Ref 54.16665, -4.62536 - SAME AS K8 |
| C | Foot Bridge behing Foxdale School - SAME AS Foxdale F3 |
| D | Bridge at junction of A24 and Kionslieu Lake foot path, (North West corner of Louisa House) - SAME AS K7 |
| F | Ditch (when wet) on Ballamona Farm Road, Foxdale (Map Ref 54.174564, _4.64190) |

| | |
|---|---|
| G | Outfall from field drain (F) on Kionsleau Back Road (Map Ref 54.17325, -4.61978) |
| I | Egress culvert from cattle stockade above Kionslieu Lake (Map Ref: 54.17447, -4.62667) |
| J | Where "I" flows in to the main ditch supplying Kionslieu Lake (Map Ref: 54.17219, -4.62349) |
| M | Where the road ditch enters the North footpath in to Kionslieu Lake (Map Ref 54.17378, -462281) |
| N | Land drain from South West corner of Louisa House grounds - culvert under Stoney Mountain Road |
| P | Outfall from of Kionslieu Reservoir (pipe) - SAME AS K5, K6 |
| Q | Downstream of P - where the stream from Kionslieu Reservoir outfall enters a culvert under A24 to the Louisa House Water Wheel housing |
| S | Outfall from 3 pipes under A24 carrying water from adjacenet to Heathlands Cattery into stream next to Cattery Car Park. S is located between T and V |
| S1 | Inflow to point S, Cattery side stream |
| S2 | Inflow to point S, Road side stream |
| T | Downstream of Q - where the water exits drainage pipe and is carried in open ditch alongside A24 |
| V | Roadside ditch alongside A24 (Springfield Terrace) - Downstream from S & T - SAME AS Foxdale F1 |
| X | Swamp ground at toe of Kionslieu West Embankment |

## River Neb

| | |
|---|---|
| N0 | River Neb, upstream of Foxdale River join |
| N1 | Slieau Whallian Rd |
| N2 | St John's School |
| N2.5 | Foxdale River before joining River Neb |
| N3 | Patric Road |
| N4 | Red Dub Weir |
| N5 | Close Y Chiarn |

| | |
|---|---|
| **From:** | Reece, Jeremy |
| **To:** | REDACTED (DEFA) |
| **Subject:** | River Neb Catchment - Heavy Metal Total Load Summary |
| **Date:** | 21 May 2025 14:32:38 |
| **Attachments:** | Summary of River Neb Heavy Metal Total Load data.pdf |

Good afternoon REDACTED

The attached summary may be of interest to you, as it shows the River Neb Catchment water monitoring data, converted to Total Load per Year.

Regards

Jeremy

**Jeremy Reece** B. Eng, C. Eng, FICE, FPWI, MAPM
Senior Project Manager, Project Management Unit, Department of Infrastructure
Tel 01624 685933 or 07624 REDACTED
e-mail Jeremy.reece2@gov.im

Catchment-wide heavy metal load model

Since Autumn 2018, a programme of water chemistry testing has been undertaken across the River Neb Catchment. This testing is to identify the concentrations of a number of heavy metals within the network of streams forming the tributaries of the River Neb.

The concentrations of each metal show the level of metals per litre of water (typically micro-grams per litre) and when multiplied by the estimated flow along that water course, the total load of each metal per year can be estimated for each sample location (typically Kg per year).

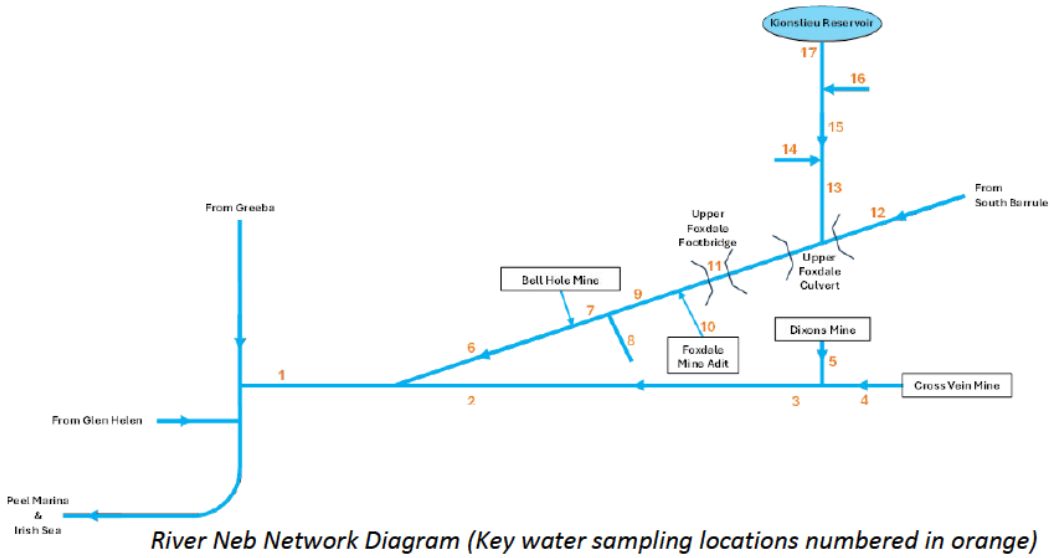
Through a process of ongoing review, the sampling locations have been optimised and significant differences in results between sampling locations have been identified and investigated, in order to locate potential sources of the Lead and Zinc entering the river network.

The network diagrams below show the principal sampling points and the estimated total load per year for Lead and Zinc at these locations:

| Location Number | Description | Lead Total Load (kg/yr) | Lead Total Load (Dissolved) (kg/yr) | Lead Total Load (Particulate) (kg/yr) | Zinc Total Load (kg/yr) | Zinc Total Load (Dissolved) (kg/yr) | Zinc Total Load (Particulate) (kg/yr) |
|---|---|---|---|---|---|---|---|
| 1 | Slieau Whallian Road, St Johns | 50 | 34 | 16 | 858 | 755 | 103 |
| 2 | Ballanass Stream, Lower Foxdale | 315 | 73 | 242 | 86 | 75 | 11 |
| 3 | Kerrowdhoo Farm Ford (below Cross Vein & Dixons Mine) | 164 | 55 | 109 | 78 | 56 | 22 |
| 4 | Stream below Cross Vein Mine | 74 | 50 | 24 | 22 | 16 | 6 |
| 5 | Stream below Dixons Mine | 23 | 12 | 11 | 64 | 42 | 22 |
| 6 | Lower Foxdale | 136 | 37 | 99 | 2296 | 1570 | 726 |
| 7 | Downstream of Upper Foxdale | 60 | 26 | 34 | 1611 | 1611 | 0 |
| 8 | Land drain from west side of valley - outfall downstream of Foxdale School | 3 | 2 | 1 | 179 | 166 | 13 |
| 9 | Downstream of Foxdale Mine Adit | 67 | 44 | 23 | 2914 | 2679 | 235 |
| 10 | Foxdale Mine Adit | 76 | 1 | 75 | 364 | 219 | 145 |
| 11 | Upper Foxdale Footbridge | 109 | 36 | 73 | 751 | 670 | 81 |
| 12 | Clock Tower Industrial Estate | 22 | 19 | 3 | 182 | 182 | 0 |
| 13 | Roadside ditch alongside Springfield Terrace | 122 | 46 | 76 | 399 | 357 | 42 |
| 14 | Culvert outfall into roadside ditch at west end of Springfield Terrace | 5 | 1 | 4 | 10 | 7 | 3 |
| 15 | Roadside ditch between Springfield Terrace and Louisa House | 65 | 22 | 43 | 213 | 187 | 26 |
| 16 | Stoney Mountain Road | 4 | 1 | 3 | 11 | 7 | 4 |
| 17 | Outfall of Kionslieu Reservoir | 62 | 30 | 32 | 186 | 165 | 21 |

*Total Load estimates at key water sampling locations*

The significant differences in total load estimates between the sample locations is used to identify a number of locations that were subject to further investigation as potential sources of heavy metals in both particulate and dissolved forms:-




*River Neb Network Diagram (Key water sampling locations numbered in orange)*

Lead

- Kionslieu Reservoir & outfall
- Diffuse inflows alongside A24 (Mines Road) between locations 15 and 13
- Cross Vein Mine and Dixons Mine
- Bell Hole Mine

Zinc

- Kionslieu Reservoir & outfall
- Diffuse inflows alongside A24 (Mines Road) between locations 15 and 13
- Clock Tower Industrial Estate between location 12 and Upper Foxdale Culvert
- Foxdale Mine Adit
- Bell Hole Mine

Note

Sampling data prior to the closure of the Cross Vein Mine site to unauthorised off-road bikes and 4x4s in March 2020 is limited. However, data for sample point 3 (Kerrowdhoo Farm Ford) is available and shows the following:

| Description | Lead Total Load (kg/year) | Lead Total Load (Dissolved) (kg/year) | Lead Total Load (Particulate) (kg/year) | Zinc Total Load (kg/year) | Zinc Total Load (Dissolved) (kg/year) | Zinc Total Load (Particulate) (kg/year) |
|---|---|---|---|---|---|---|
| October 2018 – May 2019 | 372 | | | 160 | | |
| May 2020 – August 2024 | 114 | 55 | 59 | 58 | 56 | 2 |
| % change 2018-19 to 2020-24 | -69.4% | | | -63.8% | | |

The significant reduction in lead and zinc total load indicates the effectiveness of the three stages of the Cross Vein Mine works already undertaken (closing site to off-road bikes and 4x4's, cleaning of

roadside ditches above the site to reduce surface water flows onto the site and installation of leaky dams below Cross Vein Mine).

However, installation of the capping layer and works to stabilise Dixon's Mine washfloor are still required to further reduce the release of heavy metals from the site.

During 2025/26, monthly water quality sampling activities will continue utilising PMU resources and the Government Labs, in order to provide a comprehensive pre-works baseline ahead of the planned capping of Cross Vein Mine in late 2026 and DEFA's safety improvement works at Kionslieu Reservoir in 2027.