**Premise NSW Pty Ltd**
62 075 657 359
154 Peisley St, Orange NSW 2800
PO Box 1963, Orange NSW 2800
02 6393 5000
orange@premise.com.au
**premise.com.au**

Our Ref: 217500_LET_007.docx

12 June 2019

Lithgow City Council
PO Box 19,
180 Mort Street
Lithgow NSW 2790

**Attention: Nigel Campbell, Waste & Recycling Coordinator**

**ENVIRONMENTAL MONITORING OF LITHGOW SOLID WASTE FACILITY**

Premise has completed scheduled groundwater and accumulated landfill gas monitoring at Lithgow Solid Waste Facility, located off Geordie Street, Lithgow on 7 May 2019. Leachate monitoring from point LW1 was unable to be conducted due to low volumes.

**Groundwater Levels**

Groundwater was gauged at six (6) groundwater monitoring wells across the site. Groundwater gauging data is included in **Table 1** (attached), and elevation trends are shown on **Figure 1**. No groundwater was recorded in monitoring stations MB1, MB6, MB11 and MB13. Observations were as follows:

- Depths to groundwater ranged from 3.20 metres below ground level (mbgl) at MB14, to 13.48 mbgl at MB9. Corrected groundwater elevations ranged from 897.37 metres Australian Height Datum (mAHD) at MB14, to 933.73 mAHD at MB6B.
- Inference of groundwater elevations, calculated from available survey data from installed groundwater monitoring wells indicate a flow direction to the south-west.

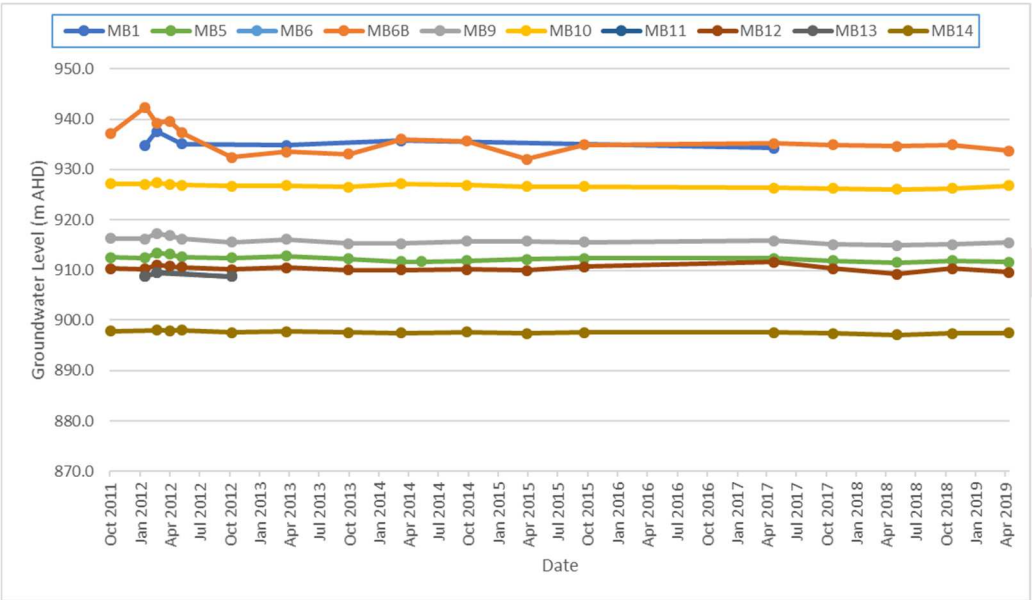



**Figure 1: Lithgow Solid Waste Facility – Groundwater Elevations**

**Groundwater Quality**

Groundwater samples were able to be collected from wells MB5, MB9, MB10, MB12 and MB14. The monitoring well casing at location MB6B had become bent at approximately 2.0 mbgl and sampling equipment was unable to be inserted beyond this depth. Samples were couriered to SGS Laboratories in Alexandria, NSW, who are NATA accredited to perform the scheduled analysis. Results of analysis are included in **Table 2** (attached), and laboratory certificates have also been appended to this letter.

Groundwater quality has been assessed by comparison to criteria (where available) adopted from Australian and New Zealand Environment and Conservation Council (ANZECC) Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* 2000 – Primary Industries: Water quality for irrigation and general water use.

- Laboratory measured pH ranged from 5.1 at MB12 to 7.1 at MB14. pH of groundwater at MB12 was below the guideline range considered suitable for pumping, irrigation and stock watering (6.0 to 8.5 pH units).
- Electrical conductivity (EC) ranged from 240 µS/cm at piezometer MB10 to 1,200 µS/cm at piezometer MB12.
- Total dissolved solids (TDS) ranged from 120 mg/L at MB10 to 680 mg/L at MB12. TDS concentrations were below the livestock watering 'loss of production' tolerance limit for the most susceptible livestock category, poultry (3,000 mg/L – ANZECC & ARMCANZ, 2000).
- The chemical oxygen demand (COD) of groundwater samples ranged from below the laboratory limit of reporting (LOR) of 10 mg/L at MB10 and MB14, to 19 mg/L at MB12.
- Total alkalinity in groundwater ranged from 37 mg/L at MB12 to 310 mg/L at MB14. Alkalinity of groundwater was below the guideline hardness value for potential fouling of waters (350 mg/L).
- Groundwater chloride concentrations ranged from 24 mg/L at MB10 to 240 mg/L at MB12. All concentrations were below the guideline value for protection of moderately sensitive crops (350 mg/L).
- Fluoride concentrations in groundwater were all below the laboratory LOR of 0.1 mg/L. All concentrations were below the guideline value of 1 mg/L for long term irrigation use (up to 100 years).
- Sulfate concentrations in groundwater ranged from 14 mg/L at MB10 to 97 mg/L at MB12.
- Calcium concentrations ranged from 12 mg/L at MB10 to 95 mg/L at MB14.
- Magnesium concentrations ranged from 8.8 mg/L at MB10 to 28 mg/L at MB14.
- Potassium concentrations ranged from 3.6 mg/L at MB10 to 44 mg/L at MB5.
- Concentrations of sodium ranged from 11 mg/L at MB10, to 89 mg/L at MB5. Sodium concentrations were below the guideline level for irrigation to moderately sensitive crops (<230 mg/L).
- Ammonia concentrations in groundwater ranged from 0.21 mgN/L at MB14 to 6.1 mgN/L at MB5.
- Nitrate concentrations ranged from below the laboratory LOR of 0.005 mgN/L at MB12 to 3.9 mgN/L at MB5.
- Phosphorus concentrations in groundwater ranged from below the laboratory LOR of 0.02 mg/L at MB12, to 0.11 mg/L at MB5. Phosphorus concentrations at MB5, MB9 and MB10 were above the guideline value of 0.05 mg/L for long term irrigation use (up to 100 years).

- Aluminium concentrations in groundwater were recorded at below the laboratory LOR of 5 µg/L with the exception of MB12, which recorded a concentration of 890 µg/L. Aluminium concentrations in groundwater were below the long-term (up to 100 years) irrigation guideline concentration of 5,000 µg/L.
- Hexavalent chromium and total chromium concentrations were below the respective laboratory LORs of 4 µg/L and 1 µg/L. Concentrations of total chromium were lower than the long-term (up to 100 years) irrigation guideline concentration of 100 µg/L.
- Iron concentrations ranged from 44 µg/L at MB5 to 40,000 µg/L at MB12. Iron concentrations at MB6B, MB9, MB10, MB12 and MB14 exceeded the long-term (up to 100 years) irrigation guideline concentration of 200 µg/L.
- Manganese concentrations ranged from 70 µg/L at MB14 to 1,600 µg/L at MB12. Manganese concentrations at locations MB5, MB9 and MB12 the long-term (up to 100 years) irrigation guideline concentration of 200 µg/L.
- Total organic carbon (TOC) in groundwater ranged from 1.8 mg/L at MB10 to 5.2 mg/L at MB9.
- Total phenols were at or below the laboratory LOR of 0.01 mg/L at all groundwater monitoring points.
- Organochlorine pesticides and organophosphorus pesticides were below respective laboratory LORs at all groundwater monitoring points.
- Total petroleum hydrocarbons (TPH) and total recoverable hydrocarbons (TRH) were below respective laboratory LORs at all groundwater monitoring points for all fractions.

**Accumulated Landfill Gas Monitoring**

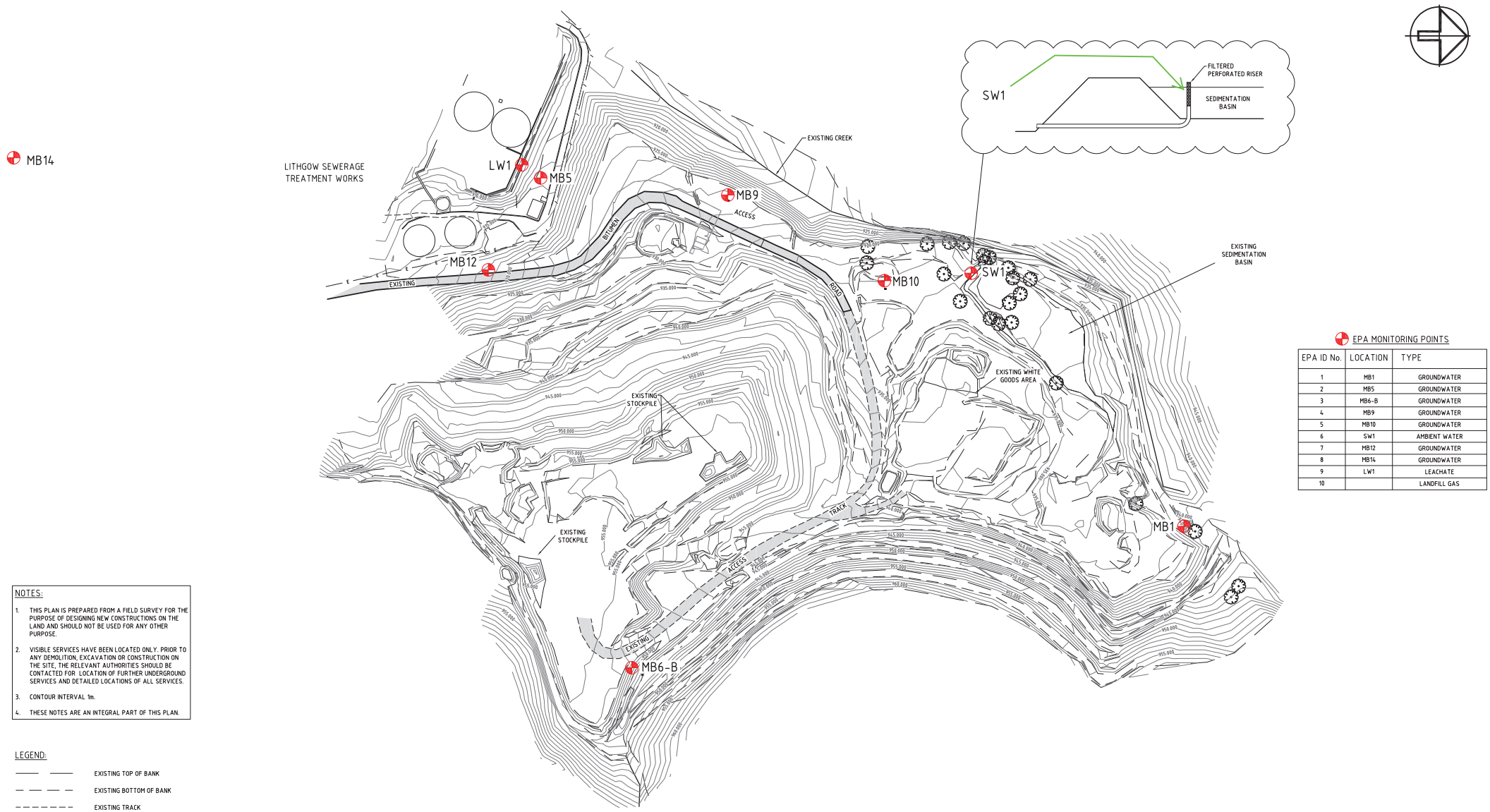
Gas concentrations in buildings and sheds within the required monitoring distance of 250 metres of filled areas were all below the respective threshold concentration of 1.25 % (v/v) during the monthly monitoring rounds conducted in January 2019 to May 2019. Results of gas monitoring are included in **Table 4** (attached)

The next routine monitoring for groundwater and leachate is scheduled for November 2019. Surface water monitoring is required to take place any calendar month when a surface water discharge is recorded. Please do not hesitate to contact us with any questions or comments you may have regarding this report.

Yours faithfully
**Premise Australia Pty Ltd**

**BRENDAN STUART**
**Environmental Scientist**

No. of Attachments – 5: Environmental Monitoring Point Locations
Table 1 – Groundwater Level Measurements
Table 2 – Results of Laboratory Analyses (Groundwater) – May 2019
Table 3 – Accumulated Landfill Gas Monitoring
SGS Laboratories Analytical Reports – May 2019




EPA MONITORING POINTS

| EPA ID No. | LOCATION | TYPE |
|---|---|---|
| 1 | MB1 | GROUNDWATER |
| 2 | MB5 | GROUNDWATER |
| 3 | MB6-B | GROUNDWATER |
| 4 | MB9 | GROUNDWATER |
| 5 | MB10 | GROUNDWATER |
| 6 | SW1 | AMBIENT WATER |
| 7 | MB12 | GROUNDWATER |
| 8 | MB14 | GROUNDWATER |
| 9 | LW1 | LEACHATE |
| 10 | | LANDFILL GAS |

NOTES:

1. THIS PLAN IS PREPARED FROM A FIELD SURVEY FOR THE PURPOSE OF DESIGNING NEW CONSTRUCTIONS ON THE LAND AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.
2. VISIBLE SERVICES HAVE BEEN LOCATED ONLY. PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON THE SITE, THE RELEVANT AUTHORITIES SHOULD BE CONTACTED FOR LOCATION OF FURTHER UNDERGROUND SERVICES AND DETAILED LOCATIONS OF ALL SERVICES.
3. CONTOUR INTERVAL 1m.
4. THESE NOTES ARE AN INTEGRAL PART OF THIS PLAN.

LEGEND:

- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- EXISTING TRACK
- EXISTING ELECTRICITY
- EXISTING FENCE
- EXISTING VEGETATION
- EXISTING ACCESS ROAD

SCALE 1:1500(A1)
0 10 20 40 60 80 100
SCALE 1:3000(A3)
0 10 20 40 60 80 100

GEOLYSE
ORANGE
154 PEISLEY STREET
P.O. BOX 1963
ORANGE, NSW 2800
orange@geolyse.com
Ph. (02) 6393 5000
www.geolyse.com
Fx. (02) 6393 5050

| No | DATE | DRAFTING CHECK | PM CHECK | DETAILS |
|---|---|---|---|---|
| A | 27/06/11 | LP | AB | WORKING DRAFT |
| B | 28/09/11 | LP | AB | EPL VARIATION |

PROJECT
LITHGOW SOLID WASTE FACILITY
LANDFILL ENVIRONMENTAL MANAGEMENT PLAN
FILE REFERENCE: O:\Projects\211109\Out\Cad\Lithgow\211109_01B_EV01-EV09.dwg

APPROVAL AUTHORITY
ENVIRONMENTAL PROTECTION AUTHORITY
EPL : 6004

CLIENT
CITY OF LITHGOW COUNCIL

DRAWING
ENVIRONMENTAL MONITORING POINTS
PROJECT NUMBER: 211109
DRAWING NUMBER: 01B_EV04
REV. B
SOURCE: CRAVEN, ELLISTON & HAYES (LITHGOW) PTY. LTD. (DRAWING No. E668-10, DATED 19/04/2010)

Premise

**TABLE 1: LITHGOW SOLID WASTE FACILITY - GROUNDWATER LEVEL RESULTS**

**Ground Water Levels:** 6-May-19

**Piezometer Details:**

| | Ground Elev (mAHD) | Stickup (m) | Elevation Top PVC (mAHD) | Date | Measured (m) | GWL (mAHD) | Well Depth (m) | Well Base (mAHD) | Water Column (m) |
|---|---|---|---|---|---|---|---|---|---|
| MB1 | 939.790 | 0.86 | 940.650 | 6/05/2019 | NMWL | - | 6.5 | 934.15 | nil |
| MB5 | 914.940 | 0.80 | 915.740 | 6/05/2019 | 4.05 | 911.69 | 9.8 | 905.94 | 5.75 |
| MB6 | 945.820 | 0.85 | 946.670 | 6/05/2019 | NMWL | - | - | - | nil |
| MB6B | 946.290 | 0.75 | 947.040 | 6/05/2019 | 13.31 | 933.73 | 19.3 | 927.74 | 5.99 |
| MB9 | 928.260 | 0.69 | 928.950 | 6/05/2019 | 13.48 | 915.47 | 17.1 | 911.85 | 3.62 |
| MB10 | 932.180 | 0.73 | 932.910 | 6/05/2019 | 6.13 | 926.78 | 13.7 | 919.21 | 7.57 |
| MB11 | 915.010 | 0.67 | 915.680 | 6/05/2019 | NMWL | - | 17.9 | 897.82 | nil |
| MB12 | 918.330 | 0.76 | 919.090 | 6/05/2019 | 9.45 | 909.64 | 22.3 | 896.84 | 12.80 |
| MB13 | 914.980 | 0.70 | 915.680 | 6/05/2019 | NMWL | - | 39.4 | 876.28 | nil |
| MB14 | 899.790 | 0.78 | 900.570 | 6/05/2019 | 3.20 | 897.37 | 17.7 | 882.87 | 14.50 |

**Definitions:**

Stickup: Height of piezometer pipe above ground surface.

Ground Elev: Actual elevation of ground at the piezometer relative to an arbitrary datum. All ground elevations are measured to the same datum, hence Piezo GWLs are relative to each other.

GWL: Actual elevation of groundwater at the piezometer relative to an arbitrary datum.

Measured: Depth of groundwater measured from the top of the piezometer pipe.

| | MB1 | | MB5 | | MB6 | | MB6B | | MB9 | | MB10 | | MB11 | | MB12 | | MB13 | | MB14 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | Measured | GWL (mAHD) | Measured | GWL (mAHD) | Measured | GWL (mAHD) | Measured | GWL (mAHD) | Measured | GWL (mAHD) | Measured | GWL (mAHD) | Measured | GWL (mAHD) | Measured | GWL (mAHD) | Measured | GWL (mAHD) | Measured | GWL (mAHD) |
| 25-Oct-11 | NMWL | | 3.20 | 912.54 | NMWL | | 9.92 | 937.12 | 12.62 | 916.33 | 5.77 | 927.14 | NMWL | | 8.69 | 910.40 | NMWL | | 2.80 | 897.77 |
| 8-Feb-12 | 5.85 | 934.80 | 3.26 | 912.48 | NMWL | | 4.68 | 942.36 | 12.71 | 916.24 | 5.83 | 927.08 | 6.87 | 908.81 | 8.77 | 910.32 | 6.89 | 908.79 | NMWL | |
| 15-Mar-12 | 3.11 | 937.54 | 2.29 | 913.45 | NMWL | | 7.82 | 939.22 | 11.56 | 917.39 | 5.51 | 927.40 | 6.08 | 909.60 | 7.95 | 911.14 | 6.11 | 909.57 | 2.64 | 897.93 |
| 24-Apr-12 | NMWL | | 2.55 | 913.19 | NMWL | | 7.47 | 939.57 | 12.10 | 916.85 | 5.78 | 927.13 | NMWL | | 8.24 | 910.85 | NMWL | | 2.67 | 897.90 |
| 31-May-12 | 5.55 | 935.10 | 3.07 | 912.67 | NMWL | | 9.71 | 937.33 | 12.73 | 916.22 | 6.04 | 926.87 | NMWL | | 8.43 | 910.66 | NMWL | | 2.64 | 897.93 |
| 30-Oct-12 | NMWL | | 3.29 | 912.45 | NMWL | | 14.64 | 932.40 | 13.33 | 915.62 | 6.19 | 926.72 | 6.83 | 908.85 | 8.90 | 910.19 | 6.87 | 908.81 | 3.11 | 897.46 |
| 17-Apr-13 | 5.81 | 934.84 | 2.87 | 912.87 | NMWL | | 13.55 | 933.49 | 12.80 | 916.15 | 6.10 | 926.81 | NMWL | | 8.50 | 910.59 | NMWL | | 2.91 | 897.66 |
| 23-Oct-13 | NMWL | | 3.44 | 912.30 | NMWL | | 13.97 | 933.07 | 13.60 | 915.35 | 6.35 | 926.56 | NMWL | | 9.01 | 910.08 | NMWL | | 3.09 | 897.48 |
| 2-Apr-14 | 4.90 | 935.75 | 3.98 | 911.76 | NMWL | | 11.00 | 936.04 | 13.66 | 915.29 | 5.75 | 927.16 | NMWL | | 9.04 | 910.05 | NMWL | | 3.20 | 897.37 |
| 2-Jun-14 | NMWL | | 3.96 | 911.78 | NMWL | | NMWL | | NMWL | | NMWL | | NMWL | | NMWL | | NMWL | | NMWL | |
| 21-Oct-14 | NMWL | | 3.81 | 911.93 | NMWL | | 11.41 | 935.63 | 13.13 | 915.82 | 6.01 | 926.90 | NMWL | | 8.89 | 910.20 | NMWL | | 2.97 | 897.60 |
| 21-Apr-15 | NMWL | | 3.56 | 912.18 | NMWL | | 14.98 | 932.06 | 13.19 | 915.76 | 6.26 | 926.65 | NMWL | | 9.06 | 910.03 | NMWL | | 3.27 | 897.30 |
| 13-Oct-15 | NMWL | | 3.34 | 912.40 | NMWL | | 12.18 | 934.86 | 13.30 | 915.65 | 6.30 | 926.61 | NMWL | | 8.35 | 910.74 | NMWL | | 3.06 | 897.51 |
| 15-May-17 | 6.36 | 934.30 | 3.37 | 912.38 | NMWL | | 11.88 | 935.16 | 13.09 | 915.86 | 6.58 | 926.34 | NMWL | | 7.45 | 911.64 | NMWL | | 3.05 | 897.52 |
| 13-Nov-17 | NMWL | | 3.80 | 911.94 | NMWL | | 12.15 | 934.89 | 13.84 | 915.11 | 6.63 | 926.28 | NMWL | | 8.70 | 910.39 | NMWL | | 3.29 | 897.28 |
| 29-May-18 | NMWL | | 4.19 | 911.55 | NMWL | | 12.38 | 934.66 | 13.99 | 914.96 | 6.83 | 926.08 | NMWL | | 9.84 | 909.25 | NMWL | | 3.50 | 897.07 |
| 13-Nov-18 | NMWL | | 3.80 | 911.94 | NMWL | | 12.15 | 934.89 | 13.84 | 915.11 | 6.63 | 926.28 | NMWL | | 8.70 | 910.39 | NMWL | | 3.29 | 897.28 |
| 6-May-19 | NMWL | | 4.05 | 911.69 | NMWL | | 13.31 | 933.73 | 13.48 | 915.47 | 6.13 | 926.78 | NMWL | | 9.45 | 909.64 | NMWL | | 3.20 | 897.37 |

**TABLE 2: LITHGOW SOLID WASTE FACILITY - RESULTS OF LABORATORY ANALYSIS** **GROUNDWATER**
**MAY 2019**

| | | | | Sample ID | MB5 | MB9 | MB10 | MB12 | MB14 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Sample Date | 7/05/2019 | 7/05/2019 | 7/05/2019 | 7/05/2019 | 7/05/2019 |
| **Group** | **Analyte** | **LOR** | **Units** | **Criteria** | PS | PS | PS | PS | PS |
| Physical Parameters | pH (Lab) | 0 | No unit | 6.0 - 8.5 | **6.2** | **6.2** | **6.2** | **5.1** | **7.1** |
| | Electrical Conductivity (Lab) | 2 | µS/cm | 4478 | **1200** | **580** | **240** | **1100** | **770** |
| | Total Dissolved Solids | 10 | mg/L | - | **660** | **290** | **120** | **680** | **440** |
| | Chemical Oxygen Demand | 10 | mg/L | - | **17** | **10** | < 10 | **19** | < 10 |
| Alkalinity | Bicarbonate Alkalinity as CaCO3 | 5 | mg/L | - | **190** | **170** | **59** | **37** | **310** |
| | Total Alkalinity as CaCO3 | 5 | mg/L | 350 | **190** | **170** | **59** | **37** | **310** |
| Anions | Chloride | 1 | mg/L | 350 | **220** | **61** | **24** | **240** | **33** |
| | Fluoride | 0.1 | mg/L | 1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Sulfate (SO4) | 1 | mg/L | - | **21** | **14** | **14** | **97** | **44** |
| Cations | Calcium (Ca) | 0.2 | mg/L | 1000 | **58** | **31** | **12** | **28** | **95** |
| | Magnesium (Mg) | 0.1 | mg/L | - | **20** | **14** | **8.8** | **22** | **28** |
| | Potassium (K) | 0.1 | mg/L | - | **44** | **13** | **3.6** | **8.6** | **8.4** |
| | Sodium (Na) | 0.5 | mg/L | 230 | **89** | **27** | **11** | **76** | **16** |
| Forms of Carbon | Total Organic Carbon | 0.2 | mg/L | - | **5.1** | **5.2** | **1.8** | **5** | **3.5** |
| Nutrients | Ammonia (NH3) as N | 0.01 | mg/L | - | **6.1** | **4.5** | **1.2** | **3.5** | **0.21** |
| | Nitrate (NO3) as N | 0.005 | mg/L | - | **3.9** | **0.034** | **0.72** | < 0.005 | **0.016** |
| | Total Phosphorus | 0.02 | mg/L | 0.05 | **0.11** | **0.08** | **0.07** | < 0.02 | **0.05** |
| Trace Metals | Hexavalent Chromium (Cr-VI) | 0.004 | mg/L | 0.1 | < 0.004 | < 0.004 | < 0.004 | < 0.004 | < 0.004 |
| | Chromium (Cr) | 1 | µg/L | - | < 1 | < 1 | < 1 | < 1 | < 1 |
| | Aluminium (Al) | 5 | µg/L | 5000 | < 5 | < 5 | < 5 | **890** | < 5 |
| | Iron (Fe) | 5 | µg/L | 200 | **44** | **14000** | **390** | **40000** | **700** |
| | Manganese (Mn) | 1 | µg/L | 200 | **700** | **1400** | **71** | **1600** | **70** |
| Phenolics | Total Phenols | 0.01 | mg/L | - | < 0.01 | **0.01** | < 0.01 | **0.02** | < 0.01 |
| OC Pesticides | Aldrin | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Alpha BHC | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Alpha Chlordane | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Alpha Endosulfan | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Beta BHC | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Beta Endosulfan | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Delta BHC | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Dieldrin | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Endosulfan sulphate | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Endrin | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Endrin aldehyde | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Endrin ketone | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Heptachlor | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Heptachlor epoxide | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Hexachlorobenzene (HCB) | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Lindane (gamma BHC) | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Methoxychlor | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | p,p'-DDD | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | p,p'-DDE | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | p,p'-DDT | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | o,p'-DDD | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | o,p'-DDT | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | o,p'-DDE | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Gamma Chlordane | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | trans-Nonachlor | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Isodrin | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | Mirex | 0.1 | µg/L | - | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| OP Pesticides | Azinphos-methyl | 0.2 | µg/L | - | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | Bromophos Ethyl | 0.2 | µg/L | - | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | Chlorpyrifos (Chlorpyrifos Ethyl) | 0.2 | µg/L | - | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | Diazinon (Dimpylate) | 0.5 | µg/L | - | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| | Dichlorvos | 0.5 | µg/L | - | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| | Dimethoate | 0.5 | µg/L | - | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| | Ethion | 0.2 | µg/L | - | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | Fenitrothion | 0.2 | µg/L | - | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | Malathion | 0.2 | µg/L | - | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | Parathion-ethyl (Parathion) | 0.2 | µg/L | - | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | Methidathion | 0.5 | µg/L | - | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Total Petroleum Hydrocarbons | TRH C6-C9 | 40 | µg/L | - | < 40 | < 40 | < 40 | < 40 | < 40 |
| | TRH C10-C14 | 50 | µg/L | - | < 50 | < 50 | < 50 | < 50 | < 50 |
| | TRH C15-C28 | 200 | µg/L | - | < 200 | < 200 | < 200 | < 200 | < 200 |
| | TRH C29-C36 | 200 | µg/L | - | < 200 | < 200 | < 200 | < 200 | < 200 |
| | TRH C10-C36 | 450 | µg/L | - | < 450 | < 450 | < 450 | < 450 | < 450 |
| | TRH C37-C40 | 200 | µg/L | - | < 200 | < 200 | < 200 | < 200 | < 200 |
| Total Recoverable Hydrocarbons | TRH C6-C10 | 50 | µg/L | - | < 50 | < 50 | < 50 | < 50 | < 50 |
| | TRH C6-C10 minus BTEX (F1) | 50 | µg/L | - | < 50 | < 50 | < 50 | < 50 | < 50 |
| | TRH >C10-C16 | 60 | µg/L | - | < 60 | < 60 | < 60 | < 60 | < 60 |
| | TRH >C16-C34 (F3) | 500 | µg/L | - | < 500 | < 500 | < 500 | < 500 | < 500 |
| | TRH >C34-C40 (F4) | 500 | µg/L | - | < 500 | < 500 | < 500 | < 500 | < 500 |
| | TRH C10-C40 | 650 | µg/L | - | < 650 | < 650 | < 650 | < 650 | < 650 |
| BTEXN Analytes | Benzene (F0) | 0.5 | µg/L | - | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |

| | |
|---|---|
| mg/L | milligrams per litre |
| µg/L | micrograms per litre |
| µS/cm | microsiemens per centimetre |
| LOR | limit of reporting |
| PS | primary sample |
| Criteria | Criteria adopted from *NSW Environment Protection Authority (EPA) Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales', 2005* |
| | within criteria |
| | criteria exceeded |

**TABLE 3: LITHGOW SOLID WASTE FACILITY - ACCUMULATED LANDFILL GAS MONITORING**
**METHANE (as %, v/v)**

| | | Date | 30/01/2019 | 19/02/2019 | 28/03/2019 | 4/04/2019 | 6/05/2019 |
|---|---|---|---|---|---|---|---|
| **Location** | **LOR** | **Units** | | | | | |
| Site Shed | 0.005 | % | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 |
| Weighbridge | 0.005 | % | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 |
| Office (STP) | 0.005 | % | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 |
| Green Shed (STP) | 0.005 | % | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 |
| Pump Room (STP) | 0.005 | % | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 |

LOR limit of reporting

# ANALYTICAL REPORT

Accreditation No. 2562

| CLIENT DETAILS | | LABORATORY DETAILS | |
|---|---|---|---|
| Contact | Brendan Stuart | Manager | Huong Crawford |
| Client | PREMISE | Laboratory | SGS Alexandria Environmental |
| Address | LEVEL 1<br>100 BRUNSWICK STREET<br>FORTITUDE VALLEY QLD 4006 | Address | Unit 16, 33 Maddox St<br>Alexandria NSW 2015 |
| Telephone | 61 2 6939 5000 | Telephone | +61 2 8594 0400 |
| Facsimile | (Not specified) | Facsimile | +61 2 8594 0499 |
| Email | Brendan.stuart@premise.com.au | Email | au.environmental.sydney@sgs.com |
| Project | **217500 - Lithgow SWF** | SGS Reference | **SE192430 R0** |
| Order Number | (Not specified) | Date Received | 08 May 2019 |
| Samples | 5 | Date Reported | 16 May 2019 |

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Bennet Lo
Senior Organic Chemist/Metals Chemis

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

Shane McDermott
Inorganic/Metals Chemist

| Parameter | Units | LOR | Sample Number: SE192430.001<br>Sample Matrix: Water<br>Sample Date: 07 May 2019<br>Sample Name: MB5 | SE192430.002<br>Water<br>07 May 2019<br>MB9 | SE192430.003<br>Water<br>07 May 2019<br>MB10 | SE192430.004<br>Water<br>07 May 2019<br>MB12 |
|---|---|---|---|---|---|---|
| **Volatile Petroleum Hydrocarbons in Water Method: AN433 Tested: 9/5/2019** | | | | | | |
| TRH C6-C10 | µg/L | 50 | <50 | <50 | <50 | <50 |
| TRH C6-C9 | µg/L | 40 | <40 | <40 | <40 | <40 |
| Surrogates | | | | | | |
| Dibromofluoromethane (Surrogate) | % | - | **102** | **100** | **102** | **102** |
| d4-1,2-dichloroethane (Surrogate) | % | - | **112** | **113** | **113** | **113** |
| d8-toluene (Surrogate) | % | - | **102** | **101** | **102** | **103** |
| Bromofluorobenzene (Surrogate) | % | - | **104** | **102** | **102** | **103** |
| VPH F Bands | | | | | | |
| Benzene (F0) | µg/L | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| TRH C6-C10 minus BTEX (F1) | µg/L | 50 | <50 | <50 | <50 | <50 |
| **TRH (Total Recoverable Hydrocarbons) in Water Method: AN403 Tested: 9/5/2019** | | | | | | |
| TRH C10-C14 | µg/L | 50 | <50 | <50 | <50 | <50 |
| TRH C15-C28 | µg/L | 200 | <200 | <200 | <200 | <200 |
| TRH C29-C36 | µg/L | 200 | <200 | <200 | <200 | <200 |
| TRH C37-C40 | µg/L | 200 | <200 | <200 | <200 | <200 |
| TRH C10-C36 | µg/L | 450 | <450 | <450 | <450 | <450 |
| TRH C10-C40 | µg/L | 650 | <650 | <650 | <650 | <650 |
| TRH F Bands | | | | | | |
| TRH >C10-C16 | µg/L | 60 | <60 | <60 | <60 | <60 |
| TRH >C16-C34 (F3) | µg/L | 500 | <500 | <500 | <500 | <500 |
| TRH >C34-C40 (F4) | µg/L | 500 | <500 | <500 | <500 | <500 |
| **OC Pesticides in Water Method: AN420 Tested: 9/5/2019** | | | | | | |
| Hexachlorobenzene (HCB) | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Alpha BHC | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Lindane (gamma BHC) | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Heptachlor | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Aldrin | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Beta BHC | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Delta BHC | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Heptachlor epoxide | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| o,p'-DDE | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Alpha Endosulfan | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Gamma Chlordane | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Alpha Chlordane | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| trans-Nonachlor | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| p,p'-DDE | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Dieldrin | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Endrin | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| o,p'-DDD | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| o,p'-DDT | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Beta Endosulfan | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| p,p'-DDD | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| p,p'-DDT | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Endosulfan sulphate | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Endrin aldehyde | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Methoxychlor | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Endrin ketone | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Isodrin | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Mirex | µg/L | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |

| Parameter | Units | LOR | Sample Number: SE192430.001<br>Sample Matrix: Water<br>Sample Date: 07 May 2019<br>Sample Name: MB5 | SE192430.002<br>Water<br>07 May 2019<br>MB9 | SE192430.003<br>Water<br>07 May 2019<br>MB10 | SE192430.004<br>Water<br>07 May 2019<br>MB12 |
|---|---|---|---|---|---|---|
| **OC Pesticides in Water Method: AN420 Tested: 9/5/2019 (continued)** | | | | | | |
| Surrogates | | | | | | |
| Tetrachloro-m-xylene (TCMX) (Surrogate) | % | - | **90** | **88** | **61** | **63** |
| **OP Pesticides in Water Method: AN420 Tested: 9/5/2019** | | | | | | |
| Dichlorvos | µg/L | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Dimethoate | µg/L | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Diazinon (Dimpylate) | µg/L | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Fenitrothion | µg/L | 0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Malathion | µg/L | 0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Chlorpyrifos (Chlorpyrifos Ethyl) | µg/L | 0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Parathion-ethyl (Parathion) | µg/L | 0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Bromophos Ethyl | µg/L | 0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Methidathion | µg/L | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Ethion | µg/L | 0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Azinphos-methyl | µg/L | 0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Surrogates | | | | | | |
| 2-fluorobiphenyl (Surrogate) | % | - | **72** | **66** | **58** | **56** |
| d14-p-terphenyl (Surrogate) | % | - | **90** | **88** | **82** | **76** |
| **Total Phenolics in Water Method: AN289 Tested: 15/5/2019** | | | | | | |
| Total Phenols | mg/L | 0.01 | <0.01 | **0.01** | <0.01 | **0.02** |
| **pH in water Method: AN101 Tested: 9/5/2019** | | | | | | |
| pH** | No unit | - | **6.2** | **6.2** | **6.2** | **5.1** |
| **Conductivity and TDS by Calculation - Water Method: AN106 Tested: 9/5/2019** | | | | | | |
| Conductivity @ 25 C | µS/cm | 2 | **1200** | **580** | **240** | **1100** |

| Parameter | Units | LOR | Sample Number: SE192430.001<br>Sample Matrix: Water<br>Sample Date: 07 May 2019<br>Sample Name: MB5 | SE192430.002<br>Water<br>07 May 2019<br>MB9 | SE192430.003<br>Water<br>07 May 2019<br>MB10 | SE192430.004<br>Water<br>07 May 2019<br>MB12 |
|---|---|---|---|---|---|---|
| **Forms of Carbon Method: AN190 Tested: 14/5/2019** | | | | | | |
| Total Organic Carbon as NPOC | mg/L | 0.2 | **5.1** | **5.2** | **1.8** | **5.0** |
| **Alkalinity Method: AN135 Tested: 9/5/2019** | | | | | | |
| Bicarbonate Alkalinity as CaCO3 | mg/L | 5 | **190** | **170** | **59** | **37** |
| Total Alkalinity as CaCO3 | mg/L | 5 | **190** | **170** | **59** | **37** |
| **Anions by Ion Chromatography in Water Method: AN245 Tested: 9/5/2019** | | | | | | |
| Fluoride | mg/L | 0.1 | <0.10 | <0.10 | <0.10 | <0.10 |
| Chloride | mg/L | 1 | **220** | **61** | **24** | **240** |
| Nitrate Nitrogen, NO3-N | mg/L | 0.005 | **3.9** | **0.034** | **0.72** | <0.005 |
| Sulfate, SO4 | mg/L | 1 | **21** | **14** | **14** | **97** |
| **Ammonia Nitrogen by Discrete Analyser (Aquakem) Method: AN291 Tested: 9/5/2019** | | | | | | |
| Ammonia Nitrogen, $NH_3$ as N | mg/L | 0.01 | **6.1** | **4.5** | **1.2** | **3.5** |
| **Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN293(Sydney only) Tested: 13/5/2019** | | | | | | |
| Total Phosphorus (Kjeldahl Digestion) as P | mg/L | 0.02 | **0.11** | **0.08** | **0.07** | <0.02 |
| **COD in Water Method: AN179/AN181 Tested: 10/5/2019** | | | | | | |
| Chemical Oxygen Demand | mg/L | 10 | **17** | **10** | <10 | **19** |

| Parameter | Units | LOR | Sample Number: SE192430.001<br>Sample Matrix: Water<br>Sample Date: 07 May 2019<br>Sample Name: MB5 | SE192430.002<br>Water<br>07 May 2019<br>MB9 | SE192430.003<br>Water<br>07 May 2019<br>MB10 | SE192430.004<br>Water<br>07 May 2019<br>MB12 |
|---|---|---|---|---|---|---|
| **Hexavalent Chromium in water by Discrete Analyser Method: AN283 Tested: 10/5/2019** | | | | | | |
| Hexavalent Chromium, Cr6+ | mg/L | 0.004 | <0.004 | <0.004 | <0.004 | <0.004 |
| **Total Dissolved Solids (TDS) in water Method: AN113 Tested: 9/5/2019** | | | | | | |
| Total Dissolved Solids Dried at 175-185°C | mg/L | 10 | **660** | **290** | **120** | **680** |
| **Metals in Water (Dissolved) by ICPOES Method: AN320 Tested: 10/5/2019** | | | | | | |
| Calcium, Ca | mg/L | 0.2 | **58** | **31** | **12** | **28** |
| Magnesium, Mg | mg/L | 0.1 | **20** | **14** | **8.8** | **22** |
| Potassium, K | mg/L | 0.1 | **44** | **13** | **3.6** | **8.6** |
| Sodium, Na | mg/L | 0.5 | **89** | **27** | **11** | **76** |
| **Trace Metals (Dissolved) in Water by ICPMS Method: AN318 Tested: 10/5/2019** | | | | | | |
| Aluminium, Al | µg/L | 5 | <5 | <5 | <5 | **890** |
| Chromium, Cr | µg/L | 1 | <1 | <1 | <1 | <1 |
| Iron, Fe | µg/L | 5 | **44** | **14000** | **390** | **40000** |
| Manganese, Mn | µg/L | 1 | **700** | **1400** | **71** | **1600** |

| Parameter | Units | LOR | Sample Number: SE192430.005<br>Sample Matrix: Water<br>Sample Date: 07 May 2019<br>Sample Name: MB14 |
|---|---|---|---|
| **Volatile Petroleum Hydrocarbons in Water Method: AN433 Tested: 9/5/2019** | | | |
| TRH C6-C10 | µg/L | 50 | <50 |
| TRH C6-C9 | µg/L | 40 | <40 |
| Surrogates | | | |
| Dibromofluoromethane (Surrogate) | % | - | **96** |
| d4-1,2-dichloroethane (Surrogate) | % | - | **108** |
| d8-toluene (Surrogate) | % | - | **102** |
| Bromofluorobenzene (Surrogate) | % | - | **102** |
| VPH F Bands | | | |
| Benzene (F0) | µg/L | 0.5 | <0.5 |
| TRH C6-C10 minus BTEX (F1) | µg/L | 50 | <50 |
| **TRH (Total Recoverable Hydrocarbons) in Water Method: AN403 Tested: 9/5/2019** | | | |
| TRH C10-C14 | µg/L | 50 | <50 |
| TRH C15-C28 | µg/L | 200 | <200 |
| TRH C29-C36 | µg/L | 200 | <200 |
| TRH C37-C40 | µg/L | 200 | <200 |
| TRH C10-C36 | µg/L | 450 | <450 |
| TRH C10-C40 | µg/L | 650 | <650 |
| TRH F Bands | | | |
| TRH >C10-C16 | µg/L | 60 | <60 |
| TRH >C16-C34 (F3) | µg/L | 500 | <500 |
| TRH >C34-C40 (F4) | µg/L | 500 | <500 |

| Parameter | Units | LOR | Sample Number: SE192430.005<br>Sample Matrix: Water<br>Sample Date: 07 May 2019<br>Sample Name: MB14 |
|---|---|---|---|
| **OC Pesticides in Water Method: AN420 Tested: 9/5/2019** | | | |
| Hexachlorobenzene (HCB) | µg/L | 0.1 | <0.1 |
| Alpha BHC | µg/L | 0.1 | <0.1 |
| Lindane (gamma BHC) | µg/L | 0.1 | <0.1 |
| Heptachlor | µg/L | 0.1 | <0.1 |
| Aldrin | µg/L | 0.1 | <0.1 |
| Beta BHC | µg/L | 0.1 | <0.1 |
| Delta BHC | µg/L | 0.1 | <0.1 |
| Heptachlor epoxide | µg/L | 0.1 | <0.1 |
| o,p'-DDE | µg/L | 0.1 | <0.1 |
| Alpha Endosulfan | µg/L | 0.1 | <0.1 |
| Gamma Chlordane | µg/L | 0.1 | <0.1 |
| Alpha Chlordane | µg/L | 0.1 | <0.1 |
| trans-Nonachlor | µg/L | 0.1 | <0.1 |
| p,p'-DDE | µg/L | 0.1 | <0.1 |
| Dieldrin | µg/L | 0.1 | <0.1 |
| Endrin | µg/L | 0.1 | <0.1 |
| o,p'-DDD | µg/L | 0.1 | <0.1 |
| o,p'-DDT | µg/L | 0.1 | <0.1 |
| Beta Endosulfan | µg/L | 0.1 | <0.1 |
| p,p'-DDD | µg/L | 0.1 | <0.1 |
| p,p'-DDT | µg/L | 0.1 | <0.1 |
| Endosulfan sulphate | µg/L | 0.1 | <0.1 |
| Endrin aldehyde | µg/L | 0.1 | <0.1 |
| Methoxychlor | µg/L | 0.1 | <0.1 |
| Endrin ketone | µg/L | 0.1 | <0.1 |
| Isodrin | µg/L | 0.1 | <0.1 |
| Mirex | µg/L | 0.1 | <0.1 |
| Surrogates | | | |
| Tetrachloro-m-xylene (TCMX) (Surrogate) | % | - | **71** |
| **OP Pesticides in Water Method: AN420 Tested: 9/5/2019** | | | |
| Dichlorvos | µg/L | 0.5 | <0.5 |
| Dimethoate | µg/L | 0.5 | <0.5 |
| Diazinon (Dimpylate) | µg/L | 0.5 | <0.5 |
| Fenitrothion | µg/L | 0.2 | <0.2 |
| Malathion | µg/L | 0.2 | <0.2 |
| Chlorpyrifos (Chlorpyrifos Ethyl) | µg/L | 0.2 | <0.2 |
| Parathion-ethyl (Parathion) | µg/L | 0.2 | <0.2 |
| Bromophos Ethyl | µg/L | 0.2 | <0.2 |
| Methidathion | µg/L | 0.5 | <0.5 |
| Ethion | µg/L | 0.2 | <0.2 |
| Azinphos-methyl | µg/L | 0.2 | <0.2 |

| Parameter | Units | LOR | Sample Number: SE192430.005<br>Sample Matrix: Water<br>Sample Date: 07 May 2019<br>Sample Name: MB14 |
|---|---|---|---|
| **OP Pesticides in Water Method: AN420 Tested: 9/5/2019 (continued)** | | | |
| Surrogates | | | |
| 2-fluorobiphenyl (Surrogate) | % | - | **62** |
| d14-p-terphenyl (Surrogate) | % | - | **88** |
| **Total Phenolics in Water Method: AN289 Tested: 15/5/2019** | | | |
| Total Phenols | mg/L | 0.01 | <0.01 |
| **pH in water Method: AN101 Tested: 9/5/2019** | | | |
| pH** | No unit | - | **7.1** |
| **Conductivity and TDS by Calculation - Water Method: AN106 Tested: 9/5/2019** | | | |
| Conductivity @ 25 C | µS/cm | 2 | **770** |
| **Forms of Carbon Method: AN190 Tested: 14/5/2019** | | | |
| Total Organic Carbon as NPOC | mg/L | 0.2 | **3.5** |
| **Alkalinity Method: AN135 Tested: 9/5/2019** | | | |
| Bicarbonate Alkalinity as CaCO3 | mg/L | 5 | **310** |
| Total Alkalinity as CaCO3 | mg/L | 5 | **310** |

| Parameter | Units | LOR | Sample Number: SE192430.005<br>Sample Matrix: Water<br>Sample Date: 07 May 2019<br>Sample Name: MB14 |
|---|---|---|---|
| **Anions by Ion Chromatography in Water Method: AN245 Tested: 9/5/2019** | | | |
| Fluoride | mg/L | 0.1 | <0.10 |
| Chloride | mg/L | 1 | **33** |
| Nitrate Nitrogen, NO3-N | mg/L | 0.005 | **0.016** |
| Sulfate, SO4 | mg/L | 1 | **44** |
| **Ammonia Nitrogen by Discrete Analyser (Aquakem) Method: AN291 Tested: 9/5/2019** | | | |
| Ammonia Nitrogen, $NH_3$ as N | mg/L | 0.01 | **0.21** |
| **Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN293(Sydney only) Tested: 13/5/2019** | | | |
| Total Phosphorus (Kjeldahl Digestion) as P | mg/L | 0.02 | **0.05** |
| **COD in Water Method: AN179/AN181 Tested: 10/5/2019** | | | |
| Chemical Oxygen Demand | mg/L | 10 | <10 |
| **Hexavalent Chromium in water by Discrete Analyser Method: AN283 Tested: 10/5/2019** | | | |
| Hexavalent Chromium, Cr6+ | mg/L | 0.004 | <0.004 |
| **Total Dissolved Solids (TDS) in water Method: AN113 Tested: 9/5/2019** | | | |
| Total Dissolved Solids Dried at 175-185°C | mg/L | 10 | **440** |

| Parameter | Units | LOR | Sample Number SE192430.005<br>Sample Matrix Water<br>Sample Date 07 May 2019<br>Sample Name MB14 |
|---|---|---|---|
| **Metals in Water (Dissolved) by ICPOES Method: AN320 Tested: 10/5/2019** | | | |
| Calcium, Ca | mg/L | 0.2 | **95** |
| Magnesium, Mg | mg/L | 0.1 | **28** |
| Potassium, K | mg/L | 0.1 | **8.4** |
| Sodium, Na | mg/L | 0.5 | **16** |
| **Trace Metals (Dissolved) in Water by ICPMS Method: AN318 Tested: 10/5/2019** | | | |
| Aluminium, Al | µg/L | 5 | <5 |
| Chromium, Cr | µg/L | 1 | <1 |
| Iron, Fe | µg/L | 5 | **700** |
| Manganese, Mn | µg/L | 1 | **70** |

# QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

## Alkalinity Method: ME-(AU)-[ENV]AN135

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---|---|---|---|---|---|---|
| Bicarbonate Alkalinity as CaCO3 | LB173356 | mg/L | 5 | <5 | 1% | NA |
| Total Alkalinity as CaCO3 | LB173356 | mg/L | 5 | <5 | 1% | 113% |

## Ammonia Nitrogen by Discrete Analyser (Aquakem) Method: ME-(AU)-[ENV]AN291

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|---|---|---|---|---|---|---|---|
| Ammonia Nitrogen, $NH_3$ as N | LB173268 | mg/L | 0.01 | <0.01 | 2 - 9% | 98% | 84% |

## Anions by Ion Chromatography in Water Method: ME-(AU)-[ENV]AN245

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---|---|---|---|---|---|---|
| Fluoride | LB173272 | mg/L | 0.1 | <0.10 | | 94% |
| Chloride | LB173272 | mg/L | 1 | <0.05 | | 96% |
| Nitrate Nitrogen, NO3-N | LB173272 | mg/L | 0.005 | <0.005 | 4% | 97% |
| Sulfate, SO4 | LB173272 | mg/L | 1 | <1.0 | 0 - 2% | 94% |

## COD in Water Method: ME-(AU)-[ENV]AN179/AN181

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---|---|---|---|---|---|---|
| Chemical Oxygen Demand | LB173419 | mg/L | 10 | <10 | 1% | 97% |

## Conductivity and TDS by Calculation - Water Method: ME-(AU)-[ENV]AN106

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---|---|---|---|---|---|---|
| Conductivity @ 25 C | LB173304 | µS/cm | 2 | <2 | 0% | 97% |

## Forms of Carbon Method: ME-(AU)-[ENV]AN190

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|---|---|---|---|---|---|---|---|
| Total Organic Carbon as NPOC | LB173665 | mg/L | 0.2 | <0.2 | 2% | 95% | 99% |

# QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

**Hexavalent Chromium in water by Discrete Analyser Method: ME-(AU)-[ENV]AN283**

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|---|---|---|---|---|---|---|---|
| Hexavalent Chromium, Cr6+ | LB173414 | mg/L | 0.004 | <0.004 | 0% | 108% | 107% |

**Metals in Water (Dissolved) by ICPOES Method: ME-(AU)-[ENV]AN320**

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|---|---|---|---|---|---|---|---|
| Calcium, Ca | LB173386 | mg/L | 0.2 | <0.2 | 1% | 88% | 76% |
| Magnesium, Mg | LB173386 | mg/L | 0.1 | <0.1 | 0% | 93% | 74% |
| Potassium, K | LB173386 | mg/L | 0.1 | <0.1 | 0% | 88% | 80% |
| Sodium, Na | LB173386 | mg/L | 0.5 | <0.5 | 0% | 88% | 65% |

**OC Pesticides in Water Method: ME-(AU)-[ENV]AN420**

| Parameter | QC Reference | Units | LOR | MB | LCS %Recovery |
|---|---|---|---|---|---|
| Hexachlorobenzene (HCB) | LB173270 | µg/L | 0.1 | <0.1 | NA |
| Alpha BHC | LB173270 | µg/L | 0.1 | <0.1 | NA |
| Lindane (gamma BHC) | LB173270 | µg/L | 0.1 | <0.1 | NA |
| Heptachlor | LB173270 | µg/L | 0.1 | <0.1 | 100% |
| Aldrin | LB173270 | µg/L | 0.1 | <0.1 | 80% |
| Beta BHC | LB173270 | µg/L | 0.1 | <0.1 | NA |
| Delta BHC | LB173270 | µg/L | 0.1 | <0.1 | 103% |
| Heptachlor epoxide | LB173270 | µg/L | 0.1 | <0.1 | NA |
| o,p'-DDE | LB173270 | µg/L | 0.1 | <0.1 | NA |
| Alpha Endosulfan | LB173270 | µg/L | 0.1 | <0.1 | NA |
| Gamma Chlordane | LB173270 | µg/L | 0.1 | <0.1 | NA |
| Alpha Chlordane | LB173270 | µg/L | 0.1 | <0.1 | NA |
| trans-Nonachlor | LB173270 | µg/L | 0.1 | <0.1 | NA |
| p,p'-DDE | LB173270 | µg/L | 0.1 | <0.1 | NA |
| Dieldrin | LB173270 | µg/L | 0.1 | <0.1 | 109% |
| Endrin | LB173270 | µg/L | 0.1 | <0.1 | 111% |
| o,p'-DDD | LB173270 | µg/L | 0.1 | <0.1 | NA |
| o,p'-DDT | LB173270 | µg/L | 0.1 | <0.1 | NA |
| Beta Endosulfan | LB173270 | µg/L | 0.1 | <0.1 | NA |
| p,p'-DDD | LB173270 | µg/L | 0.1 | <0.1 | NA |
| p,p'-DDT | LB173270 | µg/L | 0.1 | <0.1 | 104% |
| Endosulfan sulphate | LB173270 | µg/L | 0.1 | <0.1 | NA |
| Endrin aldehyde | LB173270 | µg/L | 0.1 | <0.1 | NA |
| Methoxychlor | LB173270 | µg/L | 0.1 | <0.1 | NA |
| Endrin ketone | LB173270 | µg/L | 0.1 | <0.1 | NA |
| Isodrin | LB173270 | µg/L | 0.1 | <0.1 | NA |
| Mirex | LB173270 | µg/L | 0.1 | <0.1 | NA |

Surrogates

| Parameter | QC Reference | Units | LOR | MB | LCS %Recovery |
|---|---|---|---|---|---|
| Tetrachloro-m-xylene (TCMX) (Surrogate) | LB173270 | % | - | 81% | 52% |

# QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

**OP Pesticides in Water** **Method: ME-(AU)-[ENV]AN420**

| Parameter | QC Reference | Units | LOR | MB | LCS %Recovery |
|---|---|---|---|---|---|
| Dichlorvos | LB173270 | µg/L | 0.5 | <0.5 | 107% |
| Dimethoate | LB173270 | µg/L | 0.5 | <0.5 | NA |
| Diazinon (Dimpylate) | LB173270 | µg/L | 0.5 | <0.5 | 106% |
| Fenitrothion | LB173270 | µg/L | 0.2 | <0.2 | NA |
| Malathion | LB173270 | µg/L | 0.2 | <0.2 | NA |
| Chlorpyrifos (Chlorpyrifos Ethyl) | LB173270 | µg/L | 0.2 | <0.2 | 109% |
| Parathion-ethyl (Parathion) | LB173270 | µg/L | 0.2 | <0.2 | NA |
| Bromophos Ethyl | LB173270 | µg/L | 0.2 | <0.2 | NA |
| Methidathion | LB173270 | µg/L | 0.5 | <0.5 | NA |
| Ethion | LB173270 | µg/L | 0.2 | <0.2 | 107% |
| Azinphos-methyl | LB173270 | µg/L | 0.2 | <0.2 | NA |

Surrogates

| Parameter | QC Reference | Units | LOR | MB | LCS %Recovery |
|---|---|---|---|---|---|
| 2-fluorobiphenyl (Surrogate) | LB173270 | % | - | 64% | 64% |
| d14-p-terphenyl (Surrogate) | LB173270 | % | - | 62% | 74% |

**pH in water** **Method: ME-(AU)-[ENV]AN101**

| Parameter | QC Reference | Units | LOR | MB | LCS %Recovery |
|---|---|---|---|---|---|
| pH** | LB173304 | No unit | - | 6.3 | NA |

**Total Dissolved Solids (TDS) in water** **Method: ME-(AU)-[ENV]AN113**

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---|---|---|---|---|---|---|
| Total Dissolved Solids Dried at 175-185°C | LB173354 | mg/L | 10 | <10 | 4 - 7% | 96% |

# QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

**Total Phenolics in Water** **Method: ME-(AU)-[ENV]AN289**

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|---|---|---|---|---|---|---|---|
| Total Phenols | LB173743 | mg/L | 0.01 | <0.01 | 0% | 103% | 77% |

**Total Phosphorus by Kjeldahl Digestion DA in Water** **Method: ME-(AU)-[ENV]AN279/AN293(Sydney only)**

| Parameter | QC Reference | Units | LOR | MB | LCS %Recovery | MS %Recovery |
|---|---|---|---|---|---|---|
| Total Phosphorus (Kjeldahl Digestion) as P | LB173515 | mg/L | 0.02 | <0.02 | 99% | 101% |

**Trace Metals (Dissolved) in Water by ICPMS** **Method: ME-(AU)-[ENV]AN318**

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|---|---|---|---|---|---|---|---|
| Aluminium, Al | LB173389 | µg/L | 5 | <5 | | 103% | 105% |
| Chromium, Cr | LB173389 | µg/L | 1 | <1 | 2% | 110% | 112% |
| Iron, Fe | LB173389 | µg/L | 5 | <5 | 2% | 117% | 110% |
| Manganese, Mn | LB173389 | µg/L | 1 | <1 | 1% | 101% | 55% |

**TRH (Total Recoverable Hydrocarbons) in Water** **Method: ME-(AU)-[ENV]AN403**

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---|---|---|---|---|---|---|
| TRH C10-C14 | LB173270 | µg/L | 50 | <50 | 0% | 100% |
| TRH C15-C28 | LB173270 | µg/L | 200 | <200 | 0% | 124% |
| TRH C29-C36 | LB173270 | µg/L | 200 | <200 | 0% | 119% |
| TRH C37-C40 | LB173270 | µg/L | 200 | <200 | 0% | NA |
| TRH C10-C36 | LB173270 | µg/L | 450 | <450 | 0% | NA |
| TRH C10-C40 | LB173270 | µg/L | 650 | <650 | 0% | NA |

TRH F Bands

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---|---|---|---|---|---|---|
| TRH >C10-C16 | LB173270 | µg/L | 60 | <60 | 0% | 109% |
| TRH >C16-C34 (F3) | LB173270 | µg/L | 500 | <500 | 0% | 128% |
| TRH >C34-C40 (F4) | LB173270 | µg/L | 500 | <500 | 0% | 117% |

# QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

**Volatile Petroleum Hydrocarbons in Water** **Method: ME-(AU)-[ENV]AN433**

| Parameter | QC Reference | Units | LOR | MB | LCS %Recovery |
|---|---|---|---|---|---|
| TRH C6-C10 | LB173320 | µg/L | 50 | <50 | 100% |
| TRH C6-C9 | LB173320 | µg/L | 40 | <40 | 93% |

Surrogates

| Parameter | QC Reference | Units | LOR | MB | LCS %Recovery |
|---|---|---|---|---|---|
| Dibromofluoromethane (Surrogate) | LB173320 | % | - | 129% | 109% |
| d4-1,2-dichloroethane (Surrogate) | LB173320 | % | - | 77% | 91% |
| d8-toluene (Surrogate) | LB173320 | % | - | 91% | 101% |
| Bromofluorobenzene (Surrogate) | LB173320 | % | - | 110% | 100% |

VPH F Bands

| Parameter | QC Reference | Units | LOR | MB | LCS %Recovery |
|---|---|---|---|---|---|
| Benzene (F0) | LB173320 | µg/L | 0.5 | <0.5 | NA |
| TRH C6-C10 minus BTEX (F1) | LB173320 | µg/L | 50 | <50 | 99% |

# METHOD SUMMARY

| METHOD | METHODOLOGY SUMMARY |
|---|---|
| AN020 | Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B. |
| AN101 | pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+. |
| AN106 | Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos/cm or µS/cm @ 25°C. For soils, an extract with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Total Dissolved Salts can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. SGS use 0.6. Reference APHA 2510 B. |
| AN106 | Salinity may be calculated in terms of NaCl from the sample conductivity. This assumes all soluble salts present, measured by the conductivity, are present as NaCl. |
| AN113 | Total Dissolved Solids: A well-mixed filtered sample of known volume is evaporated to dryness at 180°C and the residue weighed. Approximate methods for correlating chemical analysis with dissolved solids are available. Reference APHA 2540 C. |
| AN113 | The Total Dissolved Solids residue may also be ignited at 550 C and volatile TDS (Organic TDS) and non-volatile TDS (Inorganic) can be determined. |
| AN135 | Alkalinity (and forms of) by Titration: The sample is titrated with standard acid to pH 8.3 (P titre) and pH 4.5 (T titre) and permanent and/or total alkalinity calculated. The results are expressed as equivalents of calcium carbonate or recalculated as bicarbonate, carbonate and hydroxide. Reference APHA 2320. Internal Reference AN135 |
| AN181 | Analysis of COD by Semi Closed Reflux: The sample is refluxed with strong acid and a known excess of oxidant. After digestion the unreduced oxidant is back titrated to determine the amount of oxidant consumed. The chemically oxidised matter is calculated in terms of oxygen equivalents. Reference APHA 5220 B. |
| AN190 | TOC and DOC in Water: A homogenised micro portion of sample is injected into a heated reaction chamber packed with an oxidative catalyst that converts organic carbon to carbon dioxide. The CO2 is measured using a non-dispersive infrared detector. The process is fully automated in a commercially available analyser. If required a sugar value can be calculated from the TOC result. Reference APHA 5310 B. |
| AN190 | Chemical oxygen demand can be calculated/estimated based on the O2/C relation as 2.67*NPOC ( TOC). This is an estimate only and the factor will vary with sample matrix so results should be interpreted with caution. |
| AN245 | Anions by Ion Chromatography: A water sample is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO2, NO3 and SO4 are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B |
| AN279/AN293(Sydney) | The sample is digested with Sulphuric acid, K2SO4 and CuSO4. All forms of phosphorus are converted into orthophosphate. The digest is cooled and placed on the discrete analyser for colorimetric analysis. |
| AN283 | Hexavalent Chromium via Aquakem DA: Soluble hexavalent chromium forms a red/violet colour with diphenylcarbazide in acidic solution. This procedure is very sensitive and nearly specific for Cr6+. If total chromium is also measured the trivalent form of chromium Cr3+ can be calculated from the difference (Total Cr - Cr6+). Reference APHA3500CrB. |

# METHOD SUMMARY

| METHOD | METHODOLOGY SUMMARY |
|---|---|
| AN289 | Analysis of Total Phenols in Soil Sediment and Water: Steam distillable phenols react with 4-aminoantipyrine at pH 7.9±0.1 in the presence of potassium ferricyanide to form a coloured antipyrine dye analysed by Discrete Analyser. Reference APHA 5530 B/D. |
| AN291 | Ammonia in solution reacts with hypochlorite ions from Sodium Dichloroisocyanuate, and salicylate in the presence of Sodium Nitroprusside to form indophenol blue and measured at 670 nm by Discrete Analyser. |
| AN318 | Determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A. |
| AN320 | Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components . |
| AN320 | Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements. Reference APHA 3120 B. |
| AN403 | Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). Where F2 is corrected for Naphthalene, the VOC data for Naphthalene is used. |
| AN403 | Additionally, the volatile C6-C9/C6-C10 fractions may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoveerable Hydrocarbons - Silica (TRH-Silica) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents. |
| AN403 | The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B. |
| AN420 | SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process ( Based on USEPA 3500C and 8270D). |
| AN433 | VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260. |
| Calculation | Free and Total Carbon Dioxide may be calculated using alkalinity forms only when the samples TDS is <500mg/L. If TDS is >500mg/L free or total carbon dioxide cannot be reported . APHA4500CO2 D. |

FOOTNOTES

| | | | |
|---|---|---|---|
| IS | Insufficient sample for analysis. | LOR | Limit of Reporting |
| LNR | Sample listed, but not received. | ↑↓ | Raised or Lowered Limit of Reporting |
| * | NATA accreditation does not cover the performance of this service. | QFH | QC result is above the upper tolerance |
| | | QFL | QC result is below the lower tolerance |
| ** | Indicative data, theoretical holding time exceeded. | - | The sample was not analysed for this analyte |
| | | NVL | Not Validated |

Unless it is reported that sampling has been perfomed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au.pv.sgsvr/en-gb/environment.