AGL Upstream Investments Pty Ltd

Waukivory Pilot Project

Surface Water and Groundwater Monitoring Report to 31 March 2015

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Glossary

Acid Wash	A technique to enhance formation permeability through the use of acid to dissolve sediments that may be blocking fractures and inhibiting permeability.
Alluvium	Unconsolidated sediments (clays, sands, gravels and other materials) deposited by flowing water. Deposits can be made by streams on river beds, floodplains, and alluvial fans.
Alluvial aquifer	Permeable zones that store and produce groundwater from unconsolidated alluvial sediments. Shallow alluvial aquifers are generally unconfined aquifers.
Aquifer	Rock or sediment in a formation, group of formations, or part of a formation that is saturated and sufficiently permeable to transmit economic quantities of water.
Baseline sampling	A period of regular water quality and water level measurements that are carried out over a period long enough to determine the variability in groundwater conditions.
Bore	A structure drilled below the surface to obtain water from an aquifer or series of aquifers.
Coal	A sedimentary rock derived from the compaction and consolidation of vegetation or swamp deposits to form a fossilised carbonaceous rock.
Coal seam	A layer of coal within a sedimentary rock sequence.
Coal seam gas (CSG)	Coal seam gas is a form of natural gas (predominantly methane) that is extracted from coal seams.
Concentration	The amount or mass of a substance present in a given volume or mass of sample, usually expressed as microgram per litre (water sample) or micrograms per kilogram (sediment sample).
Conceptual model	A simplified and idealised representation (usually graphical) of the physical hydrogeologic setting and the hydrogeological understanding of the essential flow processes of the system. This includes the identification and description of the geologic and hydrologic framework, media type, hydraulic properties, sources and sinks, and important aquifer flow and surface water-groundwater interaction processes.
Confining layer	Low permeability strata that may be saturated, however will not allow water to move through it under natural hydraulic gradients.
Datalogger	A digital recording instrument that is inserted in monitoring and pumping bores to record pressure measurements and water level variations.
Detection limit	The concentration below which a particular analytical method cannot determine, with a high degree of certainty, a concentration.
Drawdown	A lowering of the water table in an unconfined aquifer or the pressure surface of a confined aquifer caused by pumping of groundwater from bores and wells.

Electrical conductivity (EC)	A measure of a fluid's ability to conduct an electrical current and is an estimation of the total ions dissolved. It is often used as a measure of water salinity.
Flowback water	The return to surface of fracture stimulation fluids before transition to natural formation water (groundwater), after which water flowing from the well is termed produced water.
Fracture	Breakage in a rock or mineral along a direction or directions that are not cleavage or fissility directions.
Fracture stimulation	Fracture stimulation involves pumping a fluid under pressure through the perforated interval into the coal seam to open cracks or fractures, increasing the connectivity and enabling the flow of water and gas.
Fracture stimulation fluid	The fluid is typically a mixture of sand, water (raw water) and additives.
Fractured rock aquifer	These occur in sedimentary, igneous and metamorphosed rocks which have been subjected to disturbance, deformation, or weathering, and which allow water to move through joints, bedding planes, fractures and faults. Although fractured rock aquifers are found over a wide area, they generally contain much less groundwater than alluvial and porous sedimentary rock aquifers.
Groundwater	The water contained in interconnected pores or fractures located below the water table in the saturated zone.
Groundwater level	The water level measured in a bore; this may be at or close to the water table in unconfined aquifers, or represent the average piezometric level across the screened interval in confined aquifers.
Hydraulic conductivity	The rate at which water of a specified density and kinematic viscosity can move through a permeable medium (notionally equivalent to the permeability of an aquifer to fresh water).
Hydraulic fracturing	See fracture stimulation.
Hydraulic gradient	The change in total hydraulic head with a change in distance in a given direction.
Hydraulic head	A specific measurement of water pressure above a datum. It is usually measured as a water surface elevation, expressed in units of length. In an aquifer, it can be calculated from the depth to water in a monitoring bore. The hydraulic head can be used to determine a hydraulic gradient between two or more points.
Hydrogeology	The study of the interrelationships of geologic materials and processes with water, especially groundwater.
Hydrology	The study of the occurrence, distribution, and chemistry of all surface waters.
Ion	An ion is an atom or molecule where the total number of electrons is not equal to the total number of protons, giving it a net positive or negative electrical charge.
Lithology	The study of rocks and their depositional or formational environment on a large specimen or outcrop scale.

Major ions	Constituents commonly present in concentrations exceeding 10 milligram per litre. Dissolved cations generally are calcium, magnesium, sodium, and potassium; the major anions are sulphate, chloride, fluoride, nitrate, and those contributing to alkalinity, most generally assumed to be bicarbonate and carbonate.
Methane (CH_4)	An odourless, colourless, flammable gas, which is the major constituent of natural gas. It is used as a fuel and is an important source of hydrogen and a wide variety of organic compounds.
Micro Siemens per centimetre (µS/cm)	A measure of water salinity commonly referred to as EC (see also electrical conductivity). Most commonly measured in the field with calibrated field meters.
Monitoring bore	A non-pumping bore, is generally of small diameter that is used to measure the elevation of the water table and/or water quality. Bores generally have a short well screen against a single aquifer through which water can enter.
Oxidation-reduction potential (ORP)	The redox potential is a measure (in volts) of the affinity of a substance for electrons – its electronegativity – compared with hydrogen (which is set at 0). Substances more strongly electronegative than (i.e. capable of oxidising) hydrogen have positive redox potentials. Substances less electronegative than (i.e. capable of reducing) hydrogen have negative redox potentials. Also known as reduction potential.
Percentile	The value below which a given percentage of observations fall. For example, the 5th percentile is the value below which five percent of observations are found.
Perforation	For pilot wells, perforation is holes punctured in the casing of a pilot well to gain access to the gas and water associated with the coal.
Permeable material	Material that permits water to move through it at perceptible rates under the hydraulic gradients normally present.
Permian	The last period of the Palaeozoic era that finished approximately 252 million years before present.
Petroleum Exploration Licence (PEL)	A Petroleum Exploration Lease (PEL) allows a company to exclusively explore a defined area for petroleum, including undertaking desktop studies, collecting samples and drilling.
Petroleum Production Lease (PPL)	A Petroleum Production Lease (PPL) allows a company exclusive rights to extract the resource within the area defined by the PPL. A PPL is only granted after a demonstration to the NSW Government that the resource is of benefit to the State and can be extracted safely and without damage to the environment or heritage areas and infrastructure.
pH	Potential of Hydrogen; the logarithm of the reciprocal of hydrogen-ion concentration in gram atoms per litre; provides a measure on a scale from 0 to 14 of the acidity or alkalinity of a solution (where 7 is neutral, greater than 7 is alkaline and less than 7 is acidic).
Piezometric pressure	See hydraulic head.
Produced water	Natural groundwater generated from coal seams during flow testing and production dewatering.

Pump commissioning	The period over which pumps are installed and tested, following fracture stimulation.
Raw water	Source water used in the fracture stimulation fluid mixture.
Recharge	The process which replenishes groundwater, usually by rainfall infiltrating from the ground surface to the water table and by river water reaching the water table or exposed aquifers. The addition of water to an aquifer.
Recharge area	A geographic area that directly receives infiltrated water from surface and in which there are downward components of hydraulic head in the aquifer. Recharge generally moves downward from the water table into the deeper parts of an aquifer then moves laterally and vertically to recharge other parts of the aquifer or deeper aquifer zones.
Recovery	The difference between the observed water level during the recovery period after cessation of pumping and the water level measured immediately before pumping stopped.
Salinity	The concentration of dissolved salts in water, usually expressed in EC units (µS/cm) or milligrams of total dissolved solids per litre (mg/L TDS).
Salinity classification	Fresh water quality – water with a salinity <800 µS/cm. Marginal water quality – water that is more saline than freshwater and generally waters between 800 and 1,600 µS/cm. Brackish quality – water that is more saline than freshwater and generally waters between 1,600 and 4,800 µS/cm. Slightly saline quality – water that is more saline than brackish water and generally waters with a salinity between 4,800 and 10,000 µS/cm. Moderately saline quality – water that is more saline than slightly saline water and generally waters between 10,000 and 20,000 µS/cm. Saline quality – water that is almost as saline as seawater and generally waters with a salinity greater than 20,000 µS/cm. Seawater quality – water that is generally around 55,000 µS/cm.
Sandstone	Sandstone is a sedimentary rock composed mainly of sand-sized minerals or rock grains (predominantly quartz).
Screen	A type of bore lining or casing of special construction, with apertures designed to permit the flow of water into a bore while preventing the entry of aquifer or filter pack material.
Sedimentary rock aquifer	These occur in consolidated sediments such as porous sandstones and conglomerates, in which water is stored in the intergranular pores, and limestone, in which water is stored in solution cavities and joints. These aquifers are generally located in sedimentary basins that are continuous over large areas and may be tens or hundreds of metres thick. In terms of quantity, they contain the largest volumes of groundwater.
Shut-in	A well is 'shut-in' when it is closed by operators to stop gas flow, either by closing valves at the surface or downhole.

Siltstone	A fine-grained rock of sedimentary origin composed mainly of silt-sized particles (0.004 to 0.06 mm).
Stratigraphy	The depositional order of sedimentary rocks in layers.
Surface water-groundwater interaction	This occurs in two ways: (1) streams gain water from groundwater through the streambed when the elevation of the water table adjacent to the streambed is greater than the water level in the stream; and (2) streams lose water to groundwater through streambeds when the elevation of the water table is lower than the water level in the stream.
Total dissolved solids (TDS)	A measure of the salinity of water, usually expressed in milligrams per litre (mg/L).
Trace element	An element found in only minor amounts (concentrations less than 10 milligram per litre) in water or sediment; includes heavy metals arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc.
Water bearing zone	Geological strata that are saturated with groundwater, however not of sufficient permeability to be called an aquifer.
Water quality	Term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose.
Water quality data	Chemical, biological, and physical measurements or observations of the characteristics of surface and ground waters, atmospheric deposition, potable water, treated effluents, and waste water and of the immediate environment in which the water exists.
Water table	The top of an unconfined aquifer. It is at atmospheric pressure and indicates the level below which soil and rock are saturated with water.
Well	Pertaining to a gas exploration well or gas production well.

Abbreviations

AGL	AGL Upstream Investments Pty Ltd
ANZECC	Australian and New Zealand Environment Conservation Council
ALS	Australian Laboratory Services
AST	Above ground storage tank
BTEX	Benzene, toluene, ethyl-benzene and xylenes
BoM	Bureau of Meteorology
BP	Before Present
CDFM	Cumulative deviation from mean
CSG	Coal seam gas
DIC	Dissolved inorganic carbon
DO	Dissolved oxygen
EC	Electrical conductivity
EPA	Environment Protection Authority
EPL	Environment Protection Licence
GDE	Groundwater Dependent Ecosystems
GFDA	Gas Field Development Area
GGP	Gloucester Gas Project
GMWL	Global Meteoric Water Line
GRL	Gloucester Resources Limited
H_2O	Water
LMWL	Local Meteoric Water Line
LoR	Limit of reporting
LTA	Long term average
MEA	Monoethanolamine
MGA	Map grid of Australia
NEPM	National Environment Protection Measures

NOW	NSW Office of Water
OCSG	Office of Coal Seam Gas
ORP	Oxidation-reduction potential
PEL	Petroleum Exploration Licence
PPL	Petroleum Production Lease
PQL	Practical quantification limit
QA/QC	Quality assurance/quality control
SGMP	Surface water and groundwater management plan
THPS	Tetrakis (hydroxymethyl) phosphonium sulphate
TPH	Total petroleum hydrocarbons
TRH	Total recoverable hydrocarbons
TDS	Total dissolved solids
TOC	Total organic carbon
UV	Ultraviolet

Units

ºC	degrees Celsius
µg/L	micrograms per litre
µS/cm	microSiemens per centimetre
%	percent
kL	kilolitres
km	kilometres
km^2	square kilometres
kPa	kilopascal
L/s	litres per second
m	metres
m/d	metres per day
m^3/s	cubic metres per second
mAHD	metres Australian Height Datum
mbgl	metres below ground level
mg/L	milligram per litre
ML	megalitres
mm	millimetres
mmol/L	millimol per litre
pCM	percent modern carbon
TU	tritium unit
V	volt
yrs BP	years before present

Executive summary

This report presents the groundwater and surface water monitoring results and their interpretation for the Waukivory Pilot Project (the Project) (exploration) activities within the Stage 1 area of the Gloucester Gas Project (GGP) from 1 January to 31 March 2015 (reporting period). This report is the second monitoring report for the Project and provides results of monitoring data from the water monitoring network and flowback water quality and volumes recovered from the four Waukivory (WK) pilot wells WK11, WK12, WK13, and WK14. The baseline sampling and fracture stimulation phases are detailed in the first monitoring report for the Project to 31 December 2014 (Parsons Brinckerhoff 2015a).

The reporting of this monitoring data is a requirement of Petroleum Exploration Licence (PEL) 285 and Environment Protection Licence (EPL) 20358. The monitoring program and subsequent reporting meets the requirements of the Surface and Groundwater Management Plan (SGMP) (AGL 2014a) and relevant sections of EPL 20358.

The scope of work for this report included:

- Interpretation of water level and water quality trends
- Assessment as to whether these trends are naturally occurring or potentially attributed to Project activities through the use of an analytical methodology that is consistent with the design requirements outlined in ANZECC (2000) and the SGMP (AGL, 2014a)
- Assessment of key analytes associated with fracture stimulation additives defined in the SGMP.

The current groundwater monitoring network at the Waukivory site consists of seven groundwater monitoring bores, one multizone monitoring well (six zones monitored), and one vibrating wire piezometer location (two zones monitored). There are three surface water monitoring sites at Waukivory located on the Avon River and Waukivory Creek.

Flowback commenced with the installation of pumps in WK12 and WK13 in December 2014, and WK11 and WK14 in January 2015. On 27 January 2015, AGL voluntarily suspended the Project, therefore suspending flowback. This followed the detection of BTEX compounds in samples of flowback water taken from WK12, WK13 and AST2 in December 2014. On 3 February 2015 flowback water was pumped from the four pilot wells for a period of four days to allow additional sampling and analysis to be carried out by AGL, the NSW Environment Protection Authority (EPA) and the Department of Resources and Energy (DRE). The project was re-suspended from 6 February through to the end of the reporting period at 31 March 2015.

Key results and conclusions from this program from 1 January 2015 to 31 March 2015 are as follows:

Pilot well water levels

Water levels in the pilot wells are highly variable and dependent on pump commissioning and operation. The pumps were commissioned in pilot wells WK12 and WK13 in December 2014 and pilot wells WK11 and WK14 in January 2015. Water levels in the pilot wells decreased by 250 to 650 m during flowback and showed significant recoveries during periods when flowback was suspended.

Pilot well water quality

The pilot well water quality shows a strong migration towards typical coal seam formation water, as characterised by produced water from Craven 06 (CR06) and Waukivory 03 (WK03) water quality data (Parsons Brinckerhoff, 2014d and 2015b).

For all measurements taken during the reporting period, the electrical conductivity (EC) of the flowback water from all pilot wells was greater than the 5000 µS/cm salinity trigger identified to mark the transition from flowback to produced water.

Monoethanolamine (MEA) and Tetrakis (hydroxymethyl) phosphonium sulphate (THPS) concentrations have shown a declining trend consistent with the removal of the fracture stimulation fluid during flowback and the natural breakdown of these compounds.

The sum of Benzene, Toluene, Ethyl benzene and Xylene (BTEX) concentrations in the flowback water are greater than those found in produced water from CR06 and WK03. During flowback, BTEX concentrations show a declining trend and are expected to reach lower concentrations with continued pumping.

Pilot well water volumes

The total flowback water volumes recovered from each well as of 31 March 2015 range from 197,465 to 608,750 litres (L).

The water recovery as a percentage of total volume injected during fracture stimulation ranges from 25.1% to 53.5% as of 31 March 2015. Therefore, as of 31 March 2015, all wells were in the flowback phase as 100% of the total volume of fracture stimulation fluids injected had not been recovered from any well.

AST2 water quality

AST2 is an open topped, 1.5 ML above ground storage tank (AST) situated adjacent to WK13 receiving flowback water from the four pilot wells.

Water quality data from AST2 shows some changes in the physico-chemical parameters over time such as an increase in pH and decrease in Dissolved Oxygen (DO). This is expected with the transition from flowback water to produced water.

The increased pH is likely to have contributed to the decrease in dissolved metals concentrations shown in the time series plots for some analytes including aluminium, arsenic, zinc, iron and manganese.

MEA concentrations have shown a declining trend consistent with that observed in the flowback water from the individual pilot wells and the accelerated breakdown of this compound due to UV radiation.

The sum of BTEX concentrations for AST2 during the current reporting period have ranged from 0 to 48 µg/L, which is an order of magnitude less than the median concentration from the pilot wells of 348 µg/L (range 0 to 795 µg/L) during the reporting period. The decrease in concentration is due to volatilisation and biodegradation of BTEX compounds from the surface of the standing water in AST2.

Groundwater levels

Groundwater levels in all Waukivory shallow alluvial, shallow rock and fault monitoring bores have shown no response attributable to fracture stimulation or flowback from the pilot wells during the current reporting period.

Groundwater levels in alluvial monitoring bores GR-P3 and WKMB06A, and shallow rock monitoring bores WKMB01, WKMB02 and WKMB06B, show an overall increase of approximately 0.1 m during the current reporting period in response to small rainfall events.

Groundwater levels at WKMB02 show an increase of approximately 0.2 m in response to individual rainfall events on 26 December 2014 and 28 January 2015. This is a greater magnitude response than that observed at any other alluvial or shallow rock monitoring bores at Waukivory during the current reporting period.

Groundwater levels in monitoring bore WKMB03, screened in the interburden (and thrust fault zone), show no overall change.

Both WKMB03 and WKMB06B are screened across the thrust fault zone, and WKMB06A is screened within the alluvium above the thrust fault zone. Hydrographs from these three monitoring bores show no anomalous water level responses and therefore provide no evidence of connectivity between the fracture stimulation zones and the shallow groundwater system via the thrust fault zone.

Divergent pressure trends are observed at WKMB05, with different sensors showing downward, constant and upward trends during the reporting period. It is not yet clear how, or if, these trends relate to the Project flowback activities; it is possible they represent delayed pressure responses, from either fracture stimulation or the commencement of flowback, due to the low permeability of the interburden. The decrease observed at Sensor 2 within the Cloverdale Coal Seam since early January 2015 is the most prominent response and could be related to the pumping and flowback activities at WK13.

Surface water levels

Water levels at the Waukivory stream gauge sites show no response attributable to flowback from the pilot wells during the current reporting period.

Water levels at stream gauge sites WKSW01 (Avon River upstream), WKSW02 (Waukivory Creek) and WKSW03 (Avon River downstream) have shown an overall increase during the reporting period (January 2015 to March 2015) due to rainfall and flow events over this period.

Groundwater quality

There has been one groundwater quality sampling event during the current reporting period. The data shows no adverse trends associated with Project activities.

Surface water quality

There has been one surface water quality sampling event during the current reporting period. The data shows no adverse trends associated with Project activities.

Water Beneficial Use Conditions

Salinity (EC) data from the current reporting period show an apparent improvement from the baseline and fracture stimulation reporting periods to the flowback reporting period. This improvement is based on relatively limited data available in the flowback reporting period (one sampling event from the Waukivory groundwater monitoring sites) and is likely to be due to natural variation. No management response is required.

Water beneficial use categories of domestic, stock, industrial and irrigation are based on yield and salinity characteristics. There has been no change in the beneficial use classification of the different waters.

Actions to correct identified adverse trends

Analysis of monitoring results has not identified any adverse trends that require management action under the SGMP.

1. Introduction

This report presents groundwater and surface water level and quality data collected during the Waukivory Pilot Project (the Project) between 1 January and 31 March 2015, and includes analysis of flowback water from pilot wells. The Project is an exploration activity as distinct from broader activities associated with the development phase of the Gloucester Gas Project (GGP).

1.1 Gloucester Gas Project

AGL Upstream Investments Pty Ltd (AGL) is proposing to build the GGP which comprises several stages of development facilitating the extraction of coal seam gas (CSG) from the Gloucester Basin. Concept Plan and Project Approval (Part 3A Approval) for the Stage 1 Gas Field Development Area (GFDA) was granted on 22 February 2011 under Part 3A of the *Environmental Planning and Assessment Act (1979)* (EP&A Act). In addition the project received approval under the *Environment Protection and Biodiversity Conservation Act (1999)* (EPBC Act) (EPBC Approval) on 11 February 2013.

AGL holds Petroleum Exploration Licence (PEL) 285, under the *Petroleum (Onshore) Act 1991*, covering the whole of the Gloucester Basin, approximately 100 km north of Newcastle, NSW. PEL 285 expired on 15 April 2012 and was renewed on 6 August 2014. The Stage 1 GFDA in relation to the PEL 285 boundary is shown in Figure 1.1. The Stage 1 GFDA with AGL owned properties and the water monitoring network is shown in Figure 1.2.

The GGP will involve the depressurisation of deep groundwater and the extraction of gas from multiple coal seams within the Gloucester Coal Measures. Target coal seam depths will vary from site to site with an expected range of 200 to 1,000 metres below ground level (mbgl). The Stage 1 GFDA includes the construction, operation, and decommissioning of 110 CSG wells and associated infrastructure, including gas and water gathering lines.

A dedicated water monitoring network is in place which has enabled the collection of baseline water level and water quality data for the different groundwater and surface water systems within the Gloucester Basin. There are now more than 50 dedicated water monitoring locations and more than four years of baseline monitoring (water levels and water quality) across the Gloucester Basin.

1.2 Waukivory pilot project

AGL received approval for the Project from the NSW Office of Coal Seam Gas (OCSG) on 6 August 2014. The approval was included with the renewal of PEL 285 and permitted AGL to fracture stimulate and flow test four existing pilot wells located within the Stage 1 GFDA of the GGP (AGL 2014a). These four pilot wells were installed between 2 October and 24 November 2012. Fracture stimulation commenced on 27 October 2014, with the final fracture stimulation on 26 November 2014. The flowback phase (process of commissioning pumps and returning fracture stimulation fluids back to the surface) commenced on 16 December 2014.

The pilot wells (Waukivory 11 (WK11), Waukivory 12 (WK12), Waukivory 13 (WK13), and Waukivory 14 (WK14)) are located in the northern part of the Stage 1 GFDA on properties leased from Gloucester Resources Limited (GRL) (Figure 1.3). The four wells have been perforated and fracture stimulated within target coal seams ranging from approximately 370 to 960 mbgl.

A surface water and groundwater management plan (SGMP) was prepared by AGL (AGL 2014a) for the Project and approved by the OCSG and NSW Office of Water (NOW) prior to the commencement of the

Project. Accompanying the renewal of PEL 285, the NSW Environment Protection Authority issued Environment Protection Licence (EPL) 20358 for the Gloucester Coal Seam Gas Project on 6 August 2014. There have been three variations to the EPL; the current version is dated 11 February 2015.The SGMP provides a framework which describes how surface water and groundwater in the local Waukivory area will be monitored and assessed during fracture stimulation and flow testing (which includes dewatering) of the deep coal seams. EPL 20358 requires the monitoring of the concentration of analytes and pollutants at prescribed monitoring locations at given frequencies using appropriate sampling methods.

NOW and EPA requirements for groundwater and surface water monitoring of CSG activities, applicable to this report, include:

- Establishment of baseline conditions
- Collection of periodic water level, water quality and volumetric data
- Reporting of data and trends.

This report complies with the reporting requirements outlined in Section 6.8 of the SGMP and addresses the general requirements of EPL 20358, Condition R4.3. There are some differences in the monitoring requirements (locations, frequencies and analytes) identified in the SGMP compared to those stipulated in the EPL. This technical report focuses on the requirements of the SGMP.

1.3 Pilot well testing

Fracture stimulation and pilot testing are exploration activities that identify potential gas resources by testing the composition, flow rate, and volume of gas in target coal seams. Fracture stimulation and pilot testing also assess water production volumes (as the wells are depressurised to allow gas flow) and potential connectivity between shallow aquifers and the water bearing zones of the deep coal seams.

The following phases of testing are referred to in this report:

- Baseline sampling was undertaken to characterise the pre-Project groundwater and surface water conditions at the Waukivory site. The baseline sampling comprised four sampling events in March, June, September and October 2014 (prior to Pilot fracture stimulation).
- Fracture stimulation involves pumping a fluid under pressure through a zone of perforated steel well casing into the coal seam to open cracks or fractures, increasing the hydraulic conductivity and enabling the flow of water and gas (27 October 2014 to 26 November 2015). The fluid is typically a mixture of sand, water and additives.
- Flowback water is the return to surface (by pumping) of fracture stimulation fluids before transition to natural formation water (groundwater), after which, water flowing from the well is termed produced water. Flowback water includes water and fluids extracted during the short period of pump commissioning (ongoing since 27 November 2014).
- Produced water is formation water which is co-produced with gas, and follows the removal of the fracture stimulation fluid (flowback) (not commenced). Pumping groundwater from a coal seam reduces the pressure and allows the gas and 'produced' groundwater to flow into the well and up to the surface. The flow rate of produced water typically decreases over time.

The SGMP (Section 6.1, pages 33 – 34) states that:

- *The flowback water period is deemed to be finished when 100% of the volume of fracture stimulation fluids injected at each well is recovered AND a salinity trigger of 5,000 µS/cm is reached (and maintained) for the return waters; and*
- *Produced water is deemed to be all deep groundwater that is pumped to surface after the flowback water trigger is achieved.*

1.4 Objectives

The objectives of this quarterly reporting of water monitoring data for the Project are to meet the commitments stated in the approved SGMP (Section 6.8, pages 51 – 52), as follows:

"The quarterly reports will include:

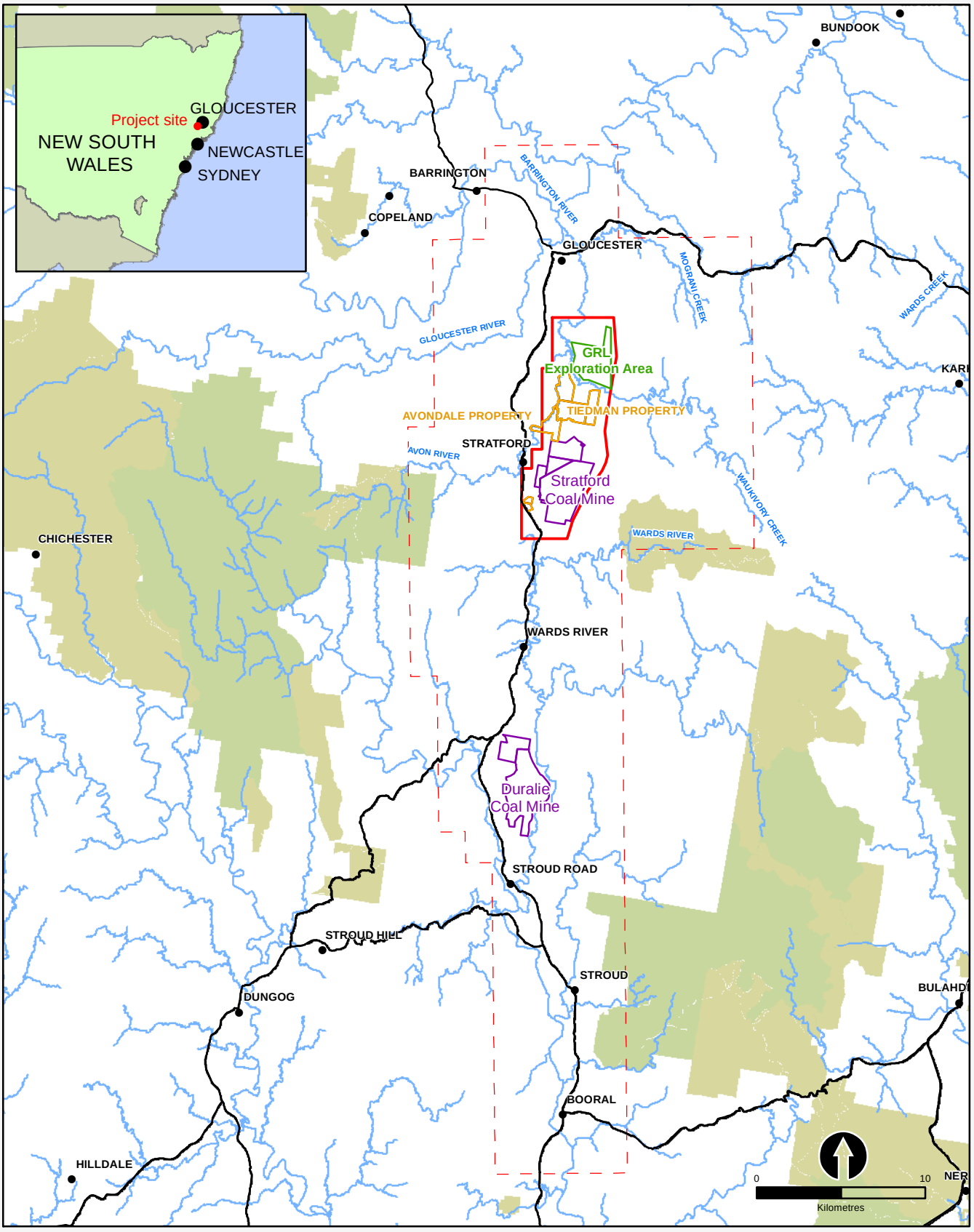
- *Analysis and interpretation of monitoring results including trends; and*
- *Details of any triggers requiring specific management and actions to be undertaken."*

This report is the second monitoring report for the Project, covering the period 1 January to 31 March 2015 and focusses on the flowback phase. Monitoring results include data obtained from groundwater and surface water monitoring points, and pilot well discharge (flowback water).

1.5 Scope of works

This quarterly report includes the following:

- Description of the monitoring program undertaken to 31 March 2015, which includes a description of the monitoring network, frequency of monitoring events, suite of analytes measured, sampling techniques, assessment criteria and quality assurance
- Presentation of groundwater and surface water levels and quality data collected to 31 March 2015 focussing on the flowback phase of the Project
- Presentation of water quality data collected from the flowback water from each pilot well during the Project
- Presentation of key analyte concentrations for monitoring fracture stimulation additives and comparison with background concentrations and fracture stimulation fluid
- Identification of trends associated with natural variations or Project activities
- Assessment of any changes to beneficial use of waters during baseline and pilot well activities as a trigger response for the Project
- Identification of exceedance of triggers, including adverse trends from pilot well activities and recommendations for management actions to be taken.



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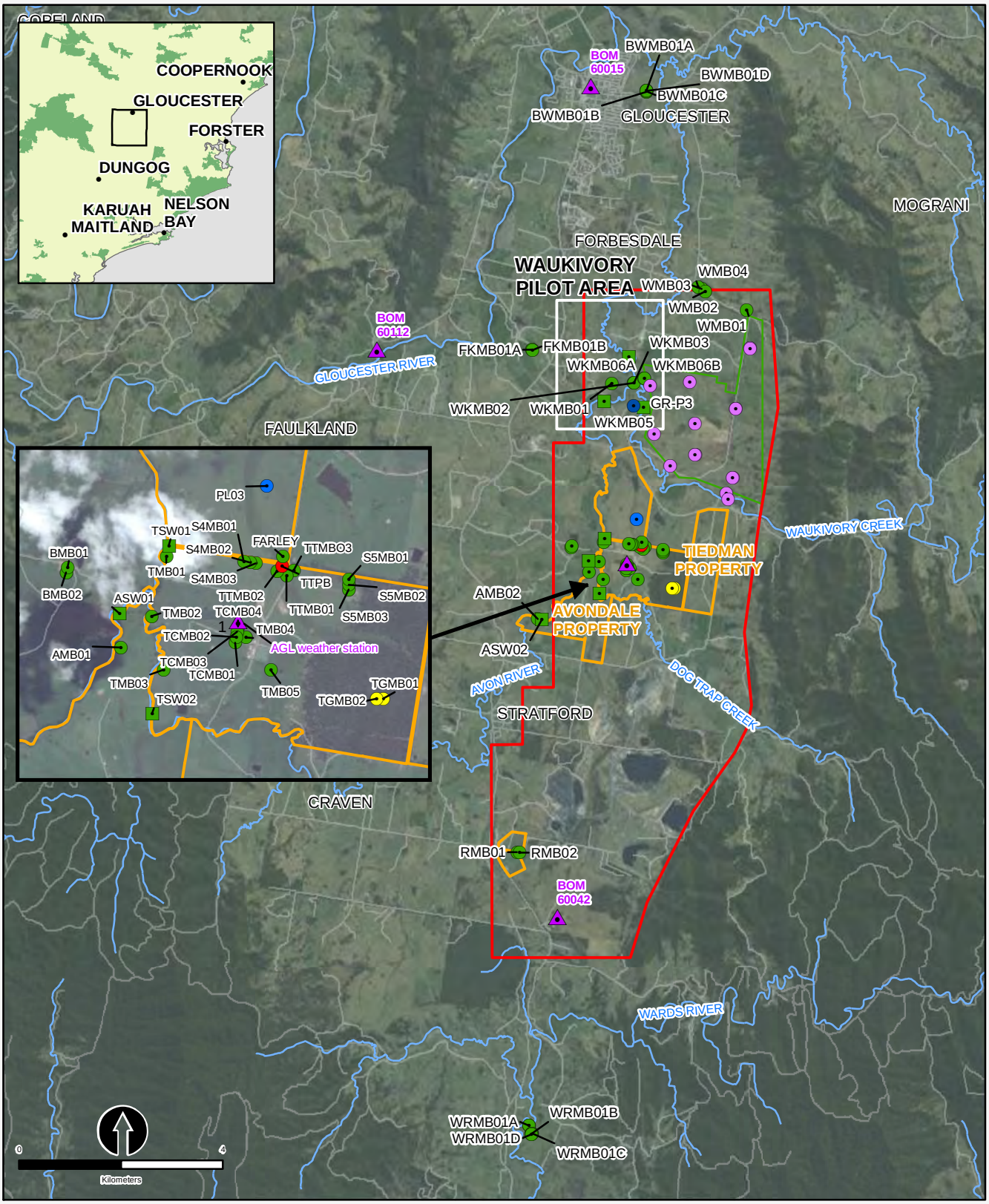
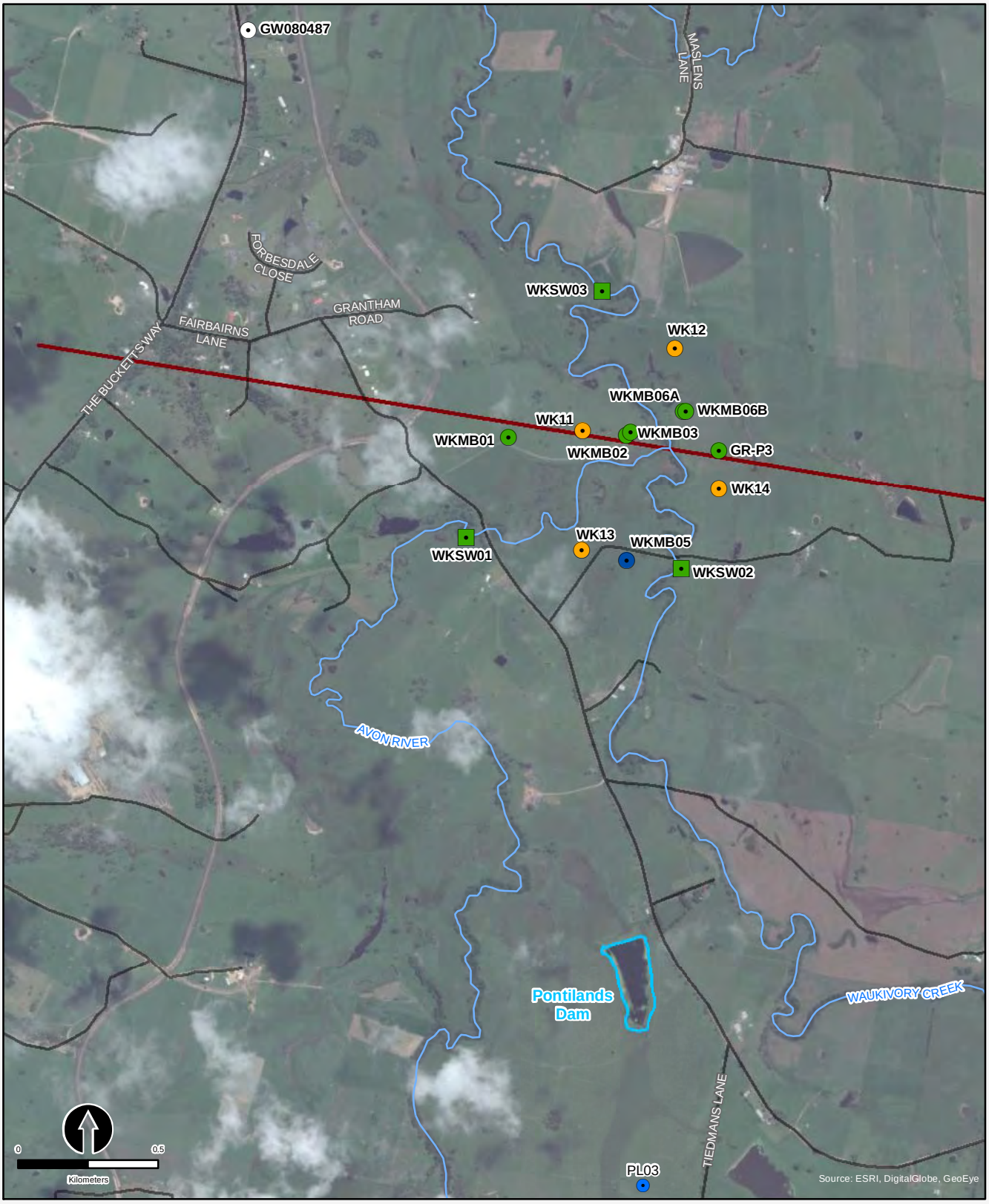
- Stage 1 GFDA boundary
- PEL 285 boundary
- AGL owned properties
- Mining Lease Boundary
- GRL exploration area boundary
- Towns
- Rivers and streams
- Major roads
- NSW State Forest
- National Park, Nature Reserve or State Conservation Area

Figure 1.1
Regional location



- GRL groundwater monitoring bore
- Multizone monitoring well
- Shallow gas monitoring bore
- Groundwater monitoring bore
- Test production bore
- VWP Monitoring Piezometers
- Stream gauge
- BOM Weather Station
- AGL owned properties
- GRL exploration area boundary
- Stage 1 GFDA boundary
- Rivers and streams
- Roads

Figure 1.2
Groundwater and surface water monitoring network



Groundwater monitoring bore
Multizone monitoring well
Pilot gas well
Private monitoring location
Stream gauge
VWP Monitoring Piezometers
Rivers and streams
Roads
Waukivory seismic section line (see Figure 3.4)

Figure 1.3
Waukivory monitoring network

2. Site characterisation

2.1 Site location

The Project site is located approximately 6 km south of Gloucester, NSW, at 176 Fairbairns Lane, Forbesdale. The site is adjacent to the flood plain of the Avon River and is characterised by paddocks used for low intensity cattle grazing. The Avon River flows in a northerly direction through the Project site. The confluence of the Avon River and its eastern tributary, Waukivory Creek, is located toward the centre of the site (Figure 1.3).

2.2 Rainfall

AGL has operated a weather station on the Tiedman property just south of the Project site since July 2011. The closest Bureau of Meteorology (BoM) weather station to the Waukivory site, at Gloucester Post Office (60015), has been operational since 1888. Locations of the weather stations are shown in Figure 1.2.

Long-term average annual rainfall (1888 to 2014) at Gloucester Post Office is 981 mm. Rainfall is seasonal, with the highest mean monthly rainfall occurring in the summer months between January and March.

The long-term, annual cumulative deviation from mean (CDFM) rainfall for Gloucester Post Office is plotted in Figure 2.1. The long-term cumulative rainfall residual plots are formulated by subtracting the average annual rainfall for the recorded period from the actual annual rainfall and then accumulating these residuals over the assessment period. Periods of below average rainfall are represented as downward trending slopes while periods of above average rainfall are represented as upward trending slopes.

The cumulative deviation plot for Gloucester Post Office (Figure 2.1) shows that over the last 60 years, short (2 to 3 year) drought periods have occurred about every 10 to 15 years. However there have been no long-term deviations from mean conditions, such as the prolonged drought periods that characterised the first half of last century.

Rainfall data from the AGL weather station for the period July 2011 (installation) to March 2015 are presented in Figure 2.2. For the reporting period January, February and March 2015 rainfall was below the monthly average, as indicated by the downward trend of the cumulative deviation plot. Total annual rainfall in 2014 was 720 mm which is significantly below the long-term average for Gloucester.

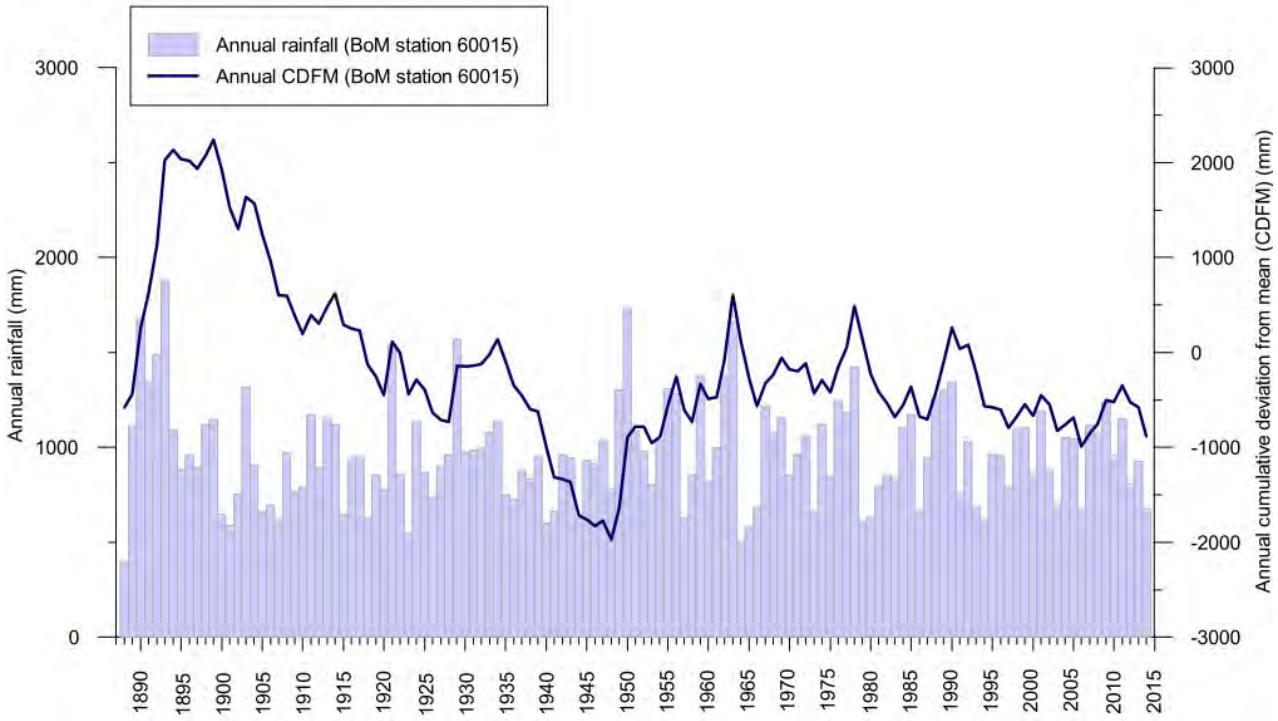


Figure 2.1 **Long-term annual rainfall and cumulative deviation from annual mean (CDFM) rainfall at Gloucester Post Office BoM station 060015 (BoM 2015)**

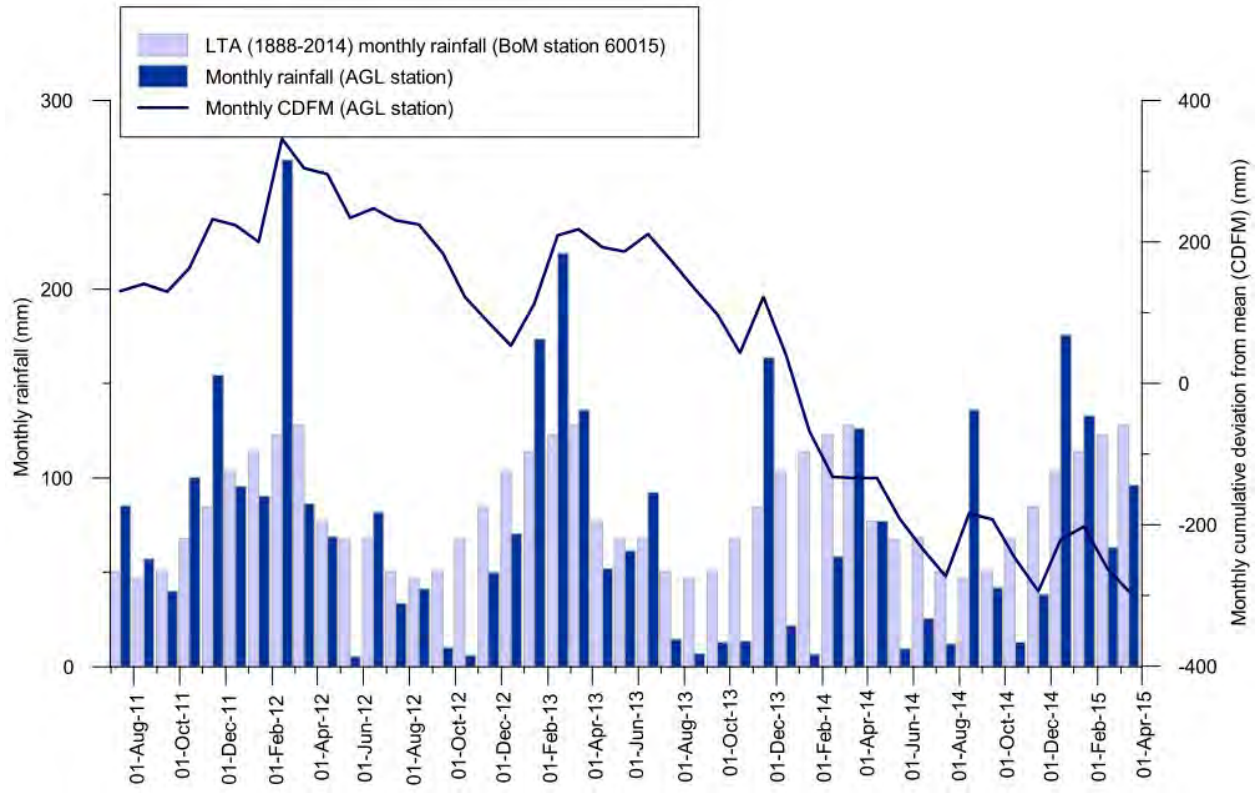


Figure 2.2 **Monthly rainfall and cumulative deviation from the monthly mean (CDFM) rainfall at the AGL Gloucester station since installation in July 2011 (AGL 2015)**

2.3 Surface hydrology

The Gloucester Basin is a narrow, north-south trending, elongated geological basin approximately 40 km long and 10 km wide, extending from Gloucester in the north to Stroud in the south. The Gloucester Basin is located high in the Manning River and Karuah River coastal catchments. The area occupied by the sedimentary rocks of the Basin (about 217 km^2) is small in comparison to the size of these catchments.

There is a surface water divide between the Wards River catchment (part of the Karuah River catchment) and the Avon River catchment (part of the Manning River catchment). In the northern Avon River catchment, surface water flow is generally to the north. In the southern Wards River catchment, surface water flow is generally to the south.

The Avon River includes the tributaries of Dog Trap Creek and Waukivory Creek within the Stage 1 GFDA (Figure 1.2). The Gloucester River joins the Avon River in the north of the Gloucester Basin. Wards River flows to the south, and is outside of the Stage 1 GFDA (Figure 1.2).

2.4 Geological setting

The Gloucester Basin comprises a thick succession of Permian sedimentary rocks representing deposition in both terrestrial and marine environments during a complex period of subsidence, uplift and relative sea level change (marine transgression and regression).

The Basin is a synclinal intermontane structure formed in part of the New England Fold Belt between a major Permian plate margin and the Sydney-Gunnedah Basin (Lennox 2009). The north–south trending synclinal nature of the Gloucester Basin resulted from the collision between the East Australian and Pacific Plates.

Following a period of extension during the Early Permian, the Gloucester Basin has undergone periods of normal and reverse faulting, with large scale tilting associated with late stage compressional movements towards the end of the Permian (Hughes 1984). Reverse faults dominate present day structure. A comparison with the contemporary horizontal stress field map (Hillis *et al* 1998) indicates the Basin is likely to be under compression in an east-west orientation.

The stratigraphy dips steeply (up to 90°) on the flanks of the Basin, dipping towards the north-south trending synclinal basin axis and flattening toward the centre of the Basin. Early Permian and Carboniferous hard resistive volcanics form the ridgelines of the Basin: the Mograni Range to the east; and the Gloucester and Barrington Tops to the west.

Overlying the Permian stratigraphy is a thin sequence of surficial Quaternary sedimentary deposits and regolith. The Quaternary sediments are non-uniform in thickness, and comprise unconsolidated alluvial sediments (sand, gravel, silt and clay) along the drainage channels and colluvial deposits across the rest of the floodplain sourced from the surrounding outcropping Permian deposits.

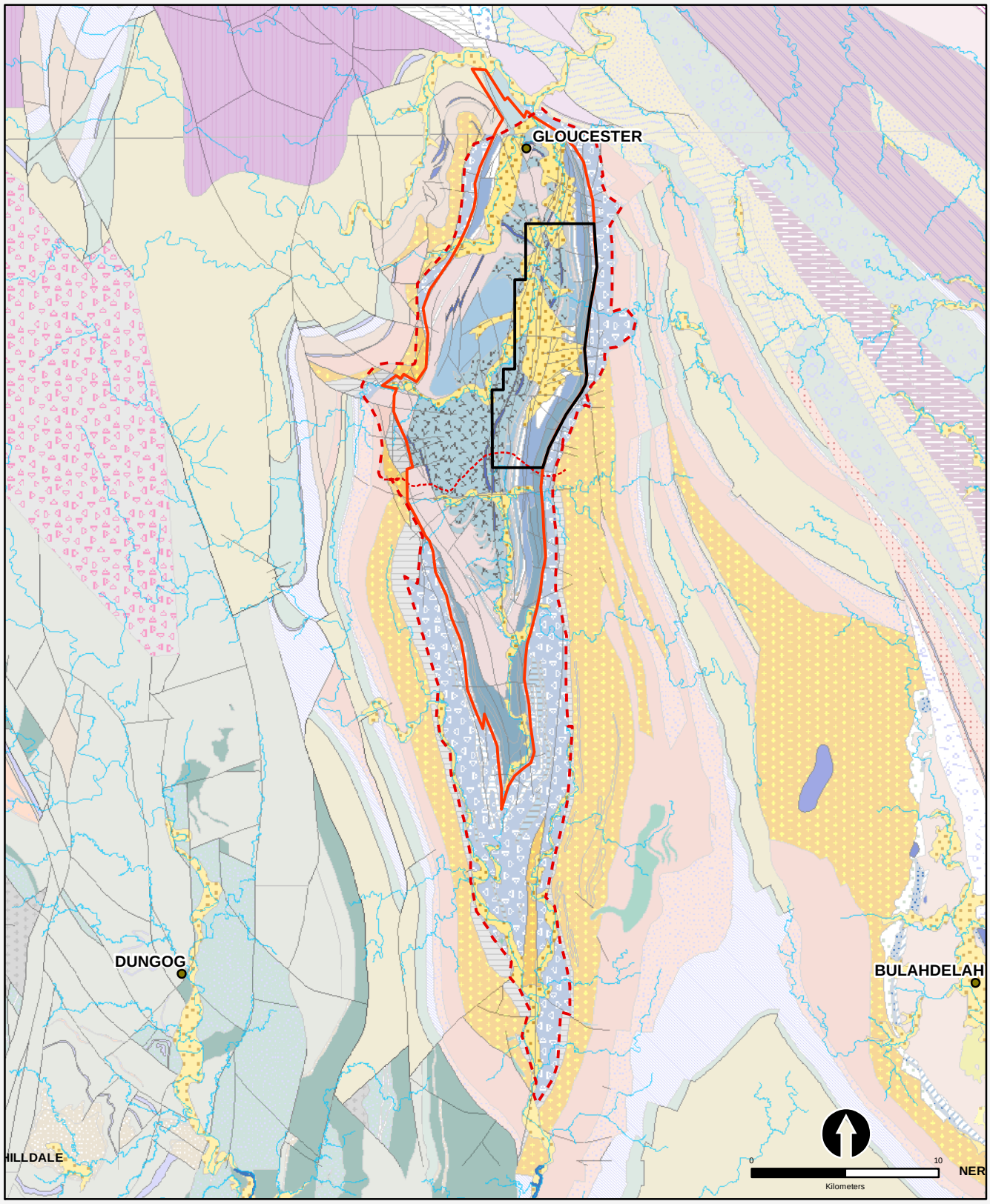
The Gloucester Basin is divided into three major Permian stratigraphic units each representing a distinct depositional setting: the Gloucester Coal Measures, the Dewrang Group, and the basal Alum Mountain Volcanics. The generalised stratigraphy of the Basin is summarised in Table 2.1. A geological map is shown in Figure 2.3. The development in the Stage 1 GFDA is targeting the intermediate and deep coal seams in the Gloucester Coal Measures generally below depths of 200 m to around 1000 m.

The fault zones identified at the Project site are mostly reverse faults where older rock strata are thrust over younger strata. Figure 2.4 shows the trace of the major faults identified on a seismic section through the Waukivory pilot area.

Table 2.1 Stratigraphy of the Gloucester Basin

Period	Group	Sub-group	Formation	Approx. thickness (m)	Coal seam	Depositional environment	Tectonic events
Upper Permian	Gloucester Coal Measures	Craven	Crowthers Road Conglomerate	350		Marine regression, pro-gradation of alluvial fans	Uplift to west of Gloucester Basin
			Leloma	585	Linden		
					JD		
					Bindaboo		
					Deards		
			Jilleon	175	Cloverdale		
					Roseville		
					Tereel/Fairbairns		
			Wards River Conglomerate	Variable			
			Wenham	23.9	Bowens Road		
					Bowens Road Lower		
		Speldon Formation				Marine transgression but also some progradation of alluvial fans in the west related to uplift	Extension (normal fault development) and regional subsidence. Uplift to west of Basin
		Avon	Dog Trap Creek	126	Glenview		
			Waukivory Creek	326	Avon		
					Triple		
					Rombo		
					Glen Road		
					Valley View		
					Parkers Road		
	Dewrang	Mammy Johnsons		300	Mammy Johnsons	Marine transgression, regression and further marine transgression	Extension (normal fault development) and regional subsidence
		Weismantel		20	Weismantel		
		Duralie Road		250			
Lower Permian	Alum Mountain Volcanics				Clareval	Arc-related rift	Rift?
					Basal		

Modified from AECOM (2009) and SRK (2005).



Stage 1 GFDA boundary
Alum Mountain Volcanics boundary
Permian Coal Measures boundary
Rivers and streams

Gloucester Basin Geology
Qa Quaternary Alluvium
G Unnamed microgranite

Permian Geology
Plc Crowthers Rd Conglomerate
Pll Leloma Formation
Pllj Jo Doth Tuff Member
Plo Jilleon Formation
Plw Wards River Conglomerate
Pla Wards River Conglomerate
Plgx Gloucester Coal Measures
Plh Wenham Formation
Plp Speldon Formation
Plt Dog Trap Creek Formation
Pli Waukivory Creek Formation
Pldy Mammy Johnsons Formation
Plde Weismantels Formation
Pldd Duralie Road Formation
Pea Alum Mountain Volcanics
Pear Unnamed Rhyolite Member
Peat Unnamed Welded Tuff Member
Peac Unnamed Basal Sequence

Carboniferous geology
Clo1 Johnsons Creek Conglomerate
Clkm McInnes Formation
Clr Booral Formation
Fault

Figure 2.3
Geology

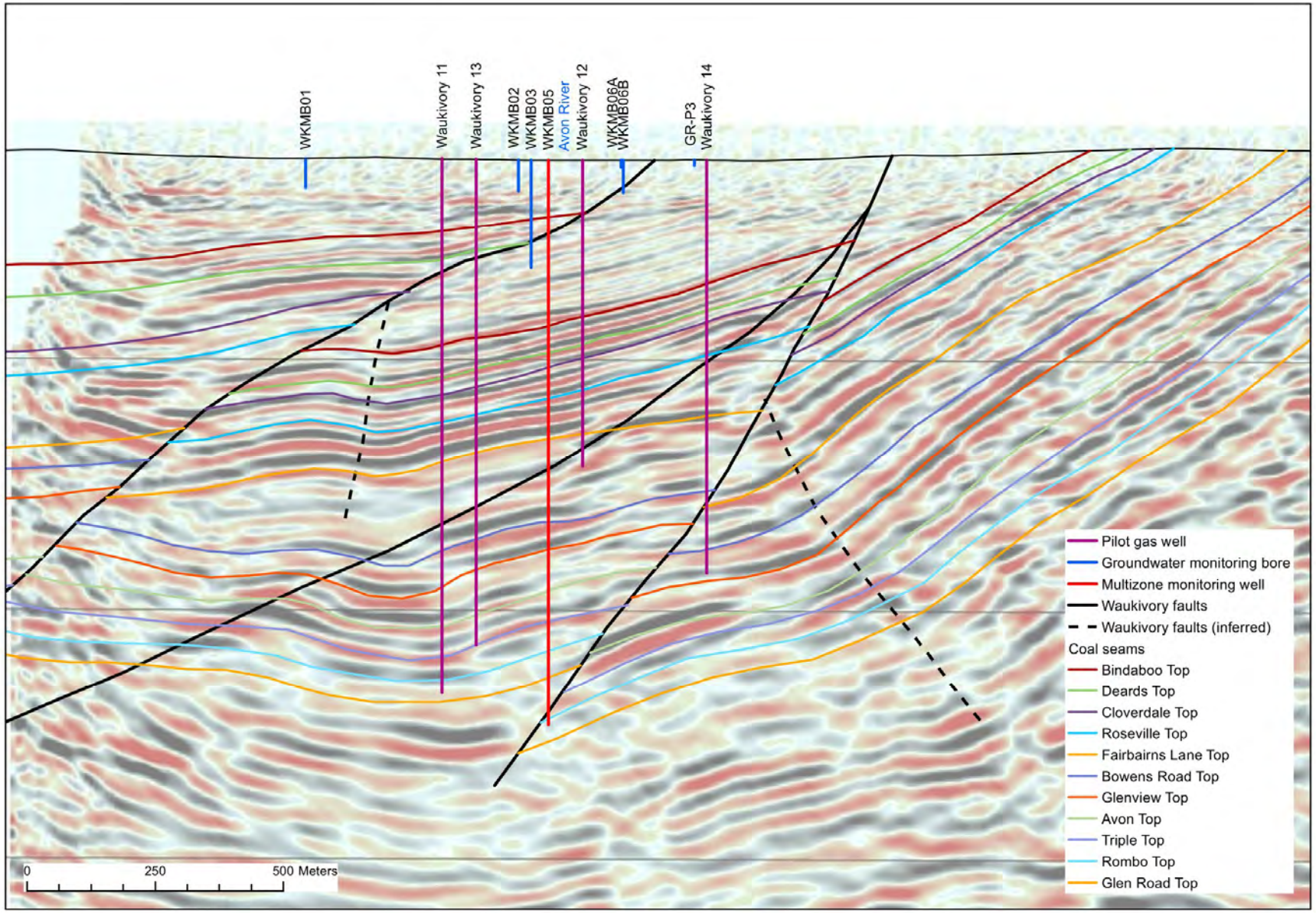


Figure 2.4 Waukivory interpreted seismic section (from Parsons Brinckerhoff 2015c) (line of section is shown on Figure 1.3)

2.5 Hydrogeological setting

Four broad hydrogeological units have been identified within the Gloucester Basin (Table 2.2). The permeability and groundwater flow characteristics of rocks within the Gloucester Basin are controlled by several factors including lithology, depth, and the degree of fracturing and faulting. In this sense hydrogeological units and flow systems do not always correspond with defined geological boundaries.

Table 2.2 Four hydrogeological units – Gloucester Basin

Unit	Aquifer type	Formation name	General lithology	Hydraulic characteristics
Alluvial deposits	Semi-confined, clay capped, porous, granular	Quaternary alluvium	Clay/mixed gravels	Heterogeneous, highly variable permeability associated with varying lithology
Shallow Rock (<150 m)	Semi-confined, fractured rock	Upper Permian Coal Measures, Alum Mountain Volcanics	Interbedded sandstone/siltstone with bedding plane fractures	Heterogeneous, high and low permeability domains associated with fault zones and fracturing
Interburden of deep coal measures	Confined, fractured rock, aquitard	Upper Permian Coal Measures	Interbedded indurated sandstone/siltstone and claystone	Low permeability associated with sparse fractures, permeability decreases with depth
Deep coal Seams	Confined, fractured rock, water bearing zones	Upper Permian Coal Measures	Coal/shale	Low permeability associated with cleating and fractures in coal seams, permeability decreases with depth

The four hydrogeological units are summarised as follows:

1. **Alluvial deposits** adjacent to major creeks and rivers comprising unconsolidated sand, gravel, and clay. The deposits are typically 12 to 15 m thick. These systems are heterogeneous but generally permeable with rapid recharge, through-flow, and discharge associated with interactions with streams, and to a lesser extent with the underlying less permeable shallow rock. Hydraulic conductivity measurements range from 0.3 to 300 metres per day (m/d), averaging around 10 m/d.
2. **Shallow rock** comprising variably weathered and fractured Permian rocks extending to approximately 150 m below the surface, across all sub-cropping Permian units. The shallow rock zone is heterogeneous with relatively impermeable domains separated by more permeable domains, but on the whole it is more permeable than the deeper coal measures. The domains of higher permeability are due to a higher density of fracturing associated with an irregular weathering profile and the near-surface expression of faulting. Aquifer zones observed during drilling occur within 75 m of the surface. Groundwater flow within this zone is more strongly controlled by weathering and fracturing than the attitude of geological strata. Hydraulic conductivity of the shallow rock ranges from 10 m/d to $1x10^{-6}$ m/d at a depth of 150 m, but is typically in the order of 10^{-3} to 10^{-4} m/d.
3. **Deep coal measures interburden**. Sandstone and siltstone units that form the interburden to coal seams are indurated and typically of very low permeability, forming aquitards and confining layers. The permeability of the interburden decreases with depth such that, at the maximum depth of CSG production, it is likely to be in the order of 10^{-5} to 10^{-7} m/d, or less.
4. **Deep coal seams**. Coal seams tend to be slightly more permeable than interburden and commonly form weak water bearing zones at depth. Permeability and storage are provided by small fractures and cleats in the coal. As with interburden, drill-stem tests clearly show that the permeability of coal seams generally decreases with depth. At the maximum depth of CSG production, the permeability of coal seams is very low (10^{-4} to 10^{-6} m/d), but may be an order of magnitude higher than the interburden.

The Alum Mountain Volcanics underlie the Permian Coal Measures, and form the impermeable base of the Gloucester Basin. The Alum Mountain Volcanics outcrop in the eastern and western boundaries of the Basin, forming the elevated topography of the Gloucester and Barrington Tops to the west, and the Mograni Range to the east.

3. Waukivory pilot project

3.1 Introduction

The following section provides an overview of the monitoring program from 1 January to 31 March 2015, during the flowback phase of the pilot testing program. The baseline sampling and fracture stimulation phases are detailed in the Waukivory Pilot Project Surface Water and Groundwater Monitoring Report to 31 December 2014 (Parsons Brinckerhoff 2015a). To summarise:

- Baseline sampling: Baseline sampling was undertaken to characterise the pre-Project groundwater and surface water conditions at the Waukivory site. The baseline sampling comprised four sampling events in March, June, September, and October 2014 (Parsons Brinckerhoff 2015a)
- Fracture stimulation: The fracture stimulation took place from 27 October 2014 to 26 November 2014 and the associated monitoring commitments were undertaken during November and December 2014 (Parsons Brinckerhoff 2015a)
- Flowback water: The initial flowback phase commenced with the installation of pumps in WK12 and WK13 in December 2014. Flowback commenced from WK11 and WK14 in January 2015
- Produced water: The produced water phase and associated sampling had not commenced by 31 March 2015. The transition from flowback to produced water will be marked by an increase in salinity (measured as electrical conductivity (EC)) to 5,000 µS/cm and a total return to surface of flowback water equal to the volume of fluids injected during fracture stimulation.

3.2 Waukivory pilot schedule and water volumes

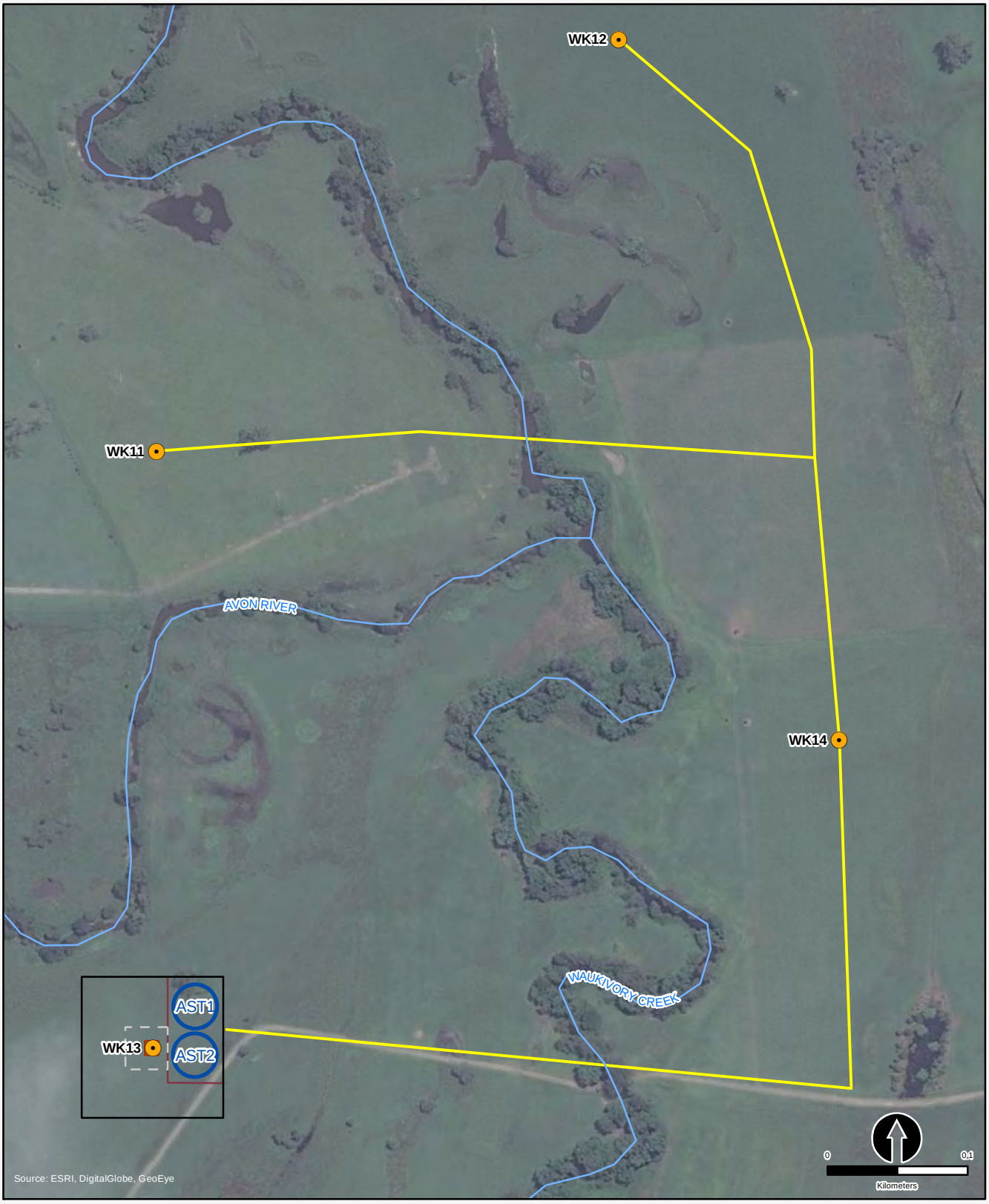
Pumps were installed in each pilot well at the completion of fracture stimulation to enable flowback to surface of fracture stimulation fluids and later, produced water. Flowback water is transported from the well head in water gathering lines to an above ground storage tank (AST2) for storage and testing prior to disposal (Figure 3.1).

Flowback commenced with the installation of pumps in WK12 and WK13 in December 2014, and WK11 and WK14 in January 2015. The periods of operation of the pumps in each pilot well from 1 January to 31 March 2015 are shown in Figure 3.2. Pumps were periodically switched off for operational reasons, such as well workover interventions and maintenance. On 27 January 2015, AGL voluntarily suspended the Project, therefore suspending flowback. This followed the detection of BTEX compounds in samples of flowback water taken from WK12, WK13 and AST2 in December 2014.

BTEX compounds were not detected in the raw water supply, or in the fracture stimulation fluid. In addition, review of sampling and laboratory protocols discount contamination of samples with BTEX during sampling and analysis. The occurrence of BTEX compounds in the flowback water resulted in the suspension of the Project and investigations by the Department of Resources and Energy (DRE) and the NSW Environment Protection Authority (EPA).

On 3 February 2015 flowback water was pumped from the four pilot wells for a period of four days to allow additional sampling and analysis to be carried out by AGL, the EPA and the DRE. The Project was re-suspended from 6 February through to the end of the reporting period at 31 March 2015. The investigations undertaken by AGL, the EPA and the DRE concluded that the source of BTEX in the flowback water is from naturally occurring groundwater within the deep coal seams which are in excess of 600 metres below the surface. These findings have been corroborated in an independent review by the University of Queensland (DRE, 2015 and EPA, 2015a).

The cumulative volumes pumped from each pilot well over the period 1 January to 31 March 2015 are shown in Figure 3.3 and Table 3.1. The percentage recovered is relative to the total volume of fracture stimulation fluids injected at each well. 341,240 L of flowback was lawfully disposed offsite from the AST2 site prior to the Pilot Project being suspended. As at 31 March 2015, there was 855,707 L of flowback water in storage in AST2.



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Pilot gas well
Tank
Rivers and streams
Water gathering line
Future Gravel Pad (30mx30m)
Gravel Pad (100mx100m)
Security fence (40mx75m)
Well enclosure (10mx10m)

Figure 3.1
Pilot wells and water gathering lines

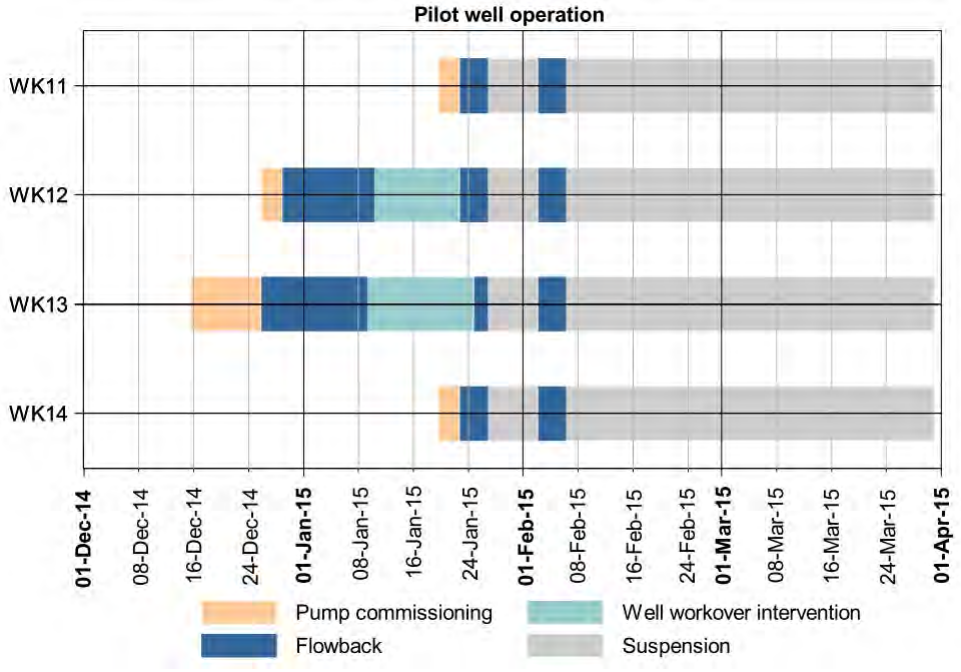


Figure 3.2 Dates of operation of the pilot wells

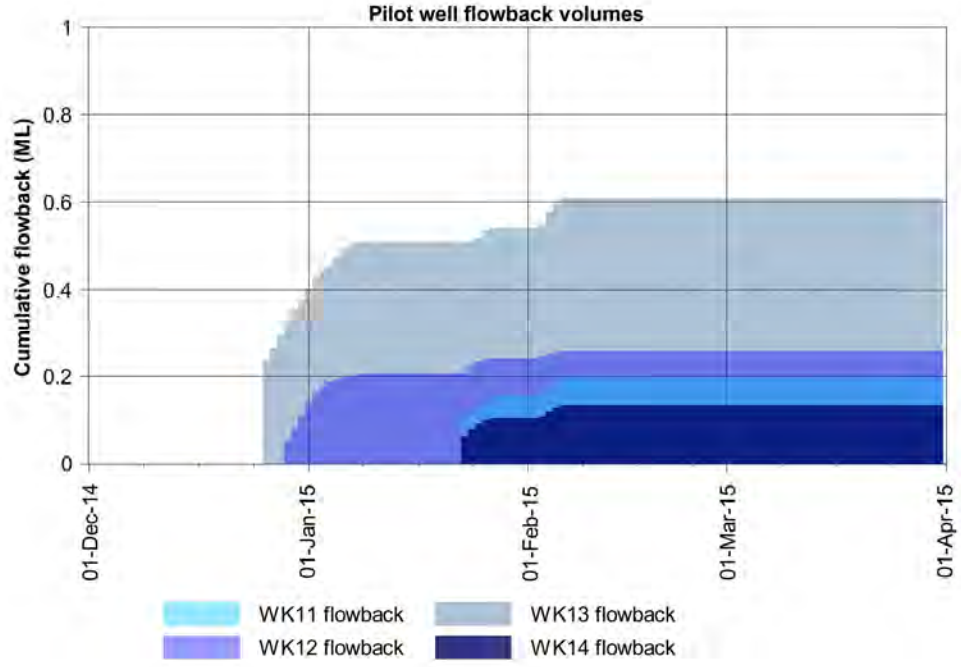


Figure 3.3 Cumulative flowback volumes from each pilot well

Table 3.1 Flowback volumes recovered up to 31 March 2015

	WK11		WK12		WK13		WK14	
	litres	%	litres	%	litres	%	litres	%
Volume recovered at 31/03/2015	197,465	25.1	256,901	53.5	608,750	40.1	133,831	28.7

3.3 Monitoring network

AGL's groundwater and surface water monitoring network consists of more than 50 dedicated water monitoring locations across the Gloucester Basin, as shown in Figure 1.2. There are more than four years of baseline monitoring data (water levels and water quality), as reported in the 2014 Groundwater and Surface Water Monitoring Status report (Parsons Brinckerhoff 2014a). Samples are also collected from the pilot wells and storage tank AST2 as part of the Project; locations are shown in Figure 1.3.

3.3.1 Pilot wells

The flowback sampling locations at the Project site (Figure 3.1) consist of:

- Pilot well WK11
- Pilot well WK12
- Pilot well WK13
- Pilot well WK14
- Storage tank AST2

Details of the perforation and fracture stimulation intervals in each of the pilot wells are provided in Table 3.2. The intervals show which coal seams the flowback water (and subsequent produced water) is sourced from. Pilot well WK12 targets mostly shallow coal seams from 371 to 597 mbgl while the other three pilot wells target mostly deeper coal seams from 404 to 964 mbgl.

3.3.2 Groundwater

The current groundwater monitoring network at the Project site (Figure 1.3) consists of:

- Five AGL groundwater monitoring bores (WKMB01, WKMB02, WKMB03, WKMB06A, and WKMB06B)
- One AGL multizone monitoring well (WKMB05: six zones monitored)
- One AGL vibrating wire piezometer (PL03: two zones monitored)
- One GRL groundwater monitoring bore (GR-P3)
- One private groundwater monitoring bore (GW080487)

Details of the groundwater monitoring network are provided in Table 3.3. Full bore logs for the AGL monitoring bores are provided in Parsons Brinckerhoff (2015a) and Parsons Brinckerhoff (2014b).

WKMB05 is a multizone groundwater monitoring installation located 164 m east of WK13. The well was drilled to a total depth of 1,100 m and was initially installed with a geophone array to collect data during the fracture stimulation of WK13 to provide an understanding of the propagation of the fracture stimulation effects.

Following the fracture stimulation of WK13, the geophone array was removed from WKMB05, six intervals were perforated, and an array of packers installed to isolate six horizons within the monitoring bore (Parsons Brinckerhoff 2015a). At each horizon a pressure transducer was installed to measure the piezometric level. The monitored horizons are shown in Table 3.3.

Table 3.2 Perforation and fracture stimulation intervals

Zone	Coal seam	Perforation interval (mbgl)	Net coal thickness (m)
WK11			
1	Avon	928.7 – 964.25	9.36
2	Glenview	860.5 – 879.2	2.18
3	Bowens Road and Fairbairns Lane	806.6 – 838.0	2.46
4	Fairbairns Lane	709.1 – 741.9	2.06
WK12			
1	Fairbairns Lane	590.4 – 597.0	1.33
2	Roseville (lower)	485.7 – 504.2	3.24
3	Roseville (upper)	406.0 – 424.1	2.93
4	Cloverdale	371.3 – 385.0	2.42
WK13			
1	Triple	934.2 – 946.3	0.91
2	Avon	878.7 – 911.4	10.05
3	Glenview	812.5 – 826.5	2.35
4	Glenview	Not perforated or fracture stimulated	
5	Fairbairns Lane (lower)	694.1 – 738.3	2.75
6	Fairbairns Lane (upper)	612.2 – 628.8	5.93
7	Roseville (lower)	540.2 – 575.1	2.05
8	Roseville (upper)	514.5 – 523.3	2.79
9	Cloverdale	451.4 – 474.0	2.23
10	Bindaboo	404.5 – 408.4	0.75
WK14			
1	Avon	774.5 – 805.8	7.5[(a)]
2	Fairbairns Lane (lower)	532.5 – 542.0	4.23
3[(b)]	Fairbairns Lane (upper)	473.8 – 490.8	3.81
4[(b)]	Roseville	453.3 – 459.7	2.05

(a) Estimated.

(b) WK14 zones 3 and 4 are acid wash intervals. Acid wash of zones 3 and 4 were conducted simultaneously.

Table 3.3 Current groundwater monitoring network

Monitoring location	Monitoring type	EPA ID	Total depth (mbgl)	Monitored interval (mbgl)	Lithology	Formation	Hydro-geological unit	Date installed	Sampling method[e]
WKMB01	Water levels and quality	10	54.0	47.0 – 53.0	Sandstone	Leloma Formation (upthrust)	Shallow rock	February 2012	Micro-purge™
WKMB02	Water levels and quality	11	61.0	51.0 – 60.0	Sandstone/ siltstone	Leloma Formation (upthrust)	Shallow rock	June 2012	Micro-purge™
WKMB03	Water levels and quality	12	210.0	200.0 – 209.0	Sandstone	Leloma Formation	Interburden (fault zone)	June 2012	Micro-purge™
PL03[a]	Water levels only	14	966.3	Sensor 2: 496	Coal	Wenham Formation – Bowens Road Coal Seam	Coal	September 2013	n/a
				Sensor 3: 463	Pebble conglomerate	Wards River conglomerate	Interburden		
WKMB05[b]	Water levels only	85	1,100.0	Sensor 1: 340.0 – 343.0	Siltstone/ sandstone	Leloma Formation	Interburden (aquitard)	November 2014	n/a
				Sensor 2: 426.0 – 429.0	Coal	Jilleon Formation – Cloverdale Coal Seam	Coal seam		
				Sensor 3: 584.0 - 587.0	Siltstone/ sandstone	Jilleon Formation	Interburden (aquitard)		
				Sensor 4: 595.4 – 598.4	Coal	Jilleon Formation – Fairbairns Coal Seam	Coal seam		
				Sensor 5: 698.5 – 701.5	Siltstone/ sandstone	Jilleon Formation	Interburden (aquitard)		
				Sensor 6: 711.0 – 714.0	Siltstone/ sandstone	Jilleon Formation	Interburden (fault zone)		
WKMB06A	Water levels and quality	n/a	13.4	6.4 – 12.4	Mixed gravels	Alluvium	Alluvium	November 2014	Submersible pump
WKMB06B	Water levels and quality	n/a	63.0	52.0 – 61.0	Siltstone/ sandstone	Leloma Formation	Shallow rock (fault zone)	November 2014	Micro-purge™

Monitoring location	Monitoring type	EPA ID	Total depth (mbgl)	Monitored interval (mbgl)	Lithology	Formation	Hydro-geological unit	Date installed	Sampling method[e]
GR-P3	Water levels and quality	90	11.0	5.0 – 9.0	Mixed gravels	Alluvium	Alluvium	March 2011	Submersible pump
GW080487	Water levels and quality	91	60.0	48.0 – 60.0	Shale	Leloma	Shallow rock	n/a	Submersible pump

(a) PL03 is a vibrating wire piezometer. Piezometric level is measured at each sensor.

(b) WKMB05 is a multizone monitoring well. Each horizon is installed with a pressure transducer to measure the piezometric level.

3.3.3 Surface water

The surface water monitoring network at the Project site consists of three AGL stream gauge locations (Figure 1.3). Details of these stream gauges are provided in Table 3.4.

Table 3.4 Surface water monitoring network

Stream gauge	EPA ID	Easting (MGA, m)	Northing (MGA, m)	Location	Stream
WKSW01	9	402002	6452208	Waukivory	Avon River (upstream)
WKSW02	8	402772	6452099	Waukivory	Waukivory Creek (upstream)
WKSW03	7	402488	6453088	Waukivory	Avon River (downstream)

MGA – Map Grid of Australia.

3.4 Water monitoring

3.4.1 Pilot wells

Dataloggers installed in the pilot wells monitor water levels and salinity. Flow meters are also installed at the pilot wells to measure flow rates of the flowback water (and subsequently produced water).

3.4.2 Groundwater and surface water

Pressure transducers equipped with a datalogger are installed at all groundwater and surface water monitoring locations. Groundwater levels are recorded every 6 hours and surface water levels are recorded every 15 minutes. Data from a barometric datalogger are used to correct for the effects of changing barometric pressure on groundwater levels. To calibrate the level recorded by the dataloggers, manual level measurements are recorded prior to logger downloads which occur every three months.

Dataloggers at the surface water monitoring locations also measure electrical conductivity (EC), which provide an indication of salinity, every 15 minutes. The EC measurements are checked every three months using a hand-held calibrated water quality meter.

Piezometric pressure is recorded every six hours at each of the six sensors in the multizone monitoring well WKMB05, and at the two vibrating wire piezometers in PL03.

Manual groundwater level measurements are recorded for private bore GW080487 at each periodic visit.

3.4.3 Water quality sampling frequency

The water quality monitoring conditions as stipulated in EPL 20358 are provided in Table 3.5. AGL has adopted a broader analytical suite for most sites (including BTEX); details are provided in the SGMP (AGL, 2014a). The frequency of groundwater, surface water and flowback water quality sampling undertaken during the Project since its inception in 2014 is presented in Parsons Brinckerhoff (2015a) and Figure 3.4. The dates and rationale for the sampling at the surface water and groundwater monitoring locations is shown in Appendix A, Table A1.1. The dates and rationale for sampling at the pilot wells and AST2 is shown in Appendix A, Table A1.2.

During the period 1 January to 31 March 2015 sampling associated with the flowback phase of the Project has been undertaken. For the purpose of trend analysis, data from the baseline sampling between March

and October 2014 (four baseline events) and sampling during and after the fracture stimulation program in November and December 2014 are also presented.

Table 3.5 Monitoring schedule

Timeframe	Raw (source) water	Fracture stimulation fluid (raw water plus additives)	Surface water	Shallow ground-water	Flowback water	Produced water
During fracture stimulation (each pilot well)	✓	✓				
Within 24 hours of the completion of the fracture stimulation of each pilot well			✓	✓		
1 week after the fracture stimulation of each pilot well			✓			
2 weeks after completion of the fracture stimulation program				✓		
4 weeks after completion of the fracture stimulation program				✓		
Fortnightly from commencement of flowback					✓	
Every 2 months from the transition to produced water						✓

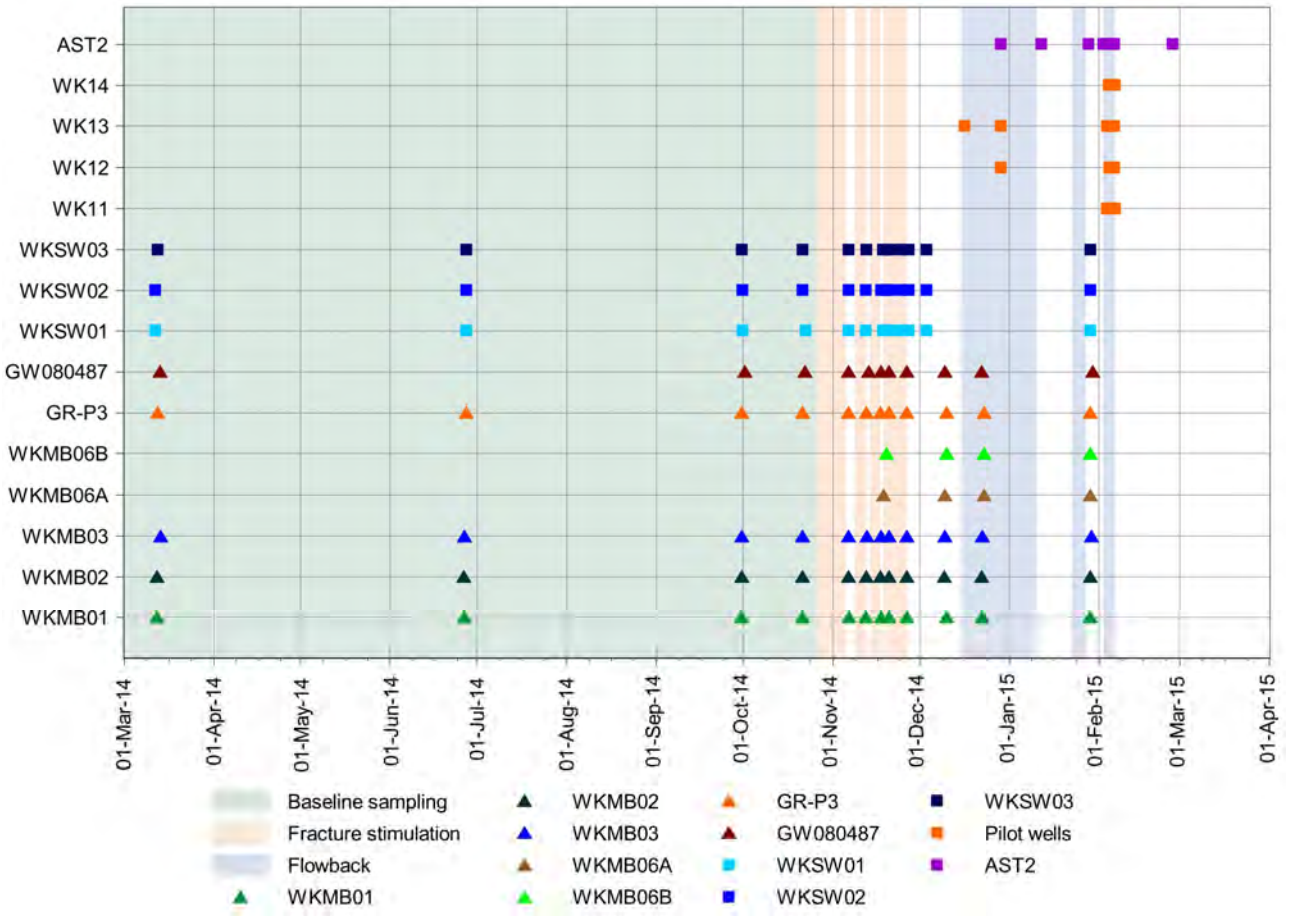


Figure 3.4 Waukivory water quality sampling frequency

3.4.4 Pilot well and AST2 sampling techniques

Sampling from the Waukivory pilot wells (WK11, WK12, WK13 and WK14) and AST2 was undertaken using sampling containers as provided by the relevant laboratories engaged for sample analysis (ALS Environmental Sydney and Envirolab Services Sydney).

Sample containers were filled according to laboratory requirements and were immediately placed in an ice-filled esky for storage and direct transport to the relevant laboratory.

Nitrile gloves were worn at all times during sampling and samples requiring filtration were filtered via single use, disposable sterile syringes and 0.45 µm Minisart syringe filters. Drip trays and containers were positioned to avoid any water contact from the pilot wells with the surrounding environment.

Pilot well sampling

All work undertaken within the hazardous zone at the well surface facilities was conducted under the supervision and instruction of AGL personnel. Approximately 50 L of water was purged from each well before sampling. Samples were collected from a continuous stream of water from a sample tap, situated downstream of the separator, on each pilot well and collected directly into the appropriate sample containers were possible. Where sub-sampling was required the material of the intermediate container was kept consistent with the sample container (e.g. glass to glass and plastic to plastic).

AST2

Samples collected from AST2 were taken using a telescopic sampling pole and single use Nalgene 500 mL sample container, used as an intermediate sub-sampling container. The telescopic pole was used to submerge the Nalgene sample container to obtain a sub-surface sample. Water collected in the Nalgene sample container was then transferred to the respective laboratory sample containers.

3.4.5 Groundwater and surface water sampling techniques

A range of methods was used to obtain groundwater quality samples from the monitoring bores. The most appropriate method for each bore was selected based on the depth of the bore, the depth to groundwater, and the permeability of the screened formation. Higher yielding monitoring bores were purged and sampled using a submersible pump. Lower yielding bores were sampled using a low flow pump. Details of the sampling technique used at each monitoring location are provided in Table 3.2.

Submersible pumps were used to purge a minimum of three well volumes (where possible) in high yielding bores (WKMB06A, GR-P3, and GW080487) prior to sampling to allow a representative groundwater sample to be collected. Water quality parameters were monitored during the purging to ensure that a representative groundwater sample was collected.

For lower yielding bores and deeper bores with large purge volumes (WKMB01, WKMB02, WKMB03 and WKMB06B), a dedicated micro-purge™ low flow sampling system was deployed. The micro-purge™ system allows groundwater to be drawn into the pump intake directly from the screened portion of the aquifer, eliminating the need to purge large volumes of groundwater from these bores. Water quality parameters were monitored during the micro-purge™ pumping to ensure that a representative groundwater sample was collected.

A telescopic sampler was used to collect grab samples from the surface water sites. A new bottle is used for each sampling round and rinsed three times prior to taking the sample. The telescopic sampler is cleaned between sampling rounds.

The water quality of each sample was measured in the field using a calibrated hand-held (YSI™) water quality meter. The following physico-chemical parameters were measured:

- Electrical conductivity – µS/cm
- Temperature – °C
- Dissolved oxygen (DO) – % saturation and mg/L
- Oxidation-reduction potential (ORP) – mV
- pH – pH units
- Total dissolved solids (TDS) – mg/L (calculated from EC).

Field measurements of free and total residual chlorine were taken using a Hach Pocket Colorimeter.

3.4.6 Chemical analysis of water

Water quality samples were collected in new sample bottles provided by the laboratory, with the appropriate preservation specific to each analyte. Samples undergoing dissolved metal analysis were filtered through 0.45 µm filters in the field prior to collection in plastic sample bottles with nitric acid preservative. Samples were analysed for the comprehensive suite of analytes listed in Table 3.6. The comprehensive suite includes all analytes prescribed for the relevant monitoring points in EPL 20358, and the expanded list in the approved SGMP (AGL, 2014a).

Table 3.6 Comprehensive suite of analytes

Category	Suite of analytes	
Field parameters	Electrical Conductivity (EC) Total Dissolved Solids (TDS) Temperature Free and total residual chlorine	pH Redox potential (ORP) Dissolved oxygen
General parameters (lab)	EC TDS (measured)	pH Total suspended solids
Major ions	Calcium Magnesium Sodium Potassium	Chloride Carbonate Bicarbonate Sulphate Fluoride
Dissolved metals and minor/ trace elements	Aluminium Antimony Arsenic Barium Beryllium Boron Bromine Cadmium Chromium Cobalt Copper Iron	Lead Manganese Mercury Molybdenum Nickel Selenium Strontium Tin Uranium Vanadium Zinc
Other analytes	Total organic carbon (TOC) Silica Free and total residual chlorine	Monoethanolamine (MEA) Tetrakis (hydroxymethyl) phosphonium sulphate (THPS)
Nutrients	Nitrate Nitrite Total nitrogen	Ammonia Total Kjeldahl Nitrogen Reactive and total phosphorus
Dissolved gases	Methane	
Hydrocarbons	Phenolic compounds Polycyclic aromatic hydrocarbons (PAH) Total petroleum hydrocarbons (TPH)	Benzene, toluene, ethyl-benzene and xylenes (BTEX) Volatile organic compounds (VOC's)

Samples were sent to the following laboratories under chain-of-custody protocols:

- Australian Laboratory Service (ALS) Environmental Pty Ltd, Smithfield, Sydney (NATA accredited laboratory) – chemistry analysis.
- Envirolab Services, Sydney NSW (NATA accredited laboratory) – THPS analysis.

3.4.7 Quality assurance

3.4.7.1 Field QA/QC

Sampling was undertaken in accordance with Parsons Brinckerhoff's sampling procedures (Appendix B) and the Australia//New Zealand standards for water quality sampling (AS/NZS 5667). The following QA/QC procedures were applied:

- Dedicated sampling equipment (such as micro-purge™ low flow sampling pumps) and disposable (single use) equipment specific to each sample location:
  - dedicated micro-purge™ pumps were used for lower yielding bores and deeper bores with high purge volumes for the Waukivory groundwater monitoring network, allowing for less groundwater disturbance and minimising loss of volatiles and disturbance of redox conditions
  - samples for metals were field filtered using single use filters and syringes
  - surface water samples were collected directly with sample bottles where safe access can be gained.
- Unstable parameters were analysed in the field, i.e. physical parameters, including pH and free chlorine.
- The hand-held water quality meter was calibrated each day for EC and pH.
- Two to three well volumes were purged prior to sampling, following stabilisation (±10% for EC and ±0.05 pH units) of key field parameters; note the micro-purge™ low flow sampling pump was designed to reduce the volume of purging required.
- Nitrile gloves were worn while collecting water samples.
- Samples were collected in appropriate bottles with appropriate preservation solutions, as specified by the NATA accredited laboratories.
- All bottles for volatile analysis were filled as far as practicable to avoid any head space and loss of volatiles.
- All sample bottles were labelled with the sample ID, date, time and samplers initials.
- Samples were placed in eskies containing ice immediately upon collection.
- Where sample storage was required overnight, samples were kept chilled and secure.
- A chain-of-custody form was completed for each batch of samples, and eskies securely sealed prior to delivery to the laboratory.
- Samples were delivered to the laboratories within the specified holding times, with the exception of pH and free chlorine, which were also analysed in the field.

3.4.7.2 Laboratory QA/QC

The laboratories conduct their own internal QA/QC program to assess the accuracy and precision of the analytical procedures. These programs include analysis of laboratory sample duplicates, spike samples, certified reference standards, surrogate standards/spikes and laboratory blanks. Laboratory QC reports are provided in Appendix C.

3.5 Key analytes: fracture stimulation additives

EPL 20358 specifies three compounds that may be present in fracture stimulation additives that are to be included in the analytical suite for all sites:

- Tetrakis (hydroxymethyl) phosphonium sulphate (THPS)
- Monoethanolamine (MEA) borate
- Sodium hypochlorite.

Although choline chloride was originally included in the list of fracture stimulation additives and referenced in the approved SGMP, the EPA removed it from the EPL in November 2014 as AGL did not include choline chloride as an additive in the fracture stimulation fluid for the Project.

Sodium hypochlorite was also not used as a fracture stimulation additive by AGL, however as discussed below, the constituents of sodium hypochlorite (free and total residual chlorine) were included in the analytical suite.

In the absence of validated methodologies for the analysis of the fracture stimulation additives THPS, MEA borate, and sodium hypochlorite in the approved SGMP, a number of elemental (breakdown) constituents were identified by AGL through consultation with analytical laboratories and the EPA (AGL, 2014b) as potential indicators of the presence of the fracture stimulation fluid in groundwater and surface water bodies when the individual compounds (listed above) cannot be identified at low concentrations in waters. The breakdown constituents were listed as:

- THPS – phosphorus and sulphate
- Monoethanolamine borate – boron and nitrogen
- Sodium hypochlorite – free and total residual chlorine.

AGL has worked with the EPA since early 2014 to develop the monitoring program for fracture stimulation additives to be used for the fracture stimulation of the four Waukivory pilot wells. During this time, the refinements which have been made to the fracture stimulation additive analysis required by the EPA under the EPL have included:

- Water samples from sampling events (from 20 October 2014 onwards) were preserved pending approval by the EPA of validated analytical methods for the detection of MEA borate and THPS
- The EPA approved the validated methodology for the analysis of MEA borate as (MEA) on 1 December 2014 with a laboratory limit of reporting (LoR (also referred to as the practical quantitation limit (PQL)) at 1 µg/L
- The EPA approved the validated methodology for THPS analysis on 19 December 2014 with a laboratory LoR at 50 µg/L with a level of uncertainty of ± 50 µg/L (Envirolab 2015)
- Analyses for MEA commenced in October 2014, utilising the method ultimately approved by the EPA on 1 December 2014
- Analyses of THPS commenced in December 2014, following EPA approval of the final validated methodology.

With the EPA approval of the analysis methods, the key analytes associated with the fracture stimulation additives tracked during the Project are:

- MEA borate (as MEA)
- THPS
- free and total residual chlorine (as constituents of sodium hypochlorite).

The LoR, rationale for analysis, and limitations of key analytes are presented in Table 3.7.

Groundwater and surface water monitoring data collected during 2014 showed that MEA, THPS and free and total residual chlorine were naturally present in the surrounding environment (Parsons Brinckerhoff 2015a). The EPA subsequently conducted independent investigations (EPA, 2015b, 2015c and 2015d) into the occurrence of these analytes; the key conclusions of which are as follows:

- *"There is insufficient scientific information on monoethanolamine to determine whether the monoethanolamine concentrations recorded were due to natural or other causes. However the EPA did conclude that it was unlikely that the monoethanolamine detections were the result of hydraulic fracturing operations introducing the chemical to the groundwater"*
- *"It was unlikely that the sporadic THPS detections recorded were a result of contamination of aquifers and surface waters as a result of hydraulic fracturing operations"*

- *"it was concluded that although levels of THPS (as formaldehyde) were detected, this could not be attributed to actions by AGL"*
- The EPA investigation into free and total residual chlorine is ongoing; EPA (2015d) does however document that *"of the two groundwater samples with reportable chlorine concentrations, one (WKMB03) was measured prior to hydraulic fracturing activities. The second (GR-P3) was measured at the reporting limit, with samples collected before and after recording levels less than the reporting limit"*

Table 3.7 Fracture stimulation additives and breakdown constituents

Analyte	Laboratory Limit of Reporting	Rationale	Limitations as Indicator
Monoethanolamine (MEA)	1 µg/L	Indicator of monoethanolamine borate	Used in several other applications in industry, for example surfactant, detergents and textiles. Ethanolamine is also used in herbicides and is present in urine secreted by mammals, thus native animals and grazing livestock may be a source of detectable background concentrations in surface water and groundwater.
THPS	50 µg/L (±50 µg/L[a])	Compound – fracture stimulation additive	THPS degrades rapidly (within 7 days) through hydrolysis, oxidation, and photo-degradation. Degradation time in flowback water and produced water (deep groundwater) is expected to be longer. Oxidation and photolysis will effectively degrade THPS in surface waters. New methodology for analysis of THPS with high level of uncertainty at the PQL level (±50 µg/L[a])
Free chlorine	0.2 mg/L	Indicator of sodium hypochlorite	Free and total residual chlorine concentrations within fracture stimulation mix may typically be below detection limits. Free chlorine and total residual chlorine are products associated with the chlorination of water supplies and may influence concentrations within surface stream monitoring points where this product has been introduced.
Total residual chlorine	0.2 mg/L	Indicator of sodium hypochlorite	

(a) Envirolab (2015)

3.6 Assessment criteria and trigger response

The criteria used for the assessment of monitoring data follows the protocols provided in the SGMP. Specific analyte trigger values at this stage in the Project are not considered appropriate due to the natural variability in groundwater and surface water quality at different locations across the site and at different depths in the geological strata. There are also insufficient sampling events to build up enough confidence/statistical sample pool to enable setting trigger threshold values as described in ANZECC (2000). Instead, general trigger criteria are used to assess monitoring sites as follows:

- Water level and water quality trends of individual or groups of analytes where the trends are distinctly related to pilot well activities. Water level response, i.e. drawdown, is attributed to depressurisation activities and provides a measure of potential connectivity between deep coal seams and the overlying shallow rock and alluvial water resources. The water quality triggers are defined as a distinct deviation from typical observed trends in water quality that can be related back to pilot well activities.
- Change in beneficial use of an aquifer by applying the beneficial use matrix designed within the SGMP (AGL, 2014a). The aquifer type refers to the alluvial and shallow fractured rock systems. The change in beneficial use is determined from a review of yield and EC (as an indicator of salinity) over the time period.

- Water quality trends associated with fracture stimulation additives or relevant breakdown/elemental constituents as key analytes within surface water and groundwater. To be monitored as part of the flowback and produced water monitoring program. The fracture stimulation additives readily dissolve and dissociate into intermediate products or elemental constituents.

The SGMP provides trigger management response protocols to be adopted for confirmed or possible changes in water resources or associated water level/water quality impacts arising from pilot well activities. The response actions/plans would be implemented by AGL and require review/endorsement by NOW and EPA (as appropriate). These response action/plans may include one or more of the following:

- Review the dataset or incident/complaint (if from a private landholder) to identify possible causes
- Implement additional sampling and monitoring as appropriate
- Inspect the bore/river site and interview landowner
- Assess the trend or impacts in terms of local Waukivory operational issues (such as flowback/produced water volumes, performance of individual wells, workovers, timing of events etc)
- Conclude whether the trend or impact is, or is not, attributed to a CSG activity
- Advise NOW and EPA (where appropriate) and recommend a course of action if the trend is or is possibly attributable to the Project.

4. Water levels

4.1 Pilot well water levels

Water levels (pressure levels) in the pilot wells are highly variable and dependent on pump commissioning and operation (including fluctuating pumping rates). When pumping is taking place, pressure level declines (drawdown) are observed in the pilot wells and when pumping ceases the pressure levels re-equilibrate (recover) to that of the target formations. The pump commissioning and flowback phases comprise periods where the pumps have been in operation and periods where pumping has ceased either due to workover intervention or suspension. These periods and the corresponding water level response in the pilot wells are shown in Figure 4.1.

Flowback commenced in pilot wells WK12 and WK13 in December 2014 and pressure levels decreased by approximately 450 m in WK12 and 650 m in WK13 during the initial period of pumping. Flowback from the wells was suspended on 27 January 2015 following detections of BTEX compounds in the flowback water from these two wells. Pressure levels then recovered slightly before pumping recommenced from 3 to 6 February 2015 and further pressure reductions were observed. Pressure levels began to recover again albeit slowly due to the build-up of casing pressure in the wells as they were shut-in when pumping was re-suspended on 6 February 2015. Pressure levels in WK12 and WK13 have recovered by approximately 100 m during the two month period prior to 31 March 2015.

The pumps were commissioned in pilot wells WK11 and WK14 in January 2015. Pressure levels decreased by about 150 m in WK11 and 300 m in WK14 until the end of January. With the suspension of flowback on the 27 January 2015, pressure levels recovered slightly then decreased again during the recommencement from 3 to 6 February 2015. Pressure levels recovered by approximately 150 m in WK11 over a 2 week period since flowback was re-suspended on 6 February 2015. Pressure levels in WK14 continued to gradually decline before starting to recover since flowback was suspended on 6 February 2015.

Pressure levels at all sites (except WK11) have not recovered to pre flowback levels following the re-suspension of pumping on 6 February. The pilot wells remained pressurised (shut-in), which will attenuate the water level recovery as shown in Figure 4.1.

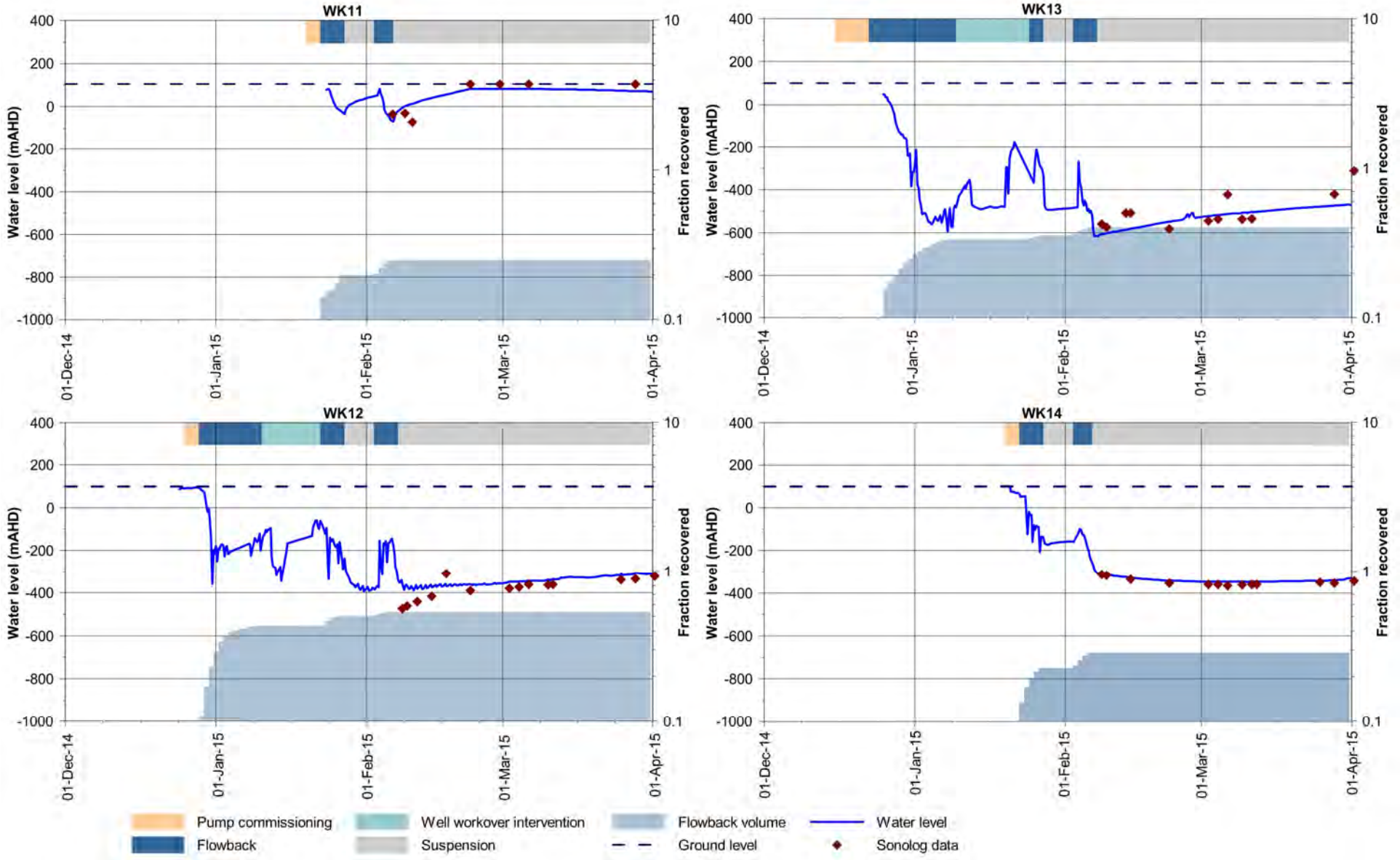


Figure 4.1 Water levels and flowback volumes at the Waukivory pilot wells

4.2 Groundwater levels

Groundwater levels for the Waukivory monitoring locations are shown in the following figures:

- WKMB01, WKMB02, WKMB03, WKMB06A, WKMB06B, GR-P3 and GW080487 for the period March 2014 to March 2015, including baseline monitoring, fracture stimulation and flowback (Figure 4.2a).
- WKMB01, WKMB02, WKMB03, WKMB06A and WKMB06B, GR-P3 and GW080487 for the period December 2014 to March 2015 covering the flowback phase in detail (Figure 4.2b).
- Piezometric levels in multizone monitoring well WKMB05 for the period November 2014 (installation) to March 2015 (Figure 4.4).
- Piezometric levels in vibrating wire piezometer PL03 for the period March 2014 to March 2015, including baseline monitoring, fracture stimulation and flowback (Figure 4.5).

Spikes depicting rapid groundwater level decline followed by recovery on the hydrographs are associated with water sampling events that have taken place from March 2014. This water level response has been the subject of an investigation by the EPA, which concluded that the fluctuations are the result of groundwater sampling (EPA, 2015d).

A description of the groundwater level responses during the flowback phase in the different hydrogeological units is provided below.

4.2.1 Alluvium

During the reporting period (January 2015 to March 2015) groundwater levels in alluvial monitoring bores GR-P3 and WKMB06A show an overall increase of about 0.1 m in response to several small rainfall events. There is a rapid recovery of groundwater levels in response to sampling events, which is indicative of the typically high hydraulic conductivity of the alluvium (Figure 4.2b) compared with the coal measures.

Groundwater levels in alluvial monitoring bores GR-P3 and WKMB06A show no response attributable to the commencement of flowback in December 2014, January 2015 or February 2015.

4.2.2 Shallow rock

During the reporting period (1 January 2015 to 31 March 2015) groundwater levels in the shallow rock monitoring bores WKMB01, WKMB02 and WKMB06B show an overall increase of about 0.1 m in response to several small rainfall events. Groundwater levels at WKMB02 show an increase in groundwater levels of about 0.2 m in response to rainfall events on 26 December 2014 and 28 January 2015. This response is not observed in the other alluvial or shallow rock monitoring bores at Waukivory (Figure 4.2b).

The shallow rock monitoring bores show a slower recovery response to sampling events, indicative of the lower hydraulic conductivity of the shallow rock unit compared with alluvium.

Groundwater levels in monitoring bores WKMB01, WKMB02 and WKMB06B show no response attributable to the commencement of the periods of flowback in December 2014, January 2015 or February 2015.

Manual groundwater measurements at private monitoring bore GW080487 screened in the shallow rock do not show a significant change in groundwater levels over the reporting period. Groundwater levels in GW080487 show no response attributable to the commencement of the periods of flowback in December 2014, January 2015 or February 2015 (Figure 4.2b).

4.2.3 Interburden of deeper coal measures

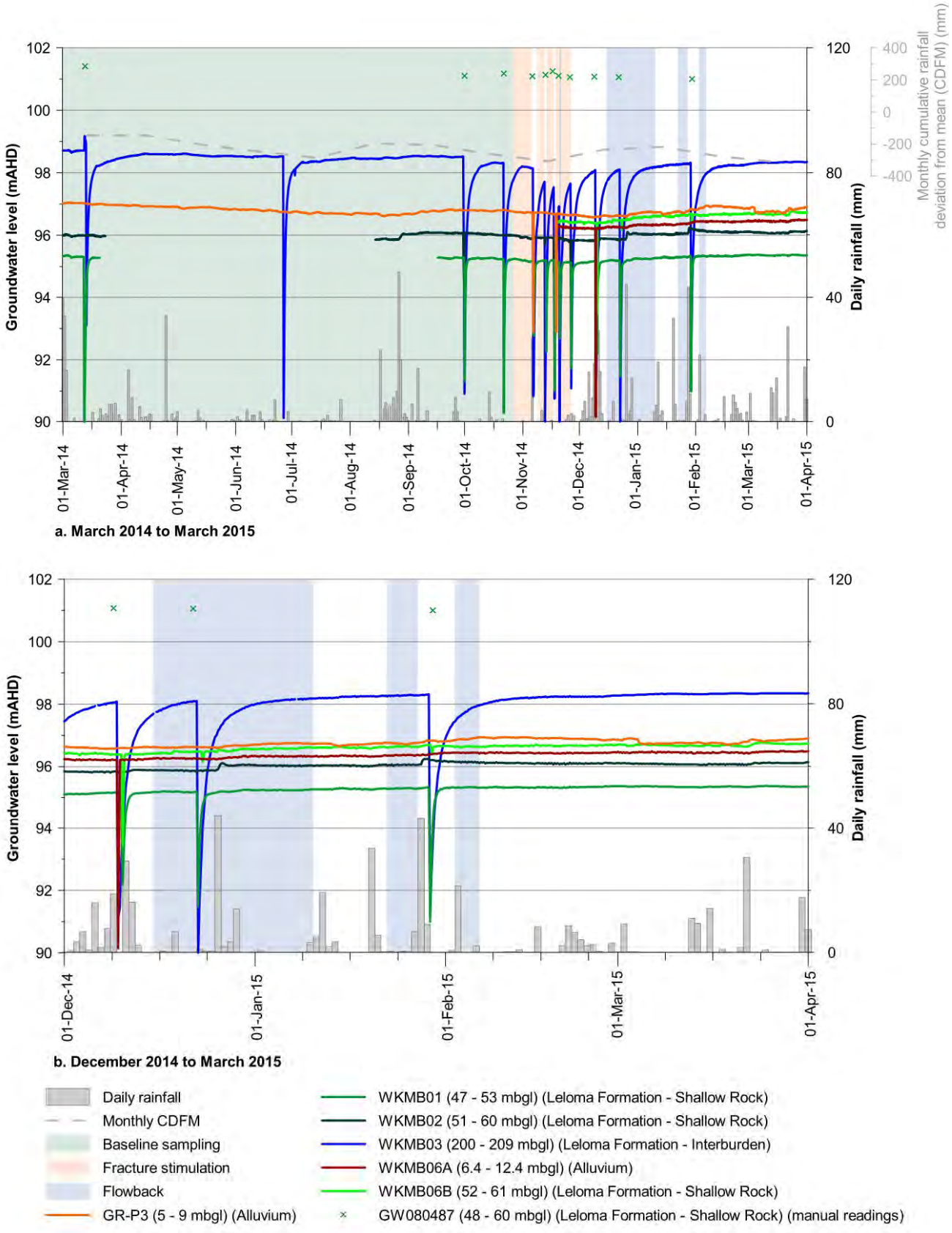
During the reporting period (January 2015 to March 2015) groundwater levels in monitoring bore WKMB03 screened in the interburden (and thrust fault zone) do not show a significant change (Figure 4.2b).

Groundwater levels at WKMB03 show a distinctive delayed recovery response to sampling events, which is indicative of very low hydraulic conductivity within the interburden/fault zone. Following sampling events the groundwater levels take approximately 2 weeks to recover.

Groundwater levels in monitoring bore WKMB03 show no response attributable to the commencement of flowback in December 2014, January 2015 or February 2015.

4.2.4 Thrust fault zone

Both WKMB03 and WKMB06B are screened across the thrust fault zone, and WKMB06A is screened within the alluvium above the thrust fault zone. Hydrographs from these three monitoring bores show no anomalous water level responses and therefore provide no evidence of connectivity between the fracture simulation zones and the shallow groundwater system via the thrust fault zone.



NB. Spikes depicting rapid groundwater level decline followed by recovery on the hydrographs are associated with water sampling events that have taken place from March 2014. This water level response has been the subject of an investigation by the EPA, which concluded that the fluctuations are the result of groundwater sampling (EPA 2015d).

Figure 4.2 Groundwater levels and rainfall at the Waukivory monitoring bores

4.2.5 Deep groundwater systems

Deep groundwater (>300 mbgl) is monitored by WKMB05 (multizone monitoring well) and PL03 (vibrating wire piezometer). The monitored intervals are both deep coal seam water bearing zones and overlying aquitards.

WKMB05

A comparison of the WKMB05 monitored intervals to WK13 perforated intervals is shown in Table 4.1 and Figure 4.3. The westerly dip of geological strata is such that coal seams intersected by WKMB05 are intersected at a greater depth in WK13 which is located 164 m to the west.

Piezometric levels in WKMB05 for the period November 2014 (installation) to 31 March 2015 are shown in Figure 4.4. The rapid changes in the piezometric levels measured at all sensors on 25 November 2014 occurred during the commissioning of the packer system. There are divergent pressure trends at WKMB05, with different sensors showing downward, constant and upward trends during the reporting period (1 January 2015 to 31 March 2015):

- Piezometric levels at sensor 1 increase by about 4 m until a peak on 20 March 2015, and then decrease by about 1 m to 31 March 2015.
- Piezometric levels at sensor 2 decrease by about 4 m from 1 January to 31 March 2015.
- Piezometric levels at sensor 3 have remained constant over the reporting period.
- Piezometric levels at sensor 4 have remained constant over the reporting period.
- Piezometric levels at sensor 5 increase by about 1 m until a peak on 19 January 2015, and then decrease by about 3.5 m to 31 March 2015.

It is not yet clear how, or if, these trends relate to the Project flowback activities; it is possible they represent delayed pressure responses, from either fracture stimulation or the commencement of flowback, due to the low permeability of the interburden. The decrease observed at Sensor 2 within the Cloverdale Coal Seam since early January 2015 is the most prominent response and could be related to the pumping and flowback activities at WK13.

Comparing each of the traces there is an apparent and pronounced upward gradient between the deepest zones (with the highest artesian pressures) and the shallowest zones (with the lowest artesian pressures). This data confirms the conceptual model of upward flow in the centre of the Basin and the effectiveness of the aquitards in confining the piezometric pressures of the underlying strata.

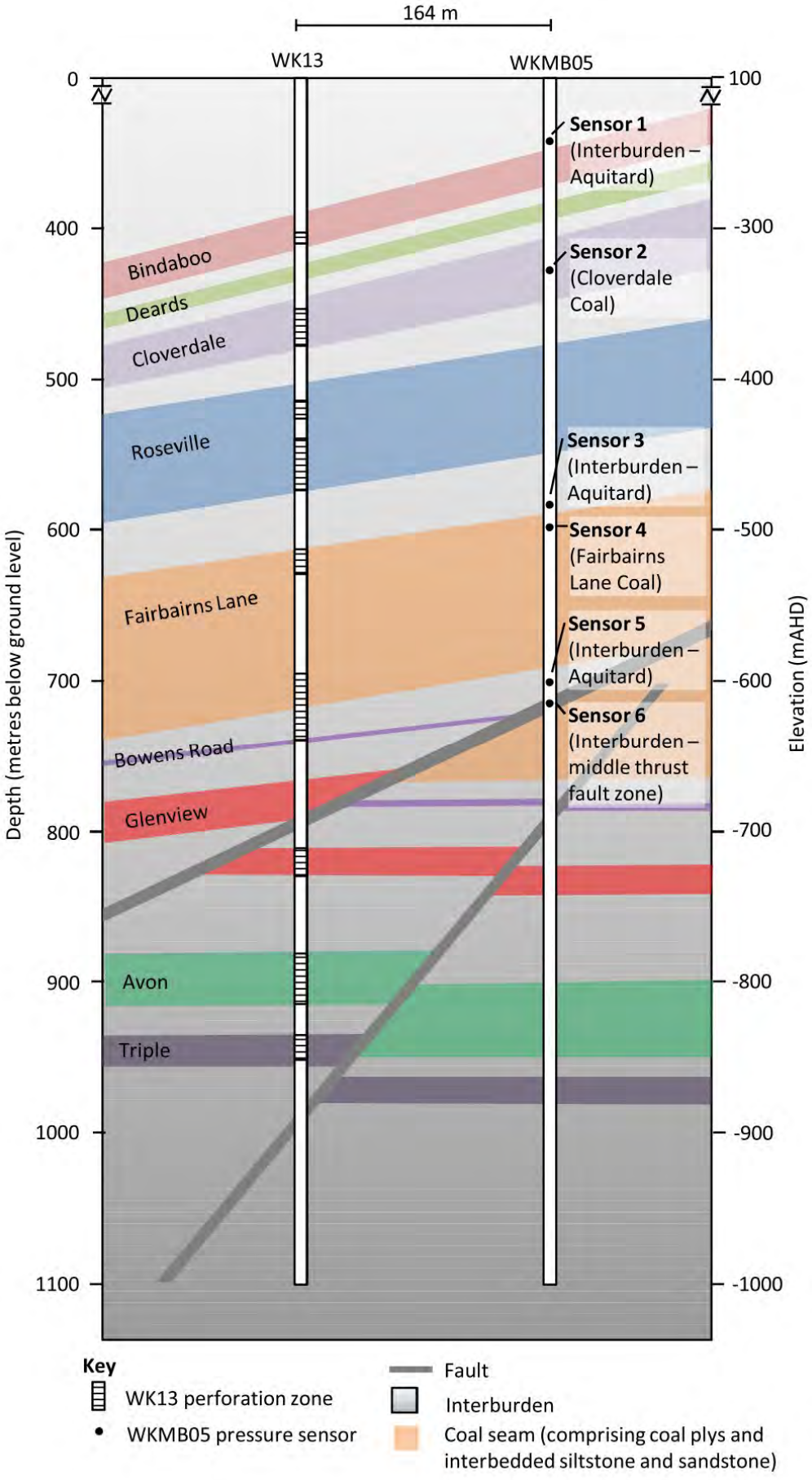


Figure 4.3 Schematic comparison of WK13 perforated intervals and WKMB05 monitored intervals

Table 4.1 Comparison of WK13 perforated intervals and WKMB05 monitored intervals

WK13			WKMB05		
Sensor	Perforated interval (mbgl)	Coal seam	Sensor	Monitored interval (mbgl)	Formation
			1	340.0 – 343.0	Leloma Formation – Interburden
10	404.5 – 408.4	Bindaboo			
			2	426.0 – 429.0	Jilleon Formation – Cloverdale Coal Seam
9	451.4 – 474.0	Cloverdale			
8	514.5 – 523.3	Roseville (upper)			
7	540.2 – 575.1	Roseville (lower)			
			3	584.0 - 587.0	Jilleon Formation – Interburden
			4	595.4 – 598.4	Jilleon Formation – Fairbairns Coal Seam
6	612.2 – 628.8	Fairbairns Lane (upper)			
5	694.1 – 738.3	Fairbairns Lane (lower)	5	698.5 – 701.5	Jilleon Formation – Interburden
			6	711.0 – 714.0	Jilleon Formation – Interbuden (fault zone)
4	Not perforated	Glenview			
3	812.5 – 826.5	Glenview			
2	878.7 – 911.4	Avon			
1	934.2 – 946.3	Triple			

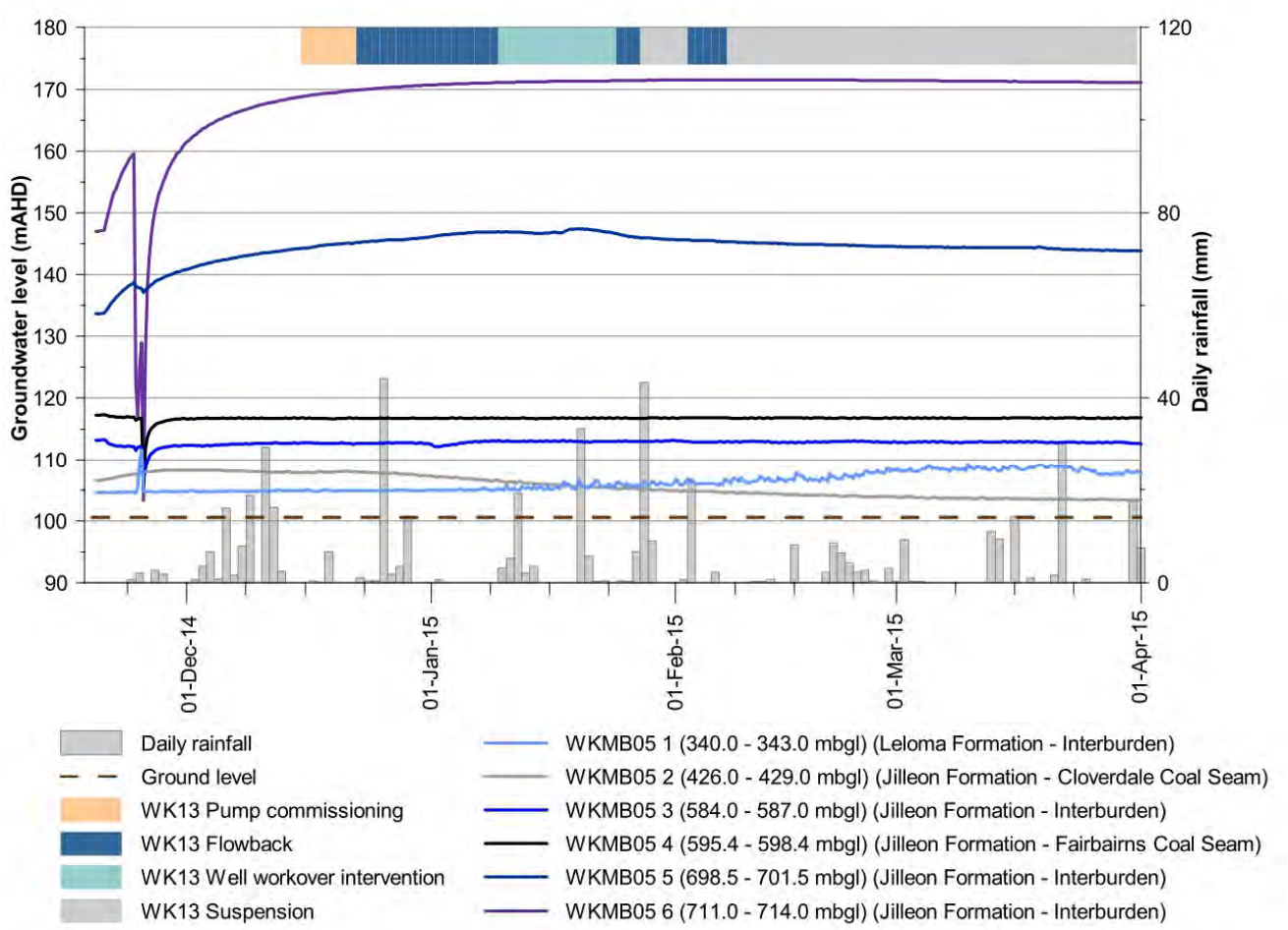


Figure 4.4 Groundwater levels and rainfall at multizone monitoring well WKMB05

PL03

Vibrating wire piezometer PL03 was installed in September 2013. Interburden sensor 3 (463 mbgl) shows a decrease in piezometric pressure of about 60 m since installation. Coal seam sensor 2 (496 mbgl) shows a decrease in piezometric pressure of about 20 m since installation. These declines reflect the long term readjustment of pore pressure in the surrounding rock since installation and do not represent natural trends. This long recovery is due to the very low permeability of the interburden and coal seams at the depth of the sensors. This phenomenon is widely observed in VWP installations and has been observed at VWP's installed at the AGL Hunter Gas Project. At that location, groundwater levels took over one year to equilibrate following installation (Parsons Brinckerhoff, 2014c).

During the reporting period (January 2015 to March 2015) piezometric levels at PL03 sensor 2 have continued to decrease by about 4 m (Figure 4.5). Two slight anomalies are apparent on the hydrograph of sensor 2; one in mid-November 2014, and a departure from the underlying trend in late March 2015. The reasons for these anomalies are unclear as they do not coincide with a period of flowback.

Piezometric levels at PL03 sensor 3 decrease by about 2.5 m from 1 January to 5 March 2015, and then increase by about 2.5 m to 31 March 2015. These trends reflect pore pressures near the sensor adjusting and recovering towards hydrostatic pressures following the local disturbance associated with installation.

No useful data or trend information is available from these two VWPs at this time.

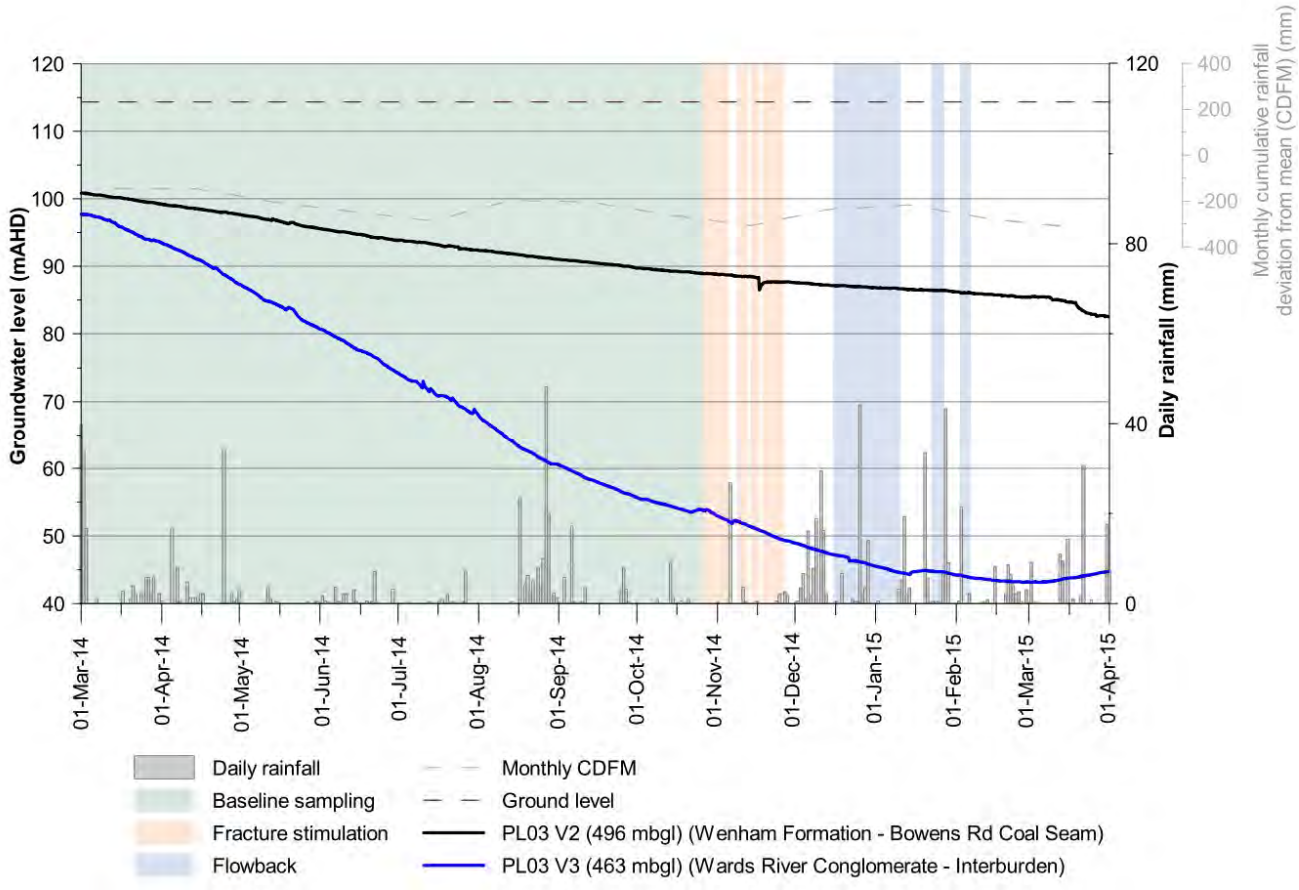


Figure 4.5 Groundwater levels and rainfall at vibrating wire piezometer PL03

4.2.6 Vertical hydraulic gradients

Groundwater levels at the WKMB06A and WKMB06B nested monitoring site show a very slight upward vertical gradient between the shallow rock and the alluvium. An upward vertical component of hydraulic gradient is characteristic of groundwater discharge areas. This is consistent with the conceptual hydrogeological model whereby deeper groundwater migrates through the shallow fractured rock and into the base of the alluvium before mixed shallow and deep groundwater discharges as baseflow to surface waters.

Groundwater levels at WKMB03 within the interburden of the deeper coal measures are higher than in the shallow rock monitoring bores WKMB01, WKMB02 and WKMB06B and indicate an upward vertical gradient and probable confining conditions attributed to the low permeability rock (Figure 4.2). Vertical seepage is likely to be limited and slow due to the low permeability of the interburden units. Furthermore, this data provides no indication that the upper thrust zone is a conduit for deep groundwater and is in hydraulic connection with shallow aquifers.

Piezometric levels at WKMB05 sensors 1 to 6 show an upward vertical gradient prior to any substantial flowback pumping in January 2015 (Figure 4.4). An upward trend in piezometric levels at WKMB05 sensor 1 and a downward trend in piezometric levels at sensor 2 from January 2015 onwards have resulted in a reversal of this gradient. This trend is expected to be related to the pumping and flowback activities at nearby WK13 (depressurisation of the Cloverdale coal seam interval and maintenance of pressure within the overlying aquitard).

WKMB05 sensors 5 and 6 show anomalously high piezometric levels of about 45 m and 70 m respectively above ground level (Figure 4.4). Piezometric pressures at these depths and in the centre of the basin are expected to be artesian (above ground elevation), although initial numerical modelling suggests that the

piezometric pressures at the deepest sensors should be in the order of 10 to 20 m above ground level. Influence from fracture stimulation is considered possible but unlikely, as there has been no corresponding pressure decrease after the flowback was initiated at WK13. Further monitoring during the continuation of the Project will assess the vertical and temporal trends at WKMB05.

4.3 Surface water levels

Surface water levels for the period September 2014 (installation) to March 2014 are shown in Figure 4.6.

Water levels at stream gauge sites WKSW01 (Avon River upstream of the Project site), WKSW02 (Waukivory Creek upstream of the Project site) and WKSW03 (Avon River downstream of the Project site) have shown an overall increase during the reporting period (January 2015 to March 2015) due to rainfall events over this period.

Water levels in the Avon River (WKSW01 and WKSW03) show an increase of about 2 m in response to the rainfall events on 26 December 2014 and 28 January 2015. Water levels then decrease over about 2 weeks to levels that are consistent with average flows.

Water levels in Waukivory Creek (WKSW03) show an increase of about 2 m in response to the rainfall event on 26 December 2014. Water levels do not decrease to pre-existing levels by the rainfall event on 28 January 2015 (which only results in a 0.5 m increase in levels), or by the end of the reporting period at 31 March 2015.

Water levels at AGL's Waukivory stream gauge sites show no response attributable to the fracture stimulation program or the commencement of periods of flowback in December 2014, January 2015 or February 2015 (Figure 4.6).

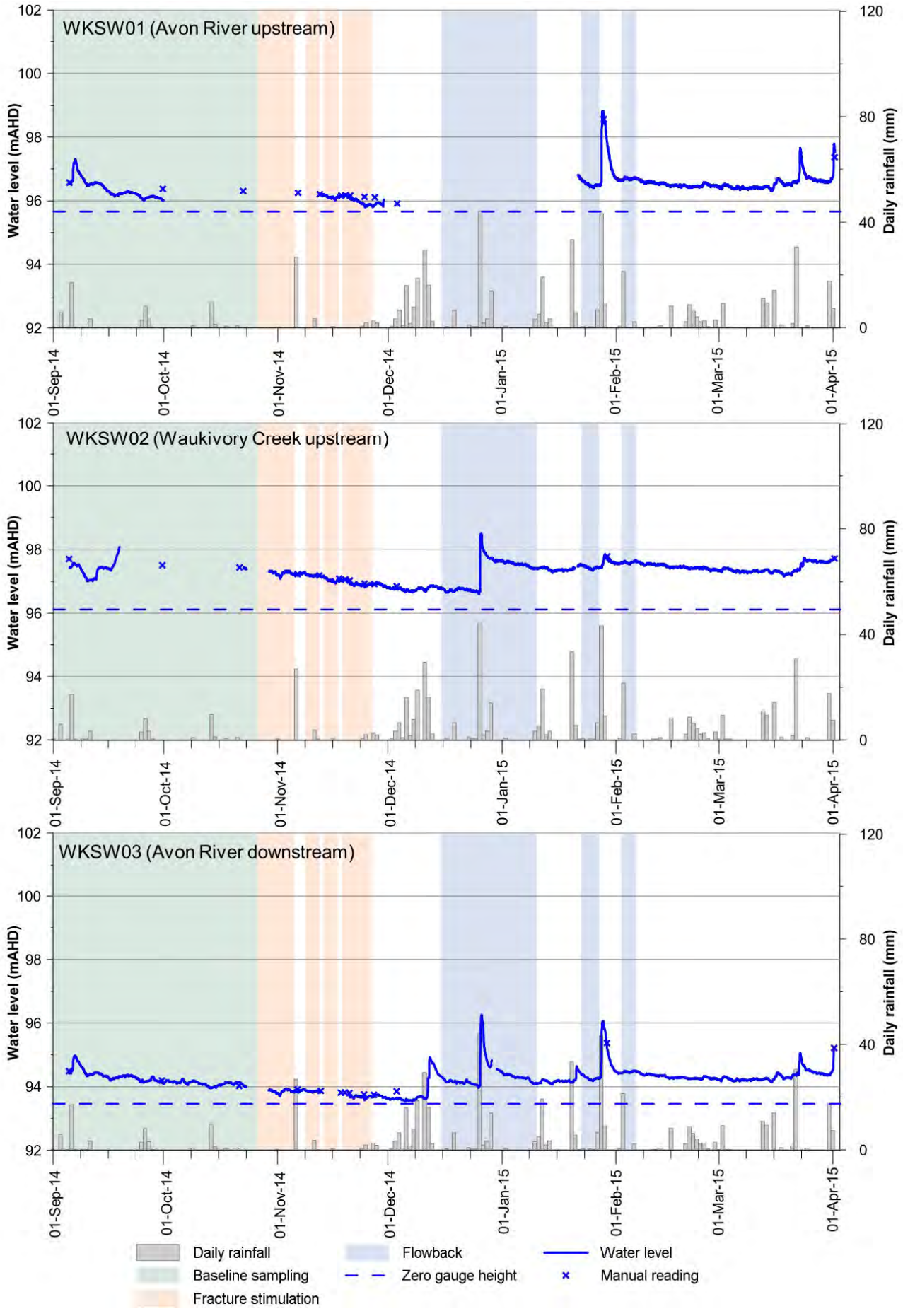


Figure 4.6 Surface water levels and rainfall at the Waukivory stream gauges

5. Water quality

5.1 Introduction

This section presents water quality monitoring data for the period 1 January 2015 to 31 March 2015. For the purpose of identifying trends, data collected since baseline commenced in March 2014 is also included in the time-series charts in this report. The water quality assessment is described for the following components within this chapter:

- Fracture stimulation fluid composition (for comparison to flowback water quality)
- Pilot well water quality monitoring results
- AST2 water quality monitoring results
- Groundwater quality monitoring results
- Surface water quality monitoring results

A comprehensive suite of elements and compounds were analysed in each sample (Section 4). Water quality results and analysis for all sampling sites and analytes are provided in the Appendices:

- Appendix C – Laboratory QC reports
- Appendix D – Summary results of water quality
- Appendix E – Pilot well analyte time-series hydrographs
- Appendix F – Groundwater and surface water time-series analyte hydrographs
- Appendix G – AST2 analyte time-series hydrographs
- Appendix H – ALS and Envirolab Services laboratory reports
- Appendix I – Groundwater and surface water trend analysis

5.2 Fracture stimulation fluid

Chemical analysis of the fracture stimulation fluid is presented in Table 5.1 as ranges for the four pilot wells, for comparison to flowback water quality. The final injected fracture stimulation fluid contained lower concentrations than groundwater and surface water of total dissolved solids, major ions, and trace metals. BTEX and some phenolic compounds were detected in baseline groundwater data, but were not present in the fracture stimulation fluids. Total petroleum hydrocarbons (TPH) were detected in both groundwater and fracture stimulation fluid at low concentrations.

Monoethanolamine (MEA) was present in concentrations that are 2 to 3 orders of magnitude higher in the fracture stimulation fluid than in surface and groundwater; however the presence of MEA in groundwater (detected in baseline monitoring) prior to any fracture stimulation activities and raw water during fracture stimulation indicates an alternative source other than the fracture stimulation fluid.

THPS was also present in the fracture stimulation fluid at concentrations 2 to 3 orders of magnitude higher than the surface and groundwater. However, there are no confirmed detections of this analyte at the water monitoring sites which could be attributed to fracture stimulation activities.

Free and total residual chlorine (constituents of sodium hypochlorite) detections occurred at selected surface water and groundwater sites. Sodium hypochlorite was not used as a fracture stimulation additive for the Project.

Table 5.1 Summary of fracture stimulation fluid concentrations

Parameter	Fracture stimulation fluid
Monoethanolamine (MEA)	Values ranged from 4,200 µg/L to 5,690 µg/L.
THPS	Values ranged from 7,800 µg/L to 13,000 µg/L.
Free and total residual chlorine	Below LoR (0.2 mg/L).
BTEX compounds	Below LoR (2 µg/L).
Boron	Values ranged from 82.5 mg/L to 115.0 mg/L.
Sulphate	Values ranged from <10 mg/L to 63 mg/L.
Total phosphorus	Values ranged from 7.1 mg/L to 16.0 mg/L.
Total nitrogen (as N)	Values ranged from 48.0 mg/L to 75.8 mg/L.
Salinity (EC)	470 to 653 µS/cm
pH	Alkaline pH (8.16 to 9.09)
Major ions	Na -HCO_3-Cl
Dissolved metals	Below LoR: Sb, Be, Cd, Cr, Co, Hg, Se, U, V. Detected dissolved metal concentrations were typically higher than in the raw water (with the exception of Fe).
Nutrients	Ammonia, nitrate and nitrite concentrations (as N) ranged between the LoR (0.1 mg/L) and 0.34 mg/L. Total organic carbon concentrations ranged from 815 to 873 mg/L.
Dissolved methane	Below LoR (10 µg/L).
Petroleum hydrocarbons	Phenols and PAHs were below LORs. TPH C_{10}-C_{36} (sum) ranged from below LoR (50 µg/L) to 1860 µg/L.

5.3 Pilot well (flowback) water quality

The flowback water quality is influenced by the fracture stimulation fluid and the water quality of the target formations of the pilot well. It is anticipated that the flowback water quality will trend towards that of the formation during the flowback phase and that the concentration of the fracture stimulation additives will decrease to background levels.

A summary of fracture stimulation fluid quality is provided in Table 5.1, and further details are provided in the Waukivory Pilot Project Surface Water and Groundwater Monitoring Report to 31 December 2014 (Parsons Brinckerhoff 2015a).

Water quality data from deep coal seams (formation water) within the Gloucester Basin is available from flow testing of the Craven 06 and Waukivory 03 gas wells in 2013 (Parsons Brinckerhoff 2014d), and flow testing of the Craven 06 gas well in 2014 (Parsons Brinckerhoff 2015b).

Four analytes have been selected as indicators of fracture stimulation fluid in flowback water as the concentration of these analytes in fracture stimulation fluid was at least an order of magnitude greater than in 'typical' Gloucester basin coal seam formation water ('produced water'):

- Sodium and EC used as general indicators of salinity to illustrate the transition from flowback water (low EC and sodium) to produced water (high EC and sodium)
- MEA borate as indicated by boron – although MEA was present in high concentrations in the fracture stimulation fluid compared to the baseline groundwater and surface water data; there was no baseline and background MEA data for sampling of produced water from CR06 and WK03 prior to the Project. Consequently, boron was used as an indicator of fracture stimulation fluid in flowback water as boron was present in high concentrations in the fracture stimulation fluid compared to baseline and background produced water monitoring undertaken prior to the Project (i.e. from CR06 and WK03)
- THPS as indicated by sulphate – although THPS was present in high concentrations in the fracture stimulation fluid compared to the groundwater and surface water baseline data, there was no baseline and background THPS data for sampling of produced water from CR06 and WK03 prior to the Project. Consequently, sulphate was used as an indicator of fracture stimulation fluid in flowback water as sulphate was present in high concentrations in the fracture stimulation fluid compared to baseline and background produced water monitoring undertaken prior to the Project (i.e. from CR06 and WK03)
- BTEX – naturally occurring in variable concentrations in deep coal seam formation water and not present in the fracture stimulation fluid.

The degree to which the flowback water quality has migrated towards that of 'typical' Gloucester basin coal seam formation water ('produced water') is shown by the scatter plots presented in Figure 5.1.

These four analytes are presented relative to TDS concentration in Figure 5.1 as TDS shows variation between the fracture stimulation fluid, flowback water and produced water, allowing the different water 'types' to be discerned.

Figure 5.1 shows that the flowback water quality is significantly closer to that of CR06 and WK03 (produced water) than that of the fracture stimulation fluid. Sodium concentrations are very low and BTEX concentrations are zero in the fracture stimulation fluid whereas in the flowback water these analytes are found at much greater concentrations. The concentration of BTEX in flowback water is expected to decrease to background levels over time.

Boron and sulphate show high concentrations in the fracture stimulation fluid due the presence of MEA borate and THPS respectively. In contrast, the samples of flowback water from the pilot wells show only slightly elevated concentrations of these compounds, and are more similar to formation water. This suggests that flowback water comprises mainly formation water which has significantly diluted the fracture stimulation fluid constituents.

The two primary indicators for the transition from flowback water to produced water remain as the volume of injected water and a water salinity (EC) above 5000 µS/cm. Both of these criteria need to be satisfied to confirm the transition to produced water.

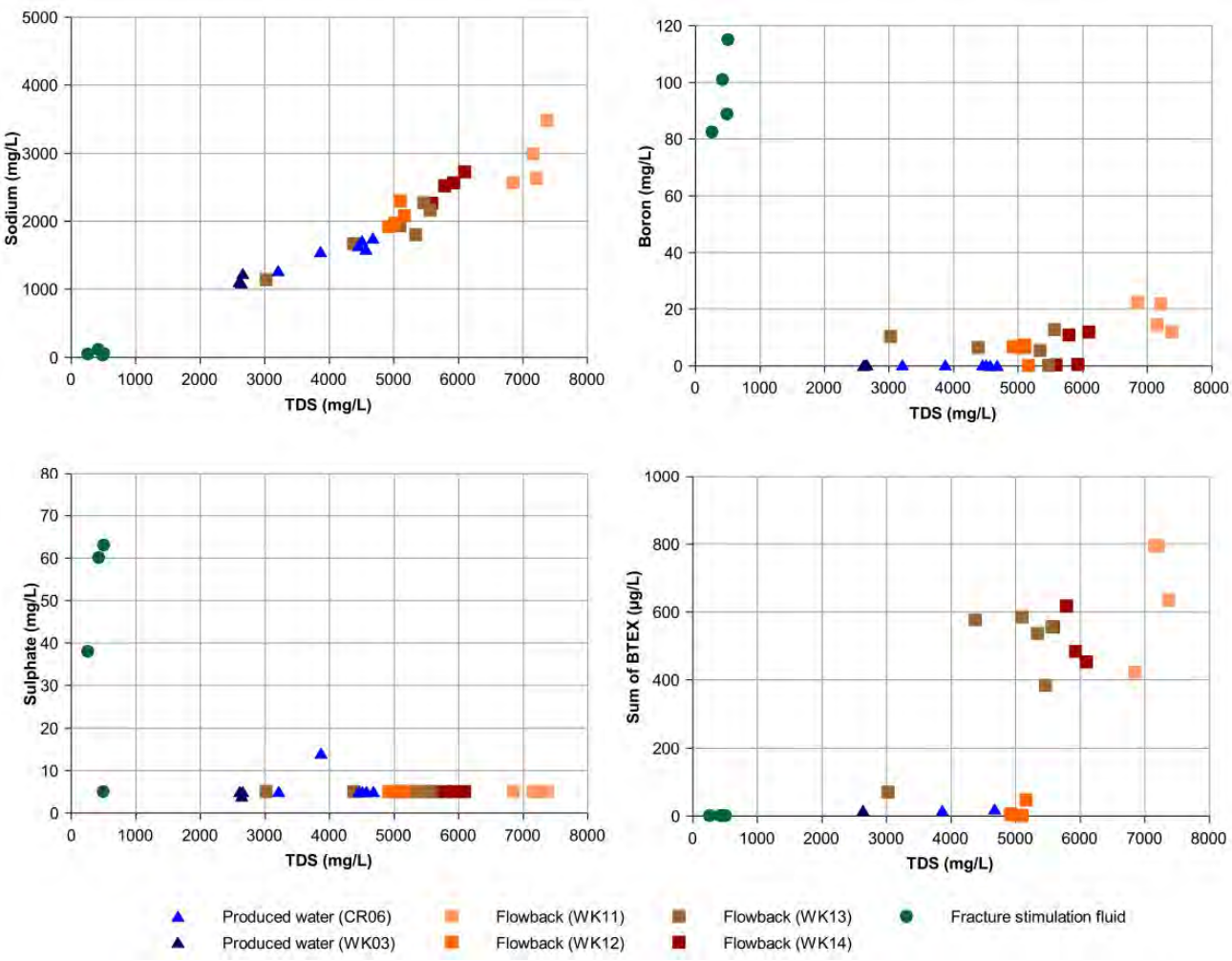


Figure 5.1 Sodium, sulphate, boron and BTEX vs TDS for formation water, fracture stimulation fluid and flowback water

Figures 5.2 to 5.5 show time series plots for EC, MEA, THPS and BTEX for each of the four pilot wells. The data has been plotted against the total flowback volume since pumping began shown as a fraction of the total volume of fracture stimulation fluid that was injected into the well during fracture stimulation. One of the two indicators of the transition from flowback to produced water is the removal of the total volume of fracture stimulation fluid.

Figure 5.2 also shows that the second indicator of the transition from flowback to produced water; an EC value above 5000 µS/cm, has been met. The EC from all pilot wells has shown an upward trend throughout the current reporting period and the latest sample (6 February 2015) shows the EC data to range from 7,490 to 10,700 µS/cm.

Figure 5.3 shows the variation of MEA concentrations during the current reporting period, which is trending downwards due to this compound being removed during flowback and breaking down in the environment. The latest sample from the pilot wells (6 February 2015) shows the MEA concentrations to range from 9 to 21 µg/L, which is comparable to natural groundwater and surface water background concentrations (Parsons Brinckerhoff, 2015a).

Figure 5.4 shows the variation of THPS concentrations during the current reporting period, the data generally show a downward trend due to this compound being removed during flowback and breaking down in the environment. The latest sample from the pilot wells (6 February 2015) shows the THPS concentrations to range from 62 to 140 µg/L. The laboratory Limit of Reporting (LOR) for THPS is 50±50 µg/L and therefore the recent detections of this compound are approaching, or below, the bounds of uncertainty in the LOR.

Figure 5.5 shows the variation in the sum of BTEX throughout the current reporting period. As discussed, BTEX concentrations in flowback water are greater than those found in the produced water from CR06 and WK03, which is likely due to WK11, WK13 and WK14 targeting deeper coal seams than CR06 and WK03. The period of pilot well pumping from 3 February to 6 February 2015 shows that during pumping BTEX concentrations show a general decline and would be expected to reach background concentrations with continued pumping.

The latest sample from the pilot wells (6 February 2015) shows the sum of BTEX concentrations to range from 0 to 635 µg/L. The lowest concentration of BTEX compounds is found in WK12 which is the shallowest gas well. The highest concentrations of BTEX compounds are found in the three deeper gas wells. This implies that it is the deeper coal seams at Waukivory and possibly across the broader Gloucester basin are the natural source of these petroleum hydrocarbons, which is consistent with the finding by the DRE (2015).

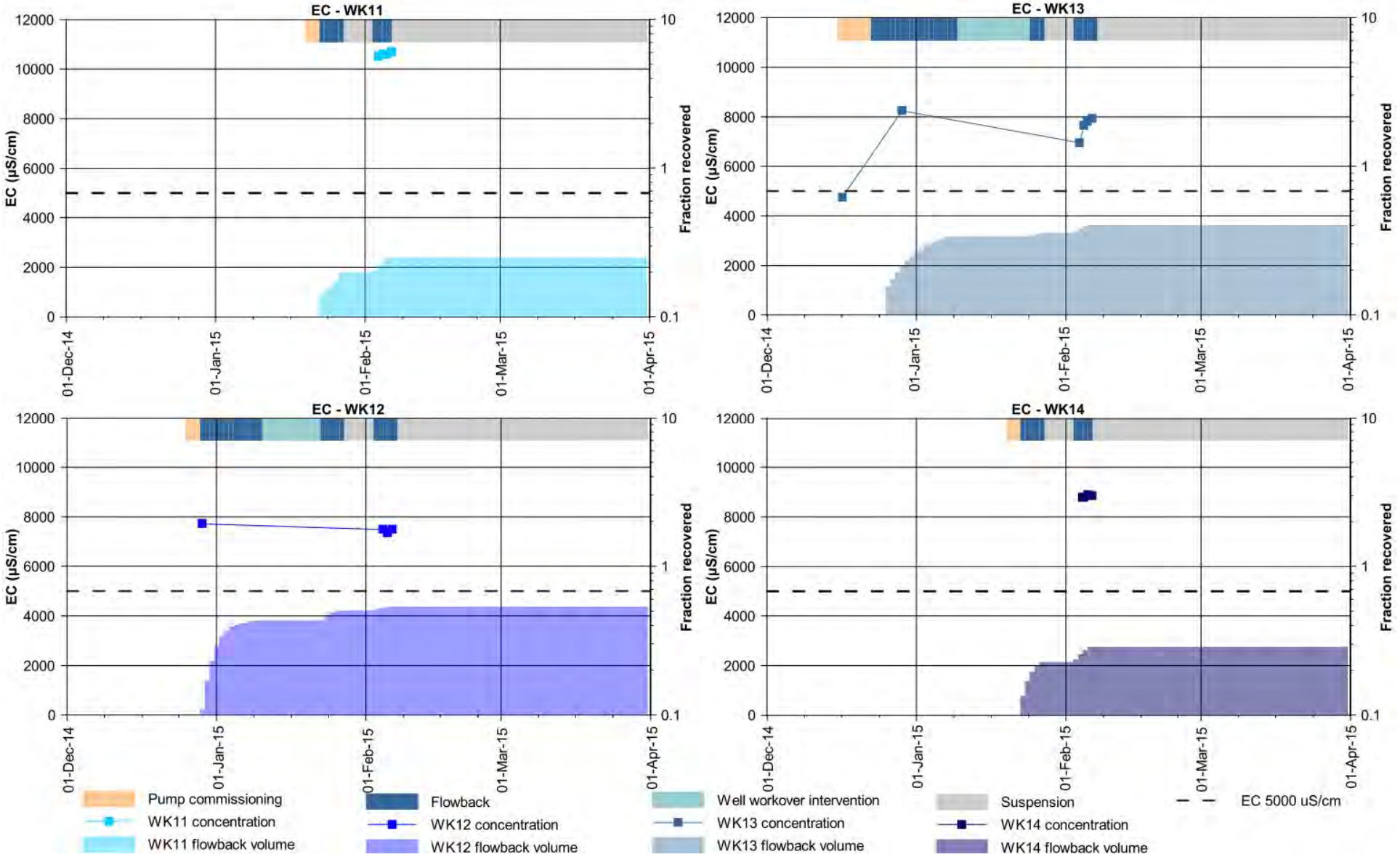


Figure 5.2 Laboratory electrical conductivity (EC) measurements and flowback volumes at the Waukivory pilot wells

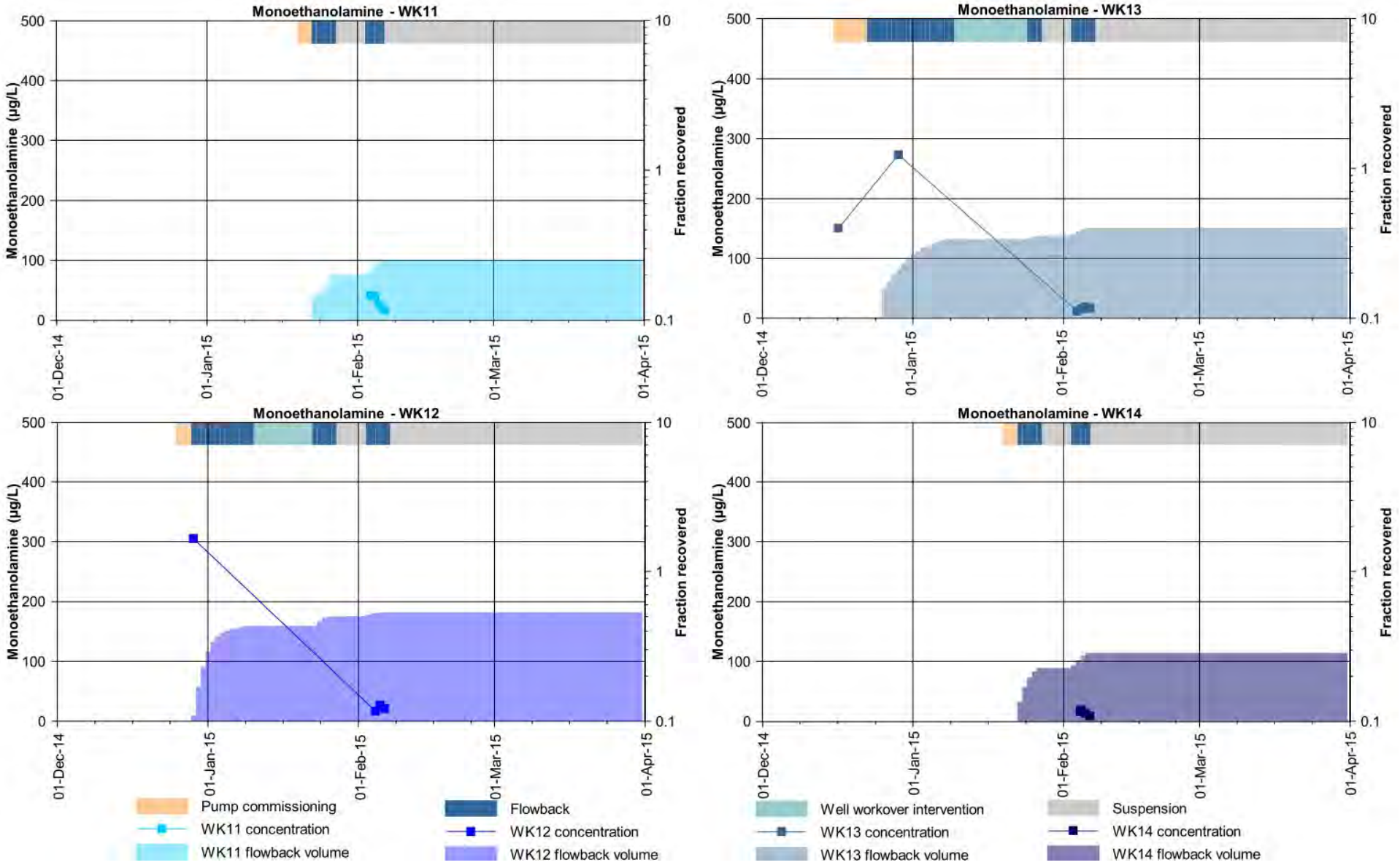


Figure 5.3 Monoethanolamine concentrations and flowback volumes at the Waukivory pilot wells

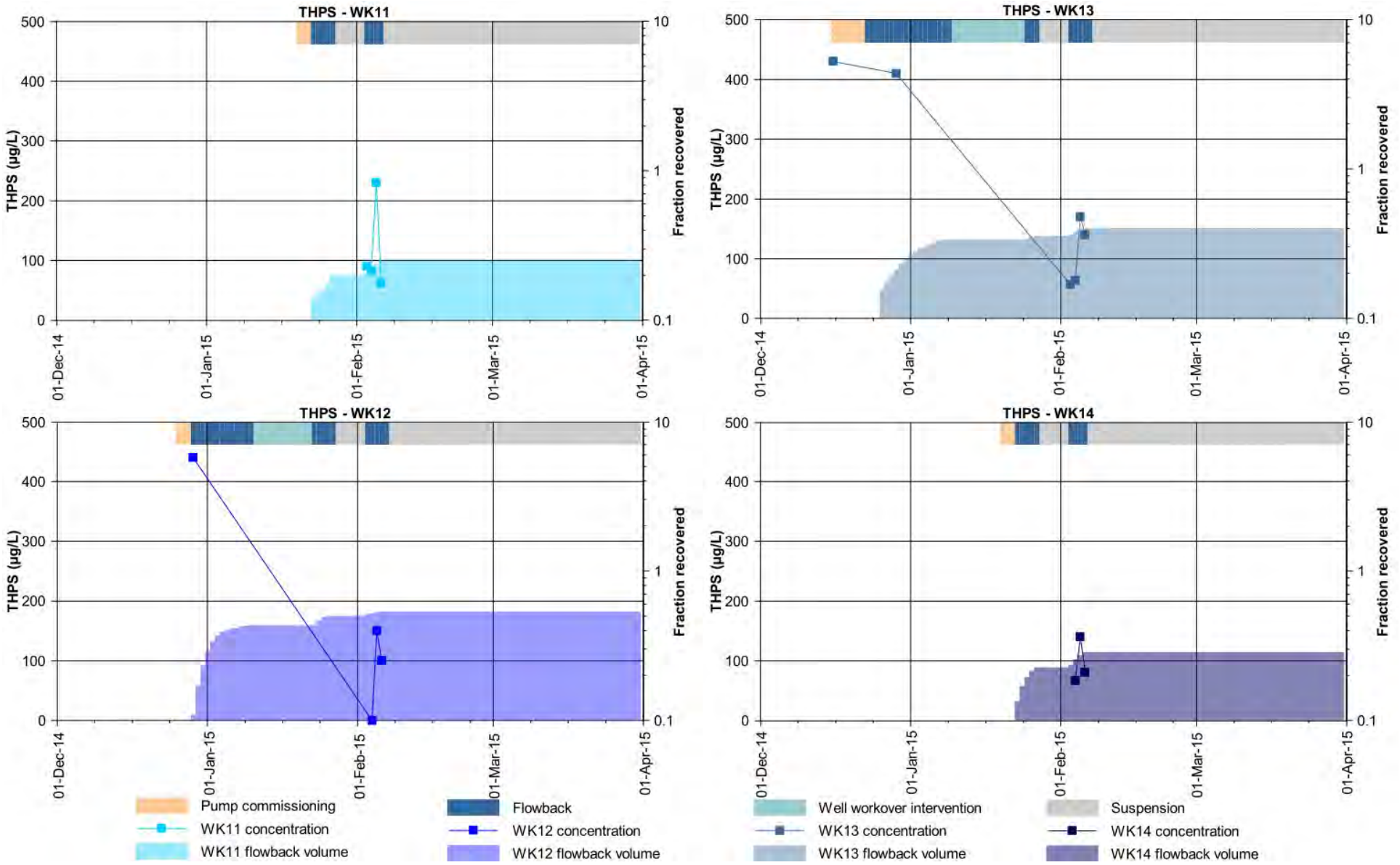


Figure 5.4 THPS concentrations and flowback volumes at the Waukivory pilot wells

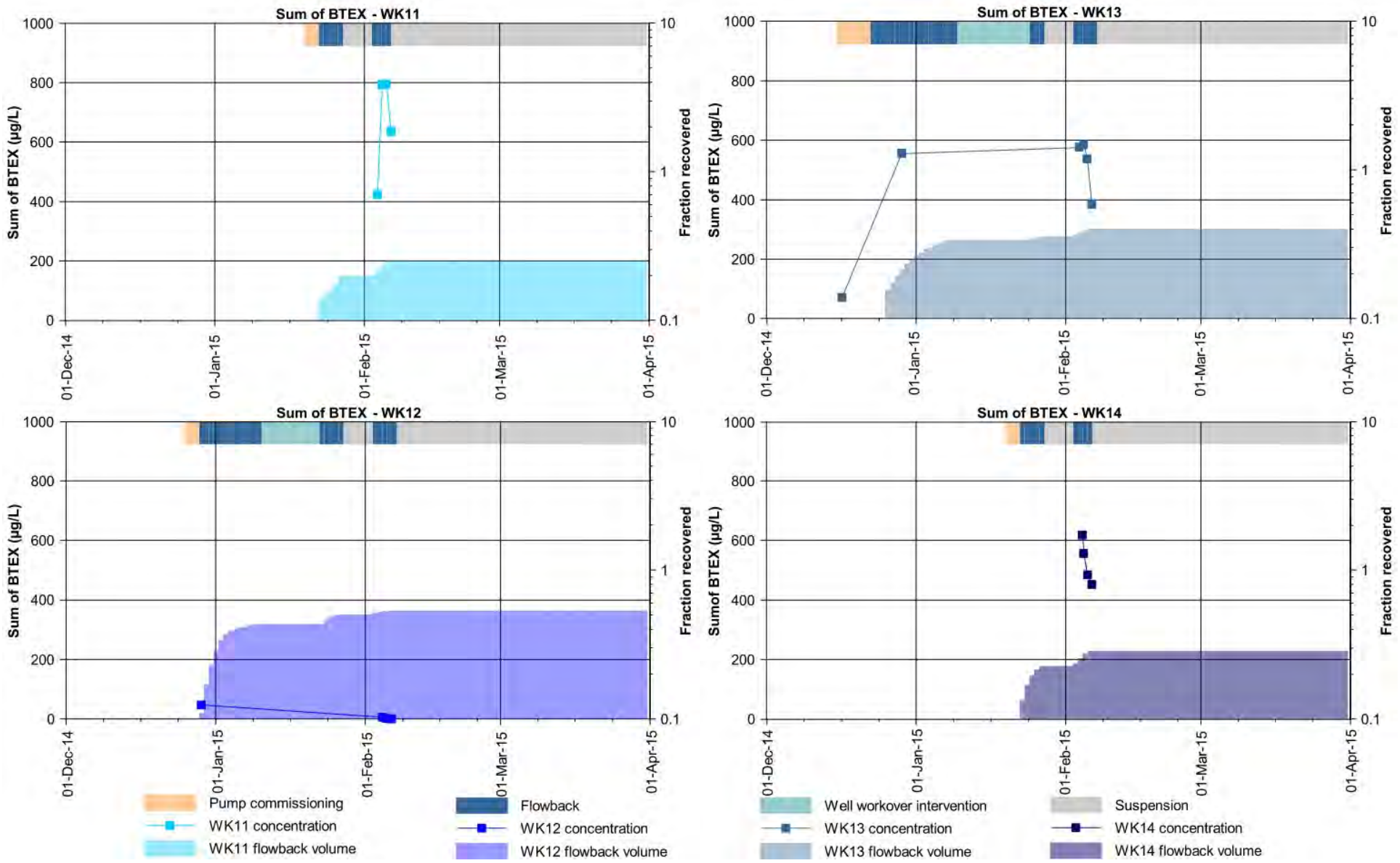


Figure 5.5 Sum of BTEX concentrations and flowback volumes at the Waukivory pilot wells

5.4 AST2 water quality

AST2 is an open topped, 1.5ML above ground storage tank situated adjacent to WK13 (Figure 3.1) receiving flowback water from the four pilot wells. The water quality data for AST2 reflects an average water quality across the four pilot wells and time period over which flowback has taken place. Monitoring at AST2 provides changes in the flowback water chemistry over time and provides a water quality assessment for disposal purposes.

Water quality data and time series plots for AST2 are presented in Appendices D and G respectively. The water quality at AST2 will be influenced by the following factors:

- Quantity and quality of the flowback water;
- Relative contributions from each gas well;
- Meteorological conditions such as rainfall and evaporation;
- Microbial activity;
- Length of time the water has been standing.

The data shows some changes in the physico-chemical parameters over time such as an increase in pH and decrease in Dissolved Oxygen (DO). The increased pH is likely to have contributed to the decrease in dissolved metals concentrations shown in the time series plots for analytes including aluminium, arsenic, zinc, iron and manganese (Appendix G, Figures G3.1, G3.3 and G3.5).

During storage in AST2 some analytes such as MEA and THPS will breakdown and some will volatilise from the surface of the standing water. Figures 5.6 to 5.8 show time series plots for the concentration of MEA, THPS and sum of BTEX in AST2.

Figure 5.6 shows the variation in the MEA concentration during the current reporting period. The declining trend is consistent with the flowback of this compound from the pilot wells and the increasing dilution with formation water. Furthermore this compound is expected to break down naturally within the pilot wells and AST2, particularly when exposed to UV radiation in AST2.

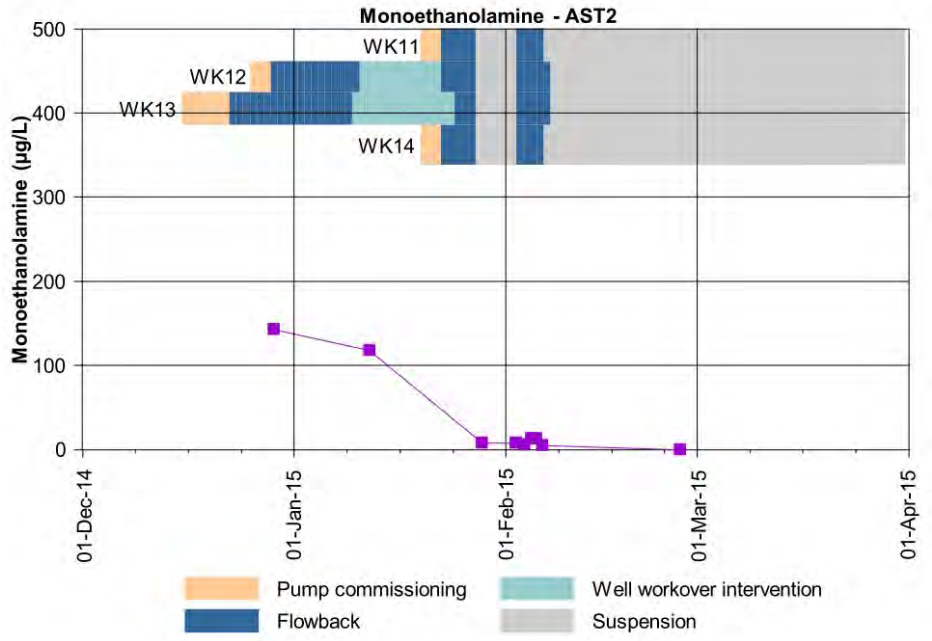


Figure 5.6 Monoethanolamine concentrations at AST2

Figure 5.7 shows the variation in the THPS concentration during the current reporting period. There is a large variability in the THPS data and some uncertainty regarding the analytical method; the LoR is quoted as being 50 µg/L ±50 µg/L so concentrations nearing 100 µg/L should be treated with caution.

The data shows an initial decline as would be expected due to removal from the pilot wells and the natural breakdown of this compound. Concentrations have ranged from 0 to 110 µg/L during the current reporting period.

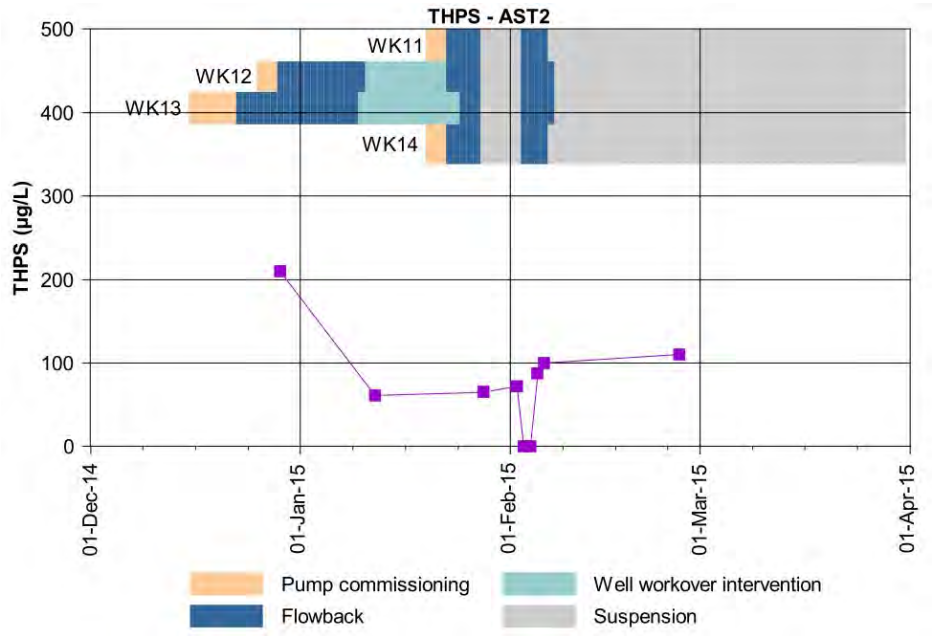


Figure 5.7 THPS concentrations at AST2

Figure 5.8 shows the sum of BTEX concentrations for AST2 during the current reporting period. The BTEX concentrations have ranged from 0 to 48 µg/L, which is an order of magnitude less than the median concentration from the pilot wells of 348 µg/L (range 0 to 795 µg/L) during the reporting period. The decrease in concentration is due to volatilisation and biodegradation of BTEX compounds from the surface of the standing water in AST2.

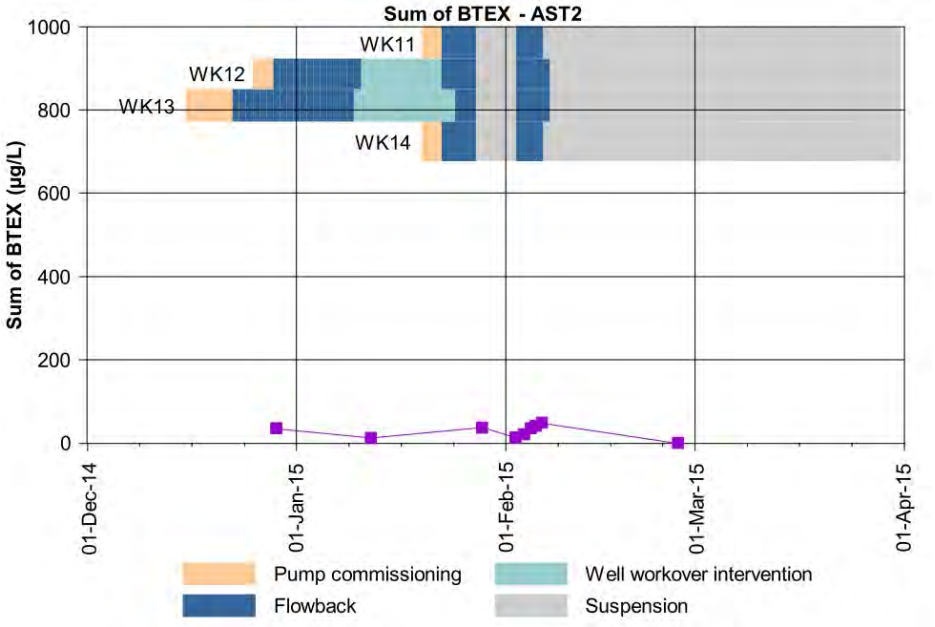


Figure 5.8 Sum of BTEX concentrations at AST2

5.5 Groundwater and surface water quality

5.5.1 Analysis methodology

The environmental guidelines for fresh and marine water quality (ANZECC, 2000) outline various methodologies for assessing surface water and groundwater monitoring data in relation to a disturbance. Selection of an appropriate method depends on the amount of data available and the temporal and spatial distribution of sampling points in relation to the disturbance.

The monitoring program for the Project includes samples collected before, during and after fracture stimulation. In addition, AGL has carried out more than four years of groundwater and surface water sampling in the Stage 1 area, providing a large number of control sites for comparison. However, monitoring for the Project includes a number of specific compounds (key analytes) that are not typically included in environmental baseline studies, limiting the value of control sites for those compounds. Further, the ANZECC (2000) guidelines do not specify trigger levels for those and other compounds analysed in this project.

In such cases, ANZECC (2000) recommend procedures for "*inference based on temporal change alone*". These include:

- *Trend analysis*: Various techniques to identify and describe trends in a chosen indicator. Statistical and control charting techniques can be used to measure changes in median (or some other mean) and variance of an indicator relative to a notional action or indicator threshold.
- *A posteriori sampling*: Applicable where a chemical marker is unequivocally related to the disturbance. For example, compounds specific (and unique) to fracture stimulation fluids (key analytes) in this project.

It should be noted that *a posteriori* sampling carried out to date has shown that compounds thought to be specific markers of fracture stimulation (e.g. THPS and MEA) are in fact present in some baseline samples and at locations remote from the Waukivory pilot wells. Those compounds therefore cannot be regarded as unequivocal markers of disturbance by virtue of their detection alone, and should be monitored for adverse trends along with other markers of water quality.

A method for assessing groundwater and surface water monitoring data for the Project has been developed in accordance with design requirements outlined in ANZECC (2000; page 7.4-4) and the Surface and Groundwater Management Plan (SGMP) (AGL, 2014a). It is noted however that the current triggers in the SGMP are currently under review. The proposed method is conceptually similar to the approach recommended in ANZECC (2000):

1. ***Filter***: All analytes (187) were filtered to identify those for which there were no detections in any sample. Those analytes were not considered further. After removing a number of non-critical and duplicated analytes, a residual list of 64 analytes remained.
2. ***Plot***: Time series plots of concentration for each detected analyte at each monitoring site were generated (Appendix I). A 5^{th} and 95^{th} percentile concentration was calculated for each time series, for all data *prior* to the current reporting period. These levels reflect the variation in the sample analyses and serve as *'**indicator thresholds**'* above (or below) which further assessment of the data may be required.
3. ***Threshold test***: The exponentially weighted moving average (EWMA) was calculated for each time series. The EWMA is a moving average that is weighted in favour of the most recent sample; the weighting decreases exponentially for progressively older samples. The parameter alpha (α) controls the distribution of weighting (a value of 0.2 was used in the analysis). An *indicator threshold* (above) is triggered if one or more EWMA values for the reporting period (quarter) exceed the 95^{th} percentile

value. The trigger simply indicates a potential trend requiring further comment; it is not a regulatory exceedance.

4. ***Trend test***: The Mann-Kendall rank correlation test (Kendall, 1938) was applied to each time series to identify if a statistically significant trend (or dependence) exists in the concentration of each analyte with respect to time. The test was applied to samples collected between the start of the fracture stimulation to the most recent sample. The level of significance was set at 95% (p-value ≤ 0.05). As above, a significant trend indicates that further review and comment is warranted.
5. ***Action trigger***: On its own, a significant data trend (as determined by the Mann-Kendall test) or an exceedance of a 95th percentile indicator threshold does not necessarily indicate impact from a disturbance activity. Rather, it acts as a trigger for further data review and assessment to determine the cause of the trend. This is a data review action trigger and is different to the primary trigger levels and the adopted thresholds for action that AGL is planning to adopt in the next version of the SGMP should there be a perceived risk to human health or the environment.
6. ***Response***: Trends that trigger an indicator threshold will be further assessed to determine if:
    a) there is sufficient data to adequately define the natural variation in concentrations
    b) the trends are clearly related to Project activities
    c) there are other factors that may indicate enhanced connectivity between the gas well and the monitoring site.

If the further data assessment suggests that the trend is related to the Project then the trend will be tracked more closely before the investigation and action levels in the SGMP are triggered and other management responses are required.

If it is concluded that the data suggests an adverse trend related to the Project then an investigation and management response will be initiated as described in the SGMP.

5.5.2 Results

Time series plots of each analyte (for which at least one sample is > LOR) and for each monitoring site are shown in Appendix I. The plots show blue shading representing the 5th to 95th percentile range of concentration prior to the last quarter and the EMWA trend in red. The fracture stimulation periods are shown in pink shading. The Mann Kendall Statistic is also shown ('nan' is shown if there is insufficient data above LOR). An example of a time series plot used for trend assessment is shown in Figure 5.9.

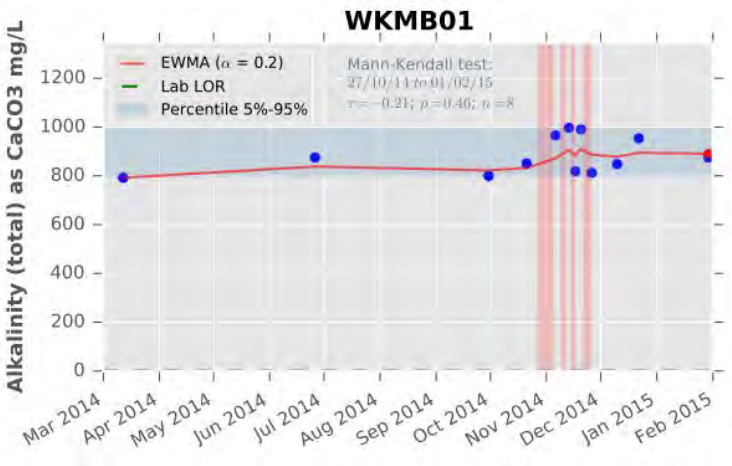
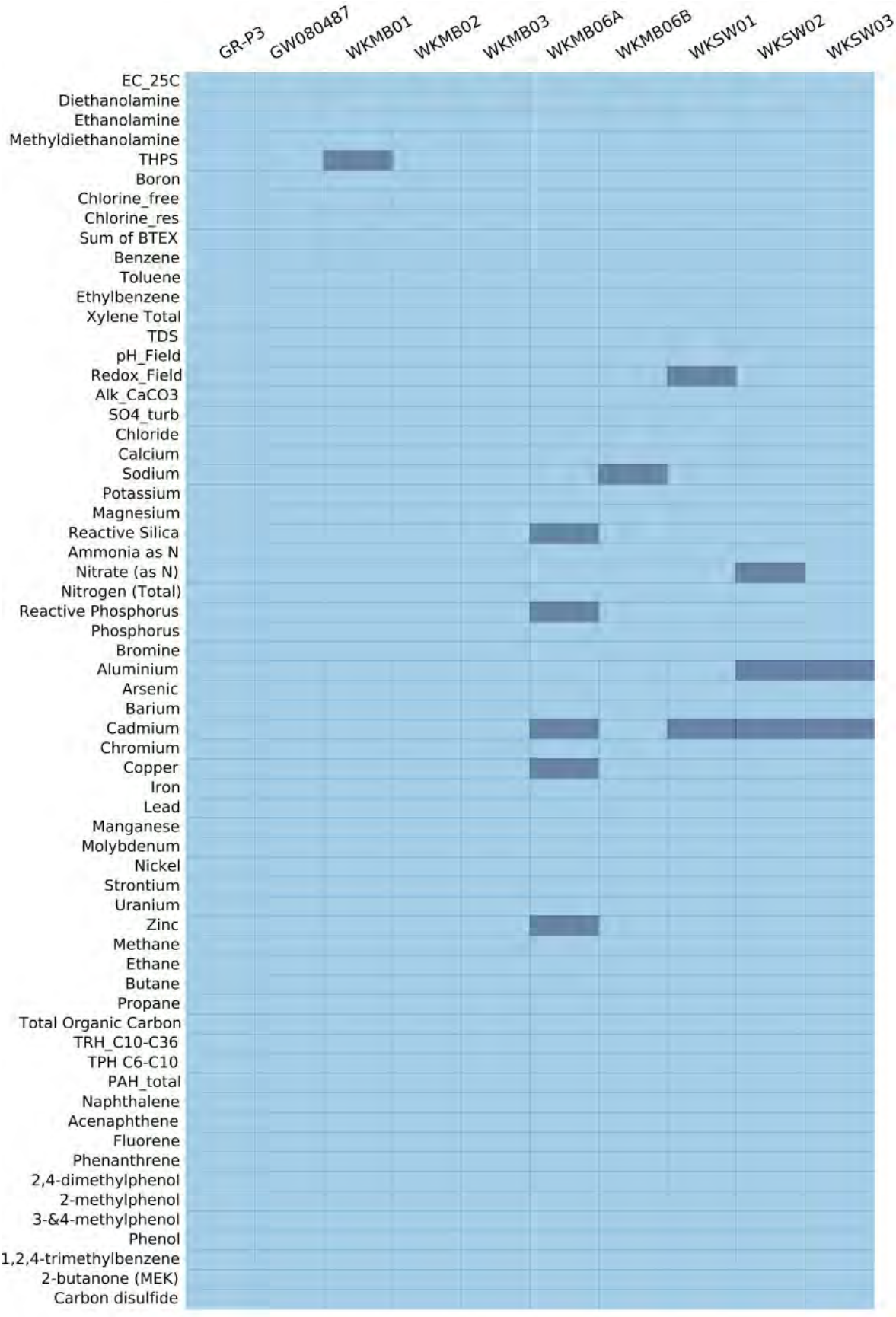


Figure 5.9 Example of time series plot used for trend analysis

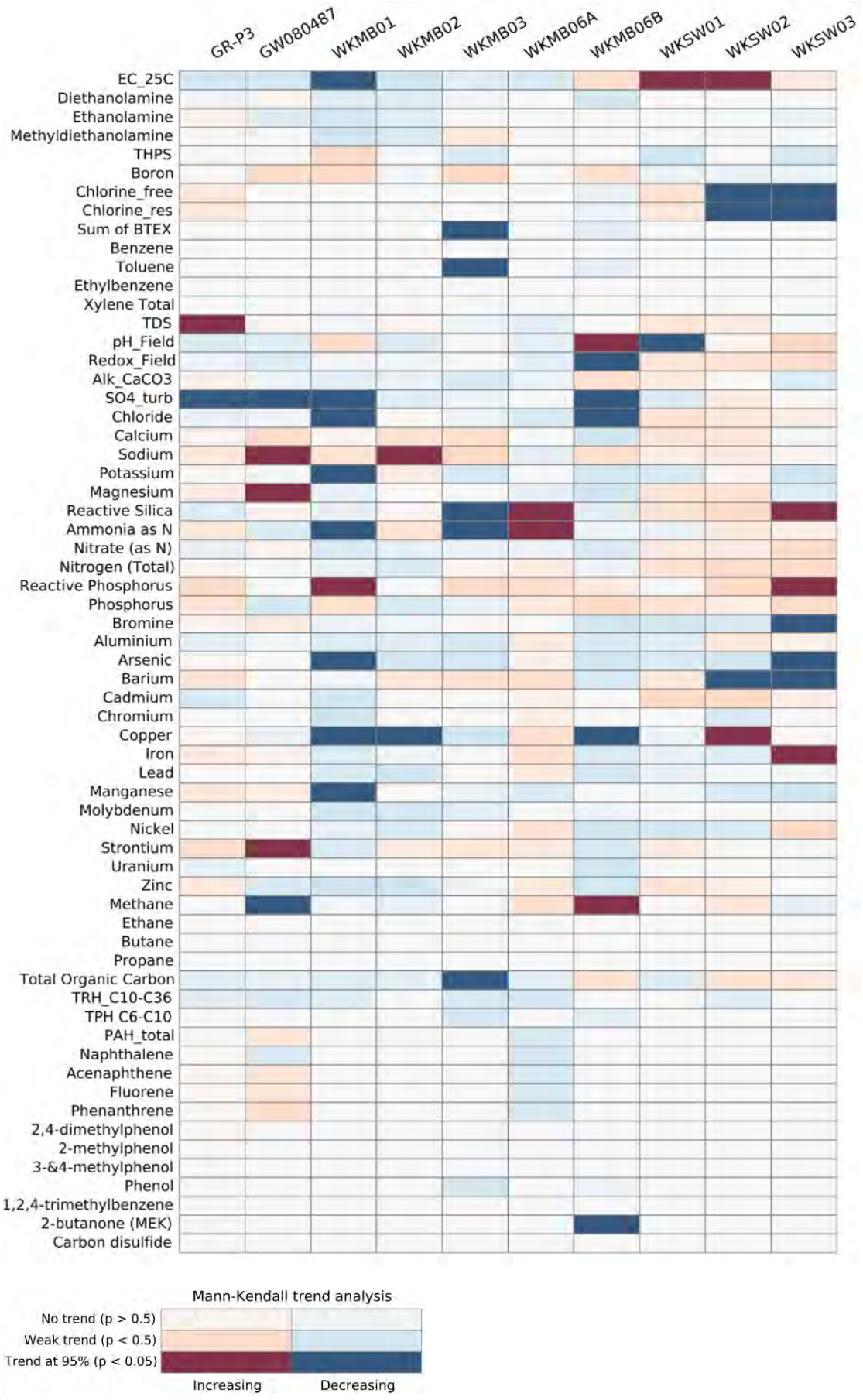
Table 5.2 summarises sites and analytes for which at least one EMWA value in the last quarter has exceeded the 95th percentile (dark blue shading). Table 5.3 summarises locations and analytes for which the time series data define a significant trend. The table is colour-coded to signify the direction of the trend (reds = increasing, blues = decreasing) and the significance of the trend. The strongest coloured rectangles represent trends that are significant at the 95% level. Locations and analytes for which an indicator threshold has been triggered are further considered in Tables 5.4 and 5.5 to assess whether additional investigation and management is required as listed in the SGMP.

Table 5.2 Comparison of the EWMA to the 5th and 95th percentile for the current reporting period



Note: Dark blue indicates sites and analytes for which at least one EMWA value in the last quarter has exceeded the 95th percentile (the P95 is calculated for data prior to the current reporting period).

Table 5.3 Summary of trends in water quality data up to 31 March 2015



5.5.3 Groundwater quality

Groundwater monitoring sites and analyses for which time series data have triggered an indicator threshold are listed in Table 5.4. Each trigger event is assessed in line with the criteria in Section 5.5.1 to determine if further investigation of the data is justified.

Table 5.4 Groundwater monitoring sites and analytes that trigger further review

Site	Analyte	Indicator type[1]	Comment	Action
WKMB01	THPS	E	Within LOR uncertainty of the laboratory method (±50 µg/L)	N
	Reactive Phosphorus	T	Latest sample 0.06 mg/L; above the 95 percentile of 0.04 mg/L, but within the range of concentrations in WKMB02 and WKMB03.	N
WKMB02	Sodium	T	Sodium is naturally higher in groundwater than in the fracture stimulation fluids and therefore not related to CSG activities	N
WKMB03	NIL		N/A	N
WKMB06A	Reactive Silica	E&T	Monitoring commenced at WKMB06A in November 2014. No data is available for the baseline period (March 2014 to October 2014) prior to fracture stimulation and flowback. Data currently insufficient for valid statistical analysis.	N
	Reactive Phosphorus	E		N
	Cadmium	E		N
	Copper	E		N
	Zinc	E		N
	Ammonia as N	T		N
WKMB06B	Sodium	E	Monitoring commenced at WKMB06B in November 2014. No data is available for the baseline period (March 2014 to October 2014) prior to fracture stimulation and flowback. Data currently insufficient for valid statistical analysis.	N
	pH	T		N
	Methane	T		N
GR-P3	TDS	T	Latest sample (2,220 mg/L) remains within narrow historical range.	N
GW080487	Sodium	T	Latest values remain within or close to the historical range. These metals are not associated with Project activities.	N
	Magnesium	T		N
	Strontium	T		N

(1) Indicator threshold type: E = EWMA outside the 5 – 95%; T = significant positive trend (Mann-Kendall $p \leq 0.05$)

5.5.3.1 Key analytes in groundwater

Of the key indicator analytes, THPS was detected in WKMB01, but was within the uncertainty of the LoR as quoted by the laboratory. None of the anomalies have been assessed as indicative of Project impacts and no management response is required.

The detection of free and total residual chlorine in groundwater samples during the baseline period was queried by the EPA in March 2015. Free and total residual chlorine was detected in groundwater and surface water samples during the previous reporting period, despite there being no sodium hypochlorite used in the fracture stimulation fluid and no, or very low detections of free and total residual chlorine in flowback water. The free and total residual chlorine is therefore unlikely to be related to fracture stimulation activities, but its

source remains unknown. Free and total residual chlorine was below the laboratory LoR during the current reporting period for all samples.

5.5.3.2 Other analytes in groundwater

Most trigger events relate concentrations of a dissolved trace metal or dissolved methane that fall within or just outside of the historical range, but lie outside of the 95th percentile range as defined by the current data set. In all cases these detections are considered to reflect natural variations and, in the case of WKMB06A and WKMB06B, a relatively short period of monitoring.

5.5.4 Surface water quality

Surface water monitoring sites and analyses for which time series data have triggered an indicator threshold are listed in Table 5.5. Each trigger event is assessed in line with the criteria in Section 5.5.1 to determine if further investigation of the data response is justified.

Table 5.5 Surface water monitoring sites and analytes that trigger further review

Site	Analyte	Indicator type[1]	Comment	Action
WKSW01	EC	T	Upward trend related to low rainfall and evaporation in late 2014. Most recent sample EC below 5th percentile	N
	Redox potential	E	Anomalous result in last quarter (240.5 mV); Redox conditions are not indicative of impacts related to the Project	N
	Cadmium	E	Anomalous result in last quarter (0.0013 mg/L), but unrelated to Project activities	N
WKSW02	EC	T	Upward trend related to low rainfall and evaporation in late 2014. Most recent sample EC below 5th percentile	N
	Copper	T	Apparent trend due to anomalous result (0.013 mg/L in December 2014). Unrelated to Project activities	N
	Nitrate	E	Anomalous result in last quarter (0.28 mg/L).	N
	Aluminium	E	Anomalous result in last quarter (0.29 mg/L), but unrelated to Project activities	N
	Cadmium	E	Anomalous result in last quarter (0.0011 mg/L), but unrelated to Project activities	N
WKSW03	Reactive Silica	T	Last sample within the historical range. Unrelated to Project activities	N
	Reactive Phosphorus	T	Apparent trend due to anomalous result (0.13 mg/L) in December 2014.	N
	Iron	T	Apparent upward trend but data plot within narrow range. Last sample < 95th percentile.	N
	Aluminium	E	Anomalous result in last quarter (0.37 mg/L), but unrelated to Project activities	N
	Cadmium	E	Anomalous result in last quarter (0.6 µg/L), but unrelated to Project activities	N

(2) Indicator threshold type: E = EWMA outside the 5 – 95%; T = significant positive trend (Mann-Kendall $p \leq 0.05$)

5.5.4.1 Key analytes in surface water

No key indicator analytes were detected at the surface water sites during the quarterly reporting period. None of the anomalies have been assessed as indicative of Project impacts and no management response is required. Previous detections of free and total residual chlorine in surface water were addressed in Section 5.5.3.1.

5.5.4.2 Other analytes in surface water

Surface water quality is highly variable and fluctuates in response to rainfall conditions and other upstream activities. Most trigger events relate to concentrations of dissolved trace metals (Cadmium and Aluminium in particular) that lie outside the 95th percentile range for the current data set. The high metals concentrations in the last sampling round are considered to reflect a recent rainfall/runoff event prior to sampling that flushed metals and nutrients into the streams following several months of low rainfall.

6. Flowback

The SGMP (Section 6.1, pages 33 – 34) (AGL, 2014a) states that:

- *The flowback water period is deemed to be finished when 100% of the volume of fracture stimulation fluids injected at each well is recovered AND a salinity trigger of 5,000 µS/cm is reached (and maintained) for the return waters; and*
- *Produced water is deemed to be all deep groundwater that is pumped to surface after the flowback water trigger is achieved.*

The total volume of fluid injected during fracture stimulation, and flowback volumes and percentage recovered up to 31 March 2015 are provided in Table 6.1. Flowback volumes are provided for all four pilot wells since commissioning in December 2014 (WK12 and WK13) and January 2015 (WK11 and WK12).

A comparison of cumulative flowback volumes recovered and laboratory electrical conductivity (EC) measurements in each of the four pilot wells is shown in Figure 6.1. At 31 March 2015 the salinity trigger of 5000 µS/cm has been reached and maintained for the flowback waters. However, the Project is still in the flowback phase as 100% of the volume of fracture stimulation fluids injected at each well has not yet been recovered (Table 6.1).

Table 6.1 Flowback volumes recovered up to 31 March 2015

	WK11		WK12		WK13		WK14	
	litres	%	litres	%	litres	%	litres	%
Total volume injected	785,450	-	480,603	-	1,516,663	-	466,535	-
Volume recovered at 31/03/2015	197,465	25.1	256,901	53.5	608,750	40.1	133,831	28.7
Volume remaining to recover at 31/03/2015	587,985	74.9	223,702	46.5	907,913	59.9	332,704	71.3

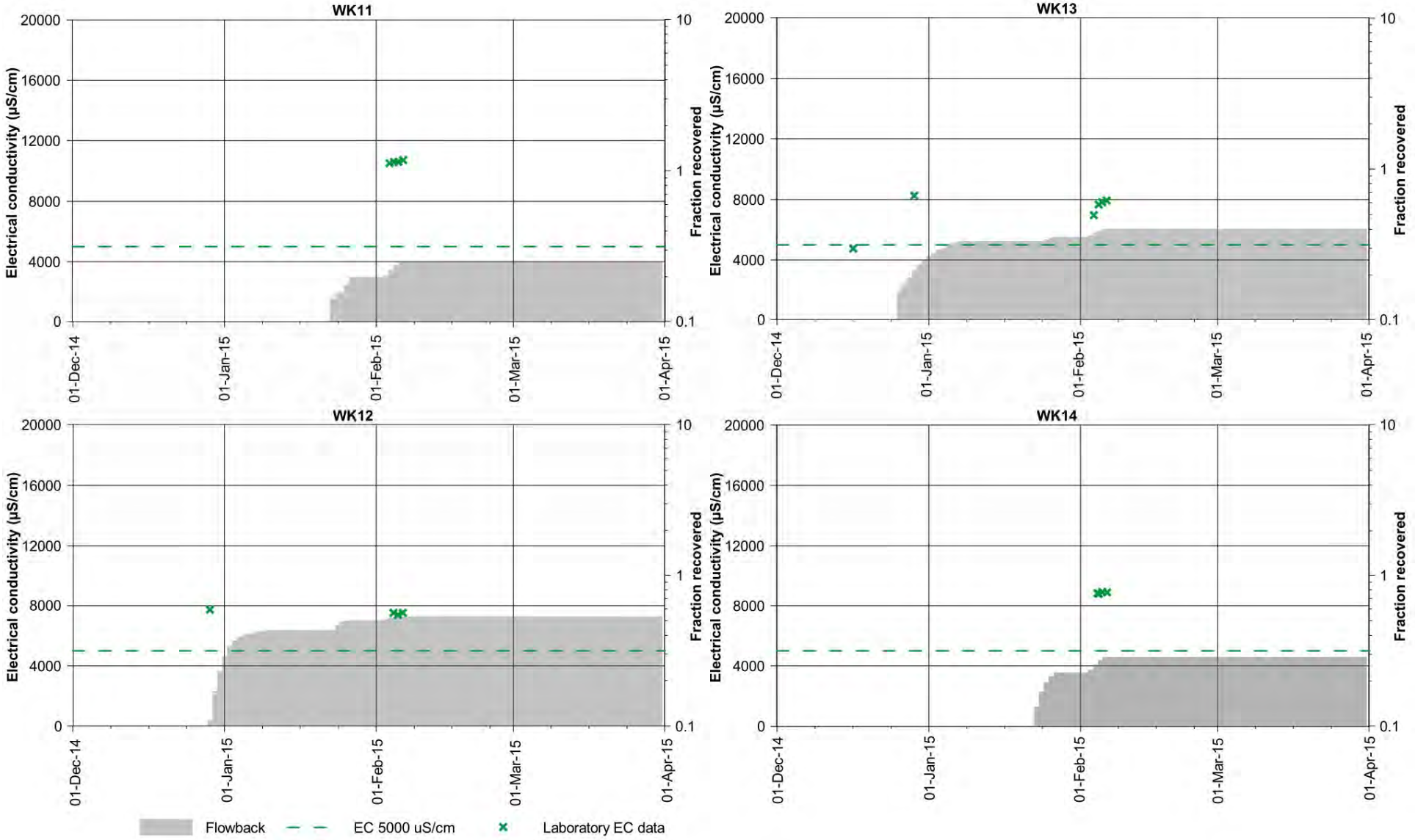


Figure 6.1 Laboratory electrical conductivity measurements and flowback volumes at the Waukivory pilot wells

7. Beneficial use

Water beneficial use categories of domestic, stock, industrial and irrigation are based on yield and salinity characteristics. A generalised beneficial use matrix is described in the SGMP (AGL, 2014a). Each aquifer can be assigned one or more beneficial use categories (based on the matrix in Table 7.1). Beneficial use categories can vary spatially for each groundwater system.

The aquifers in the Waukivory area rarely yield water at a rate greater than 1 L/s and contain poor water quality with salinities greater than 1600 µS/cm (AGL, 2014a). The beneficial use categories that apply across the Gloucester Basin are shown in Table 7.1.

Table 7.1 Generalised beneficial use matrix, based on salinity and yield

		Yield (L/s)			
		<5	0.5-5	<0.5	
Salinity (µS/cm)	0-800	D+I+S	D+I+S	D+S	A
	801-1600	D+I+S	D+I+S	D+S+In	B
	1601-4800	I+S+In	I+S+In	S+In	C
	4801-10000	S+In	S+In	In	D
	10001-20000	In	In	In	E
	>20000				F
		1	2	3	

Key: D – domestic; I – irrigation; S – stock; In – industry

- Alluvial baseline
- Alluvial fracture stimulation
- Alluvial flowback
- Shallow rock baseline
- Shallow rock fracture stimulation
- Shallow rock flowback

The salinity (EC) data on which the beneficial use classification for the Waukivory pilot area is based is summarised in Table 7.2. All data that is within the 10th percentile and the 90th percentile has been used in the beneficial use classification. A percentile is the value below which a given percentage of observations fall. For example, the 10th percentile is the value below which 10% of observations are found. The 10th and 90th percentiles presented in Table 7.2 are used as a method of discounting outlying values.

The yield data is assumed to remain unchanged from the assessment documented in the SGMP (AGL, 2014a).

Table 7.2 Summary statistics for electrical conductivity during baseline and fracture stimulation water quality monitoring

		Electrical conductivity (µS/cm)			
		Alluvial		**Shallow Rock**	
		Field	**Lab**	**Field**	**Lab**
Baseline	10th percentile	3966	4105	880	912
	Median	4013	4215	3865	3970
	90th percentile	4248	4297	5644	5960
Fracture stimulation	10th percentile	2737	2754	884	862
	Median	3821	4090	3739	3870
	90th percentile	4013	4105	4920	5048
Flowback	10th percentile	2596	2628	998	1022
	Median	2431	3260	2571	2595
	90th percentile	3919	3892	4279	4333

The following beneficial use categories can be assigned to each of the groundwater systems in the Waukivory area during the baseline reporting period, as shown in Table 7.1:

- Alluvial aquifers – C2, C3
- Shallow rock aquifers – B2, B3, C2, C3, D2, D3.

The following beneficial use categories can be assigned to each of the groundwater systems in the Waukivory area during the fracture stimulation period, as shown in Table 7.1:

- Alluvial aquifers – C2, C3
- Shallow rock aquifers – B2, B3, C2, C3, D2, D3.

The following beneficial use categories can be assigned to each of the groundwater systems in the Waukivory area during the flowback period, as shown in Table 7.1:

- Alluvial aquifers – C2, C3
- Shallow rock aquifers – B2, B3, C2, C3.

Salinity (EC) data from the current reporting period show an apparent improvement from the baseline and fracture stimulation reporting periods to the flowback reporting period. This is likely due to natural variation (such as rainfall recharge during the period) combined with the relatively limited data available in the flowback reporting period (one sampling event only from the Waukivory groundwater monitoring sites). No management response is required.

Water beneficial use categories of domestic, stock, industrial and irrigation are based on yield and salinity characteristics. There has been no change in the beneficial use classification of the different waters across the different phases of the Project.

8. Conclusions

The following conclusions are drawn from a review of the flowback water and groundwater and surface water monitoring data for the Waukivory site, during the period 1 January to 31 March 2015. The review included:

- Interpretation of water level and water quality trends.
- Assessment as to whether trends are naturally occurring or potentially attributed to Project activities.
- Assessment of key analytes associated with fracture stimulation additives defined in AGL's SGMP.

Pilot well water levels

Pressure levels in the pilot wells are highly variable and dependent on pump commissioning (commencement of flowback) and operation. Flowback commenced in pilot wells WK12 and WK13 in December 2014 and in pilot wells WK11 and WK14 in January 2015. Pressure levels decreased by 150 to 650 m during flowback and showed significant recoveries during periods when pumping was suspended.

Pilot well water quality

The pilot well water quality during the current flowback phase is showing a strong migration towards typical coal seam formation water (as depicted by produced water from CR06 and WK03).

The salinity (EC) of the flowback water from all pilot wells is greater than the 5000 µS/cm trigger for the transition from flowback to produced water.

MEA and THPS concentrations have shown a declining trend consistent with the removal of the fracture stimulation fluid during flowback and the natural breakdown of these compounds.

BTEX concentrations in the flowback water are greater than those found in the produced water from CR06 and WK03. During pumping, BTEX concentrations show a marked decline and are expected to reach background concentrations with continued pumping.

Pilot well water volumes

The total flowback water volumes recovered from each well as of 31 March 2015 range from 197,465 to 608,750 L.

The water recovery as a percentage of total volume injected during fracture stimulation ranges from 25.1% to 53.5% as of March 31 2015. Therefore all wells are currently in the flowback phase as 100% of the total volume injected has not been recovered from any well.

AST2 water quality

The data shows some changes in the physio-chemical parameters over time such as an increase in pH and decrease in Dissolved Oxygen (DO). This is expected with the transition from flowback water to produced water.

The increased pH is likely to have contributed to the decrease in dissolved metals concentrations shown in the time series plots for some analytes including aluminium, arsenic, zinc, iron and manganese.

MEA concentrations have shown a declining trend consistent with that observed in the flowback water from the individual pilot wells and the accelerated breakdown of this compound due to exposure to UV radiation.

The sum of BTEX concentrations for AST2 during the current reporting period have ranged from 0 to 48 µg/L, which is an order of magnitude less than the median concentration from the pilot wells of 348 µg/L (range 0 to 795 µg/L) during the reporting period. The decrease in concentration is due to volatilisation and biodegradation of BTEX compounds from the surface of the standing water in AST2.

Groundwater levels

Groundwater levels in all Waukivory monitoring bores have shown no response attributable to fracture stimulation or flowback from the pilot wells during the current reporting period.

Groundwater levels in alluvial monitoring bores GR-P3 and WKMB06A show an overall increase of about 0.1 m during the current reporting period.

Groundwater levels in the shallow rock monitoring bores WKMB01, WKMB02 and WKMB06B show an overall increase of about 0.1 m during the current reporting period.

Groundwater levels at WKMB02 show an increase in groundwater levels, in response to individual rainfall events on 26 December 2014 and 28 January 2015, of about 0.2 m; this is a greater magnitude response than that observed at other alluvial or shallow rock monitoring bores at Waukivory.

Groundwater levels in monitoring bore WKMB03 screened in the interburden (and thrust fault zone) show no overall change.

Both WKMB03 and WKMB06B are screened across the thrust fault zone, and WKMB06A is screened within the alluvium above the thrust fault zone. Hydrographs from these three monitoring bores show no anomalous water level responses and therefore provide no evidence of connectivity between the fracture simulation zones and the shallow groundwater system via the thrust fault zone.

There are divergent pressure trends at WKMB05, with different sensors showing downward, constant and upward trends during the reporting period. It is not yet clear how, or if, these trends relate to the Project flowback activities; it is possible they represent delayed pressure responses, from either fracture stimulation or the commencement of flowback, due to the low permeability of the interburden. The decrease observed at Sensor 2 within the Cloverdale Coal Seam since early January 2015 is the most prominent response and could be related to the pumping and flowback activities at WK13.

Groundwater quality

There has been one groundwater quality sampling event during the current reporting period. The data shows that there were no adverse trends associated with Project activities.

Surface water levels

Water levels at the Waukivory stream gauge sites show no response attributable to flowback from the pilot wells during the current reporting period.

Water levels at stream gauge sites WKSW01 (Avon River upstream), WKSW02 (Waukivory Creek) and WKSW03 (Avon River downstream) have shown an overall increase during the reporting period (January 2015 to March 2015) due to rainfall events over this period.

Surface water quality

There has been one surface water quality sampling event during the current reporting period. The data shows that there were no adverse trends associated with Project activities.

Water Beneficial Use Conditions

Salinity (EC) data from the current reporting period show an apparent improvement from the baseline and fracture stimulation reporting periods to the flowback reporting period. This improvement is based on relatively limited data available in the flowback reporting period (one sampling event from the Waukivory groundwater monitoring sites) and is likely to be due to natural variation. No management response is required.

Water beneficial use categories of domestic, stock, industrial and irrigation are based on yield and salinity characteristics. There has been no change in the beneficial use classification of the different waters.

Actions to correct identified adverse trends

Analysis of monitoring results has not identified adverse trends that require corrective action.

9. Statement of limitations

Scope of services

This second operational quarterly report (the report) has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the client and Parsons Brinckerhoff (scope of services). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

Reliance on data

In preparing the report, Parsons Brinckerhoff has relied upon data, surveys, analyses, designs, plans and other information provided by the client and other individuals and organisations, most of which are referred to in the report (the data). Except as otherwise stated in the report, Parsons Brinckerhoff has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (conclusions) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Parsons Brinckerhoff will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Parsons Brinckerhoff.

Environmental conclusions

In accordance with the scope of services, Parsons Brinckerhoff has relied upon the data and has conducted environmental field monitoring and/or testing in the preparation of the report. The nature and extent of monitoring and/or testing conducted is described in the report.

On all sites, varying degrees of non-uniformity of the vertical and horizontal soil or groundwater conditions are encountered. Hence no monitoring, common testing or sampling technique can eliminate the possibility that monitoring or testing results/samples are not totally representative of soil and/or water conditions encountered. The conclusions are based upon the data and the environmental field monitoring and/or testing and are therefore merely indicative of the environmental condition of the site at the time of preparing the report, including the presence or otherwise of contaminants or emissions.

Also, it should be recognised that site conditions, including the extent and concentration of contaminants, can change with time.

Within the limitations imposed by the scope of services, the monitoring, testing, sampling and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

Report for benefit of client

The report has been prepared for the benefit of the client (and no other party). Parsons Brinckerhoff assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of Parsons Brinckerhoff or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Parties other than the client should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

Other limitations

Parsons Brinckerhoff will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

10. References

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Appendix A

Sampling dates, locations and rationale

Table A1.1 Monitoring dates and rationale for groundwater and surface water sampling

	Monitoring point										
	EPA ID	10	11	12	na	na	90	91	9	8	7	Sampling rationale
	AGL Location	WKMB01	WKMB02	WKMB03	WKMB06A	WKMB06B	GR-P3	GW080487	WKSW01	WKSW02	WKSW03	
Sampling date	11 Mar 14 12 Mar 14 13 Mar 14	x	x	x			x	x	x	x	x	2014 baseline #1 (pre-Waukivory Pilot)
	26 Jun 14 27 Jun 14	x	x	x			x		x	x	x	2014 baseline #2 (pre-Waukivory Pilot)
	30 Sep 14 1 Oct 14	x	x	x			x	x	x	x	x	2014 baseline #3 (pre-Waukivory Pilot)
	21 Oct 14 22 Oct 14	x	x	x			x	x	x	x	x	2014 baseline #4 (pre-Waukivory Pilot)
	6 Nov 14	x	x	x			x	x	x	x	x	within 24 hours of the completion of the fracture stimulation of WK13
	12 Nov 14 13 Nov 14	x	x	x			x	x	x	x	x	within 24 hours of the completion of the fracture stimulation of zone 2 WK12[(a)], one week after fracture stimulation of WK13 for surface water samples
	17 Nov 14 18 Nov 14	x	x	x			x	x	x	x	x	within 24 hours of the completion of the fracture stimulation of WK14
	18 Nov 14 19 Nov 14				x	x			x	x	x	first sampling events following installation of the new bores, one week after fracture stimulation of zone 2 WK12 for surface water samples

	Monitoring point										
EPA ID	10	11	12	na	na	90	91	9	8	7	Sampling rationale
AGL Location	WKMB01	WKMB02	WKMB03	WKMB06A	WKMB06B	GR-P3	GW080487	WKSW01	WKSW02	WKSW03	
20 Nov 14	x	x	x			x	x	x	x	x	within 24 hours of the completion of the fracture stimulation of WK12
24 Nov 14								x	x	x	one week after fracture stimulation of WK14 for surface water samples
26 Nov 14 27 Nov 14	x	x	x			x	x	x	x	x	within 24 hours of the completion of the fracture stimulation of WK11, one week after fracture stimulation of WK12 for surface water samples
3 Dec 14								x	x	x	one week after fracture stimulation of WK13 for surface water samples
9 Dec 14 10 Dec 14	x	x	x	x	x	x	x				two weeks after the completion of the fracture stimulation of WK11
22 Dec 14 23 Dec 14	x	x	x	x	x	x	x				four weeks after the completion of the fracture stimulation of WK11
29 Jan 15 30 Jan 15	x	x	x	x	x	x	x	x	x	x	two weeks from commencement of flowback

[a] Additional sampling event – not required under Special Frequency 3 (EPL 20358)

Table A1.2 Monitoring dates and rationale for flowback sampling

		Monitoring point					
	AGL Location	AST2	WK11	WK12	WK13	WK14	Reason for sampling
Sampling date	16 Dec 14				X		commencement of flowback
	29 Dec 14	X		X	X		fortnightly sampling from the commencement of flowback
	12 Jan 15	X					fortnightly sampling from the commencement of flowback
	28 Jan 15	X					fortnightly sampling from the commencement of flowback
	2 Feb 15	X					BTEX investigation
	3 Feb 15	X	X		X		BTEX investigation
	4 Feb 15	X	X	X	X	X X[(a)]	BTEX investigation
	5 Feb 15	X	X	X	X	X	BTEX investigation
	6 Feb 15	X	X	X	X	X	BTEX investigation
	26 Feb 15	X					AST2 water quality monitoring

[(a)] Two samples collected from WK14 on 4 February 15

Appendix B

Parsons Brinckerhoff sampling procedures

PARSONS BRINCKERHOFF

Groundwater Team

Standard Operating Procedure Groundwater and Surface Water Sampling

1. Purpose and scope

This procedure outlines general protocols and work practices to be applied when collecting groundwater and surface water samples.

It is noted that other methods of groundwater and surface water sampling are possible and that deviation from this standard operating procedure (SOP) may be appropriate in some circumstances. The rationale for any deviations from this SOP should be discussed and agreed to with the Project Manager (PM) prior to undertaking the works and documented during the works.

2. References

- AS/NZS 5667.1:1998: Water quality - Sampling - Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples.
- AS/NZS 5667.11:1998: Water quality - Sampling - Guidance on sampling of groundwaters.
- AS/NZS 5667.6:1998: Water quality - Sampling - Guidance on sampling of rivers and streams.
- Australian and New Zealand Environmental Conservation Council, and Agricultural and Resource Management Council of Australia and New Zealand 2000 *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* October 2000.
- Geoscience Australia 2009, *Groundwater Sampling and Analysis – a field guide*, Geoscience Australia, Record 2009/27 95 pp.
- Parsons Brinckerhoff safe work method statements (SWMS's) for the use of the micropurge control box, generator, air compressor, Grundfos and 12-volt pump.
- State guidelines and regulations (as applicable).

3. Input documentation

- Site specific Health, Environment and Safety Plan (HESP), SWMS's and other related OHSE documents.
- Site specific access permits (if required).

4. Equipment

- Personal protective equipment and other safety equipment as identified in the HESP.
- Camera and mobile phone.
- Field data recording forms or all-weather field book, chain-of-custody forms (COC), marker pen (water proof – permanent is preferable) and pencil.
- Electronic dip meter (dipper).
- Water sampling collection equipment: water quality meter, calibration solutions, sample bottles, esky and ice.
- Groundwater sample collection equipment (as required): bailer, rope, pump, regulator, compressor, no-purge sampler, keys and screwdriver.

- Surface water sample collection equipment (as required): sampler (bomb, Van Dorn, telescopic sampler, long handled sampling pole, bucket).
- Decontamination equipment including clean buckets, phosphate free detergent e.g. Decon 90, potable water and deionised water (if required).
- Appropriately labelled waste disposal containers for off-site disposal of waste water (if required) e.g. 200 L drums.

5. Groundwater levels

- Slowly lower the dipper down the well and measure and record the depth to groundwater from the marked point at the top of the casing and record. If no marking is present, measure from the highest point of the casing and note this on the field data recording form.
- Measure and record the depth to the base of the well and record (typically for shallow bores).
- Before installing a data logger, a manual water level measurement should be taken as well as prior to every logger download.
- Program the data logger and then install the data logger into a bore by suspending the logger on a wire cable in the water column. Secure the logger with a wire cable to the top of the well casing using metal swages. Potential groundwater level variations in the bore and individual logger specifications (different loggers have different pressure thresholds) should be considered before the depth at which the logger is to be installed is determined, as the logger must remain below the groundwater level.

6. Purge volumes

- Typically three bore volumes are removed from a bore prior to sampling (moderate to high yielding bores). Less than three bore volumes can be removed prior to sampling in the following circumstances:
  - a bore is purged dry or drawn down to the level of the pump for low yielding bores
  - field parameters stabilise prior to the removal of three bore volumes (see Section 7)
  - no-purge sampling equipment is used
  - low-flow groundwater pumps are used, with the intake at the screened section.
- One bore volume (L) = approximately 2 x height of water column (m) for 50 mm wells.

7. Deployment and purging

- Decontaminate non-disposal groundwater sampling equipment.
- Calibrate the water quality meter daily.
- Unstable parameters should be measured in the field, such as temperature, dissolved oxygen (DO), oxidation-reduction potential (redox), electrical conductivity (EC) and pH as purging progresses. Total dissolved solids and carbon dioxide can also be measured in the field if required.
- Continue purging until at least three consecutive sets of field parameters are obtained and monitor the changes in pH, temperature and EC Samples should not be taken until consecutive sets of field parameters agree to within 10%:
- Qualitatively assess and record the colour of purged water, turbidity, any odours and other observations and note this on the field data recording form.

7.1 Pump selection

A range of methods can be used to obtain groundwater quality samples from monitoring bores. The most appropriate method for each bore should be selected based on the depth of the bore, the diameter of the bore, the depth to groundwater, and the permeability of the screened formation. Higher yielding monitoring bores are typically purged and sampled using a submersible (high-flow) pump. Lower yielding bores are typically sampled using a low-flow pump.

7.1.1 Submersible (high-flow) pump

- Refer to Parsons Brinckerhoff's SWMS's for the use of the micropurge control box, generator, air compressor, Grundfos and 12-volt pump.
- Three bore volumes are typically extracted.

7.1.2 Low-flow (micropurge) groundwater sampling

- The micropurge pump allows groundwater to be drawn into the pump intake directly from the screened portion of the aquifer, eliminating the need to purge large volumes of groundwater from these bores.
- Refer to Parsons Brinckerhoff's SWMS for the micropurge.

7.1.3 Bailing

- Lower the bailer down the well and commence purging.
- Disturbance of groundwater in the well should be minimised by lowering and withdrawing the bailer gently. Volatilisation should be minimised when transferring liquid from the bailer into the sample bottle.

7.1.4 No-purge groundwater sampling

- Ensure that a sufficient volume of groundwater can be recovered to enable the required analysis, and measurement of groundwater quality parameters, can be conducted.
- Deploy and retrieve the no-purge sampler in the well in accordance with the manufacturer's instructions. No purging is required for this method of groundwater sampling.
- No-purge samplers include diffusion samplers e.g. PDBS, RPPS, PsMS, and RCS and grab samplers e.g. HydraSleeve® and Snap Sampler™.

8. Sampling

8.1 All water samples

- Label the lid and/or side of water sample bottles with sample ID, date and time.
- When collecting samples for volatile analysis, make sure all bottles are filled as far as practicable to minimise the headspace within the container and avoid potential loss of volatiles.
- Immediately place all samples into an esky pre-packed with ice or ice bricks, or a cooled field fridge. To reduce the potential for breakage, samples can be placed on the firm base of the esky with ice placed in a secure bag (to prevent leakage) on top. Samples should be arranged to minimise lateral movement during transport, and free space can be reduced by adding inert packing material (bubble wrap etc.) if required.

- Complete a quality control check of the labels of all samples submitted to the laboratory against the sample IDs on the COC.
- Transport all samples on ice (temperature below 4°C) to the laboratory as soon as practical with the completed and relinquished COC. The COC should include the following information: sample ID, date and time of sampling, project number, number of sample bottles, analysis requested, laboratory quote number, specific comments and remarks, name and signature of collector, date and time samples are relinquished, contact details.
- Decontaminate all non-disposable sampling equipment between sampling locations through the use of decon with tap water followed by a rinse with tap water. Deionised water should be used if a rinsate sample is required.
- Any split replicate (triplicate) samples should be sent directly to the secondary laboratory in a separate esky from that containing the primary samples, with all other samples sent to the primary laboratory.
- Typically samples should not be frozen. Exceptions include samples for total phosphorus (AS/NZS 5667.1:1998) however advice must be sought from the laboratory.

8.2 Surface water samples

- Sample surface water from upstream and work downstream. Take care to avoid disturbing sediment.
- Note and record the appearance of the surface water body, i.e. colour, turbidity, odour, surface crusts, films or floating material, algae, etc. Also note any other relevant observations such as dead or distressed vegetation, surface rubbish, surface sheen, etc.
- If sampling un-stratified surface waters, lower the surface water sampler carefully into the surface water body at a location well away from the edge. Collect the water sample from approximately 100 mm below the surface of the water body. Following collection, decant the surface water sample into the laboratory supplied sample containers. Use a dedicated sampling bottle for each location. Never submerse laboratory-supplied sample bottles that may contain acid or preservative, into the surface water body.
- If sampling stratified surface waters, lower a weighted sampler such as a bomb sampler or a Van Dorn sampler below the water surface to the depth required, and allow to fill until bubbles stop rising to the surface. When the bottle is full, gently remove it from the water.
- If sampling for metals, no filtering is required (total metals).

8.3 Groundwater samples

- Collect groundwater samples for volatile analytes first.
- If sampling for metals, groundwater samples are to be field filtered (typically filtered to 0.45 um).
- Withdraw sampling equipment from the well and replace/lock well caps and covers.

9. Quality Control (QC) sample collection

- The requirement for QC samples should be assessed depending on the project and client requirements. The following provides the types of QC samples that may be required and a suggested frequency:
  - Blind replicates (duplicates): 1 in 20 primary samples.
  - Split replicates (triplicates): 1 in 20 primary samples.

  - Rinsate blank: 1 per day of sampling or as specified with the client/PM. Run deionised water over the decontaminated field sampling equipment and into a laboratory provided sample container. Place in the esky or field fridge with the other samples. The rinsate blank shall be analysed for the same analytes as the field sample collected immediately prior to decontamination of the field equipment. Not necessary when dedicated equipment is used for purging and sampling.
  - Trip blank: 1 per esky or as specified with the client/PM. Two vials containing deionised water will be provided by the laboratory. Keep the vials in the same esky as the primary and blind replicate samples during transport to/from the site and during site works. The trip blank shall be analysed for the same volatile compounds as the primary samples. Record which eskys contained which trip blank samples on the COC in case detectable concentrations of contaminants are reported in trip blank samples.
  - Field blank and trip spike: as specified with the client/PM.
- Label QC samples 'QC**_date' with the first QC sample labelled QC01 and the second labelled QC02 etc. in order of collection. This includes blind and split replicates as well as rinsate, trip and field blanks and trip spikes.

10. Waste disposal

- Store and dispose of waste water appropriately. Waste water should not be disposed of onto the site surface or to sewer/stormwater without testing, unless approved by the client and appropriate procedures are in place to ensure that there is no adverse impact to the environment or human health.
- Waste water can be collected in appropriately labelled waste containers. 200 L drums are suitable for most projects requiring waste water removal.
- Refer to the Contaminated Land Management SOP for further details regarding waste disposal.

11. Output documentation

The following documents shall be placed on the electronic project file as soon as possible upon completion of the fieldwork:

- Field data recording forms or relevant pages from the all-weather field book.
- Completed COC.
- Signed HESP.

Appendix C

Laboratory QC reports

Appendix C

Laboratory QC reports summary table

Date samples received	Report number	Lab Name
13-January-2015	ES1500419	ALS
30-January-2015	ES1501844	ALS
29-January-2015	ES1501981	ALS
29-January-2015	ES1501982	ALS
02-February-2015	ES1502224	ALS
04-February-2015	ES1502485	ALS
04-February-2015	ES1502614	ALS
05-February-2015	ES1502642	ALS
05-February-2015	ES1502776	ALS
05-February-2015	ES1502783	ALS
06-February-2015	ES1502916	ALS
06-February-2015	ES1502917	ALS
26-February-2015	ES1504724	ALS
13-January-2015	121884	Envirolab
30-January-2015	122757	Envirolab
02-February-2015	122818	Envirolab
04-February-2015	122955	Envirolab
05-February-2015	123059	Envirolab
05-February-2015	123060	Envirolab
06-February-2015	123117	Envirolab
06-February-2015	123154	Envirolab
26-February-2015	124237	Envirolab

QUALITY CONTROL REPORT

Work Order	: **ES1500419**	Page	: 1 of 21
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: SDaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 13-JAN-2015
Sampler	: BR/SD	Issue Date	: 12-MAY-2015
Order number	: ----		
		No. of samples received	: 1
Quote number	: SY/933/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Edwandy Fadjar	Organic Coordinator	Sydney Organics
Lana Nguyen	Senior LCMS Chemist	Sydney Organics
Merrin Avery	Supervisor - Inorganic	Newcastle - Inorganics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA005: pH (QC Lot: 3786342)									
ES1500417-001	Anonymous	EA005: pH Value	----	0.01	pH Unit	8.41	8.45	0.5	0% - 20%
ES1500420-012	Anonymous	EA005: pH Value	----	0.01	pH Unit	8.76	8.79	0.3	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 3785587)									
ES1500419-001	AST2	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	6310	6300	0.2	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 3788855)									
ES1500246-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	29	22	28.3	No Limit
ES1500467-002	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	40500	40300	0.3	0% - 20%
EA025: Suspended Solids (QC Lot: 3788856)									
ES1500246-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	9	8	0.0	No Limit
ES1500467-002	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	54	46	17.1	0% - 50%
ED009: Anions (QC Lot: 3788129)									
ES1500419-001	AST2	ED009-X: Chloride	16887-00-6	0.100	mg/L	508	526	3.5	0% - 20%
ES1500625-001	Anonymous	ED009-X: Chloride	16887-00-6	0.100	mg/L	3070	3100	1.0	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3785586)									
ES1500419-001	AST2	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	252	239	5.4	0% - 20%
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	2260	2350	3.8	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	2510	2590	2.9	0% - 20%
ES1500685-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	116	129	10.4	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	116	129	10.4	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3785547)									
ES1500419-001	AST2	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	<10	0.0	No Limit
ES1500494-013	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	11100	11200	1.0	0% - 20%
ED045G: Chloride Discrete analyser (QC Lot: 3785545)									
ES1500419-001	AST2	ED045G: Chloride	16887-00-6	1	mg/L	512	506	1.2	0% - 20%
ES1500494-013	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	1130	1130	0.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 3788460)									
ES1500419-001	AST2	ED093F: Calcium	7440-70-2	1	mg/L	23	23	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	3	3	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	1640	1640	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	17	17	0.0	0% - 50%
EW1500138-004	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	65	65	0.0	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
ED093F: Dissolved Major Cations (QC Lot: 3788460) - continued									
EW1500138-004	Anonymous	ED093F: Magnesium	7439-95-4	1	mg/L	71	72	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	109	107	1.8	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	15	15	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3788458)									
ES1500419-001	AST2	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0028	0.0028	0.0	0% - 20%
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.008	0.008	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	2.75	2.74	0.2	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.046	0.045	0.0	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.021	0.021	0.0	0% - 20%
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.035	0.035	0.0	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.005	0.006	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.008	0.008	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.074	0.075	2.1	0% - 50%
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.03	0.04	31.2	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	11.8	11.7	0.6	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.22	0.21	0.0	No Limit
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	0.8	0.8	0.0	No Limit
ES1500494-008	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.044	0.043	0.0	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	3.45	3.54	2.4	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.002	0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.010	0.011	12.6	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3788458) - continued									
ES1500494-008	Anonymous	EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.30	0.28	8.9	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	0.4	0.4	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3788461)									
ES1500419-001	AST2	EG020B-F: Strontium	7440-24-6	0.001	mg/L	2.59	2.57	0.7	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 3788459)									
ES1500489-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG052G: Silica by Discrete Analyser (QC Lot: 3785546)									
ES1500419-001	AST2	EG052G: Reactive Silica	----	0.05	mg/L	20.2	20.5	1.1	0% - 20%
EK010/011: Chlorine (QC Lot: 3786836)									
ES1500419-001	AST2	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
		EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
ME1500064-003	Anonymous	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
		EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3785588)									
ES1500419-001	AST2	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.9	1.0	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3788042)									
ES1500199-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.08	0.07	0.0	No Limit
ES1500696-003	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3785543)									
ES1500419-001	AST2	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES1500494-013	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	0.18	0.18	0.0	0% - 50%
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3788041)									
ES1500199-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.43	0.43	0.0	0% - 20%
ES1500636-004	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.54	0.54	0.0	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3788046)									
ES1500199-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.2	0.0	No Limit
ES1500639-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.5	0.5	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3788047)									
ES1500199-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.02	<0.02	0.0	No Limit
ES1500639-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.03	0.02	38.0	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3785544)									
ES1500419-001	AST2	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	<0.01	68.7	No Limit
ES1500494-013	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.07	0.07	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 3786207)									
EM1500183-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	30	31	0.0	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP005: Total Organic Carbon (TOC) (QC Lot: 3786207) - continued									
ES1500438-004	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	6	6	0.0	No Limit
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 3788548)									
EM1500235-003	Anonymous	EP033: Methane	74-82-8	10	µg/L	85	104	20.4	0% - 50%
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
ES1500592-001	Anonymous	EP033: Methane	74-82-8	10	µg/L	1970	1890	3.8	0% - 20%
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	16	14	10.4	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 3786220)									
ES1500457-029	Anonymous	EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
ES1500573-002	Anonymous	EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
EP074B: Oxygenated Compounds (QC Lot: 3786220)									
ES1500457-029	Anonymous	EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074B: Oxygenated Compounds (QC Lot: 3786220) - continued									
ES1500573-002	Anonymous	EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit
EP074C: Sulfonated Compounds (QC Lot: 3786220)									
ES1500457-029	Anonymous	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
ES1500573-002	Anonymous	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
EP074D: Fumigants (QC Lot: 3786220)									
ES1500457-029	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
ES1500573-002	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3786220)									
ES1500457-029	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3786220) - continued									
ES1500457-029	Anonymous	EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
ES1500573-002	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 3786220)									
ES1500457-029	Anonymous	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074F: Halogenated Aromatic Compounds (QC Lot: 3786220) - continued									
ES1500457-029	Anonymous	EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
ES1500573-002	Anonymous	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 3786220)									
ES1500457-029	Anonymous	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
ES1500573-002	Anonymous	EP074: Chloroform	67-66-3	5	µg/L	16	18	8.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	11	12	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	8	9	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3786221)									
ES1500457-029	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3786221)									
ES1500457-029	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 3786221)									
ES1500457-029	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP262: Ethanolamines (QC Lot: 3786158)									
ES1500419-001	AST2	EP262: Ethanolamine	141-43-5	1	µg/L	118	129	8.9	0% - 20%
		EP262: Diethanolamine	111-42-2	1	µg/L	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010P: Conductivity by PC Titrator (QCLot: 3785587)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	107	95	113
EA015: Total Dissolved Solids (QCLot: 3788855)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	293 mg/L	108	67	125
				----	2000 mg/L	101	87	109
EA025: Suspended Solids (QCLot: 3788856)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	111	83	129
				----	1000 mg/L	98.2	86	110
ED009: Anions (QCLot: 3788129)								
ED009-X: Chloride	16887-00-6	0.1	mg/L	<0.100	2 mg/L	101	89	107
ED037P: Alkalinity by PC Titrator (QCLot: 3785586)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	98.6	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3785547)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	94.9	86	122
ED045G: Chloride Discrete analyser (QCLot: 3785545)								
ED045G: Chloride	16887-00-6	1	mg/L	----	1000 mg/L	99.9	77	119
				<1	10 mg/L	105	75	123
ED093F: Dissolved Major Cations (QCLot: 3788460)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	# 87.2	90	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	96.9	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	103	82	118
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	94.7	87	117
EG020F: Dissolved Metals by ICP-MS (QCLot: 3788458)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	99.5	78	118
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.7	80	118
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	100	78	116
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	97.2	80	112

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3788458) - continued								
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.9	82	112
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.2	81	113
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	97.8	80	114
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	96.7	79	113
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	97.3	81	113
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	95.6	81	113
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	94.2	79	117
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	97.1	81	115
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	91.1	73	125
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	89.3	76	120
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	96.6	81	113
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.4	80	116
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	90.8	73	123
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	95.5	78	116
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3788461)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	97.0	80	112
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3788459)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	87.8	78	114
EG052G: Silica by Discrete Analyser (QCLot: 3785546)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.10	5 mg/L	# 93.6	94	114
EK010/011: Chlorine (QCLot: 3786836)								
EK010: Chlorine - Free	----	0.2	mg/L	<0.2	----	----	----	----
EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	----	----	----	----
EK040P: Fluoride by PC Titrator (QCLot: 3785588)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5.0 mg/L	103	75	119
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3788042)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.0 mg/L	100	86	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3785543)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3785543) - continued								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.5 mg/L	98.3	83	119
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3788041)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	98.5	87	119
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3788046)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	1.0 mg/L	92.0	66	126
				<0.1	10 mg/L	86.2	66	114
				----	5 mg/L	96.9	66	119
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3788047)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	----	1.0 mg/L	101	66	124
				<0.01	4.42 mg/L	85.5	67	117
				----	0.442 mg/L	95.0	63	123
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3785544)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	97.2	82	122
EP005: Total Organic Carbon (TOC) (QCLot: 3786207)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	97.2	76	120
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3788548)								
EP033: Methane	74-82-8	10	µg/L	<10	27.92 µg/L	100	86	114
EP033: Ethene	74-85-1	10	µg/L	<10	51.76 µg/L	94.9	87	111
EP033: Ethane	74-84-0	10	µg/L	<10	57.05 µg/L	93.4	87	111
EP033: Propene	115-07-1	10	µg/L	<10	74.71 µg/L	95.8	85	113
EP033: Propane	74-98-6	10	µg/L	<10	77.52 µg/L	98.8	84	112
EP033: Butene	25167-67-3	20	µg/L	<20	99.61 µg/L	94.7	83	115
EP033: Butane	106-97-8	20	µg/L	<20	103.19 µg/L	95.0	85	115
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3786220)								
EP074: Styrene	100-42-5	5	µg/L	<5	10 µg/L	90.2	74	118
EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	10 µg/L	97.4	75	121
EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	10 µg/L	99.3	67	123
EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	10 µg/L	98.5	70	122
EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	10 µg/L	100	69	123
EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	10 µg/L	99.9	71	121

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3786220) - continued								
EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	10 µg/L	96.1	70	122
EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	10 µg/L	102	67	123
EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	10 µg/L	99.8	62	126
EP074B: Oxygenated Compounds (QCLot: 3786220)								
EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	100 µg/L	73.1	61.4	134
EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	100 µg/L	115	73.6	130
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	100 µg/L	101	61	139
EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	100 µg/L	94.6	65	137
EP074C: Sulfonated Compounds (QCLot: 3786220)								
EP074: Carbon disulfide	75-15-0	5	µg/L	<5	10 µg/L	85.1	72.8	127
EP074D: Fumigants (QCLot: 3786220)								
EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	10 µg/L	92.5	61	119
EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	10 µg/L	101	76	120
EP074: cis-1.3-Dichloropropylene	10061-01-5	10	µg/L	<10	10 µg/L	83.2	62	120
EP074: trans-1.3-Dichloropropylene	10061-02-6	10	µg/L	<10	10 µg/L	80.4	61	119
EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	10 µg/L	90.2	69	117
EP074E: Halogenated Aliphatic Compounds (QCLot: 3786220)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	103	60.6	138
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	112	67.4	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	126	69.4	129
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	127	56	140
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	122	63	135
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	111	65	131
EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	101	69	123
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	86.6	70.2	128
EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	99.0	71	119
EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	104	75	119
EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	96.2	77	117
EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	94.4	61	119
EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	101	73	119

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 3786220) - continued								
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	86.2	63	121
EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	103	78	122
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	98.8	74	120
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	97.9	74	118
EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	97.2	75	123
EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	102	79	121
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	95.6	72	124
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	80.1	66	114
EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	61.3	60	120
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	72.4	70.6	128
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	99.0	70	124
EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	99.7	74	128
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	74.4	71.8	126
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	83.0	66.4	136
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	95.2	58	132
EP074F: Halogenated Aromatic Compounds (QCLot: 3786220)								
EP074: Chlorobenzene	108-90-7	5	µg/L	<5	10 µg/L	98.0	80	118
EP074: Bromobenzene	108-86-1	5	µg/L	<5	10 µg/L	94.9	76	116
EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	10 µg/L	99.2	71	121
EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	10 µg/L	98.6	71	121
EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	10 µg/L	101	74	120
EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	10 µg/L	103	72	120
EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	10 µg/L	101	77	117
EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	10 µg/L	98.4	60	126
EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	10 µg/L	96.6	67	125
EP074G: Trihalomethanes (QCLot: 3786220)								
EP074: Chloroform	67-66-3	5	µg/L	<5	10 µg/L	102	76	118
EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	10 µg/L	80.7	64	118
EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	10 µg/L	74.3	65	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074G: Trihalomethanes (QCLot: 3786220) - continued								
EP074: Bromoform	75-25-2	5	µg/L	<5	10 µg/L	81.5	73.5	126
EP075(SIM)A: Phenolic Compounds (QCLot: 3786331)								
EP075(SIM): Phenol	108-95-2	0.2	µg/L	<1.0	5 µg/L	45.7	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	<1.0	5 µg/L	79.2	63.8	110
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	<1.0	5 µg/L	80.5	55.9	112
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	<2.0	10 µg/L	78.1	42.5	114
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	<1.0	5 µg/L	87.5	62.7	117
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.2	µg/L	<1.0	5 µg/L	82.9	59.9	112
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.2	µg/L	<1.0	5 µg/L	93.8	59.3	122
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.2	µg/L	<1.0	5 µg/L	85.2	64.3	118
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	<1.0	5 µg/L	85.9	63	119
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.2	µg/L	<1.0	5 µg/L	91.2	58.7	118
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.2	µg/L	<1.0	5 µg/L	94.2	50	108
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	<2.0	10 µg/L	53.6	10	95
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3786331)								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	<1.0	5 µg/L	77.3	58.6	119
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	<1.0	5 µg/L	98.4	63.6	114
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	<1.0	5 µg/L	94.8	62.2	113
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	<1.0	5 µg/L	104	63.9	115
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	<1.0	5 µg/L	68.4	62.6	116
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	<1.0	5 µg/L	67.8	64.3	116
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	<1.0	5 µg/L	70.8	63.6	118
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	<1.0	5 µg/L	73.9	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	<1.0	5 µg/L	77.5	64.1	117
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	<1.0	5 µg/L	76.0	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.2	µg/L	<1.0	5 µg/L	71.6	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<1.0	5 µg/L	85.5	61.7	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.5	5 µg/L	74.6	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<1.0	5 µg/L	71.6	59.9	118

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3786331) - continued								
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<1.0	5 µg/L	75.1	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<1.0	5 µg/L	71.3	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3786221)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	88.2	75	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3786330)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	80.0	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	88.0	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	78.5	62	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3786221)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	89.0	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3786330)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	82.4	58.9	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	91.4	73.9	138
EP071: >C34 - C40 Fraction	----	50	µg/L	<100	1500 µg/L	88.0	67	127
EP080: BTEXN (QCLot: 3786221)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	92.2	70	124
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	88.8	65	129
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	85.2	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	85.2	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	84.8	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	80.9	70	124
EP262: Ethanolamines (QCLot: 3786158)								
EP262: Ethanolamine	141-43-5	1	µg/L	<1	10 µg/L	116	50	130
EP262: Diethanolamine	111-42-2	1	µg/L	<1	10 µg/L	82.8	50	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED009: Anions (QCLot: 3788129)							
ES1500419-001	AST2	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3785547)							
ES1500419-001	AST2	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	110	70	130
ED045G: Chloride Discrete analyser (QCLot: 3785545)							
ES1500419-001	AST2	ED045G: Chloride	16887-00-6	250 mg/L	78.3	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3788458)							
ES1500380-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	102	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	102	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	97.7	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	97.9	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	96.0	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	99.6	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	101	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	97.1	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	100	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	99.9	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	95.9	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	107	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3788459)							
ES1500419-001	AST2	EG035F: Mercury	7439-97-6	0.0100 mg/L	81.8	70	130
EG052G: Silica by Discrete Analyser (QCLot: 3785546)							
ES1500419-001	AST2	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	70	130
EK040P: Fluoride by PC Titrator (QCLot: 3785588)							
ES1500419-001	AST2	EK040P: Fluoride	16984-48-8	5.0 mg/L	104	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3788042)							
ES1500199-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	98.3	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3785543)							
ES1500419-001	AST2	EK057G: Nitrite as N	----	0.5 mg/L	94.3	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3788041)							
ES1500199-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	5 mg/L	104	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3788046)							
ES1500419-001	AST2	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	87.9	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3788047)							
ES1500419-001	AST2	EK067G: Total Phosphorus as P	----	1.0 mg/L	87.8	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3785544)							
ES1500419-001	AST2	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	87.4	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 3786207)							
EM1500183-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	98.0	70	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3788548)							
EM1500235-004	Anonymous	EP033: Methane	74-82-8	27.92 µg/L	# Not Determined	70	130
		EP033: Ethene	74-85-1	51.76 µg/L	100	70	130
		EP033: Ethane	74-84-0	57.05 µg/L	96.9	70	130
		EP033: Propene	115-07-1	74.71 µg/L	101	70	130
		EP033: Propane	74-98-6	77.52 µg/L	102	70	130
		EP033: Butene	25167-67-3	99.61 µg/L	102	70	130
		EP033: Butane	106-97-8	103.19 µg/L	127	70	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 3786220)							
ES1500457-029	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	87.8	70	130
		EP074: Trichloroethene	79-01-6	25 µg/L	86.1	70	130
EP074F: Halogenated Aromatic Compounds (QCLot: 3786220)							
ES1500457-029	Anonymous	EP074: Chlorobenzene	108-90-7	25 µg/L	88.7	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3786221)							
ES1500457-029	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	107	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3786221)							
ES1500457-029	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	105	70	130
EP080: BTEXN (QCLot: 3786221)							
ES1500457-029	Anonymous	EP080: Benzene	71-43-2	25 µg/L	96.5	70	130
		EP080: Toluene	108-88-3	25 µg/L	91.3	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	100	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	96.7	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	101	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	87.6	70	130
EP262: Ethanolamines (QCLot: 3786158)							
ES1500419-001	AST2	EP262: Ethanolamine	141-43-5	10 µg/L	# Not Determined	50	130
		EP262: Diethanolamine	111-42-2	10 µg/L	90.8	50	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3785543)										
ES1500419-001	AST2	EK057G: Nitrite as N	----	0.5 mg/L	94.3	----	70	130	----	----
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3785544)										
ES1500419-001	AST2	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	87.4	----	70	130	----	----
ED045G: Chloride Discrete analyser (QCLot: 3785545)										
ES1500419-001	AST2	ED045G: Chloride	16887-00-6	250 mg/L	78.3	----	70	130	----	----
EG052G: Silica by Discrete Analyser (QCLot: 3785546)										
ES1500419-001	AST2	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	----	70	130	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3785547)										
ES1500419-001	AST2	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	110	----	70	130	----	----
EK040P: Fluoride by PC Titrator (QCLot: 3785588)										
ES1500419-001	AST2	EK040P: Fluoride	16984-48-8	5.0 mg/L	104	----	70	130	----	----
EP262: Ethanolamines (QCLot: 3786158)										
ES1500419-001	AST2	EP262: Ethanolamine	141-43-5	10 µg/L	# Not Determined	----	50	130	----	----
		EP262: Diethanolamine	111-42-2	10 µg/L	90.8	----	50	130	----	----
EP005: Total Organic Carbon (TOC) (QCLot: 3786207)										
EM1500183-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	98.0	----	70	130	----	----
EP074E: Halogenated Aliphatic Compounds (QCLot: 3786220)										
ES1500457-029	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	87.8	----	70	130	----	----
		EP074: Trichloroethene	79-01-6	25 µg/L	86.1	----	70	130	----	----
EP074F: Halogenated Aromatic Compounds (QCLot: 3786220)										
ES1500457-029	Anonymous	EP074: Chlorobenzene	108-90-7	25 µg/L	88.7	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3786221)										
ES1500457-029	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	107	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3786221)										
ES1500457-029	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	105	----	70	130	----	----
EP080: BTEXN (QCLot: 3786221)										
ES1500457-029	Anonymous	EP080: Benzene	71-43-2	25 µg/L	96.5	----	70	130	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080: BTEXN (QCLot: 3786221) - continued										
ES1500457-029	Anonymous	EP080: Toluene	108-88-3	25 µg/L	91.3	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	25 µg/L	100	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	96.7	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	25 µg/L	101	----	70	130	----	----
		EP080: Naphthalene	91-20-3	25 µg/L	87.6	----	70	130	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3788041)										
ES1500199-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	5 mg/L	104	----	70	130	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3788042)										
ES1500199-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	98.3	----	70	130	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3788046)										
ES1500419-001	AST2	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	87.9	----	70	130	----	----
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3788047)										
ES1500419-001	AST2	EK067G: Total Phosphorus as P	----	1.0 mg/L	87.8	----	70	130	----	----
ED009: Anions (QCLot: 3788129)										
ES1500419-001	AST2	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	----	70	130	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3788458)										
ES1500380-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	102	----	70	130	----	----
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	102	----	70	130	----	----
		EG020A-F: Barium	7440-39-3	0.2 mg/L	97.7	----	70	130	----	----
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	97.9	----	70	130	----	----
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	96.0	----	70	130	----	----
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	99.6	----	70	130	----	----
		EG020A-F: Copper	7440-50-8	0.2 mg/L	101	----	70	130	----	----
		EG020A-F: Lead	7439-92-1	0.2 mg/L	97.1	----	70	130	----	----
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	100	----	70	130	----	----
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	99.9	----	70	130	----	----
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	95.9	----	70	130	----	----
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	107	----	70	130	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3788459)										
ES1500419-001	AST2	EG035F: Mercury	7439-97-6	0.0100 mg/L	81.8	----	70	130	----	----
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3788548)										
EM1500235-004	Anonymous									

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3788548) - continued										
EM1500235-004	Anonymous	EP033: Methane	74-82-8	27.92 µg/L	# Not Determined	----	70	130	----	----
		EP033: Ethene	74-85-1	51.76 µg/L	100	----	70	130	----	----
		EP033: Ethane	74-84-0	57.05 µg/L	96.9	----	70	130	----	----
		EP033: Propene	115-07-1	74.71 µg/L	101	----	70	130	----	----
		EP033: Propane	74-98-6	77.52 µg/L	102	----	70	130	----	----
		EP033: Butene	25167-67-3	99.61 µg/L	102	----	70	130	----	----
		EP033: Butane	106-97-8	103.19 µg/L	127	----	70	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1500419**	Page	: 1 of 12
Amendment	: **1**		
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
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Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 13-JAN-2015
Sampler	: BR/SD	Issue Date	: 12-MAY-2015
Order number	: ----		
		No. of samples received	: 1
Quote number	: SY/933/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005: pH							
Clear Plastic Bottle - Natural (EA005)							
AST2	**12-JAN-2015**	**----**	----	----	**13-JAN-2015**	12-JAN-2015	×
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P)							
AST2	**12-JAN-2015**	**---**	09-FEB-2015	----	**14-JAN-2015**	09-FEB-2015	✓
EA015: Total Dissolved Solids							
Clear Plastic Bottle - Natural (EA015H)							
AST2	**12-JAN-2015**	**---**	19-JAN-2015	----	**16-JAN-2015**	19-JAN-2015	✓
EA025: Suspended Solids							
Clear Plastic Bottle - Natural (EA025H)							
AST2	**12-JAN-2015**	**---**	19-JAN-2015	----	**16-JAN-2015**	19-JAN-2015	✓
ED009: Anions							
Clear Plastic Bottle - Natural (ED009-X)							
AST2	**12-JAN-2015**	**----**	----	----	**20-JAN-2015**	09-FEB-2015	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
AST2	**12-JAN-2015**	**---**	26-JAN-2015	----	**14-JAN-2015**	26-JAN-2015	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
AST2	**12-JAN-2015**	**---**	09-FEB-2015	----	**14-JAN-2015**	09-FEB-2015	✓
ED045G: Chloride Discrete analyser							
Clear Plastic Bottle - Natural (ED045G)							
AST2	**12-JAN-2015**	**---**	09-FEB-2015	----	**14-JAN-2015**	09-FEB-2015	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
AST2	**12-JAN-2015**	**---**	09-FEB-2015	----	**17-JAN-2015**	09-FEB-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
AST2	**12-JAN-2015**	**---**	11-JUL-2015	----	**17-JAN-2015**	11-JUL-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)							
AST2	**12-JAN-2015**	**---**	11-JUL-2015	----	**17-JAN-2015**	11-JUL-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
AST2	**12-JAN-2015**	---	09-FEB-2015	----	**19-JAN-2015**	09-FEB-2015	✓
EG052G: Silica by Discrete Analyser							
Clear Plastic Bottle - Natural (EG052G)							
AST2	**12-JAN-2015**	---	09-FEB-2015	----	**14-JAN-2015**	09-FEB-2015	✓
EK010/011: Chlorine							
Clear Plastic Bottle - Natural (EK010)							
AST2	**12-JAN-2015**	----	----	----	**15-JAN-2015**	12-JAN-2015	×
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
AST2	**12-JAN-2015**	---	09-FEB-2015	----	**14-JAN-2015**	09-FEB-2015	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
AST2	**12-JAN-2015**	---	09-FEB-2015	----	**16-JAN-2015**	09-FEB-2015	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
AST2	**12-JAN-2015**	---	14-JAN-2015	----	**14-JAN-2015**	14-JAN-2015	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
AST2	**12-JAN-2015**	---	09-FEB-2015	----	**16-JAN-2015**	09-FEB-2015	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
AST2	**12-JAN-2015**	**16-JAN-2015**	09-FEB-2015	✓	**16-JAN-2015**	09-FEB-2015	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
AST2	**12-JAN-2015**	**16-JAN-2015**	09-FEB-2015	✓	**16-JAN-2015**	09-FEB-2015	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
AST2	**12-JAN-2015**	---	14-JAN-2015	----	**14-JAN-2015**	14-JAN-2015	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005)							
AST2	**12-JAN-2015**	----	----	----	**15-JAN-2015**	09-FEB-2015	✓
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - Sulfuric Acid (EP033)							
AST2	**12-JAN-2015**	----	----	----	**16-JAN-2015**	26-JAN-2015	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
AST2	**12-JAN-2015**	**15-JAN-2015**	19-JAN-2015	✓	**16-JAN-2015**	24-FEB-2015	✓
EP074D: Fumigants							
Amber VOC Vial - Sulfuric Acid (EP074)							
AST2	**12-JAN-2015**	**15-JAN-2015**	26-JAN-2015	✓	**15-JAN-2015**	26-JAN-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074E: Halogenated Aliphatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074) AST2	**12-JAN-2015**	**15-JAN-2015**	26-JAN-2015	✓	**15-JAN-2015**	26-JAN-2015	✓
EP074F: Halogenated Aromatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074) AST2	**12-JAN-2015**	**15-JAN-2015**	26-JAN-2015	✓	**15-JAN-2015**	26-JAN-2015	✓
EP074A: Monocyclic Aromatic Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP074) AST2	**12-JAN-2015**	**15-JAN-2015**	26-JAN-2015	✓	**15-JAN-2015**	26-JAN-2015	✓
EP074B: Oxygenated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074) AST2	**12-JAN-2015**	**15-JAN-2015**	26-JAN-2015	✓	**15-JAN-2015**	26-JAN-2015	✓
EP074C: Sulfonated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074) AST2	**12-JAN-2015**	**15-JAN-2015**	26-JAN-2015	✓	**15-JAN-2015**	26-JAN-2015	✓
EP074G: Trihalomethanes							
Amber VOC Vial - Sulfuric Acid (EP074) AST2	**12-JAN-2015**	**15-JAN-2015**	26-JAN-2015	✓	**15-JAN-2015**	26-JAN-2015	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM)) AST2	**12-JAN-2015**	**15-JAN-2015**	19-JAN-2015	✓	**16-JAN-2015**	24-FEB-2015	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM)) AST2	**12-JAN-2015**	**15-JAN-2015**	19-JAN-2015	✓	**16-JAN-2015**	24-FEB-2015	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) AST2	**12-JAN-2015**	**15-JAN-2015**	26-JAN-2015	✓	**15-JAN-2015**	26-JAN-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080) AST2	**12-JAN-2015**	**15-JAN-2015**	26-JAN-2015	✓	**15-JAN-2015**	26-JAN-2015	✓
EP262: Ethanolamines							
Amber Glass Bottle - Unpreserved (EP262) AST2	**12-JAN-2015**	**----**	----	----	**15-JAN-2015**	19-JAN-2015	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	2	15	**13.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	7	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	8	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	1	**100.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	2	13	**15.4**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH	EA005	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	11	**18.2**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	1	**100.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	16	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	9	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Fluoride by PC Titrator	EK040P	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	11	**9.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	19	**15.8**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	3	20	**15.0**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	11	**9.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	11	**9.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH	EA005	WATER	In house: Referenced to APHA 4500 H+ B. pH of water samples is determined by ISE either manually or by automated pH meter. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Standard Anions -by IC (Extended Method)	ED009-X	WATER	In house: Referenced to APHA 4110. This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Silica (Reactive) by Discrete Analyser	EG052G	WATER	In house: Referenced to APHA 4500-SiO2 D: Under Acdic conditions reactive silicon combines with ammonium molybdate to form a yellow molybdosilicic acid complex. This is reduced by 1-amino-2-naphthol-4-sulfonic acid to a silicomolybdenum blue complex which is measured by discrete analyser at 670 nm. This method is compliant with NEPM (2013) Schedule B(3)
Chlorine	EK010	WATER	In-house (DPD colourimetry)
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500 F--C CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ammonium as N	EK055G-NH4	WATER	Ammonium in the sample is reported as the ionised / unionised fractions by the use of a nomograph and the initial pH and Temperature. Ammonia is determined by direct colorimetry by Discrete Analyser according to APHA 4500-NH3 G. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Volatile Organic Compounds	EP074	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Ethanolamines by LCMSMS	EP262	WATER	In-house LC-MSMS: Benzoyl derivatives of target compounds are analysed by LC/MSMS in ESI Positive Mode.

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
ED093F: Dissolved Major Cations	4558981-019	----	**Calcium**	7440-70-2	87.2 %	90-114%	**Recovery less than lower control limit**
EG052G: Silica by Discrete Analyser	4555391-002	----	**Reactive Silica**	----	93.6 %	94-114%	**Recovery less than lower control limit**
Matrix Spike (MS) Recoveries							
ED009: Anions	ES1500419-001	AST2	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG052G: Silica by Discrete Analyser	ES1500419-001	AST2	**Reactive Silica**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP033: C1 - C4 Hydrocarbon Gases	EM1500235-004	Anonymous	**Methane**	74-82-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP262: Ethanolamines	ES1500419-001	AST2	**Ethanolamine**	141-43-5	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **WATER**

Method	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)	*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EA005: pH						
Clear Plastic Bottle - Natural						
AST2	----	----	----	13-JAN-2015	12-JAN-2015	**1**
EK010/011: Chlorine						
Clear Plastic Bottle - Natural						
AST2	----	----	----	15-JAN-2015	12-JAN-2015	**3**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

QUALITY CONTROL REPORT

Work Order	: **ES1501844**	Page	: 1 of 21
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: SDaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 30-JAN-2015
Sampler	: CR/KM	Issue Date	: 10-FEB-2015
Order number	: ----		
		No. of samples received	: 11
Quote number	: SY/933/14	No. of samples analysed	: 11

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Alex Rossi	Organic Chemist	Sydney Organics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Merrin Avery	Supervisor - Inorganic	Newcastle - Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA005: pH (QC Lot: 3806072)									
ES1501839-011	Anonymous	EA005: pH Value	----	0.01	pH Unit	7.68	7.67	0.1	0% - 20%
ES1501844-001	WKSW02	EA005: pH Value	----	0.01	pH Unit	7.39	7.37	0.3	0% - 20%
EA005: pH (QC Lot: 3806073)									
ES1501844-011	QA2	EA005: pH Value	----	0.01	pH Unit	7.34	7.31	0.4	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 3806688)									
ES1501842-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	1000	1000	0.1	0% - 20%
ES1501844-004	WKMB02	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	885	886	0.1	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 3812136)									
ES1501844-001	WKSW02	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	278	262	5.9	0% - 20%
ES1502190-002	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	736	722	2.0	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 3812763)									
ES1501844-009	GW080487	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	2010	2040	1.6	0% - 20%
ES1502292-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	620	600	3.3	0% - 20%
EA025: Suspended Solids (QC Lot: 3812137)									
ES1501844-001	WKSW02	EA025H: Suspended Solids (SS)	----	5	mg/L	8	9	0.0	No Limit
ES1502190-002	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	16	19	17.4	No Limit
EA025: Suspended Solids (QC Lot: 3812764)									
ES1501844-009	GW080487	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ES1502292-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	7	6	14.8	No Limit
ED009: Anions (QC Lot: 3807400)									
ES1501837-001	Anonymous	ED009-X: Chloride	16887-00-6	0.100	mg/L	4.41	4.31	2.3	0% - 20%
ES1501844-005	WKMB03	ED009-X: Chloride	16887-00-6	0.100	mg/L	375	379	1.1	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3806686)									
ES1501838-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	456	466	2.2	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	456	466	2.2	0% - 20%
ES1501838-010	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	350	355	1.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	350	355	1.3	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3806690)									
ES1501844-004	WKMB02	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	73	75	2.7	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
ED037P: Alkalinity by PC Titrator (QC Lot: 3806690) - continued									
ES1501844-004	WKMB02	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	263	256	2.9	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	336	331	1.7	0% - 20%
ES1502190-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	197	197	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	197	197	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3805601)									
ES1501834-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	62	62	0.0	0% - 20%
ES1501842-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	50	50	0.0	0% - 20%
ED045G: Chloride Discrete analyser (QC Lot: 3805600)									
ES1501834-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	353	351	0.7	0% - 20%
ES1501842-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	187	185	1.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 3807385)									
ES1501844-002	WKSW03	ED093F: Calcium	7440-70-2	1	mg/L	7	7	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	4	4	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	25	25	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	3	4	0.0	No Limit
ES1501844-011	QA2	ED093F: Calcium	7440-70-2	1	mg/L	84	86	1.8	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	41	41	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	866	873	0.8	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	6	6	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3807386)									
ES1501844-002	WKSW03	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0006	0.0007	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.040	0.040	0.0	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.005	0.004	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.040	0.039	0.0	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.022	0.020	10.1	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.37	0.39	4.9	0% - 20%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3807386) - continued									
ES1501844-002	WKSW03	EG020A-F: Iron	7439-89-6	0.05	mg/L	0.65	0.66	1.9	0% - 50%
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	<0.1	0.0	No Limit
ES1501844-011	QA2	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.243	0.261	7.2	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.051	0.052	0.0	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.011	0.012	10.3	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.06	0.07	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.31	0.32	0.0	No Limit
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	1.7	1.8	7.6	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3807387)									
ES1501844-002	WKSW03	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.099	0.098	0.0	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
ES1501844-011	QA2	EG020B-F: Strontium	7440-24-6	0.001	mg/L	6.17	6.58	6.6	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 3807384)									
ES1501844-003	WKMB01	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES1501844-010	QA1	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG052G: Silica by Discrete Analyser (QC Lot: 3805603)									
ES1501842-001	Anonymous	EG052G: Reactive Silica	----	0.05	mg/L	9.66	9.64	0.2	0% - 20%
ES1501844-006	GR-P3	EG052G: Reactive Silica	----	0.05	mg/L	36.0	36.6	1.9	0% - 20%
EK010/011: Chlorine (QC Lot: 3805338)									
ES1501844-001	WKSW02	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
		EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
ES1501844-010	QA1	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
		EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3806689)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EK040P: Fluoride by PC Titrator (QC Lot: 3806689) - continued									
ES1501842-001	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.8	0.7	14.0	No Limit
ES1501844-004	WKMB02	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.3	0.3	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3806547)									
ES1501844-001	WKSW02	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.01	0.01	0.0	No Limit
ES1501844-010	QA1	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.01	0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3805598)									
ES1501833-001	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	0.07	0.07	0.0	No Limit
ES1501834-001	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3805604)									
ES1501842-001	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	0.10	0.11	0.0	0% - 50%
ES1501844-006	GR-P3	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3806546)									
ES1501844-001	WKSW02	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.29	0.29	0.0	0% - 20%
ES1501844-010	QA1	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.29	0.28	0.0	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3806544)									
ES1501844-001	WKSW02	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.3	1.4	0.0	0% - 50%
ES1501844-011	QA2	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	0.6	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3806545)									
ES1501844-001	WKSW02	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.14	0.11	23.6	0% - 50%
ES1501844-011	QA2	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3805599)									
ES1501833-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES1501844-006	GR-P3	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.02	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 3807734)									
ES1501833-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	5	5	0.0	No Limit
ES1501844-006	GR-P3	EP005: Total Organic Carbon	----	1	mg/L	2	2	0.0	No Limit
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 3812173)									
EM1501060-001	Anonymous	EP033: Methane	74-82-8	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
ES1501844-009	GW080487	EP033: Methane	74-82-8	10	µg/L	66	70	4.8	No Limit
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 3812173) - continued									
ES1501844-009	GW080487	EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 3813304)									
ES1501844-001	WKSW02	EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
ES1501844-009	GW080487	EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
EP074B: Oxygenated Compounds (QC Lot: 3813304)									
ES1501844-001	WKSW02	EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit
ES1501844-009	GW080487	EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit
EP074C: Sulfonated Compounds (QC Lot: 3813304)									
ES1501844-001	WKSW02	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
ES1501844-009	GW080487	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
EP074D: Fumigants (QC Lot: 3813304)									
ES1501844-001	WKSW02	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
ES1501844-009	GW080487	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074D: Fumigants (QC Lot: 3813304) - continued									
ES1501844-009	GW080487	EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3813304)									
ES1501844-001	WKSW02	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
ES1501844-009	GW080487	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3813304) - continued									
ES1501844-009	GW080487	EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 3813304)									
ES1501844-001	WKSW02	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
ES1501844-009	GW080487	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074G: Trihalomethanes (QC Lot: 3813304)									
ES1501844-001	WKSW02	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
ES1501844-009	GW080487	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3813305)									
ES1501844-001	WKSW02	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES1501844-009	GW080487	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3813305)									
ES1501844-001	WKSW02	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES1501844-009	GW080487	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 3813305)									
ES1501844-001	WKSW02	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES1501844-009	GW080487	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP262: Ethanolamines (QC Lot: 3807501)									
ES1501844-001	WKSW02	EP262: Ethanolamine	141-43-5	1	µg/L	<1	<1	0.0	No Limit
		EP262: Diethanolamine	111-42-2	1	µg/L	<1	<1	0.0	No Limit
ES1501844-011	QA2	EP262: Ethanolamine	141-43-5	1	µg/L	<1	<1	0.0	No Limit
		EP262: Diethanolamine	111-42-2	1	µg/L	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010P: Conductivity by PC Titrator (QCLot: 3806688)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	103	95	113
EA015: Total Dissolved Solids (QCLot: 3812136)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	293 mg/L	113	67	125
				----	2000 mg/L	89.9	87	109
EA015: Total Dissolved Solids (QCLot: 3812763)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	293 mg/L	76.8	67	125
				----	2000 mg/L	90.0	87	109
EA025: Suspended Solids (QCLot: 3812137)								
EA025H: Suspended Solids (SS)	----	5	mg/L	----	1000 mg/L	92.6	86	110
				<5	150 mg/L	104	83	129
EA025: Suspended Solids (QCLot: 3812764)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	86.7	83	129
				----	1000 mg/L	88.9	86	110
ED009: Anions (QCLot: 3807400)								
ED009-X: Chloride	16887-00-6	0.1	mg/L	<0.100	2 mg/L	103	89	107
ED037P: Alkalinity by PC Titrator (QCLot: 3806686)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	106	81	111
ED037P: Alkalinity by PC Titrator (QCLot: 3806690)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	94.4	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3805601)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	100	86	122
ED045G: Chloride Discrete analyser (QCLot: 3805600)								
ED045G: Chloride	16887-00-6	1	mg/L	----	1000 mg/L	97.2	77	119
				<1	10 mg/L	102	75	123
ED093F: Dissolved Major Cations (QCLot: 3807385)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	91.2	90	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	107	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	111	82	118
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	103	87	117
EG020F: Dissolved Metals by ICP-MS (QCLot: 3807386)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	100	85	115
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.01 mg/L	103	85	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3807386) - continued								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.5	85	115
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	104	85	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	97.3	85	115
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.7	85	115
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	96.4	85	115
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	97.7	85	115
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	99.3	85	115
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	96.2	85	115
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	96.7	85	115
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	91.6	85	115
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	98.5	85	115
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	101	85	115
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	101	85	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	93.9	85	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	105	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	110	85	115
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	88.7	85	115
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3807387)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	96.5	80	112
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3807384)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	97.5	78	114
EG052G: Silica by Discrete Analyser (QCLot: 3805603)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.10	5 mg/L	107	94	114
EK010/011: Chlorine (QCLot: 3805338)								
EK010: Chlorine - Free	----	0.2	mg/L	<0.2	----	----	----	----
EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	----	----	----	----
EK040P: Fluoride by PC Titrator (QCLot: 3806689)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5.0 mg/L	99.6	75	119
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3806547)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.0 mg/L	96.9	86	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3805598)								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.5 mg/L	94.0	83	119
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3805604)								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.5 mg/L	96.3	83	119

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3806546)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	96.8	87	119
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3806544)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	77.2	66	114
				----	5 mg/L	96.2	66	119
				----	1.0 mg/L	104	66	126
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3806545)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	80.8	67	117
				----	0.442 mg/L	88.7	63	123
				----	1.0 mg/L	95.4	66	124
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3805599)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	104	82	122
EP005: Total Organic Carbon (TOC) (QCLot: 3807734)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	86.0	76	120
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3812173)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	93.9	86	114
EP033: Ethene	74-85-1	10	µg/L	<10	50.29 µg/L	94.6	87	111
EP033: Ethane	74-84-0	10	µg/L	<10	54.43 µg/L	93.7	87	111
EP033: Propene	115-07-1	10	µg/L	<10	73.97 µg/L	93.5	85	113
EP033: Propane	74-98-6	10	µg/L	<10	78.28 µg/L	93.6	84	112
EP033: Butene	25167-67-3	20	µg/L	<20	99.61 µg/L	93.8	83	115
EP033: Butane	106-97-8	20	µg/L	<20	102.18 µg/L	94.0	85	115
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3813304)								
EP074: Styrene	100-42-5	5	µg/L	<5	10 µg/L	97.6	74	118
EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	10 µg/L	99.5	75	121
EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	10 µg/L	103	67	123
EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	10 µg/L	103	70	122
EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	10 µg/L	106	69	123
EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	10 µg/L	104	71	121
EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	10 µg/L	102	70	122
EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	10 µg/L	104	67	123
EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	10 µg/L	105	62	126
EP074B: Oxygenated Compounds (QCLot: 3813304)								
EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	100 µg/L	99.5	61.4	134
EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	100 µg/L	80.0	73.6	130
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	100 µg/L	99.1	61	139
EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	100 µg/L	82.3	65	137

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074C: Sulfonated Compounds (QCLot: 3813304)								
EP074: Carbon disulfide	75-15-0	5	µg/L	<5	10 µg/L	84.5	72.8	127
EP074D: Fumigants (QCLot: 3813304)								
EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	10 µg/L	97.0	61	119
EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	10 µg/L	103	76	120
EP074: cis-1.3-Dichloropropylene	10061-01-5	10	µg/L	<10	10 µg/L	82.2	62	120
EP074: trans-1.3-Dichloropropylene	10061-02-6	10	µg/L	<10	10 µg/L	78.1	61	119
EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	10 µg/L	101	69	117
EP074E: Halogenated Aliphatic Compounds (QCLot: 3813304)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	103	60.6	138
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	101	67.4	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	105	69.4	129
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	111	56	140
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	109	63	135
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	108	65	131
EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	103	69	123
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	75.8	70.2	128
EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	106	71	119
EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	105	75	119
EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	104	77	117
EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	94.2	61	119
EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	105	73	119
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	83.8	63	121
EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	104	78	122
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	107	74	120
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	97.7	74	118
EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	100	75	123
EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	103	79	121
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	109	72	124
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	82.2	66	114
EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	100	60	120
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	92.3	70.6	128
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	96.1	70	124
EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	97.0	74	128
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	80.9	71.8	126
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	77.3	66.4	136
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	108	58	132

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074F: Halogenated Aromatic Compounds (QCLot: 3813304)								
EP074: Chlorobenzene	108-90-7	5	µg/L	<5	10 µg/L	109	80	118
EP074: Bromobenzene	108-86-1	5	µg/L	<5	10 µg/L	106	76	116
EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	10 µg/L	108	71	121
EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	10 µg/L	108	71	121
EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	10 µg/L	109	74	120
EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	10 µg/L	108	72	120
EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	10 µg/L	108	77	117
EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	10 µg/L	109	60	126
EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	10 µg/L	110	67	125
EP074G: Trihalomethanes (QCLot: 3813304)								
EP074: Chloroform	67-66-3	5	µg/L	<5	10 µg/L	104	76	118
EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	10 µg/L	80.9	64	118
EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	10 µg/L	85.7	65	115
EP074: Bromoform	75-25-2	5	µg/L	<5	10 µg/L	92.0	73.5	126
EP075(SIM)A: Phenolic Compounds (QCLot: 3806146)								
EP075(SIM): Phenol	108-95-2	0.2	µg/L	<1.0	5 µg/L	36.9	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	<1.0	5 µg/L	68.0	63.8	110
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	<1.0	5 µg/L	67.1	55.9	112
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	<2.0	10 µg/L	63.1	42.5	114
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	<1.0	5 µg/L	66.5	62.7	117
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.2	µg/L	<1.0	5 µg/L	67.1	59.9	112
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.2	µg/L	<1.0	5 µg/L	75.8	59.3	122
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.2	µg/L	<1.0	5 µg/L	87.6	64.3	118
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	<1.0	5 µg/L	76.1	63	119
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.2	µg/L	<1.0	5 µg/L	65.2	58.7	118
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.2	µg/L	<1.0	5 µg/L	74.0	50	108
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	<2.0	10 µg/L	38.2	10	95
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3806146)								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	<1.0	5 µg/L	72.0	58.6	119
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	<1.0	5 µg/L	# 63.0	63.6	114
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	<1.0	5 µg/L	64.5	62.2	113
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	<1.0	5 µg/L	65.2	63.9	115
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	<1.0	5 µg/L	86.2	62.6	116
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	<1.0	5 µg/L	95.3	64.3	116
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	<1.0	5 µg/L	104	63.6	118
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	<1.0	5 µg/L	103	63.1	118

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3806146) - continued								
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	<1.0	5 µg/L	96.0	64.1	117
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	<1.0	5 µg/L	91.0	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.2	µg/L	<1.0	5 µg/L	98.2	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<1.0	5 µg/L	92.7	61.7	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.5	5 µg/L	96.8	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<1.0	5 µg/L	95.6	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<1.0	5 µg/L	96.9	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<1.0	5 µg/L	94.5	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3806147)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	104	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	97.7	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	95.5	62	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3813305)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	79.9	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3806147)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	97.2	58.9	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	96.0	73.9	138
EP071: >C34 - C40 Fraction	----	50	µg/L	<100	1500 µg/L	101	67	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3813305)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	80.9	75	127
EP080: BTEXN (QCLot: 3813305)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	80.7	70	124
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	85.8	65	129
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	81.3	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	83.6	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	84.5	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	88.0	70	124
EP262: Ethanolamines (QCLot: 3807501)								
EP262: Ethanolamine	141-43-5	1	µg/L	<1	10 µg/L	112	50	130
EP262: Diethanolamine	111-42-2	1	µg/L	<1	10 µg/L	85.7	50	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED009: Anions (QCLot: 3807400)							
ES1501837-001	Anonymous	ED009-X: Chloride	16887-00-6	20 mg/L	106	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3805601)							
ES1501834-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70	130
ED045G: Chloride Discrete analyser (QCLot: 3805600)							
ES1501834-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	97.2	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3807386)							
ES1501844-004	WKMB02	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	107	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	117	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	103	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	102	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	104	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	103	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	105	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	106	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	110	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	101	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	102	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	112	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3807384)							
ES1501844-001	WKSW02	EG035F: Mercury	7439-97-6	0.0100 mg/L	90.8	70	130
EG052G: Silica by Discrete Analyser (QCLot: 3805603)							
ES1501842-001	Anonymous	EG052G: Reactive Silica	----	5 mg/L	89.8	70	130
EK040P: Fluoride by PC Titrator (QCLot: 3806689)							
ES1501842-001	Anonymous	EK040P: Fluoride	16984-48-8	5.0 mg/L	95.8	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3806547)							
ES1501844-001	WKSW02	EK055G: Ammonia as N	7664-41-7	1 mg/L	99.4	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3805598)							
ES1501833-001	Anonymous	EK057G: Nitrite as N	----	0.5 mg/L	105	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3805604)							
ES1501834-001	Anonymous	EK057G: Nitrite as N	----	0.5 mg/L	104	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3806546)							
ES1501844-001	WKSW02	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	104	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3806544)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3806544) - continued							
ES1501844-002	WKSW03	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	89.3	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3806545)							
ES1501844-002	WKSW03	EK067G: Total Phosphorus as P	----	1.0 mg/L	96.9	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3805599)							
ES1501833-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	105	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 3807734)							
ES1501842-001	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	84.4	70	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3812173)							
EM1501060-002	Anonymous	EP033: Methane	74-82-8	28.48 µg/L	83.8	70	130
		EP033: Ethene	74-85-1	50.29 µg/L	90.1	70	130
		EP033: Ethane	74-84-0	54.43 µg/L	90.4	70	130
		EP033: Propene	115-07-1	73.97 µg/L	87.8	70	130
		EP033: Propane	74-98-6	78.28 µg/L	90.5	70	130
		EP033: Butene	25167-67-3	99.61 µg/L	88.9	70	130
		EP033: Butane	106-97-8	102.18 µg/L	90.9	70	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 3813304)							
ES1501844-001	WKSW02	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	74.6	70	130
		EP074: Trichloroethene	79-01-6	25 µg/L	88.3	70	130
EP074F: Halogenated Aromatic Compounds (QCLot: 3813304)							
ES1501844-001	WKSW02	EP074: Chlorobenzene	108-90-7	25 µg/L	99.8	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3813305)							
ES1501844-001	WKSW02	EP080: C6 - C9 Fraction	----	325 µg/L	98.1	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3813305)							
ES1501844-001	WKSW02	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	99.2	70	130
EP080: BTEXN (QCLot: 3813305)							
ES1501844-001	WKSW02	EP080: Benzene	71-43-2	25 µg/L	87.2	70	130
		EP080: Toluene	108-88-3	25 µg/L	93.3	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	95.6	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	97.0	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	100	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	105	70	130
EP262: Ethanolamines (QCLot: 3807501)							
ES1501844-001	WKSW02	EP262: Ethanolamine	141-43-5	10 µg/L	116	50	130

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP262: Ethanolamines (QCLot: 3807501) - continued							
ES1501844-001	WKSW02	EP262: Diethanolamine	111-42-2	10 µg/L	61.3	50	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPDs (%): Value	RPDs (%): Control Limit
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3805598)										
ES1501833-001	Anonymous	EK057G: Nitrite as N	----	0.5 mg/L	105	----	70	130	----	----
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3805599)										
ES1501833-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	105	----	70	130	----	----
ED045G: Chloride Discrete analyser (QCLot: 3805600)										
ES1501834-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	97.2	----	70	130	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3805601)										
ES1501834-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	----	70	130	----	----
EG052G: Silica by Discrete Analyser (QCLot: 3805603)										
ES1501842-001	Anonymous	EG052G: Reactive Silica	----	5 mg/L	89.8	----	70	130	----	----
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3805604)										
ES1501834-001	Anonymous	EK057G: Nitrite as N	----	0.5 mg/L	104	----	70	130	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3806544)										
ES1501844-002	WKSW03	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	89.3	----	70	130	----	----
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3806545)										
ES1501844-002	WKSW03	EK067G: Total Phosphorus as P	----	1.0 mg/L	96.9	----	70	130	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3806546)										
ES1501844-001	WKSW02	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	104	----	70	130	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3806547)										
ES1501844-001	WKSW02	EK055G: Ammonia as N	7664-41-7	1 mg/L	99.4	----	70	130	----	----
EK040P: Fluoride by PC Titrator (QCLot: 3806689)										
ES1501842-001	Anonymous	EK040P: Fluoride	16984-48-8	5.0 mg/L	95.8	----	70	130	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3807384)										
ES1501844-001	WKSW02	EG035F: Mercury	7439-97-6	0.0100 mg/L	90.8	----	70	130	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3807386)										

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EG020F: Dissolved Metals by ICP-MS (QCLot: 3807386) - continued										
ES1501844-004	WKMB02	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	107	----	70	130	----	----
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	117	----	70	130	----	----
		EG020A-F: Barium	7440-39-3	0.2 mg/L	103	----	70	130	----	----
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	102	----	70	130	----	----
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	104	----	70	130	----	----
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	103	----	70	130	----	----
		EG020A-F: Copper	7440-50-8	0.2 mg/L	105	----	70	130	----	----
		EG020A-F: Lead	7439-92-1	0.2 mg/L	106	----	70	130	----	----
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	110	----	70	130	----	----
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	101	----	70	130	----	----
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	102	----	70	130	----	----
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	112	----	70	130	----	----
ED009: Anions (QCLot: 3807400)										
ES1501837-001	Anonymous	ED009-X: Chloride	16887-00-6	20 mg/L	106	----	70	130	----	----
EP262: Ethanolamines (QCLot: 3807501)										
ES1501844-001	WKSW02	EP262: Ethanolamine	141-43-5	10 µg/L	116	----	50	130	----	----
		EP262: Diethanolamine	111-42-2	10 µg/L	61.3	----	50	130	----	----
EP005: Total Organic Carbon (TOC) (QCLot: 3807734)										
ES1501842-001	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	84.4	----	70	130	----	----
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3812173)										
EM1501060-002	Anonymous	EP033: Methane	74-82-8	28.48 µg/L	83.8	----	70	130	----	----
		EP033: Ethene	74-85-1	50.29 µg/L	90.1	----	70	130	----	----
		EP033: Ethane	74-84-0	54.43 µg/L	90.4	----	70	130	----	----
		EP033: Propene	115-07-1	73.97 µg/L	87.8	----	70	130	----	----
		EP033: Propane	74-98-6	78.28 µg/L	90.5	----	70	130	----	----
		EP033: Butene	25167-67-3	99.61 µg/L	88.9	----	70	130	----	----
		EP033: Butane	106-97-8	102.18 µg/L	90.9	----	70	130	----	----
EP074E: Halogenated Aliphatic Compounds (QCLot: 3813304)										
ES1501844-001	WKSW02	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	74.6	----	70	130	----	----
		EP074: Trichloroethene	79-01-6	25 µg/L	88.3	----	70	130	----	----
EP074F: Halogenated Aromatic Compounds (QCLot: 3813304)										
ES1501844-001	WKSW02	EP074: Chlorobenzene	108-90-7	25 µg/L	99.8	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3813305)										
ES1501844-001	WKSW02	EP080: C6 - C9 Fraction	----	325 µg/L	98.1	----	70	130	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3813305)										
ES1501844-001	WKSW02	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	99.2	----	70	130	----	----
EP080: BTEXN (QCLot: 3813305)										
ES1501844-001	WKSW02	EP080: Benzene	71-43-2	25 µg/L	87.2	----	70	130	----	----
		EP080: Toluene	108-88-3	25 µg/L	93.3	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	25 µg/L	95.6	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	97.0	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	25 µg/L	100	----	70	130	----	----
		EP080: Naphthalene	91-20-3	25 µg/L	105	----	70	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1501844**	Page	: 1 of 19
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: SDaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 30-JAN-2015
Sampler	: CR/KM	Issue Date	: 10-FEB-2015
Order number	: ----		
		No. of samples received	: 11
Quote number	: SY/933/14	No. of samples analysed	: 11

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005: pH							
Clear Plastic Bottle - Natural (EA005)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**----**	----	----	**30-JAN-2015**	29-JAN-2015	×
Clear Plastic Bottle - Natural (EA005)							
GW080487, QA1, QA2	**30-JAN-2015**	**----**	----	----	**30-JAN-2015**	30-JAN-2015	✓
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**---**	26-FEB-2015	----	**02-FEB-2015**	26-FEB-2015	✓
Clear Plastic Bottle - Natural (EA010-P)							
GW080487, QA1, QA2	**30-JAN-2015**	**---**	27-FEB-2015	----	**02-FEB-2015**	27-FEB-2015	✓
EA015: Total Dissolved Solids							
Clear Plastic Bottle - Natural (EA015H)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**---**	05-FEB-2015	----	**05-FEB-2015**	05-FEB-2015	✓
Clear Plastic Bottle - Natural (EA015H)							
GW080487, QA1, QA2	**30-JAN-2015**	**---**	06-FEB-2015	----	**06-FEB-2015**	06-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA025: Suspended Solids							
Clear Plastic Bottle - Natural (EA025H)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	---	05-FEB-2015	----	**05-FEB-2015**	05-FEB-2015	✓
Clear Plastic Bottle - Natural (EA025H)							
GW080487, QA1, QA2	**30-JAN-2015**	---	06-FEB-2015	----	**06-FEB-2015**	06-FEB-2015	✓
ED009: Anions							
Clear Plastic Bottle - Natural (ED009-X)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**----**	----	----	**03-FEB-2015**	26-FEB-2015	✓
Clear Plastic Bottle - Natural (ED009-X)							
GW080487, QA1, QA2	**30-JAN-2015**	**----**	----	----	**03-FEB-2015**	27-FEB-2015	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	---	12-FEB-2015	----	**02-FEB-2015**	12-FEB-2015	✓
Clear Plastic Bottle - Natural (ED037-P)							
GW080487, QA1, QA2	**30-JAN-2015**	---	13-FEB-2015	----	**02-FEB-2015**	13-FEB-2015	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	---	26-FEB-2015	----	**31-JAN-2015**	26-FEB-2015	✓
Clear Plastic Bottle - Natural (ED041G)							
GW080487, QA1, QA2	**30-JAN-2015**	---	27-FEB-2015	----	**31-JAN-2015**	27-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED045G: Chloride Discrete analyser							
Clear Plastic Bottle - Natural (ED045G)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	---	26-FEB-2015	----	**31-JAN-2015**	26-FEB-2015	✓
Clear Plastic Bottle - Natural (ED045G)							
GW080487, QA1, QA2	**30-JAN-2015**	---	27-FEB-2015	----	**31-JAN-2015**	27-FEB-2015	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	---	26-FEB-2015	----	**03-FEB-2015**	26-FEB-2015	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
GW080487, QA1, QA2	**30-JAN-2015**	---	27-FEB-2015	----	**03-FEB-2015**	27-FEB-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	---	28-JUL-2015	----	**03-FEB-2015**	28-JUL-2015	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
GW080487, QA1, QA2	**30-JAN-2015**	---	29-JUL-2015	----	**03-FEB-2015**	29-JUL-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	---	28-JUL-2015	----	**03-FEB-2015**	28-JUL-2015	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)							
GW080487, QA1, QA2	**30-JAN-2015**	---	29-JUL-2015	----	**03-FEB-2015**	29-JUL-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	---	26-FEB-2015	----	**06-FEB-2015**	26-FEB-2015	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
GW080487, QA1, QA2	**30-JAN-2015**	---	27-FEB-2015	----	**06-FEB-2015**	27-FEB-2015	✓
EG052G: Silica by Discrete Analyser							
Clear Plastic Bottle - Natural (EG052G)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	---	26-FEB-2015	----	**31-JAN-2015**	26-FEB-2015	✓
Clear Plastic Bottle - Natural (EG052G)							
GW080487, QA1, QA2	**30-JAN-2015**	---	27-FEB-2015	----	**31-JAN-2015**	27-FEB-2015	✓
EK010/011: Chlorine							
Clear Plastic Bottle - Natural (EK010)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**----**	----	----	**30-JAN-2015**	29-JAN-2015	×
Clear Plastic Bottle - Natural (EK010)							
GW080487, QA1, QA2	**30-JAN-2015**	**----**	----	----	**30-JAN-2015**	30-JAN-2015	✓
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	---	26-FEB-2015	----	**02-FEB-2015**	26-FEB-2015	✓
Clear Plastic Bottle - Natural (EK040P)							
GW080487, QA1, QA2	**30-JAN-2015**	---	27-FEB-2015	----	**02-FEB-2015**	27-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	---	26-FEB-2015	----	**02-FEB-2015**	26-FEB-2015	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
GW080487, QA1, QA2	**30-JAN-2015**	---	27-FEB-2015	----	**02-FEB-2015**	27-FEB-2015	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	---	31-JAN-2015	----	**31-JAN-2015**	31-JAN-2015	✓
Clear Plastic Bottle - Natural (EK057G)							
GW080487, QA1, QA2	**30-JAN-2015**	---	01-FEB-2015	----	**31-JAN-2015**	01-FEB-2015	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	---	26-FEB-2015	----	**02-FEB-2015**	26-FEB-2015	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
GW080487, QA1, QA2	**30-JAN-2015**	---	27-FEB-2015	----	**02-FEB-2015**	27-FEB-2015	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**02-FEB-2015**	26-FEB-2015	✓	**02-FEB-2015**	26-FEB-2015	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
GW080487, QA1, QA2	**30-JAN-2015**	**02-FEB-2015**	27-FEB-2015	✓	**02-FEB-2015**	27-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**02-FEB-2015**	26-FEB-2015	✓	**02-FEB-2015**	26-FEB-2015	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
GW080487, QA1, QA2	**30-JAN-2015**	**02-FEB-2015**	27-FEB-2015	✓	**02-FEB-2015**	27-FEB-2015	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**---**	31-JAN-2015	----	**31-JAN-2015**	31-JAN-2015	✓
Clear Plastic Bottle - Natural (EK071G)							
GW080487, QA1, QA2	**30-JAN-2015**	**---**	01-FEB-2015	----	**31-JAN-2015**	01-FEB-2015	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06B	**29-JAN-2015**	**----**	----	----	**03-FEB-2015**	26-FEB-2015	✓
Amber TOC Vial - Sulfuric Acid (EP005)							
GW080487, QA1, QA2	**30-JAN-2015**	**----**	----	----	**03-FEB-2015**	27-FEB-2015	✓
Amber VOC Vial - Sulfuric Acid (EP005)							
WKMB06A	**29-JAN-2015**	**----**	----	----	**03-FEB-2015**	26-FEB-2015	✓
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - Sulfuric Acid (EP033)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**----**	----	----	**05-FEB-2015**	12-FEB-2015	✓
Amber VOC Vial - Sulfuric Acid (EP033)							
GW080487, QA1, QA2	**30-JAN-2015**	**----**	----	----	**05-FEB-2015**	13-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**02-FEB-2015**	05-FEB-2015	✓	**05-FEB-2015**	14-MAR-2015	✓
Amber Glass Bottle - Unpreserved (EP071)							
GW080487, QA1, QA2	**30-JAN-2015**	**02-FEB-2015**	06-FEB-2015	✓	**05-FEB-2015**	14-MAR-2015	✓
EP074D: Fumigants							
Amber VOC Vial - Sulfuric Acid (EP074)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**08-FEB-2015**	12-FEB-2015	✓	**08-FEB-2015**	12-FEB-2015	✓
Amber VOC Vial - Sulfuric Acid (EP074)							
GW080487, QA1, QA2	**30-JAN-2015**	**08-FEB-2015**	13-FEB-2015	✓	**08-FEB-2015**	13-FEB-2015	✓
EP074E: Halogenated Aliphatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**08-FEB-2015**	12-FEB-2015	✓	**08-FEB-2015**	12-FEB-2015	✓
Amber VOC Vial - Sulfuric Acid (EP074)							
GW080487, QA1, QA2	**30-JAN-2015**	**08-FEB-2015**	13-FEB-2015	✓	**08-FEB-2015**	13-FEB-2015	✓
EP074F: Halogenated Aromatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**08-FEB-2015**	12-FEB-2015	✓	**08-FEB-2015**	12-FEB-2015	✓
Amber VOC Vial - Sulfuric Acid (EP074)							
GW080487, QA1, QA2	**30-JAN-2015**	**08-FEB-2015**	13-FEB-2015	✓	**08-FEB-2015**	13-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074A: Monocyclic Aromatic Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP074)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**08-FEB-2015**	12-FEB-2015	✓	**08-FEB-2015**	12-FEB-2015	✓
Amber VOC Vial - Sulfuric Acid (EP074)							
GW080487, QA1, QA2	**30-JAN-2015**	**08-FEB-2015**	13-FEB-2015	✓	**08-FEB-2015**	13-FEB-2015	✓
EP074B: Oxygenated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**08-FEB-2015**	12-FEB-2015	✓	**08-FEB-2015**	12-FEB-2015	✓
Amber VOC Vial - Sulfuric Acid (EP074)							
GW080487, QA1, QA2	**30-JAN-2015**	**08-FEB-2015**	13-FEB-2015	✓	**08-FEB-2015**	13-FEB-2015	✓
EP074C: Sulfonated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**08-FEB-2015**	12-FEB-2015	✓	**08-FEB-2015**	12-FEB-2015	✓
Amber VOC Vial - Sulfuric Acid (EP074)							
GW080487, QA1, QA2	**30-JAN-2015**	**08-FEB-2015**	13-FEB-2015	✓	**08-FEB-2015**	13-FEB-2015	✓
EP074G: Trihalomethanes							
Amber VOC Vial - Sulfuric Acid (EP074)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**08-FEB-2015**	12-FEB-2015	✓	**08-FEB-2015**	12-FEB-2015	✓
Amber VOC Vial - Sulfuric Acid (EP074)							
GW080487, QA1, QA2	**30-JAN-2015**	**08-FEB-2015**	13-FEB-2015	✓	**08-FEB-2015**	13-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**02-FEB-2015**	05-FEB-2015	✓	**05-FEB-2015**	14-MAR-2015	✓
Amber Glass Bottle - Unpreserved (EP075(SIM))							
GW080487, QA1, QA2	**30-JAN-2015**	**02-FEB-2015**	06-FEB-2015	✓	**05-FEB-2015**	14-MAR-2015	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**02-FEB-2015**	05-FEB-2015	✓	**05-FEB-2015**	14-MAR-2015	✓
Amber Glass Bottle - Unpreserved (EP075(SIM))							
GW080487, QA1, QA2	**30-JAN-2015**	**02-FEB-2015**	06-FEB-2015	✓	**05-FEB-2015**	14-MAR-2015	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**08-FEB-2015**	12-FEB-2015	✓	**08-FEB-2015**	12-FEB-2015	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
GW080487, QA1, QA2	**30-JAN-2015**	**08-FEB-2015**	13-FEB-2015	✓	**08-FEB-2015**	13-FEB-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**08-FEB-2015**	12-FEB-2015	✓	**08-FEB-2015**	12-FEB-2015	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
GW080487, QA1, QA2	**30-JAN-2015**	**08-FEB-2015**	13-FEB-2015	✓	**08-FEB-2015**	13-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP262: Ethanolamines							
Amber Glass Bottle - Unpreserved (EP262)							
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	**29-JAN-2015**	**----**	----	----	**03-FEB-2015**	05-FEB-2015	✓
Amber Glass Bottle - Unpreserved (EP262)							
GW080487, QA1, QA2	**30-JAN-2015**	**----**	----	----	**03-FEB-2015**	06-FEB-2015	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	4	40	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	2	17	**11.8**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	2	12	**16.7**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	15	**13.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	2	12	**16.7**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	2	14	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	2	14	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	4	31	**12.9**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH	EA005	3	23	**13.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	15	**13.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	2	15	**13.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	4	33	**12.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	4	33	**12.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	2	13	**15.4**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	2	40	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	12	**8.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	12	**8.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Fluoride by PC Titrator	EK040P	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	2	31	**6.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	4	33	**12.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	4	33	**12.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	19	**15.8**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	3	19	**15.8**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	12	**8.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	12	**8.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	2	31	**6.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	33	**6.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	33	**6.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Total Phosphorus as P By Discrete Analyser	EK067G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	12	**8.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	2	31	**6.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH	EA005	WATER	In house: Referenced to APHA 21st ed. 4500 H+ B. pH of water samples is determined by ISE either manually or by automated pH meter. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 21st ed., 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 21st ed., 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 21st ed., 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Standard Anions -by IC (Extended Method)	ED009-X	WATER	In house: Referenced to APHA 21st ed., 4110. This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 21st ed., 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 21st ed., 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 21st ed., 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 21st ed., 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 21st ed. 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Silica (Reactive) by Discrete Analyser	EG052G	WATER	In house: Referenced to APHA 21st ed. 4500-SiO2 D: Under Acdic conditions reactive silicon combines with ammonium molybdate to form a yellow molybdosilicic acid complex. This is reduced by 1-amino-2-naphthol-4-sulfonic acid to a silicomolybdenum blue complex which is measured by discrete analyser at 670 nm. This method is compliant with NEPM (2013) Schedule B(3)
Chlorine	EK010	WATER	In-house (DPD colourimetry)
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 21st ed., 4500 F--C CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 21st ed., 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ammonium as N	EK055G-NH4	WATER	Ammonium in the sample is reported as the ionised / unionised fractions by the use of a nomograph and the initial pH and Temperature. Ammonia is determined by direct colorimetry by Discrete Analyser according to APHA 21st ed., 4500-NH3 G. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 21st ed., 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 21st ed., 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 21st ed., 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 21st ed., 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 21st ed., 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 21st ed., 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 21st ed., 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 21st Ed. 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 21st ed., 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Volatile Organic Compounds	EP074	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Ethanolamines by LCMSMS	EP262	WATER	In-house LC-MSMS: Benzoyl derivatives of target compounds are analysed by LC/MSMS in ESI Positive Mode.

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	4582860-002	----	**Acenaphthylene**	208-96-8	63.0 %	63.6-114%	**Recovery less than lower control limit**
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1501834-001	Anonymous	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**

Regular Sample Surrogates

Sub-Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP075(SIM)S: Phenolic Compound Surrogates	ES1501844-001	WKSW02	**Phenol-d6**	13127-88-3	66.8 %	10.0-44 %	**Recovery greater than upper data quality objective**
EP075(SIM)S: Phenolic Compound Surrogates	ES1501844-001	WKSW02	**2-Chlorophenol-D4**	93951-73-6	107 %	14-94 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	ES1501844-001	WKSW02	**2-Fluorobiphenyl**	321-60-8	108 %	20-104 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	ES1501844-001	WKSW02	**Anthracene-d10**	1719-06-8	120 %	27.4-113 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	ES1501844-001	WKSW02	**4-Terphenyl-d14**	1718-51-0	126 %	32-112 %	**Recovery greater than upper data quality objective**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **WATER**

Method	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)	*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EA005: pH						

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005: pH - Analysis Holding Time Compliance						
Clear Plastic Bottle - Natural						
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	----	----	----	30-JAN-2015	29-JAN-2015	**1**
EK010/011: Chlorine						
Clear Plastic Bottle - Natural						
WKSW02, WKSW03, WKMB01, WKMB02, WKMB03, GR-P3, WKMB06A, WKMB06B	----	----	----	30-JAN-2015	29-JAN-2015	**1**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

QUALITY CONTROL REPORT

Work Order	: **ES1501981**	Page	: 1 of 20
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: S DAYKIN	Contact	: Loren Schiavon
Address	: PO Box 5394 SYDNEY NSW 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: sdaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: ----	Telephone	: +61 2 8784 8503
Facsimile	: ----	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 29-JAN-2015
Sampler	: CS	Issue Date	: 12-MAY-2015
Order number	: ----		
		No. of samples received	: 1
Quote number	: SY/933/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA005P: pH by PC Titrator (QC Lot: 3803438)									
ES1501988-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	6.97	6.93	0.6	0% - 20%
ES1501988-003	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.07	7.10	0.4	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 3803439)									
ES1501968-003	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	594	591	0.5	0% - 20%
ES1501983-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	934	929	0.5	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 3805141)									
ES1501411-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	131	144	9.3	0% - 50%
ES1501673-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	25100	25200	0.3	0% - 20%
EA025: Suspended Solids (QC Lot: 3805142)									
ES1501411-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	14	15	6.9	No Limit
ES1501673-006	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	21	12	51.5	No Limit
ED009: Anions (QC Lot: 3804078)									
ES1501791-001	Anonymous	ED009-X: Chloride	16887-00-6	0.100	mg/L	25.8	26.0	0.4	0% - 20%
ES1501913-005	Anonymous	ED009-X: Chloride	16887-00-6	0.100	mg/L	5.92	6.15	3.7	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3803437)									
ES1501946-005	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	104	106	2.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	104	106	2.3	0% - 20%
ES1501988-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	530	525	1.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	530	525	1.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3803413)									
ES1501914-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.0	No Limit
ED045G: Chloride Discrete analyser (QC Lot: 3803412)									
ES1501914-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	4	4	0.0	No Limit
ES1501981-001	AST2	ED045G: Chloride	16887-00-6	1	mg/L	502	502	0.0	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3803947)									
ES1501678-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.002	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.024	0.026	6.4	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3803947) - continued									
ES1501678-001	Anonymous	EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.008	0.007	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.011	0.011	0.0	0% - 50%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.003	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.015	0.018	18.8	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.56	0.57	0.0	0% - 20%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.06	0.06	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.56	0.58	3.2	0% - 50%
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	0.1	0.1	0.0	No Limit
ES1501679-003	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.011	0.011	0.0	0% - 50%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.007	0.008	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.030	0.028	5.1	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.15	0.16	0.0	0% - 50%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.13	0.14	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.07	0.07	0.0	No Limit
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	0.1	0.1	0.0	No Limit
EG052G: Silica by Discrete Analyser (QC Lot: 3803415)									
ES1501981-001	AST2	EG052G: Reactive Silica	----	0.05	mg/L	18.4	18.9	2.4	0% - 20%
EK010/011: Chlorine (QC Lot: 3805338)									
ES1501844-001	Anonymous	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
		EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK010/011: Chlorine (QC Lot: 3805338) - continued									
ES1501844-010	Anonymous	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
		EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3803436)									
ES1501913-001	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	1.3	1.4	0.0	0% - 50%
ES1501988-001	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.2	0.2	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3803957)									
ES1501935-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.17	0.17	0.0	0% - 50%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3803411)									
ES1501914-001	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3803956)									
ES1501935-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	50.4	50.6	0.6	0% - 20%
ES1501936-003	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	42.0	42.0	0.1	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3803953)									
ES1501935-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	15.0	14.5	3.4	No Limit
ES1501936-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	13.0	13.5	3.8	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3803954)									
ES1501935-004	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	41.2	38.0	8.2	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3803414)									
ES1501981-001	AST2	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.02	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 3804442)									
ES1501861-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	20	20	0.0	0% - 50%
ES1501994-002	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	26	31	16.3	0% - 20%
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 3805109)									
EM1500722-001	Anonymous	EP033: Methane	74-82-8	10	µg/L	22	22	0.0	No Limit
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EP1500492-001	Anonymous	EP033: Methane	74-82-8	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 3804465)									

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 3804465) - continued									
ES1501659-002	Anonymous	EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
EP074B: Oxygenated Compounds (QC Lot: 3804465)									
ES1501659-002	Anonymous	EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit
EP074C: Sulfonated Compounds (QC Lot: 3804465)									
ES1501659-002	Anonymous	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
EP074D: Fumigants (QC Lot: 3804465)									
ES1501659-002	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3804465)									
ES1501659-002	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3804465) - continued									
ES1501659-002	Anonymous	EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 3804465)									
ES1501659-002	Anonymous	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 3804465)									
ES1501659-002	Anonymous	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3804466)									
ES1501659-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3804466)									
ES1501659-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 3804466)									
ES1501659-002	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	10	10	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP262: Ethanolamines (QC Lot: 3804015)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP262: Ethanolamines (QC Lot: 3804015) - continued									
ES1501981-001	AST2	EP262: Ethanolamine	141-43-5	1	µg/L	8	12	41.8	0% - 50%
		EP262: Diethanolamine	111-42-2	1	µg/L	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010P: Conductivity by PC Titrator (QCLot: 3803439)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	106	95	113
EA015: Total Dissolved Solids (QCLot: 3805141)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	----	2000 mg/L	92.0	87	109
				<10	293 mg/L	113	67	125
EA025: Suspended Solids (QCLot: 3805142)								
EA025H: Suspended Solids (SS)	----	5	mg/L	----	1000 mg/L	87.1	86	110
				<5	150 mg/L	90.0	83	129
ED009: Anions (QCLot: 3804078)								
ED009-X: Chloride	16887-00-6	0.1	mg/L	<0.100	2 mg/L	95.1	89	107
ED037P: Alkalinity by PC Titrator (QCLot: 3803437)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	104	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3803413)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	86	122
ED045G: Chloride Discrete analyser (QCLot: 3803412)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	112	75	123
				----	1000 mg/L	103	77	119
ED093F: Dissolved Major Cations (QCLot: 3803949)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	98.6	90	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	96.5	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	85.1	82	118
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	96.8	87	117
EG020F: Dissolved Metals by ICP-MS (QCLot: 3803947)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	102	85	115
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.01 mg/L	99.4	85	115
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.9	85	115
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	99.3	85	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	97.2	85	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3803947) - continued								
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	101	85	115
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	107	85	115
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	103	85	115
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	99.2	85	115
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	102	85	115
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	102	85	115
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	97.1	85	115
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	105	85	115
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	106	85	115
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	98.9	85	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	107	85	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	99.0	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	110	85	115
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	108	85	115
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3803950)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	100	80	112
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3803948)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	96.1	78	114
EG052G: Silica by Discrete Analyser (QCLot: 3803415)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.10	5 mg/L	105	94	114
EK010/011: Chlorine (QCLot: 3805338)								
EK010: Chlorine - Free	----	0.2	mg/L	<0.2	----	----	----	----
EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	----	----	----	----
EK040P: Fluoride by PC Titrator (QCLot: 3803436)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5.0 mg/L	102	75	119
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3803957)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.0 mg/L	104	86	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3803411)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3803411) - continued								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.5 mg/L	93.9	83	119
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3803956)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	101	87	119
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3803953)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	5 mg/L	90.2	66	119
				----	1.0 mg/L	82.0	66	126
				<0.1	10 mg/L	77.2	66	114
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3803954)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	----	0.442 mg/L	90.5	63	123
				<0.01	4.42 mg/L	82.8	67	117
				----	1.0 mg/L	103	66	124
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3803414)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	99.8	82	122
EP005: Total Organic Carbon (TOC) (QCLot: 3804442)								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	96.2	76	120
EP020: Oil and Grease (O&G) (QCLot: 3804736)								
EP020: Oil & Grease	----	5	mg/L	<5	5000 mg/L	112	80	120
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3805109)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	100	86	114
EP033: Ethene	74-85-1	10	µg/L	<10	50.29 µg/L	102	87	111
EP033: Ethane	74-84-0	10	µg/L	<10	54.43 µg/L	103	87	111
EP033: Propene	115-07-1	10	µg/L	<10	73.97 µg/L	107	85	113
EP033: Propane	74-98-6	10	µg/L	<10	78.28 µg/L	106	84	112
EP033: Butene	25167-67-3	20	µg/L	<20	99.61 µg/L	112	83	115
EP033: Butane	106-97-8	20	µg/L	<20	102.18 µg/L	112	85	115
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3804465)								
EP074: Styrene	100-42-5	5	µg/L	<5	10 µg/L	96.6	74	118
EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	10 µg/L	95.3	75	121
EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	10 µg/L	97.3	67	123
EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	10 µg/L	99.6	70	122

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3804465) - continued								
EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	10 µg/L	99.2	69	123
EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	10 µg/L	99.0	71	121
EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	10 µg/L	100	70	122
EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	10 µg/L	96.7	67	123
EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	10 µg/L	91.7	62	126
EP074B: Oxygenated Compounds (QCLot: 3804465)								
EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	100 µg/L	81.8	61.4	134
EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	100 µg/L	77.5	73.6	130
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	100 µg/L	87.6	61	139
EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	100 µg/L	75.3	65	137
EP074C: Sulfonated Compounds (QCLot: 3804465)								
EP074: Carbon disulfide	75-15-0	5	µg/L	<5	10 µg/L	85.4	72.8	127
EP074D: Fumigants (QCLot: 3804465)								
EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	10 µg/L	92.6	61	119
EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	10 µg/L	91.5	76	120
EP074: cis-1.3-Dichloropropylene	10061-01-5	10	µg/L	<10	10 µg/L	81.7	62	120
EP074: trans-1.3-Dichloropropylene	10061-02-6	10	µg/L	<10	10 µg/L	88.4	61	119
EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	10 µg/L	92.4	69	117
EP074E: Halogenated Aliphatic Compounds (QCLot: 3804465)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	108	60.6	138
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	106	67.4	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	105	69.4	129
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	124	56	140
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	112	63	135
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	105	65	131
EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	99.0	69	123
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	93.1	70.2	128
EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	93.2	71	119
EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	99.0	75	119
EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	96.1	77	117

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 3804465) - continued								
EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	89.8	61	119
EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	92.8	73	119
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	84.3	63	121
EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	97.4	78	122
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	95.4	74	120
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	90.4	74	118
EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	92.8	75	123
EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	95.6	79	121
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	90.0	72	124
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	87.0	66	114
EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	71.0	60	120
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	73.1	70.6	128
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	93.5	70	124
EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	96.7	74	128
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	84.0	71.8	126
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	77.8	66.4	136
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	98.5	58	132
EP074F: Halogenated Aromatic Compounds (QCLot: 3804465)								
EP074: Chlorobenzene	108-90-7	5	µg/L	<5	10 µg/L	94.0	80	118
EP074: Bromobenzene	108-86-1	5	µg/L	<5	10 µg/L	95.7	76	116
EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	10 µg/L	96.5	71	121
EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	10 µg/L	98.1	71	121
EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	10 µg/L	99.1	74	120
EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	10 µg/L	101	72	120
EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	10 µg/L	97.9	77	117
EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	10 µg/L	94.8	60	126
EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	10 µg/L	106	67	125
EP074G: Trihalomethanes (QCLot: 3804465)								
EP074: Chloroform	67-66-3	5	µg/L	<5	10 µg/L	95.7	76	118

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074G: Trihalomethanes (QCLot: 3804465) - continued								
EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	10 µg/L	85.8	64	118
EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	10 µg/L	79.1	65	115
EP074: Bromoform	75-25-2	5	µg/L	<5	10 µg/L	75.1	73.5	126
EP075(SIM)A: Phenolic Compounds (QCLot: 3804776)								
EP075(SIM): Phenol	108-95-2	0.2	µg/L	<1.0	5 µg/L	56.9	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	<1.0	5 µg/L	89.4	63.8	110
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	<1.0	5 µg/L	88.3	55.9	112
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	<2.0	10 µg/L	93.2	42.5	114
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	<1.0	5 µg/L	96.3	62.7	117
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.2	µg/L	<1.0	5 µg/L	89.8	59.9	112
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.2	µg/L	<1.0	5 µg/L	96.0	59.3	122
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.2	µg/L	<1.0	5 µg/L	96.7	64.3	118
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	<1.0	5 µg/L	91.2	63	119
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.2	µg/L	<1.0	5 µg/L	87.8	58.7	118
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.2	µg/L	<1.0	5 µg/L	85.3	50	108
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	<2.0	10 µg/L	44.9	10	95
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3804776)								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	<1.0	5 µg/L	85.0	58.6	119
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	<1.0	5 µg/L	94.8	63.6	114
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	<1.0	5 µg/L	89.3	62.2	113
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	<1.0	5 µg/L	95.9	63.9	115
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	<1.0	5 µg/L	94.9	62.6	116
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	<1.0	5 µg/L	100	64.3	116
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	<1.0	5 µg/L	103	63.6	118
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	<1.0	5 µg/L	101	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	<1.0	5 µg/L	95.5	64.1	117
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	<1.0	5 µg/L	96.7	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.2	µg/L	<1.0	5 µg/L	86.4	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<1.0	5 µg/L	102	61.7	117

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3804776) - continued								
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.5	5 µg/L	99.8	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<1.0	5 µg/L	98.1	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<1.0	5 µg/L	99.4	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<1.0	5 µg/L	92.6	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3804466)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	88.0	75	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3804778)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	87.0	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	97.3	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	95.0	62	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3804466)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	89.3	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3804778)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	93.6	58.9	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	99.1	73.9	138
EP071: >C34 - C40 Fraction	----	50	µg/L	<100	1500 µg/L	98.7	67	127
EP080: BTEXN (QCLot: 3804466)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	102	70	124
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	110	65	129
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	106	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	109	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	112	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	106	70	124
EP262: Ethanolamines (QCLot: 3804015)								
EP262: Ethanolamine	141-43-5	1	µg/L	<1	10 µg/L	100	50	130
EP262: Diethanolamine	111-42-2	1	µg/L	<1	10 µg/L	110	50	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED009: Anions (QCLot: 3804078)							
ES1501791-001	Anonymous	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3803413)							
ES1501914-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	102	70	130
ED045G: Chloride Discrete analyser (QCLot: 3803412)							
ES1501914-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	101	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3803947)							
ES1501678-002	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	104	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	120	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	98.7	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	102	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	101	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	105	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	105	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	110	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	106	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	102	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	104	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	108	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3803948)							
ES1501981-001	AST2	EG035F: Mercury	7439-97-6	0.0100 mg/L	92.3	70	130
EG052G: Silica by Discrete Analyser (QCLot: 3803415)							
ES1501981-001	AST2	EG052G: Reactive Silica	----	5 mg/L	87.1	70	130
EK040P: Fluoride by PC Titrator (QCLot: 3803436)							
ES1501913-001	Anonymous	EK040P: Fluoride	16984-48-8	5.0 mg/L	96.6	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3803957)							
ES1501935-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	84.9	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3803411)							
ES1501914-001	Anonymous	EK057G: Nitrite as N	----	0.5 mg/L	93.4	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3803956)							
ES1501935-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3803953)							
ES1501936-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	100 mg/L	91.8	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3803954)							
ES1501936-001	Anonymous	EK067G: Total Phosphorus as P	----	20 mg/L	99.7	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3803414)							
ES1501981-001	AST2	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	92.7	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 3804442)							
ES1501968-004	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	110	70	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3805109)							
EM1500889-001	Anonymous	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	70	130
		EP033: Ethene	74-85-1	50.29 µg/L	101	70	130
		EP033: Ethane	74-84-0	54.43 µg/L	102	70	130
		EP033: Propene	115-07-1	73.97 µg/L	104	70	130
		EP033: Propane	74-98-6	78.28 µg/L	103	70	130
		EP033: Butene	25167-67-3	99.61 µg/L	110	70	130
		EP033: Butane	106-97-8	102.18 µg/L	109	70	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 3804465)							
ES1501690-003	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	77.4	70	130
		EP074: Trichloroethene	79-01-6	25 µg/L	84.1	70	130
EP074F: Halogenated Aromatic Compounds (QCLot: 3804465)							
ES1501690-003	Anonymous	EP074: Chlorobenzene	108-90-7	25 µg/L	109	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3804466)							
ES1501690-003	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	110	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3804466)							
ES1501690-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	108	70	130
EP080: BTEXN (QCLot: 3804466)							
ES1501690-003	Anonymous	EP080: Benzene	71-43-2	25 µg/L	79.1	70	130
		EP080: Toluene	108-88-3	25 µg/L	97.8	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	90.2	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	95.3	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	91.3	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	92.7	70	130
EP262: Ethanolamines (QCLot: 3804015)							
ES1501981-001	AST2	EP262: Ethanolamine	141-43-5	10 µg/L	118	50	130
		EP262: Diethanolamine	111-42-2	10 µg/L	110	50	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3803411)										
ES1501914-001	Anonymous	EK057G: Nitrite as N	----	0.5 mg/L	93.4	----	70	130	----	----
ED045G: Chloride Discrete analyser (QCLot: 3803412)										
ES1501914-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	101	----	70	130	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3803413)										
ES1501914-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	102	----	70	130	----	----
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3803414)										
ES1501981-001	AST2	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	92.7	----	70	130	----	----
EG052G: Silica by Discrete Analyser (QCLot: 3803415)										
ES1501981-001	AST2	EG052G: Reactive Silica	----	5 mg/L	87.1	----	70	130	----	----
EK040P: Fluoride by PC Titrator (QCLot: 3803436)										
ES1501913-001	Anonymous	EK040P: Fluoride	16984-48-8	5.0 mg/L	96.6	----	70	130	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3803947)										
ES1501678-002	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	104	----	70	130	----	----
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	120	----	70	130	----	----
		EG020A-F: Barium	7440-39-3	0.2 mg/L	98.7	----	70	130	----	----
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	102	----	70	130	----	----
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	101	----	70	130	----	----
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	105	----	70	130	----	----
		EG020A-F: Copper	7440-50-8	0.2 mg/L	105	----	70	130	----	----
		EG020A-F: Lead	7439-92-1	0.2 mg/L	110	----	70	130	----	----
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	106	----	70	130	----	----
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	102	----	70	130	----	----
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	104	----	70	130	----	----
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	108	----	70	130	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3803948)										
ES1501981-001	AST2	EG035F: Mercury	7439-97-6	0.0100 mg/L	92.3	----	70	130	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3803953)										
ES1501936-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	100 mg/L	91.8	----	70	130	----	----
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3803954)										

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3803954) - continued										
ES1501936-001	Anonymous	EK067G: Total Phosphorus as P	----	20 mg/L	99.7	----	70	130	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3803956)										
ES1501935-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	----	70	130	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3803957)										
ES1501935-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	84.9	----	70	130	----	----
EP262: Ethanolamines (QCLot: 3804015)										
ES1501981-001	AST2	EP262: Ethanolamine	141-43-5	10 µg/L	118	----	50	130	----	----
		EP262: Diethanolamine	111-42-2	10 µg/L	110	----	50	130	----	----
ED009: Anions (QCLot: 3804078)										
ES1501791-001	Anonymous	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	----	70	130	----	----
EP005: Total Organic Carbon (TOC) (QCLot: 3804442)										
ES1501968-004	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	110	----	70	130	----	----
EP074E: Halogenated Aliphatic Compounds (QCLot: 3804465)										
ES1501690-003	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	77.4	----	70	130	----	----
		EP074: Trichloroethene	79-01-6	25 µg/L	84.1	----	70	130	----	----
EP074F: Halogenated Aromatic Compounds (QCLot: 3804465)										
ES1501690-003	Anonymous	EP074: Chlorobenzene	108-90-7	25 µg/L	109	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3804466)										
ES1501690-003	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	110	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3804466)										
ES1501690-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	108	----	70	130	----	----
EP080: BTEXN (QCLot: 3804466)										
ES1501690-003	Anonymous	EP080: Benzene	71-43-2	25 µg/L	79.1	----	70	130	----	----
		EP080: Toluene	108-88-3	25 µg/L	97.8	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	25 µg/L	90.2	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	95.3	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	25 µg/L	91.3	----	70	130	----	----
		EP080: Naphthalene	91-20-3	25 µg/L	92.7	----	70	130	----	----
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3805109)										
EM1500889-001	Anonymous	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	----	70	130	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3805109) - continued										
EM1500889-001	Anonymous	EP033: Ethene	74-85-1	50.29 µg/L	101	----	70	130	----	----
		EP033: Ethane	74-84-0	54.43 µg/L	102	----	70	130	----	----
		EP033: Propene	115-07-1	73.97 µg/L	104	----	70	130	----	----
		EP033: Propane	74-98-6	78.28 µg/L	103	----	70	130	----	----
		EP033: Butene	25167-67-3	99.61 µg/L	110	----	70	130	----	----
		EP033: Butane	106-97-8	102.18 µg/L	109	----	70	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1501981**	Page	: 1 of 11
Amendment	: **1**		
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: S DAYKIN	Contact	: Loren Schiavon
Address	: PO Box 5394 SYDNEY NSW 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: sdaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: ----	Telephone	: +61 2 8784 8503
Facsimile	: ----	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 29-JAN-2015
Sampler	: CS	Issue Date	: 12-MAY-2015
Order number	: ----		
		No. of samples received	: 1
Quote number	: SY/933/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P)							
AST2	**28-JAN-2015**	---	28-JAN-2015	----	**29-JAN-2015**	28-JAN-2015	×
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P)							
AST2	**28-JAN-2015**	---	25-FEB-2015	----	**29-JAN-2015**	25-FEB-2015	✓
EA015: Total Dissolved Solids							
Clear Plastic Bottle - Natural (EA015H)							
AST2	**28-JAN-2015**	---	04-FEB-2015	----	**30-JAN-2015**	04-FEB-2015	✓
EA025: Suspended Solids							
Clear Plastic Bottle - Natural (EA025H)							
AST2	**28-JAN-2015**	---	04-FEB-2015	----	**30-JAN-2015**	04-FEB-2015	✓
ED009: Anions							
Clear Plastic Bottle - Natural (ED009-X)							
AST2	**28-JAN-2015**	**----**	----	----	**30-JAN-2015**	25-FEB-2015	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
AST2	**28-JAN-2015**	---	11-FEB-2015	----	**29-JAN-2015**	11-FEB-2015	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
AST2	**28-JAN-2015**	---	25-FEB-2015	----	**29-JAN-2015**	25-FEB-2015	✓
ED045G: Chloride Discrete analyser							
Clear Plastic Bottle - Natural (ED045G)							
AST2	**28-JAN-2015**	---	25-FEB-2015	----	**29-JAN-2015**	25-FEB-2015	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
AST2	**28-JAN-2015**	---	25-FEB-2015	----	**02-FEB-2015**	25-FEB-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
AST2	**28-JAN-2015**	---	27-JUL-2015	----	**02-FEB-2015**	27-JUL-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)							
AST2	**28-JAN-2015**	---	27-JUL-2015	----	**02-FEB-2015**	27-JUL-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
AST2	**28-JAN-2015**	**---**	25-FEB-2015	----	**30-JAN-2015**	25-FEB-2015	✓
EG052G: Silica by Discrete Analyser							
Clear Plastic Bottle - Natural (EG052G)							
AST2	**28-JAN-2015**	**---**	25-FEB-2015	----	**29-JAN-2015**	25-FEB-2015	✓
EK010/011: Chlorine							
Clear Plastic Bottle - Natural (EK010)							
AST2	**28-JAN-2015**	**----**	----	----	**30-JAN-2015**	28-JAN-2015	×
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
AST2	**28-JAN-2015**	**---**	25-FEB-2015	----	**29-JAN-2015**	25-FEB-2015	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
AST2	**28-JAN-2015**	**---**	25-FEB-2015	----	**30-JAN-2015**	25-FEB-2015	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
AST2	**28-JAN-2015**	**---**	30-JAN-2015	----	**29-JAN-2015**	30-JAN-2015	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
AST2	**28-JAN-2015**	**---**	25-FEB-2015	----	**30-JAN-2015**	25-FEB-2015	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
AST2	**28-JAN-2015**	**30-JAN-2015**	25-FEB-2015	✓	**30-JAN-2015**	25-FEB-2015	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
AST2	**28-JAN-2015**	**30-JAN-2015**	25-FEB-2015	✓	**30-JAN-2015**	25-FEB-2015	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
AST2	**28-JAN-2015**	**---**	30-JAN-2015	----	**29-JAN-2015**	30-JAN-2015	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005)							
AST2	**28-JAN-2015**	**----**	----	----	**30-JAN-2015**	25-FEB-2015	✓
EP020: Oil and Grease (O&G)							
Amber Glass Bottle - Sulfuric Acid (EP020)							
AST2	**28-JAN-2015**	**----**	----	----	**30-JAN-2015**	25-FEB-2015	✓
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - Sulfuric Acid (EP033)							
AST2	**28-JAN-2015**	**----**	----	----	**01-FEB-2015**	11-FEB-2015	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
AST2	**28-JAN-2015**	**30-JAN-2015**	04-FEB-2015	✓	**01-FEB-2015**	11-MAR-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074D: Fumigants							
Amber VOC Vial - Sulfuric Acid (EP074)							
AST2	**28-JAN-2015**	**30-JAN-2015**	11-FEB-2015	✓	**30-JAN-2015**	11-FEB-2015	✓
EP074E: Halogenated Aliphatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
AST2	**28-JAN-2015**	**30-JAN-2015**	11-FEB-2015	✓	**30-JAN-2015**	11-FEB-2015	✓
EP074F: Halogenated Aromatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
AST2	**28-JAN-2015**	**30-JAN-2015**	11-FEB-2015	✓	**30-JAN-2015**	11-FEB-2015	✓
EP074A: Monocyclic Aromatic Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP074)							
AST2	**28-JAN-2015**	**30-JAN-2015**	11-FEB-2015	✓	**30-JAN-2015**	11-FEB-2015	✓
EP074B: Oxygenated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
AST2	**28-JAN-2015**	**30-JAN-2015**	11-FEB-2015	✓	**30-JAN-2015**	11-FEB-2015	✓
EP074C: Sulfonated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
AST2	**28-JAN-2015**	**30-JAN-2015**	11-FEB-2015	✓	**30-JAN-2015**	11-FEB-2015	✓
EP074G: Trihalomethanes							
Amber VOC Vial - Sulfuric Acid (EP074)							
AST2	**28-JAN-2015**	**30-JAN-2015**	11-FEB-2015	✓	**30-JAN-2015**	11-FEB-2015	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
AST2	**28-JAN-2015**	**30-JAN-2015**	04-FEB-2015	✓	**01-FEB-2015**	11-MAR-2015	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
AST2	**28-JAN-2015**	**30-JAN-2015**	04-FEB-2015	✓	**01-FEB-2015**	11-MAR-2015	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
AST2	**28-JAN-2015**	**30-JAN-2015**	11-FEB-2015	✓	**30-JAN-2015**	11-FEB-2015	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber VOC Vial - Sulfuric Acid (EP080)							
AST2	**28-JAN-2015**	**30-JAN-2015**	11-FEB-2015	✓	**30-JAN-2015**	11-FEB-2015	✓
EP262: Ethanolamines							
Amber Glass Bottle - Unpreserved (EP262)							
AST2	**28-JAN-2015**	**----**	----	----	**31-JAN-2015**	04-FEB-2015	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	1	9	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	16	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	2	11	**18.2**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	2	15	**13.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	15	**13.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	8	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH by PC Titrator	EA005-P	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	8	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	13	**15.4**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	13	**15.4**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	15	**13.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	9	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	8	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	8	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	16	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	11	**9.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Nitrite as N by Discrete Analyser	EK057G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Oil and Grease	EP020	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	13	**15.4**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	13	**15.4**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	15	**20.0**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	3	9	**33.3**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	11	**9.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Oil and Grease	EP020	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
TRH - Semivolatile Fraction	EP071	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Standard Anions -by IC (Extended Method)	ED009-X	WATER	In house: Referenced to APHA 4110. This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Silica (Reactive) by Discrete Analyser	EG052G	WATER	In house: Referenced to APHA 4500-SiO2 D: Under Acdic conditions reactive silicon combines with ammonium molybdate to form a yellow molybdosilicic acid complex. This is reduced by 1-amino-2-naphthol-4-sulfonic acid to a silicomolybdenum blue complex which is measured by discrete analyser at 670 nm. This method is compliant with NEPM (2013) Schedule B(3)
Chlorine	EK010	WATER	In-house (DPD colourimetry)
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500 F--C CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ammonium as N	EK055G-NH4	WATER	Ammonium in the sample is reported as the ionised / unionised fractions by the use of a nomograph and the initial pH and Temperature. Ammonia is determined by direct colorimetry by Discrete Analyser according to APHA 4500-NH3 G. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
Oil and Grease	EP020	WATER	In house: Referenced to APHA 5520 B. Oil & grease is a gravimetric procedure to determine the amount of oil & grease residue in an aqueous sample. The sample is serially extracted three times n-hexane. The resultant extracts are combined, dehydrated and concentrated prior to gravimetric determination. This method is compliant with NEPM (2013) Schedule B(3)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Volatile Organic Compounds	EP074	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Ethanolamines by LCMSMS	EP262	WATER	In-house LC-MSMS: Benzoyl derivatives of target compounds are analysed by LC/MSMS in ESI Positive Mode.

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED009: Anions	ES1501791-001	Anonymous	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	ES1501935-001	Anonymous	**Nitrite + Nitrate as N**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP033: C1 - C4 Hydrocarbon Gases	EM1500889-001	Anonymous	**Methane**	74-82-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural						
AST2	----	----	----	29-JAN-2015	28-JAN-2015	**1**
EK010/011: Chlorine						
Clear Plastic Bottle - Natural						
AST2	----	----	----	30-JAN-2015	28-JAN-2015	**2**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

QUALITY CONTROL REPORT

Work Order	: **ES1501982**	Page	: 1 of 20
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: S DAYKIN	Contact	: Loren Schiavon
Address	: PO Box 5394 SYDNEY NSW 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: sdaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: ----	Telephone	: +61 2 8784 8503
Facsimile	: ----	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 29-JAN-2015
Sampler	: CS	Issue Date	: 06-FEB-2015
Order number	: ----		
		No. of samples received	: 1
Quote number	: SY/933/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA005P: pH by PC Titrator (QC Lot: 3803438)									
ES1501988-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	6.97	6.93	0.6	0% - 20%
ES1501988-003	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.07	7.10	0.4	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 3803439)									
ES1501968-003	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	594	591	0.5	0% - 20%
ES1501983-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	934	929	0.5	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 3809196)									
ES1501841-002	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	4290	4200	2.0	0% - 20%
EA025: Suspended Solids (QC Lot: 3809197)									
ES1501841-002	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ED009: Anions (QC Lot: 3804078)									
ES1501791-001	Anonymous	ED009-X: Chloride	16887-00-6	0.100	mg/L	25.8	26.0	0.4	0% - 20%
ES1501913-005	Anonymous	ED009-X: Chloride	16887-00-6	0.100	mg/L	5.92	6.15	3.7	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3803437)									
ES1501946-005	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	104	106	2.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	104	106	2.3	0% - 20%
ES1501988-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	530	525	1.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	530	525	1.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3803413)									
ES1501914-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.0	No Limit
ED045G: Chloride Discrete analyser (QC Lot: 3803412)									
ES1501914-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	4	4	0.0	No Limit
ES1501981-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	502	502	0.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 3805574)									
ES1501982-001	WKSW01	ED093F: Calcium	7440-70-2	1	mg/L	5	4	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	3	3	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	16	15	0.0	0% - 50%
		ED093F: Potassium	7440-09-7	1	mg/L	4	4	0.0	No Limit
ES1501988-003	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	282	288	2.1	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	1200	1210	0.9	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	5710	5700	0.2	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
ED093F: Dissolved Major Cations (QC Lot: 3805574) - continued									
ES1501988-003	Anonymous	ED093F: Potassium	7440-09-7	1	mg/L	28	28	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3805575)									
ES1501982-001	WKSW01	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0013	0.0014	0.0	0% - 50%
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.051	0.052	2.2	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.008	0.008	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.040	0.041	3.4	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.051	0.056	9.0	0% - 50%
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.48	0.48	0.0	0% - 20%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.92	0.92	0.0	0% - 50%
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	<0.1	0.0	No Limit
ES1501988-003	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.112	0.110	1.9	0% - 50%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	1.32	1.31	0.4	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.016	0.016	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.070	0.071	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.10	<0.10	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.10	<0.10	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.10	<0.10	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.50	<0.50	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3805575) - continued									
ES1501988-003	Anonymous	EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.50	<0.50	0.0	No Limit
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	37.4	37.3	0.4	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3805576)									
ES1501982-001	WKSW01	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.071	0.068	4.2	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 3805573)									
ES1501831-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES1501988-005	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG052G: Silica by Discrete Analyser (QC Lot: 3803415)									
ES1501981-001	Anonymous	EG052G: Reactive Silica	----	0.05	mg/L	18.4	18.9	2.4	0% - 20%
EK010/011: Chlorine (QC Lot: 3805338)									
ES1501844-001	Anonymous	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
		EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
ES1501844-010	Anonymous	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
		EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3803436)									
ES1501913-001	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	1.3	1.4	0.0	0% - 50%
ES1501988-001	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.2	0.2	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3803944)									
ES1501946-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.10	0.12	10.9	0% - 50%
ES1501982-001	WKSW01	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3803411)									
ES1501914-001	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3803943)									
ES1501946-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.10	0.10	0.0	0% - 50%
ES1501982-001	WKSW01	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.09	0.08	16.4	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3803939)									
ES1501943-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.4	0.0	No Limit
ES1501994-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.9	3.2	7.9	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3803940)									
ES1501943-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.42	0.45	6.6	0% - 20%
ES1501994-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	1.86	1.61	14.0	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3803414)									
ES1501981-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.02	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 3804442)									
ES1501861-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	20	20	0.0	0% - 50%
ES1501994-002	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	26	31	16.3	0% - 20%
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 3806698)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 3806698) - continued									
EM1500695-003	Anonymous	EP033: Methane	74-82-8	10	µg/L	225	250	10.3	0% - 20%
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
ES1501982-001	WKSW01	EP033: Methane	74-82-8	10	µg/L	18	18	0.0	No Limit
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 3806075)									
ES1501875-016	Anonymous	EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
ES1501883-001	Anonymous	EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
EP074B: Oxygenated Compounds (QC Lot: 3806075)									
ES1501875-016	Anonymous	EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit
ES1501883-001	Anonymous	EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074B: Oxygenated Compounds (QC Lot: 3806075) - continued									
ES1501883-001	Anonymous	EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit
EP074C: Sulfonated Compounds (QC Lot: 3806075)									
ES1501875-016	Anonymous	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
ES1501883-001	Anonymous	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
EP074D: Fumigants (QC Lot: 3806075)									
ES1501875-016	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
ES1501883-001	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3806075)									
ES1501875-016	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3806075) - continued									
ES1501875-016	Anonymous	EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
ES1501883-001	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 3806075)									
ES1501875-016	Anonymous	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP074F: Halogenated Aromatic Compounds (QC Lot: 3806075) - continued									
ES1501875-016	Anonymous	EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
ES1501883-001	Anonymous	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 3806075)									
ES1501875-016	Anonymous	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
ES1501883-001	Anonymous	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3806076)									
ES1501875-016	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES1501883-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	70	60	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3806076)									
ES1501875-016	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES1501883-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	80	70	17.0	No Limit
EP080: BTEXN (QC Lot: 3806076)									
ES1501875-016	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES1501883-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	11	14	23.4	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	2	3	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 3806076) - continued									
ES1501883-001	Anonymous	EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP262: Ethanolamines (QC Lot: 3804015)									
ES1501981-001	Anonymous	EP262: Ethanolamine	141-43-5	1	µg/L	8	12	41.8	0% - 50%
		EP262: Diethanolamine	111-42-2	1	µg/L	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EA010P: Conductivity by PC Titrator (QCLot: 3803439)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	106	95	113
EA015: Total Dissolved Solids (QCLot: 3809196)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	----	2000 mg/L	91.5	87	109
				<10	293 mg/L	105	67	125
EA025: Suspended Solids (QCLot: 3809197)								
EA025H: Suspended Solids (SS)	----	5	mg/L	----	1000 mg/L	94.9	86	110
				<5	150 mg/L	92.0	83	129
ED009: Anions (QCLot: 3804078)								
ED009-X: Chloride	16887-00-6	0.1	mg/L	<0.100	2 mg/L	95.1	89	107
ED037P: Alkalinity by PC Titrator (QCLot: 3803437)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	104	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3803413)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	86	122
ED045G: Chloride Discrete analyser (QCLot: 3803412)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	112	75	123
				----	1000 mg/L	103	77	119
ED093F: Dissolved Major Cations (QCLot: 3805574)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	90.3	90	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	105	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	102	82	118
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	98.7	87	117
EG020F: Dissolved Metals by ICP-MS (QCLot: 3805575)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	97.6	85	115
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.01 mg/L	103	85	115
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.9	85	115
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	99.2	85	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	99.6	85	115
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.8	85	115
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	104	85	115
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	92.2	85	115
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	95.0	85	115
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	97.5	85	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3805575) - continued								
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	97.7	85	115
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	98.7	85	115
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.6	85	115
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	91.7	85	115
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	108	85	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	101	85	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	94.3	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	99.7	85	115
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	99.2	85	115
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3805576)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	91.8	80	112
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3805573)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	101	78	114
EG052G: Silica by Discrete Analyser (QCLot: 3803415)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.10	5 mg/L	105	94	114
EK010/011: Chlorine (QCLot: 3805338)								
EK010: Chlorine - Free	----	0.2	mg/L	<0.2	----	----	----	----
EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	----	----	----	----
EK040P: Fluoride by PC Titrator (QCLot: 3803436)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5.0 mg/L	102	75	119
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3803944)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.0 mg/L	100	86	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3803411)								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.5 mg/L	93.9	83	119
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3803943)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	94.0	87	119
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3803939)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	1.0 mg/L	90.8	66	126
				----	5 mg/L	77.0	66	119
				<0.1	10 mg/L	82.0	66	114
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3803940)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	----	0.442 mg/L	95.0	63	123
				<0.01	4.42 mg/L	86.9	67	117
				----	1.0 mg/L	98.3	66	124

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3803414)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	99.8	82	122
EP005: Total Organic Carbon (TOC) (QCLot: 3804442)								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	96.2	76	120
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3806698)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	108	86	114
EP033: Ethene	74-85-1	10	µg/L	<10	50.29 µg/L	108	87	111
EP033: Ethane	74-84-0	10	µg/L	<10	54.43 µg/L	108	87	111
EP033: Propene	115-07-1	10	µg/L	<10	73.97 µg/L	108	85	113
EP033: Propane	74-98-6	10	µg/L	<10	78.28 µg/L	109	84	112
EP033: Butene	25167-67-3	20	µg/L	<20	99.61 µg/L	108	83	115
EP033: Butane	106-97-8	20	µg/L	<20	102.18 µg/L	107	85	115
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3806075)								
EP074: Styrene	100-42-5	5	µg/L	<5	10 µg/L	98.5	74	118
EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	10 µg/L	99.3	75	121
EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	10 µg/L	97.6	67	123
EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	10 µg/L	97.8	70	122
EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	10 µg/L	99.4	69	123
EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	10 µg/L	97.7	71	121
EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	10 µg/L	99.0	70	122
EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	10 µg/L	96.4	67	123
EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	10 µg/L	95.5	62	126
EP074B: Oxygenated Compounds (QCLot: 3806075)								
EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	100 µg/L	94.7	61.4	134
EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	100 µg/L	91.4	73.6	130
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	100 µg/L	104	61	139
EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	100 µg/L	86.9	65	137
EP074C: Sulfonated Compounds (QCLot: 3806075)								
EP074: Carbon disulfide	75-15-0	5	µg/L	<5	10 µg/L	108	72.8	127
EP074D: Fumigants (QCLot: 3806075)								
EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	10 µg/L	97.0	61	119
EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	10 µg/L	103	76	120
EP074: cis-1.3-Dichloropropylene	10061-01-5	10	µg/L	<10	10 µg/L	96.9	62	120
EP074: trans-1.3-Dichloropropylene	10061-02-6	10	µg/L	<10	10 µg/L	98.3	61	119
EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	10 µg/L	104	69	117
EP074E: Halogenated Aliphatic Compounds (QCLot: 3806075)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	71.4	60.6	138

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 3806075) - continued								
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	99.5	67.4	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	102	69.4	129
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	112	56	140
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	104	63	135
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	105	65	131
EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	109	69	123
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	95.7	70.2	128
EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	101	71	119
EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	99.4	75	119
EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	99.2	77	117
EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	101	61	119
EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	93.4	73	119
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	103	63	121
EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	96.4	78	122
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	99.0	74	120
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	100	74	118
EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	104	75	123
EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	97.1	79	121
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	83.4	72	124
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	96.8	66	114
EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	92.7	60	120
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	96.4	70.6	128
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	107	70	124
EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	99.1	74	128
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	124	71.8	126
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	100	66.4	136
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	92.1	58	132
EP074F: Halogenated Aromatic Compounds (QCLot: 3806075)								
EP074: Chlorobenzene	108-90-7	5	µg/L	<5	10 µg/L	99.2	80	118
EP074: Bromobenzene	108-86-1	5	µg/L	<5	10 µg/L	100	76	116
EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	10 µg/L	95.9	71	121
EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	10 µg/L	98.7	71	121
EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	10 µg/L	98.2	74	120
EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	10 µg/L	99.6	72	120
EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	10 µg/L	95.7	77	117
EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	10 µg/L	91.0	60	126
EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	10 µg/L	91.9	67	125

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074G: Trihalomethanes (QCLot: 3806075)								
EP074: Chloroform	67-66-3	5	µg/L	<5	10 µg/L	97.1	76	118
EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	10 µg/L	99.1	64	118
EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	10 µg/L	97.4	65	115
EP074: Bromoform	75-25-2	5	µg/L	<5	10 µg/L	106	73.5	126
EP075(SIM)A: Phenolic Compounds (QCLot: 3804272)								
EP075(SIM): Phenol	108-95-2	0.2	µg/L	<1.0	5 µg/L	33.4	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	<1.0	5 µg/L	64.2	63.8	110
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	<1.0	5 µg/L	66.6	55.9	112
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	<2.0	10 µg/L	57.4	42.5	114
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	<1.0	5 µg/L	77.9	62.7	117
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.2	µg/L	<1.0	5 µg/L	72.3	59.9	112
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.2	µg/L	<1.0	5 µg/L	76.5	59.3	122
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.2	µg/L	<1.0	5 µg/L	82.0	64.3	118
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	<1.0	5 µg/L	74.1	63	119
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.2	µg/L	<1.0	5 µg/L	73.5	58.7	118
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.2	µg/L	<1.0	5 µg/L	76.2	50	108
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	<2.0	10 µg/L	46.8	10	95
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3804272)								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	<1.0	5 µg/L	74.7	58.6	119
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	<1.0	5 µg/L	84.0	63.6	114
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	<1.0	5 µg/L	79.8	62.2	113
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	<1.0	5 µg/L	83.2	63.9	115
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	<1.0	5 µg/L	87.7	62.6	116
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	<1.0	5 µg/L	90.0	64.3	116
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	<1.0	5 µg/L	92.8	63.6	118
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	<1.0	5 µg/L	87.3	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	<1.0	5 µg/L	88.3	64.1	117
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	<1.0	5 µg/L	92.4	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.2	µg/L	<1.0	5 µg/L	89.5	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<1.0	5 µg/L	98.8	61.7	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.5	5 µg/L	95.3	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<1.0	5 µg/L	99.0	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<1.0	5 µg/L	96.1	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<1.0	5 µg/L	94.3	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3804271)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	102	59	129

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3804271) - continued								
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	98.0	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	90.0	62	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3806076)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	98.7	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3804271)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	96.4	58.9	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	94.6	73.9	138
EP071: >C34 - C40 Fraction	----	50	µg/L	<100	1500 µg/L	96.7	67	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3806076)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	97.9	75	127
EP080: BTEXN (QCLot: 3806076)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	100	70	124
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	94.5	65	129
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	90.2	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	89.3	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	92.9	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	97.3	70	124
EP262: Ethanolamines (QCLot: 3804015)								
EP262: Ethanolamine	141-43-5	1	µg/L	<1	10 µg/L	100	50	130
EP262: Diethanolamine	111-42-2	1	µg/L	<1	10 µg/L	110	50	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
ED009: Anions (QCLot: 3804078)							
ES1501791-001	Anonymous	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3803413)							
ES1501914-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	102	70	130
ED045G: Chloride Discrete analyser (QCLot: 3803412)							
ES1501914-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	101	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3805575)							
ES1501831-003	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	103	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	106	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	108	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	103	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	105	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	99.5	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	100	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	97.2	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	# Not Determined	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	97.8	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	102	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	103	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3805573)							
ES1501831-001	Anonymous	EG035F: Mercury	7439-97-6	0.0100 mg/L	91.7	70	130
EG052G: Silica by Discrete Analyser (QCLot: 3803415)							
ES1501981-001	Anonymous	EG052G: Reactive Silica	----	5 mg/L	87.1	70	130
EK040P: Fluoride by PC Titrator (QCLot: 3803436)							
ES1501913-001	Anonymous	EK040P: Fluoride	16984-48-8	5.0 mg/L	96.6	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3803944)							
ES1501946-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	109	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3803411)							
ES1501914-001	Anonymous	EK057G: Nitrite as N	----	0.5 mg/L	93.4	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3803943)							
ES1501946-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	102	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3803939)							
ES1501943-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	88.3	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3803940)							
ES1501943-002	Anonymous	EK067G: Total Phosphorus as P	----	1.0 mg/L	99.9	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3803414)							
ES1501981-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	92.7	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 3804442)							
ES1501968-004	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	110	70	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3806698)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3806698) - continued							
EM1500785-001	Anonymous	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	70	130
		EP033: Ethene	74-85-1	50.29 µg/L	108	70	130
		EP033: Ethane	74-84-0	54.43 µg/L	108	70	130
		EP033: Propene	115-07-1	73.97 µg/L	108	70	130
		EP033: Propane	74-98-6	78.28 µg/L	108	70	130
		EP033: Butene	25167-67-3	99.61 µg/L	108	70	130
		EP033: Butane	106-97-8	102.18 µg/L	108	70	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 3806075)							
ES1501875-016	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	93.6	70	130
		EP074: Trichloroethene	79-01-6	25 µg/L	85.0	70	130
EP074F: Halogenated Aromatic Compounds (QCLot: 3806075)							
ES1501875-016	Anonymous	EP074: Chlorobenzene	108-90-7	25 µg/L	95.8	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3806076)							
ES1501875-016	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	86.4	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3806076)							
ES1501875-016	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	86.6	70	130
EP080: BTEXN (QCLot: 3806076)							
ES1501875-016	Anonymous	EP080: Benzene	71-43-2	25 µg/L	78.4	70	130
		EP080: Toluene	108-88-3	25 µg/L	78.2	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	79.0	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	79.0	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	83.1	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	94.9	70	130
EP262: Ethanolamines (QCLot: 3804015)							
ES1501981-001	Anonymous	EP262: Ethanolamine	141-43-5	10 µg/L	118	50	130
		EP262: Diethanolamine	111-42-2	10 µg/L	110	50	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3803411)										
ES1501914-001	Anonymous	EK057G: Nitrite as N	----	0.5 mg/L	93.4	----	70	130	----	----
ED045G: Chloride Discrete analyser (QCLot: 3803412)										
ES1501914-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	101	----	70	130	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3803413)										
ES1501914-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	102	----	70	130	----	----
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3803414)										
ES1501981-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	92.7	----	70	130	----	----
EG052G: Silica by Discrete Analyser (QCLot: 3803415)										
ES1501981-001	Anonymous	EG052G: Reactive Silica	----	5 mg/L	87.1	----	70	130	----	----
EK040P: Fluoride by PC Titrator (QCLot: 3803436)										
ES1501913-001	Anonymous	EK040P: Fluoride	16984-48-8	5.0 mg/L	96.6	----	70	130	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3803939)										
ES1501943-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	88.3	----	70	130	----	----
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3803940)										
ES1501943-002	Anonymous	EK067G: Total Phosphorus as P	----	1.0 mg/L	99.9	----	70	130	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3803943)										
ES1501946-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	102	----	70	130	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3803944)										
ES1501946-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	109	----	70	130	----	----
EP262: Ethanolamines (QCLot: 3804015)										
ES1501981-001	Anonymous	EP262: Ethanolamine	141-43-5	10 µg/L	118	----	50	130	----	----
		EP262: Diethanolamine	111-42-2	10 µg/L	110	----	50	130	----	----
ED009: Anions (QCLot: 3804078)										
ES1501791-001	Anonymous	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	----	70	130	----	----
EP005: Total Organic Carbon (TOC) (QCLot: 3804442)										
ES1501968-004	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	110	----	70	130	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3805573)										
ES1501831-001	Anonymous	EG035F: Mercury	7439-97-6	0.0100 mg/L	91.7	----	70	130	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3805575)										
ES1501831-003	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	103	----	70	130	----	----
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	106	----	70	130	----	----
		EG020A-F: Barium	7440-39-3	0.2 mg/L	108	----	70	130	----	----
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	103	----	70	130	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EG020F: Dissolved Metals by ICP-MS (QCLot: 3805575) - continued										
ES1501831-003	Anonymous	EG020A-F: Chromium	7440-47-3	0.2 mg/L	105	----	70	130	----	----
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	99.5	----	70	130	----	----
		EG020A-F: Copper	7440-50-8	0.2 mg/L	100	----	70	130	----	----
		EG020A-F: Lead	7439-92-1	0.2 mg/L	97.2	----	70	130	----	----
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	# Not Determined	----	70	130	----	----
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	97.8	----	70	130	----	----
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	102	----	70	130	----	----
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	103	----	70	130	----	----
EP074E: Halogenated Aliphatic Compounds (QCLot: 3806075)										
ES1501875-016	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	93.6	----	70	130	----	----
		EP074: Trichloroethene	79-01-6	25 µg/L	85.0	----	70	130	----	----
EP074F: Halogenated Aromatic Compounds (QCLot: 3806075)										
ES1501875-016	Anonymous	EP074: Chlorobenzene	108-90-7	25 µg/L	95.8	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3806076)										
ES1501875-016	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	86.4	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3806076)										
ES1501875-016	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	86.6	----	70	130	----	----
EP080: BTEXN (QCLot: 3806076)										
ES1501875-016	Anonymous	EP080: Benzene	71-43-2	25 µg/L	78.4	----	70	130	----	----
		EP080: Toluene	108-88-3	25 µg/L	78.2	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	25 µg/L	79.0	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	79.0	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	25 µg/L	83.1	----	70	130	----	----
		EP080: Naphthalene	91-20-3	25 µg/L	94.9	----	70	130	----	----
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3806698)										
EM1500785-001	Anonymous	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	----	70	130	----	----
		EP033: Ethene	74-85-1	50.29 µg/L	108	----	70	130	----	----
		EP033: Ethane	74-84-0	54.43 µg/L	108	----	70	130	----	----
		EP033: Propene	115-07-1	73.97 µg/L	108	----	70	130	----	----
		EP033: Propane	74-98-6	78.28 µg/L	108	----	70	130	----	----
		EP033: Butene	25167-67-3	99.61 µg/L	108	----	70	130	----	----
		EP033: Butane	106-97-8	102.18 µg/L	108	----	70	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1501982**	Page	: 1 of 11
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: S DAYKIN	Contact	: Loren Schiavon
Address	: PO Box 5394 SYDNEY NSW 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: sdaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: ----	Telephone	: +61 2 8784 8503
Facsimile	: ----	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 29-JAN-2015
Sampler	: CS	Issue Date	: 06-FEB-2015
Order number	: ----		
		No. of samples received	: 1
Quote number	: SY/933/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P)							
WKSW01	**28-JAN-2015**	**---**	28-JAN-2015	----	**29-JAN-2015**	28-JAN-2015	×
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P)							
WKSW01	**28-JAN-2015**	**---**	25-FEB-2015	----	**29-JAN-2015**	25-FEB-2015	✓
EA015: Total Dissolved Solids							
Clear Plastic Bottle - Natural (EA015H)							
WKSW01	**28-JAN-2015**	**---**	04-FEB-2015	----	**04-FEB-2015**	04-FEB-2015	✓
EA025: Suspended Solids							
Clear Plastic Bottle - Natural (EA025H)							
WKSW01	**28-JAN-2015**	**---**	04-FEB-2015	----	**04-FEB-2015**	04-FEB-2015	✓
ED009: Anions							
Clear Plastic Bottle - Natural (ED009-X)							
WKSW01	**28-JAN-2015**	**----**	----	----	**30-JAN-2015**	25-FEB-2015	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
WKSW01	**28-JAN-2015**	**---**	11-FEB-2015	----	**29-JAN-2015**	11-FEB-2015	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
WKSW01	**28-JAN-2015**	**---**	25-FEB-2015	----	**29-JAN-2015**	25-FEB-2015	✓
ED045G: Chloride Discrete analyser							
Clear Plastic Bottle - Natural (ED045G)							
WKSW01	**28-JAN-2015**	**---**	25-FEB-2015	----	**29-JAN-2015**	25-FEB-2015	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
WKSW01	**28-JAN-2015**	**---**	25-FEB-2015	----	**31-JAN-2015**	25-FEB-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
WKSW01	**28-JAN-2015**	**---**	27-JUL-2015	----	**31-JAN-2015**	27-JUL-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)							
WKSW01	**28-JAN-2015**	**---**	27-JUL-2015	----	**31-JAN-2015**	27-JUL-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
WKSW01	**28-JAN-2015**	---	25-FEB-2015	----	**04-FEB-2015**	25-FEB-2015	✓
EG052G: Silica by Discrete Analyser							
Clear Plastic Bottle - Natural (EG052G)							
WKSW01	**28-JAN-2015**	---	25-FEB-2015	----	**29-JAN-2015**	25-FEB-2015	✓
EK010/011: Chlorine							
Clear Plastic Bottle - Natural (EK010)							
WKSW01	**28-JAN-2015**	**----**	----	----	**30-JAN-2015**	28-JAN-2015	×
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
WKSW01	**28-JAN-2015**	---	25-FEB-2015	----	**29-JAN-2015**	25-FEB-2015	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
WKSW01	**28-JAN-2015**	---	25-FEB-2015	----	**30-JAN-2015**	25-FEB-2015	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
WKSW01	**28-JAN-2015**	---	30-JAN-2015	----	**29-JAN-2015**	30-JAN-2015	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
WKSW01	**28-JAN-2015**	---	25-FEB-2015	----	**30-JAN-2015**	25-FEB-2015	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
WKSW01	**28-JAN-2015**	**30-JAN-2015**	25-FEB-2015	✓	**30-JAN-2015**	25-FEB-2015	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
WKSW01	**28-JAN-2015**	**30-JAN-2015**	25-FEB-2015	✓	**30-JAN-2015**	25-FEB-2015	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
WKSW01	**28-JAN-2015**	---	30-JAN-2015	----	**29-JAN-2015**	30-JAN-2015	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005)							
WKSW01	**28-JAN-2015**	**----**	----	----	**30-JAN-2015**	25-FEB-2015	✓
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - Sulfuric Acid (EP033)							
WKSW01	**28-JAN-2015**	**----**	----	----	**02-FEB-2015**	11-FEB-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
WKSW01	**28-JAN-2015**	**02-FEB-2015**	04-FEB-2015	✓	**04-FEB-2015**	14-MAR-2015	✓
EP074D: Fumigants							
Amber VOC Vial - Sulfuric Acid (EP074)							
WKSW01	**28-JAN-2015**	**02-FEB-2015**	11-FEB-2015	✓	**02-FEB-2015**	11-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074E: Halogenated Aliphatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074) WKSW01	**28-JAN-2015**	**02-FEB-2015**	11-FEB-2015	✓	**02-FEB-2015**	11-FEB-2015	✓
EP074F: Halogenated Aromatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074) WKSW01	**28-JAN-2015**	**02-FEB-2015**	11-FEB-2015	✓	**02-FEB-2015**	11-FEB-2015	✓
EP074A: Monocyclic Aromatic Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP074) WKSW01	**28-JAN-2015**	**02-FEB-2015**	11-FEB-2015	✓	**02-FEB-2015**	11-FEB-2015	✓
EP074B: Oxygenated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074) WKSW01	**28-JAN-2015**	**02-FEB-2015**	11-FEB-2015	✓	**02-FEB-2015**	11-FEB-2015	✓
EP074C: Sulfonated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074) WKSW01	**28-JAN-2015**	**02-FEB-2015**	11-FEB-2015	✓	**02-FEB-2015**	11-FEB-2015	✓
EP074G: Trihalomethanes							
Amber VOC Vial - Sulfuric Acid (EP074) WKSW01	**28-JAN-2015**	**02-FEB-2015**	11-FEB-2015	✓	**02-FEB-2015**	11-FEB-2015	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM)) WKSW01	**28-JAN-2015**	**02-FEB-2015**	04-FEB-2015	✓	**04-FEB-2015**	14-MAR-2015	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM)) WKSW01	**28-JAN-2015**	**02-FEB-2015**	04-FEB-2015	✓	**04-FEB-2015**	14-MAR-2015	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) WKSW01	**28-JAN-2015**	**02-FEB-2015**	11-FEB-2015	✓	**02-FEB-2015**	11-FEB-2015	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber VOC Vial - Sulfuric Acid (EP080) WKSW01	**28-JAN-2015**	**02-FEB-2015**	11-FEB-2015	✓	**02-FEB-2015**	11-FEB-2015	✓
EP262: Ethanolamines							
Amber Glass Bottle - Unpreserved (EP262) WKSW01	**28-JAN-2015**	**----**	----	----	**31-JAN-2015**	04-FEB-2015	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	2	14	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	16	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	2	8	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	2	17	**11.8**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	6	**16.7**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	2	15	**13.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	8	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH by PC Titrator	EA005-P	2	17	**11.8**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	8	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	1	9	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	9	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	17	**11.8**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	16	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Fluoride by PC Titrator	EK040P	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	9	**22.2**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	9	**22.2**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	20	**15.0**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	3	20	**15.0**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 21st ed. 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 21st ed., 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 21st ed., 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 21st ed., 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Standard Anions -by IC (Extended Method)	ED009-X	WATER	In house: Referenced to APHA 21st ed., 4110. This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 21st ed., 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 21st ed., 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 21st ed., 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 21st ed., 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 21st ed. 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Silica (Reactive) by Discrete Analyser	EG052G	WATER	In house: Referenced to APHA 21st ed. 4500-SiO2 D: Under Acdic conditions reactive silicon combines with ammonium molybdate to form a yellow molybdosilicic acid complex. This is reduced by 1-amino-2-naphthol-4-sulfonic acid to a silicomolybdenum blue complex which is measured by discrete analyser at 670 nm. This method is compliant with NEPM (2013) Schedule B(3)
Chlorine	EK010	WATER	In-house (DPD colourimetry)
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 21st ed., 4500 F--C CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 21st ed., 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ammonium as N	EK055G-NH4	WATER	Ammonium in the sample is reported as the ionised / unionised fractions by the use of a nomograph and the initial pH and Temperature. Ammonia is determined by direct colorimetry by Discrete Analyser according to APHA 21st ed., 4500-NH3 G. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 21st ed., 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 21st ed., 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 21st ed., 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 21st ed., 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 21st ed., 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 21st ed., 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 21st ed., 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 21st Ed. 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 21st ed., 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Volatile Organic Compounds	EP074	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Ethanolamines by LCMSMS	EP262	WATER	In-house LC-MSMS: Benzoyl derivatives of target compounds are analysed by LC/MSMS in ESI Positive Mode.

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED009: Anions	ES1501791-001	Anonymous	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG020F: Dissolved Metals by ICP-MS	ES1501831-003	Anonymous	**Manganese**	7439-96-5	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP033: C1 - C4 Hydrocarbon Gases	EM1500785-001	Anonymous	**Methane**	74-82-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural						
WKSW01	----	----	----	29-JAN-2015	28-JAN-2015	**1**
EK010/011: Chlorine						
Clear Plastic Bottle - Natural						
WKSW01	----	----	----	30-JAN-2015	28-JAN-2015	**2**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

QUALITY CONTROL REPORT

Work Order	: **ES1502224**	Page	: 1 of 21
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
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Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 02-FEB-2015
Sampler	: SD,CS	Issue Date	: 12-MAY-2015
Order number	: ----		
		No. of samples received	: 2
Quote number	: SY/933/14	No. of samples analysed	: 2

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Alex Rossi	Organic Chemist	Sydney Organics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
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Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA005: pH (QC Lot: 3808003)									
ES1502120-002	Anonymous	EA005: pH Value	----	0.01	pH Unit	7.33	7.30	0.4	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 3807452)									
ES1502118-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	493	490	0.6	0% - 20%
ES1502224-002	QA	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	6070	6070	0.0	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 3807420)									
ES1502118-005	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	468	407	13.8	0% - 20%
EA025: Suspended Solids (QC Lot: 3807421)									
ES1502118-005	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	249	240	3.6	0% - 20%
ED009: Anions (QC Lot: 3807401)									
ES1502044-004	Anonymous	ED009-X: Chloride	16887-00-6	0.100	mg/L	1780	1780	0.09	0% - 20%
ES1502224-001	AST2	ED009-X: Chloride	16887-00-6	0.100	mg/L	484	506	4.4	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3807451)									
ES1502118-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	162	163	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	162	163	0.0	0% - 20%
ES1502224-002	QA	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	448	448	0.0	0% - 20%
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	1930	1940	0.8	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	2380	2390	0.6	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3807441)									
ES1501736-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.0	No Limit
ES1502118-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	51	51	0.0	0% - 20%
ED045G: Chloride Discrete analyser (QC Lot: 3807439)									
ES1501736-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	7	7	0.0	No Limit
ES1502118-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	20	21	0.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 3807708)									
ES1502224-001	AST2	ED093F: Calcium	7440-70-2	1	mg/L	5	5	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	2	2	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	1500	1490	1.2	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	14	14	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3807709)									
ES1502224-001	AST2	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	0.001	0.002	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3807709) - continued									
ES1502224-001	AST2	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	2.28	2.36	3.7	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.006	0.006	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.007	0.007	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.026	0.027	0.0	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.006	0.007	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.007	0.007	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	9.55	10.1	5.4	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	2.53	2.66	4.9	0% - 20%
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	0.8	0.6	23.5	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3807710)									
ES1502224-001	AST2	EG020B-F: Strontium	7440-24-6	0.001	mg/L	2.24	2.26	0.8	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 3807707)									
ES1502224-002	QA	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG052G: Silica by Discrete Analyser (QC Lot: 3807440)									
ES1501736-001	Anonymous	EG052G: Reactive Silica	----	0.05	mg/L	13.7	13.8	1.2	0% - 20%
EK010/011: Chlorine (QC Lot: 3807175)									
ES1502205-001	Anonymous	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
		EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3807454)									
ES1502118-001	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.2	0.3	34.5	No Limit
ES1502224-002	QA	EK040P: Fluoride	16984-48-8	0.1	mg/L	1.0	1.0	0.0	0% - 50%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3807431)									
ES1502224-001	AST2	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.01	0.01	0.0	No Limit
EW1500268-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.04	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3807443)									
ES1502119-010	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	0.03	0.02	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3807430)									
ES1502113-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	25.8	24.8	4.2	0% - 20%
ES1502224-001	AST2	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.01	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3807433)									
ES1502113-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	8.3	9.0	8.6	No Limit
ES1502224-002	QA	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	5.3	5.2	0.0	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3807434)									
ES1502113-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	18.3	19.0	3.5	0% - 20%
ES1502224-002	QA	EK067G: Total Phosphorus as P	----	0.01	mg/L	2.08	2.03	2.5	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3807442)									
ES1502118-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.01	0.01	0.0	No Limit
ES1502299-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 3807734)									
ES1501833-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	5	5	0.0	No Limit
ES1501844-006	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	2	2	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 3807735)									
ES1502224-002	QA	EP005: Total Organic Carbon	----	1	mg/L	349	352	1.0	0% - 20%
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 3807760)									
ES1502224-001	AST2	EP033: Methane	74-82-8	10	µg/L	925	903	2.4	0% - 20%
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	29	28	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 3807743)									
ES1502224-001	AST2	EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
EP074B: Oxygenated Compounds (QC Lot: 3807743)									
ES1502224-001	AST2	EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit
EP074C: Sulfonated Compounds (QC Lot: 3807743)									
ES1502224-001	AST2	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
EP074D: Fumigants (QC Lot: 3807743)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074D: Fumigants (QC Lot: 3807743) - continued									
ES1502224-001	AST2	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3807743)									
ES1502224-001	AST2	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 3807743)									
ES1502224-001	AST2	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP074F: Halogenated Aromatic Compounds (QC Lot: 3807743) - continued									
ES1502224-001	AST2	EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 3807743)									
ES1502224-001	AST2	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 3808547)									
ES1502224-001	AST2	EP075(SIM): Phenol	108-95-2	1.0	µg/L	2.2	2.0	8.5	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	<2.0	0.0	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3808547)									
ES1502224-001	AST2	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3807744)									
ES1502224-001	AST2	EP080: C6 - C9 Fraction	----	20	µg/L	40	50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3808546)									
ES1502224-001	AST2	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3807744)									
ES1502224-001	AST2	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	40	50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3808546)									
ES1502224-001	AST2	EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
EP080: BTEXN (QC Lot: 3807744)									
ES1502224-001	AST2	EP080: Benzene	71-43-2	1	µg/L	6	6	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	7	6	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP262: Ethanolamines (QC Lot: 3807501)									
ES1501844-001	Anonymous	EP262: Ethanolamine	141-43-5	1	µg/L	<1	<1	0.0	No Limit
		EP262: Diethanolamine	111-42-2	1	µg/L	<1	<1	0.0	No Limit
ES1501844-011	Anonymous	EP262: Ethanolamine	141-43-5	1	µg/L	<1	<1	0.0	No Limit
		EP262: Diethanolamine	111-42-2	1	µg/L	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010P: Conductivity by PC Titrator (QCLot: 3807452)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	104	95	113
EA015: Total Dissolved Solids (QCLot: 3807420)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	293 mg/L	122	67	125
				----	2000 mg/L	88.4	87	109
EA025: Suspended Solids (QCLot: 3807421)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	97.0	83	129
				----	1000 mg/L	94.1	86	110
ED009: Anions (QCLot: 3807401)								
ED009-X: Chloride	16887-00-6	0.1	mg/L	<0.100	2 mg/L	104	89	107
ED037P: Alkalinity by PC Titrator (QCLot: 3807451)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	95.4	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3807441)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	108	86	122
ED045G: Chloride Discrete analyser (QCLot: 3807439)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	117	75	123
				----	1000 mg/L	105	77	119
ED093F: Dissolved Major Cations (QCLot: 3807708)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	93.4	90	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	105	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	115	82	118
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	106	87	117
EG020F: Dissolved Metals by ICP-MS (QCLot: 3807709)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	95.1	85	115
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.01 mg/L	94.5	85	115
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.4	85	115
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	99.8	85	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	87.6	85	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3807709) - continued								
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.1	85	115
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	93.3	85	115
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	108	85	115
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	105	85	115
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.1	85	115
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	86.8	85	115
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	97.3	85	115
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	106	85	115
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	103	85	115
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	95.9	85	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	91.0	85	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	108	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	113	85	115
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	87.0	85	115
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3807710)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	98.4	80	112
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3807707)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	92.7	78	114
EG052G: Silica by Discrete Analyser (QCLot: 3807440)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.10	5 mg/L	107	94	114
EK010/011: Chlorine (QCLot: 3807175)								
EK010: Chlorine - Free	----	0.2	mg/L	<0.2	----	----	----	----
EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	----	----	----	----
EK040P: Fluoride by PC Titrator (QCLot: 3807454)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5.0 mg/L	97.2	75	119
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3807431)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.0 mg/L	105	86	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3807443)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3807443) - continued								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.5 mg/L	94.3	83	119
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3807430)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	100	87	119
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3807433)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	5 mg/L	99.0	66	119
				----	1.0 mg/L	104	66	126
				<0.1	10 mg/L	82.4	66	114
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3807434)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	89.4	67	117
				----	0.442 mg/L	88.2	63	123
				----	1.0 mg/L	100	66	124
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3807442)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	99.6	82	122
EP005: Total Organic Carbon (TOC) (QCLot: 3807734)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	86.0	76	120
EP005: Total Organic Carbon (TOC) (QCLot: 3807735)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	81.9	76	120
EP020: Oil and Grease (O&G) (QCLot: 3807403)								
EP020: Oil & Grease	----	5	mg/L	<5	5000 mg/L	98.7	80	120
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3807760)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	94.8	86	114
EP033: Ethene	74-85-1	10	µg/L	<10	50.29 µg/L	93.4	87	111
EP033: Ethane	74-84-0	10	µg/L	<10	54.43 µg/L	94.0	87	111
EP033: Propene	115-07-1	10	µg/L	<10	73.97 µg/L	93.4	85	113
EP033: Propane	74-98-6	10	µg/L	<10	78.28 µg/L	94.4	84	112
EP033: Butene	25167-67-3	20	µg/L	<20	99.61 µg/L	92.2	83	115
EP033: Butane	106-97-8	20	µg/L	<20	102.18 µg/L	92.6	85	115
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3807743)								
EP074: Styrene	100-42-5	5	µg/L	<5	10 µg/L	97.1	74	118
EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	10 µg/L	99.6	75	121

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3807743) - continued								
EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	10 µg/L	100	67	123
EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	10 µg/L	97.6	70	122
EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	10 µg/L	99.5	69	123
EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	10 µg/L	96.7	71	121
EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	10 µg/L	96.1	70	122
EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	10 µg/L	98.7	67	123
EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	10 µg/L	98.2	62	126
EP074B: Oxygenated Compounds (QCLot: 3807743)								
EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	100 µg/L	104	61.4	134
EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	100 µg/L	122	73.6	130
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	100 µg/L	101	61	139
EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	100 µg/L	107	65	137
EP074C: Sulfonated Compounds (QCLot: 3807743)								
EP074: Carbon disulfide	75-15-0	5	µg/L	<5	10 µg/L	85.1	72.8	127
EP074D: Fumigants (QCLot: 3807743)								
EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	10 µg/L	100	61	119
EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	10 µg/L	102	76	120
EP074: cis-1.3-Dichloropropylene	10061-01-5	10	µg/L	<10	10 µg/L	112	62	120
EP074: trans-1.3-Dichloropropylene	10061-02-6	10	µg/L	<10	10 µg/L	100	61	119
EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	10 µg/L	101	69	117
EP074E: Halogenated Aliphatic Compounds (QCLot: 3807743)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	62.9	60.6	138
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	78.9	67.4	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	81.8	69.4	129
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	97.3	56	140
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	102	63	135
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	104	65	131
EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	95.7	69	123
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	88.0	70.2	128
EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	98.6	71	119

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 3807743) - continued								
EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	101	75	119
EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	98.2	77	117
EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	97.8	61	119
EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	101	73	119
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	111	63	121
EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	97.8	78	122
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	101	74	120
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	103	74	118
EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	98.0	75	123
EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	105	79	121
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	98.7	72	124
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	106	66	114
EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	101	60	120
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	116	70.6	128
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	113	70	124
EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	98.0	74	128
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	105	71.8	126
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	105	66.4	136
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	94.4	58	132
EP074F: Halogenated Aromatic Compounds (QCLot: 3807743)								
EP074: Chlorobenzene	108-90-7	5	µg/L	<5	10 µg/L	100	80	118
EP074: Bromobenzene	108-86-1	5	µg/L	<5	10 µg/L	97.0	76	116
EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	10 µg/L	99.5	71	121
EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	10 µg/L	98.2	71	121
EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	10 µg/L	96.3	74	120
EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	10 µg/L	97.8	72	120
EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	10 µg/L	97.1	77	117
EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	10 µg/L	94.4	60	126
EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	10 µg/L	92.2	67	125

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074G: Trihalomethanes (QCLot: 3807743)								
EP074: Chloroform	67-66-3	5	µg/L	<5	10 µg/L	102	76	118
EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	10 µg/L	113	64	118
EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	10 µg/L	111	65	115
EP074: Bromoform	75-25-2	5	µg/L	<5	10 µg/L	110	73.5	126
EP075(SIM)A: Phenolic Compounds (QCLot: 3808547)								
EP075(SIM): Phenol	108-95-2	0.2	µg/L	<1.0	5 µg/L	34.8	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	<1.0	5 µg/L	# 63.6	63.8	110
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	<1.0	5 µg/L	63.8	55.9	112
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	<2.0	10 µg/L	56.4	42.5	114
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	<1.0	5 µg/L	81.0	62.7	117
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.2	µg/L	<1.0	5 µg/L	88.3	59.9	112
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.2	µg/L	<1.0	5 µg/L	68.2	59.3	122
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.2	µg/L	<1.0	5 µg/L	80.9	64.3	118
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	<1.0	5 µg/L	72.3	63	119
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.2	µg/L	<1.0	5 µg/L	64.4	58.7	118
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.2	µg/L	<1.0	5 µg/L	69.6	50	108
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	<2.0	10 µg/L	22.1	10	95
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3808547)								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	<1.0	5 µg/L	83.5	58.6	119
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	<1.0	5 µg/L	71.6	63.6	114
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	<1.0	5 µg/L	68.0	62.2	113
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	<1.0	5 µg/L	71.0	63.9	115
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	<1.0	5 µg/L	76.0	62.6	116
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	<1.0	5 µg/L	86.8	64.3	116
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	<1.0	5 µg/L	84.6	63.6	118
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	<1.0	5 µg/L	83.0	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	<1.0	5 µg/L	73.7	64.1	117
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	<1.0	5 µg/L	81.4	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.2	µg/L	<1.0	5 µg/L	75.7	61.7	119

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3808547) - continued								
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<1.0	5 µg/L	84.3	61.7	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.5	5 µg/L	73.6	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<1.0	5 µg/L	72.9	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<1.0	5 µg/L	89.0	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<1.0	5 µg/L	82.9	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3807744)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	101	75	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3808546)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	105	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	96.3	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	98.0	62	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3807744)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	103	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3808546)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	91.6	58.9	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	102	73.9	138
EP071: >C34 - C40 Fraction	----	50	µg/L	<100	1500 µg/L	98.7	67	127
EP080: BTEXN (QCLot: 3807744)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	97.3	70	124
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	110	65	129
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	101	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	99.7	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	99.4	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	103	70	124
EP262: Ethanolamines (QCLot: 3807501)								
EP262: Ethanolamine	141-43-5	1	µg/L	<1	10 µg/L	112	50	130
EP262: Diethanolamine	111-42-2	1	µg/L	<1	10 µg/L	85.7	50	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED009: Anions (QCLot: 3807401)							
ES1502044-004	Anonymous	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3807441)							
ES1501736-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	117	70	130
ED045G: Chloride Discrete analyser (QCLot: 3807439)							
ES1501736-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	104	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3807709)							
ES1502224-002	QA	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	125	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	105	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	# Not Determined	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	101	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	98.2	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	127	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	120	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	91.2	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	97.5	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	119	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	100	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	117	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3807707)							
ES1502224-001	AST2	EG035F: Mercury	7439-97-6	0.0100 mg/L	82.8	70	130
EG052G: Silica by Discrete Analyser (QCLot: 3807440)							
ES1501736-001	Anonymous	EG052G: Reactive Silica	----	5 mg/L	94.7	70	130
EK040P: Fluoride by PC Titrator (QCLot: 3807454)							
ES1502118-001	Anonymous	EK040P: Fluoride	16984-48-8	5.0 mg/L	107	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3807431)							
ES1502224-001	AST2	EK055G: Ammonia as N	7664-41-7	1 mg/L	89.5	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3807443)							
ES1502119-010	Anonymous	EK057G: Nitrite as N	----	0.5 mg/L	100	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3807430)							
ES1502113-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3807433)							
ES1502118-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	96.0	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3807434)							
ES1502118-001	Anonymous	EK067G: Total Phosphorus as P	----	1.0 mg/L	102	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3807442)							
ES1502118-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	96.9	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 3807734)							
ES1501842-001	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	84.4	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 3807735)							
EW1500379-001	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	80.5	70	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3807760)							
ES1502224-002	QA	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	70	130
		EP033: Ethene	74-85-1	50.29 µg/L	96.3	70	130
		EP033: Ethane	74-84-0	54.43 µg/L	96.5	70	130
		EP033: Propene	115-07-1	73.97 µg/L	94.5	70	130
		EP033: Propane	74-98-6	78.28 µg/L	95.6	70	130
		EP033: Butene	25167-67-3	99.61 µg/L	93.1	70	130
		EP033: Butane	106-97-8	102.18 µg/L	93.3	70	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 3807743)							
ES1502224-001	AST2	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	87.0	70	130
		EP074: Trichloroethene	79-01-6	25 µg/L	83.5	70	130
EP074F: Halogenated Aromatic Compounds (QCLot: 3807743)							
ES1502224-001	AST2	EP074: Chlorobenzene	108-90-7	25 µg/L	91.7	70	130
EP075(SIM)A: Phenolic Compounds (QCLot: 3808547)							
ES1502224-001	AST2	EP075(SIM): Phenol	108-95-2	20 µg/L	28.4	20	130
		EP075(SIM): 2-Chlorophenol	95-57-8	20 µg/L	76.6	60	130
		EP075(SIM): 2-Nitrophenol	88-75-5	20 µg/L	75.1	60	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	20 µg/L	77.5	70	130
		EP075(SIM): Pentachlorophenol	87-86-5	20 µg/L	47.4	20	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3808547)							
ES1502224-001	AST2	EP075(SIM): Acenaphthene	83-32-9	20 µg/L	78.6	70	130
		EP075(SIM): Pyrene	129-00-0	20 µg/L	84.1	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3807744)							
ES1502224-001	AST2	EP080: C6 - C9 Fraction	----	325 µg/L	125	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3808546)							
ES1502224-001	AST2	EP071: C10 - C14 Fraction	----	200 µg/L	100	74	150
		EP071: C15 - C28 Fraction	----	300 µg/L	103	77	153
		EP071: C29 - C36 Fraction	----	200 µg/L	105	67	153
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3807744)							
ES1502224-001	AST2	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	119	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3808546)							
ES1502224-001	AST2	EP071: >C10 - C16 Fraction	>C10_C16	250 µg/L	104	74	150
		EP071: >C16 - C34 Fraction	----	350 µg/L	106	77	153
		EP071: >C34 - C40 Fraction	----	150 µg/L	107	67	153
EP080: BTEXN (QCLot: 3807744)							
ES1502224-001	AST2	EP080: Benzene	71-43-2	25 µg/L	96.9	70	130
		EP080: Toluene	108-88-3	25 µg/L	112	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	113	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	112	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	108	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	98.1	70	130
EP262: Ethanolamines (QCLot: 3807501)							
ES1501844-001	Anonymous	EP262: Ethanolamine	141-43-5	10 µg/L	116	50	130
		EP262: Diethanolamine	111-42-2	10 µg/L	61.3	50	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
ED009: Anions (QCLot: 3807401)										
ES1502044-004	Anonymous	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	----	70	130	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3807430)										
ES1502113-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	----	70	130	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3807431)										
ES1502224-001	AST2	EK055G: Ammonia as N	7664-41-7	1 mg/L	89.5	----	70	130	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3807433)										
ES1502118-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	96.0	----	70	130	----	----
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3807434)										
ES1502118-001	Anonymous	EK067G: Total Phosphorus as P	----	1.0 mg/L	102	----	70	130	----	----
ED045G: Chloride Discrete analyser (QCLot: 3807439)										
ES1501736-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	104	----	70	130	----	----
EG052G: Silica by Discrete Analyser (QCLot: 3807440)										
ES1501736-001	Anonymous	EG052G: Reactive Silica	----	5 mg/L	94.7	----	70	130	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3807441)										
ES1501736-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	117	----	70	130	----	----
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3807442)										
ES1502118-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	96.9	----	70	130	----	----
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3807443)										
ES1502119-010	Anonymous	EK057G: Nitrite as N	----	0.5 mg/L	100	----	70	130	----	----
EK040P: Fluoride by PC Titrator (QCLot: 3807454)										
ES1502118-001	Anonymous	EK040P: Fluoride	16984-48-8	5.0 mg/L	107	----	70	130	----	----
EP262: Ethanolamines (QCLot: 3807501)										
ES1501844-001	Anonymous	EP262: Ethanolamine	141-43-5	10 µg/L	116	----	50	130	----	----
		EP262: Diethanolamine	111-42-2	10 µg/L	61.3	----	50	130	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3807707)										
ES1502224-001	AST2	EG035F: Mercury	7439-97-6	0.0100 mg/L	82.8	----	70	130	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3807709)										
ES1502224-002	QA	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	125	----	70	130	----	----
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	105	----	70	130	----	----
		EG020A-F: Barium	7440-39-3	0.2 mg/L	# Not Determined	----	70	130	----	----
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	101	----	70	130	----	----
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	98.2	----	70	130	----	----
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	127	----	70	130	----	----
		EG020A-F: Copper	7440-50-8	0.2 mg/L	120	----	70	130	----	----
		EG020A-F: Lead	7439-92-1	0.2 mg/L	91.2	----	70	130	----	----
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	97.5	----	70	130	----	----
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	119	----	70	130	----	----
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	100	----	70	130	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EG020F: Dissolved Metals by ICP-MS (QCLot: 3807709) - continued										
ES1502224-002	QA	EG020A-F: Zinc	7440-66-6	0.2 mg/L	117	----	70	130	----	----
EP005: Total Organic Carbon (TOC) (QCLot: 3807734)										
ES1501842-001	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	84.4	----	70	130	----	----
EP005: Total Organic Carbon (TOC) (QCLot: 3807735)										
EW1500379-001	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	80.5	----	70	130	----	----
EP074E: Halogenated Aliphatic Compounds (QCLot: 3807743)										
ES1502224-001	AST2	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	87.0	----	70	130	----	----
		EP074: Trichloroethene	79-01-6	25 µg/L	83.5	----	70	130	----	----
EP074F: Halogenated Aromatic Compounds (QCLot: 3807743)										
ES1502224-001	AST2	EP074: Chlorobenzene	108-90-7	25 µg/L	91.7	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3807744)										
ES1502224-001	AST2	EP080: C6 - C9 Fraction	----	325 µg/L	125	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3807744)										
ES1502224-001	AST2	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	119	----	70	130	----	----
EP080: BTEXN (QCLot: 3807744)										
ES1502224-001	AST2	EP080: Benzene	71-43-2	25 µg/L	96.9	----	70	130	----	----
		EP080: Toluene	108-88-3	25 µg/L	112	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	25 µg/L	113	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	112	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	25 µg/L	108	----	70	130	----	----
		EP080: Naphthalene	91-20-3	25 µg/L	98.1	----	70	130	----	----
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3807760)										
ES1502224-002	QA	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	----	70	130	----	----
		EP033: Ethene	74-85-1	50.29 µg/L	96.3	----	70	130	----	----
		EP033: Ethane	74-84-0	54.43 µg/L	96.5	----	70	130	----	----
		EP033: Propene	115-07-1	73.97 µg/L	94.5	----	70	130	----	----
		EP033: Propane	74-98-6	78.28 µg/L	95.6	----	70	130	----	----
		EP033: Butene	25167-67-3	99.61 µg/L	93.1	----	70	130	----	----
		EP033: Butane	106-97-8	102.18 µg/L	93.3	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3808546)										
ES1502224-001	AST2	EP071: C10 - C14 Fraction	----	200 µg/L	100	----	74	150	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3808546) - continued										
ES1502224-001	AST2	EP071: C15 - C28 Fraction	----	300 µg/L	103	----	77	153	----	----
		EP071: C29 - C36 Fraction	----	200 µg/L	105	----	67	153	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3808546)										
ES1502224-001	AST2	EP071: >C10 - C16 Fraction	>C10_C16	250 µg/L	104	----	74	150	----	----
		EP071: >C16 - C34 Fraction	----	350 µg/L	106	----	77	153	----	----
		EP071: >C34 - C40 Fraction	----	150 µg/L	107	----	67	153	----	----
EP075(SIM)A: Phenolic Compounds (QCLot: 3808547)										
ES1502224-001	AST2	EP075(SIM): Phenol	108-95-2	20 µg/L	28.4	----	20	130	----	----
		EP075(SIM): 2-Chlorophenol	95-57-8	20 µg/L	76.6	----	60	130	----	----
		EP075(SIM): 2-Nitrophenol	88-75-5	20 µg/L	75.1	----	60	130	----	----
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	20 µg/L	77.5	----	70	130	----	----
		EP075(SIM): Pentachlorophenol	87-86-5	20 µg/L	47.4	----	20	130	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3808547)										
ES1502224-001	AST2	EP075(SIM): Acenaphthene	83-32-9	20 µg/L	78.6	----	70	130	----	----
		EP075(SIM): Pyrene	129-00-0	20 µg/L	84.1	----	70	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1502224**	Page	: 1 of 11
Amendment	: **1**		
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
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Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 02-FEB-2015
Sampler	: SD,CS	Issue Date	: 12-MAY-2015
Order number	: ----		
		No. of samples received	: 2
Quote number	: SY/933/14	No. of samples analysed	: 2

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005: pH								
Clear Plastic Bottle - Natural (EA005)								
AST2,	QA	**02-FEB-2015**	**----**	----	----	**02-FEB-2015**	02-FEB-2015	✓
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural (EA010-P)								
AST2,	QA	**02-FEB-2015**	**---**	02-MAR-2015	----	**03-FEB-2015**	02-MAR-2015	✓
EA015: Total Dissolved Solids								
Clear Plastic Bottle - Natural (EA015H)								
AST2,	QA	**02-FEB-2015**	**---**	09-FEB-2015	----	**03-FEB-2015**	09-FEB-2015	✓
EA025: Suspended Solids								
Clear Plastic Bottle - Natural (EA025H)								
AST2,	QA	**02-FEB-2015**	**---**	09-FEB-2015	----	**03-FEB-2015**	09-FEB-2015	✓
ED009: Anions								
Clear Plastic Bottle - Natural (ED009-X)								
AST2,	QA	**02-FEB-2015**	**----**	----	----	**03-FEB-2015**	02-MAR-2015	✓
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
AST2,	QA	**02-FEB-2015**	**---**	16-FEB-2015	----	**03-FEB-2015**	16-FEB-2015	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)								
AST2,	QA	**02-FEB-2015**	**---**	02-MAR-2015	----	**03-FEB-2015**	02-MAR-2015	✓
ED045G: Chloride Discrete analyser								
Clear Plastic Bottle - Natural (ED045G)								
AST2,	QA	**02-FEB-2015**	**---**	02-MAR-2015	----	**03-FEB-2015**	02-MAR-2015	✓
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)								
AST2,	QA	**02-FEB-2015**	**---**	02-MAR-2015	----	**03-FEB-2015**	02-MAR-2015	✓
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)								
AST2,	QA	**02-FEB-2015**	**---**	01-AUG-2015	----	**03-FEB-2015**	01-AUG-2015	✓
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)								
AST2,	QA	**02-FEB-2015**	**---**	01-AUG-2015	----	**03-FEB-2015**	01-AUG-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035F: Dissolved Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)								
AST2,	QA	**02-FEB-2015**	**---**	02-MAR-2015	----	**04-FEB-2015**	02-MAR-2015	✓
EG052G: Silica by Discrete Analyser								
Clear Plastic Bottle - Natural (EG052G)								
AST2,	QA	**02-FEB-2015**	**---**	02-MAR-2015	----	**03-FEB-2015**	02-MAR-2015	✓
EK010/011: Chlorine								
Clear Plastic Bottle - Natural (EK010)								
AST2,	QA	**02-FEB-2015**	**----**	----	----	**02-FEB-2015**	02-FEB-2015	✓
EK040P: Fluoride by PC Titrator								
Clear Plastic Bottle - Natural (EK040P)								
AST2,	QA	**02-FEB-2015**	**---**	02-MAR-2015	----	**03-FEB-2015**	02-MAR-2015	✓
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G)								
AST2,	QA	**02-FEB-2015**	**---**	02-MAR-2015	----	**03-FEB-2015**	02-MAR-2015	✓
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G)								
AST2,	QA	**02-FEB-2015**	**---**	04-FEB-2015	----	**03-FEB-2015**	04-FEB-2015	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G)								
AST2,	QA	**02-FEB-2015**	**---**	02-MAR-2015	----	**03-FEB-2015**	02-MAR-2015	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G)								
AST2,	QA	**02-FEB-2015**	**03-FEB-2015**	02-MAR-2015	✓	**03-FEB-2015**	02-MAR-2015	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G)								
AST2,	QA	**02-FEB-2015**	**03-FEB-2015**	02-MAR-2015	✓	**03-FEB-2015**	02-MAR-2015	✓
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G)								
AST2,	QA	**02-FEB-2015**	**---**	04-FEB-2015	----	**03-FEB-2015**	04-FEB-2015	✓
EP005: Total Organic Carbon (TOC)								
Amber TOC Vial - Sulfuric Acid (EP005)								
AST2,	QA	**02-FEB-2015**	**----**	----	----	**03-FEB-2015**	02-MAR-2015	✓
EP020: Oil and Grease (O&G)								
Amber Glass Bottle - Sulfuric Acid (EP020)								
AST2,	QA	**02-FEB-2015**	**----**	----	----	**03-FEB-2015**	02-MAR-2015	✓
EP033: C1 - C4 Hydrocarbon Gases								
Amber VOC Vial - Sulfuric Acid (EP033)								
AST2,	QA	**02-FEB-2015**	**----**	----	----	**03-FEB-2015**	16-FEB-2015	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
AST2,	QA	**02-FEB-2015**	**03-FEB-2015**	09-FEB-2015	✓	**03-FEB-2015**	15-MAR-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074D: Fumigants								
Amber VOC Vial - Sulfuric Acid (EP074)								
AST2,	QA	**02-FEB-2015**	**03-FEB-2015**	16-FEB-2015	✓	**03-FEB-2015**	16-FEB-2015	✓
EP074E: Halogenated Aliphatic Compounds								
Amber VOC Vial - Sulfuric Acid (EP074)								
AST2,	QA	**02-FEB-2015**	**03-FEB-2015**	16-FEB-2015	✓	**03-FEB-2015**	16-FEB-2015	✓
EP074F: Halogenated Aromatic Compounds								
Amber VOC Vial - Sulfuric Acid (EP074)								
AST2,	QA	**02-FEB-2015**	**03-FEB-2015**	16-FEB-2015	✓	**03-FEB-2015**	16-FEB-2015	✓
EP074A: Monocyclic Aromatic Hydrocarbons								
Amber VOC Vial - Sulfuric Acid (EP074)								
AST2,	QA	**02-FEB-2015**	**03-FEB-2015**	16-FEB-2015	✓	**03-FEB-2015**	16-FEB-2015	✓
EP074B: Oxygenated Compounds								
Amber VOC Vial - Sulfuric Acid (EP074)								
AST2,	QA	**02-FEB-2015**	**03-FEB-2015**	16-FEB-2015	✓	**03-FEB-2015**	16-FEB-2015	✓
EP074C: Sulfonated Compounds								
Amber VOC Vial - Sulfuric Acid (EP074)								
AST2,	QA	**02-FEB-2015**	**03-FEB-2015**	16-FEB-2015	✓	**03-FEB-2015**	16-FEB-2015	✓
EP074G: Trihalomethanes								
Amber VOC Vial - Sulfuric Acid (EP074)								
AST2,	QA	**02-FEB-2015**	**03-FEB-2015**	16-FEB-2015	✓	**03-FEB-2015**	16-FEB-2015	✓
EP075(SIM)A: Phenolic Compounds								
Amber Glass Bottle - Unpreserved (EP075(SIM))								
AST2,	QA	**02-FEB-2015**	**03-FEB-2015**	09-FEB-2015	✓	**03-FEB-2015**	15-MAR-2015	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM))								
AST2,	QA	**02-FEB-2015**	**03-FEB-2015**	09-FEB-2015	✓	**03-FEB-2015**	15-MAR-2015	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
AST2,	QA	**02-FEB-2015**	**03-FEB-2015**	16-FEB-2015	✓	**03-FEB-2015**	16-FEB-2015	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber VOC Vial - Sulfuric Acid (EP080)								
AST2,	QA	**02-FEB-2015**	**03-FEB-2015**	16-FEB-2015	✓	**03-FEB-2015**	16-FEB-2015	✓
EP262: Ethanolamines								
Amber Glass Bottle - Unpreserved (EP262)								
AST2,	QA	**02-FEB-2015**	**----**	----	----	**03-FEB-2015**	09-FEB-2015	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	2	12	**16.7**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	2	18	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	2	10	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	8	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	8	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	2	14	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	2	11	**18.2**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	8	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH	EA005	1	8	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	14	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	2	12	**16.7**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	3	25	**12.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	12	**8.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	10	**10.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	11	**9.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Oil and Grease	EP020	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	12	**8.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	5	**40.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	5	**40.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	19	**15.8**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	25	**8.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	3	19	**15.8**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	10	**10.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	11	**9.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Oil and Grease	EP020	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	12	**8.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Suspended Solids (High Level)	EA025H	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	25	**8.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	11	**9.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	12	**8.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	25	**8.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH	EA005	WATER	In house: Referenced to APHA 4500 H+ B. pH of water samples is determined by ISE either manually or by automated pH meter. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Standard Anions -by IC (Extended Method)	ED009-X	WATER	In house: Referenced to APHA 4110. This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Silica (Reactive) by Discrete Analyser	EG052G	WATER	In house: Referenced to APHA 4500-SiO2 D: Under Acdic conditions reactive silicon combines with ammonium molybdate to form a yellow molybdosilicic acid complex. This is reduced by 1-amino-2-naphthol-4-sulfonic acid to a silicomolybdenum blue complex which is measured by discrete analyser at 670 nm. This method is compliant with NEPM (2013) Schedule B(3)
Chlorine	EK010	WATER	In-house (DPD colourimetry)
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500 F--C CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ammonium as N	EK055G-NH4	WATER	Ammonium in the sample is reported as the ionised / unionised fractions by the use of a nomograph and the initial pH and Temperature. Ammonia is determined by direct colorimetry by Discrete Analyser according to APHA 4500-NH3 G. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
Oil and Grease	EP020	WATER	In house: Referenced to APHA 5520 B. Oil & grease is a gravimetric procedure to determine the amount of oil & grease residue in an aqueous sample. The sample is serially extracted three times n-hexane. The resultant extracts are combined, dehydrated and concentrated prior to gravimetric determination. This method is compliant with NEPM (2013) Schedule B(3)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Volatile Organic Compounds	EP074	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Ethanolamines by LCMSMS	EP262	WATER	In-house LC-MSMS: Benzoyl derivatives of target compounds are analysed by LC/MSMS in ESI Positive Mode.

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP075(SIM)A: Phenolic Compounds	4586081-007	----	**2-Chlorophenol**	95-57-8	63.6 %	63.8-110%	**Recovery less than lower control limit**
Matrix Spike (MS) Recoveries							
ED009: Anions	ES1502044-004	Anonymous	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG020F: Dissolved Metals by ICP-MS	ES1502224-002	QA	**Barium**	7440-39-3	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	ES1502113-001	Anonymous	**Nitrite + Nitrate as N**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP033: C1 - C4 Hydrocarbon Gases	ES1502224-002	QA	**Methane**	74-82-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1502485**	Page	: 1 of 21
Amendment	: **3**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
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Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 04-FEB-2015
Sampler	: CS/AM	Issue Date	: 22-MAY-2015
Order number	: ----		
		No. of samples received	: 12
Quote number	: SY/933/14	No. of samples analysed	: 3

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA005P: pH by PC Titrator (QC Lot: 3810124)									
ES1502397-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.25	7.24	0.1	0% - 20%
ES1502485-001	WK11	EA005-P: pH Value	----	0.01	pH Unit	7.57	7.98	5.3	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 3810123)									
ES1502231-020	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	1270	1270	0.0	0% - 20%
ES1502485-001	WK11	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	10500	10500	0.09	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 3811123)									
ES1502485-001	WK11	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	7450	7100	4.8	0% - 20%
EA025: Suspended Solids (QC Lot: 3811124)									
ES1502485-001	WK11	EA025H: Suspended Solids (SS)	----	5	mg/L	66	77	15.3	0% - 50%
ED009: Anions (QC Lot: 3809806)									
ES1502485-001	WK11	ED009-X: Chloride	16887-00-6	0.100	mg/L	677	697	2.9	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3810122)									
ES1502231-020	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	39	40	0.0	0% - 20%
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	246	240	2.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	285	280	1.7	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3810027)									
ES1502325-020	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	21	22	0.0	0% - 20%
ES1502485-001	WK11	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.0	No Limit
ED045G: Chloride Discrete analyser (QC Lot: 3810026)									
ES1502325-020	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	7	7	0.0	No Limit
ES1502485-001	WK11	ED045G: Chloride	16887-00-6	1	mg/L	700	693	1.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 3810084)									
ES1502485-001	WK11	ED093F: Calcium	7440-70-2	1	mg/L	42	42	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	5	5	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	3030	3090	2.1	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	17	17	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3810085)									
ES1502485-001	WK11	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	0.001	0.002	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	9.06	8.94	1.4	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.003	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3810085) - continued									
ES1502485-001	WK11	EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.100	0.100	0.0	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.005	0.004	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.011	0.012	0.0	0% - 50%
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	22.4	21.1	5.7	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.40	0.42	3.2	No Limit
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	1.4	1.4	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3810086)									
ES1502485-001	WK11	EG020B-F: Strontium	7440-24-6	0.001	mg/L	7.69	7.75	0.8	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 3810083)									
ES1502485-002	WK11U/S	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG052G: Silica by Discrete Analyser (QC Lot: 3810028)									
ES1502485-001	WK11	EG052G: Reactive Silica	----	0.05	mg/L	35.5	35.5	0.2	0% - 20%
EK010/011: Chlorine (QC Lot: 3810016)									
ES1502458-001	Anonymous	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
		EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3810125)									
ES1502485-001	WK11	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.9	0.8	21.4	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3809972)									
ES1502425-005	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.03	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3810024)									
ES1502325-020	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES1502485-001	WK11	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.07	152	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3809971)									
ES1502425-005	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.14	0.14	0.0	0% - 50%
ES1502485-001	WK11	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.02	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3809965)									
ES1502425-005	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.5	0.5	0.0	No Limit
ES1502485-001	WK11	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	8.8	8.8	0.0	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3809966)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3809966) - continued									
ES1502485-001	WK11	EK067G: Total Phosphorus as P	----	0.01	mg/L	3.71	3.65	1.6	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3810025)									
ES1502325-020	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES1502485-001	WK11	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 3811138)									
ES1502485-001	WK11	EP005: Total Organic Carbon	----	1	mg/L	2	2	0.0	No Limit
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 3809672)									
ES1502485-001	WK11	EP033: Methane	74-82-8	10	µg/L	2170	2220	2.0	0% - 20%
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	402	405	0.8	0% - 20%
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	47	45	3.8	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 3809537)									
ES1502485-001	WK11	EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
EP074B: Oxygenated Compounds (QC Lot: 3809537)									
ES1502485-001	WK11	EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	160	160	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit
EP074C: Sulfonated Compounds (QC Lot: 3809537)									
ES1502485-001	WK11	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
EP074D: Fumigants (QC Lot: 3809537)									
ES1502485-001	WK11	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3809537)									
ES1502485-001	WK11	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3809537) - continued									
ES1502485-001	WK11	EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 3809537)									
ES1502485-001	WK11	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 3809537)									
ES1502485-001	WK11	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP074G: Trihalomethanes (QC Lot: 3809537) - continued									
ES1502485-001	WK11	EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 3809655)									
ES1502485-001	WK11	EP075(SIM): Phenol	108-95-2	1.0	µg/L	13.5	12.6	6.5	0% - 50%
		EP075(SIM): 2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	1.0	µg/L	10.3	9.7	6.6	0% - 50%
		EP075(SIM): 2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	1.0	µg/L	3.8	3.5	5.8	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2.0	µg/L	54.4	50.0	8.4	0% - 20%
		EP075(SIM): Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3809655)									
ES1502485-001	WK11	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Naphthalene	91-20-3	1.0	µg/L	2.4	2.2	5.4	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3809538)									
ES1502485-001	WK11	EP080: C6 - C9 Fraction	----	20	µg/L	680	650	3.8	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3809654)									
ES1502485-001	WK11	EP071: C15 - C28 Fraction	----	100	µg/L	400	400	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	210	220	0.0	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	280	260	6.9	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3809538)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3809538) - continued									
ES1502485-001	WK11	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	720	700	3.8	0% - 20%
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3809654)									
ES1502485-001	WK11	EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	190	200	0.0	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	570	560	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	100	100	0.0	No Limit
EP080: BTEXN (QC Lot: 3809538)									
ES1502485-001	WK11	EP080: Benzene	71-43-2	1	µg/L	151	148	2.3	0% - 20%
		EP080: Toluene	108-88-3	2	µg/L	202	225	10.7	0% - 20%
		EP080: Ethylbenzene	100-41-4	2	µg/L	4	4	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	52	53	2.3	0% - 20%
		EP080: ortho-Xylene	95-47-6	2	µg/L	13	13	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP262: Ethanolamines (QC Lot: 3809514)									
ES1502485-001	WK11	EP262: Ethanolamine	141-43-5	1	µg/L	41	37	9.7	0% - 20%
		EP262: Diethanolamine	111-42-2	1	µg/L	14	12	9.7	0% - 50%

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010P: Conductivity by PC Titrator (QCLot: 3810123)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	105	95	113
EA015: Total Dissolved Solids (QCLot: 3811123)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	293 mg/L	111	67	125
				----	2000 mg/L	93.0	87	109
EA025: Suspended Solids (QCLot: 3811124)								
EA025H: Suspended Solids (SS)	----	5	mg/L	----	1000 mg/L	87.1	86	110
				<5	150 mg/L	92.0	83	129
ED009: Anions (QCLot: 3809806)								
ED009-X: Chloride	16887-00-6	0.1	mg/L	<0.100	2 mg/L	99.6	89	107
ED037P: Alkalinity by PC Titrator (QCLot: 3810122)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	99.2	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3810027)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	104	86	122
ED045G: Chloride Discrete analyser (QCLot: 3810026)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	102	75	123
				----	1000 mg/L	99.0	77	119
ED093F: Dissolved Major Cations (QCLot: 3810084)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	93.2	90	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	103	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	102	82	118
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	99.8	87	117
EG020F: Dissolved Metals by ICP-MS (QCLot: 3810085)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	102	85	115
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.01 mg/L	103	85	115
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.2	85	115
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	104	85	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	95.8	85	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3810085) - continued								
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.3	85	115
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.7	85	115
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	99.3	85	115
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	98.1	85	115
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	100	85	115
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	98.2	85	115
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	98.2	85	115
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	100	85	115
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	99.4	85	115
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	105	85	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	99.4	85	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	101	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	102	85	115
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	92.3	85	115
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3810086)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	97.2	80	112
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3810083)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	97.7	78	114
EG052G: Silica by Discrete Analyser (QCLot: 3810028)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.10	5 mg/L	105	94	114
EK010/011: Chlorine (QCLot: 3810016)								
EK010: Chlorine - Free	----	0.2	mg/L	<0.2	----	----	----	----
EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	----	----	----	----
EK040P: Fluoride by PC Titrator (QCLot: 3810125)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5.0 mg/L	98.2	75	119
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3809972)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.0 mg/L	103	86	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3810024)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3810024) - continued								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.5 mg/L	98.2	83	119
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3809971)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	106	87	119
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3809965)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	5 mg/L	79.2	66	119
				<0.1	10 mg/L	78.1	66	114
				----	1.0 mg/L	98.6	66	126
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3809966)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	----	0.442 mg/L	91.4	63	123
				----	1.0 mg/L	75.8	66	124
				<0.01	4.42 mg/L	83.9	67	117
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3810025)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	108	82	122
EP005: Total Organic Carbon (TOC) (QCLot: 3811138)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	88.3	76	120
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3809672)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	96.5	86	114
EP033: Ethene	74-85-1	10	µg/L	<10	50.29 µg/L	95.4	87	111
EP033: Ethane	74-84-0	10	µg/L	<10	54.43 µg/L	96.4	87	111
EP033: Propene	115-07-1	10	µg/L	<10	73.97 µg/L	95.8	85	113
EP033: Propane	74-98-6	10	µg/L	<10	78.28 µg/L	96.0	84	112
EP033: Butene	25167-67-3	20	µg/L	<20	99.61 µg/L	95.7	83	115
EP033: Butane	106-97-8	20	µg/L	<20	102.18 µg/L	96.0	85	115
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3809537)								
EP074: Styrene	100-42-5	5	µg/L	<5	10 µg/L	90.4	74	118
EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	10 µg/L	91.7	75	121
EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	10 µg/L	94.3	67	123
EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	10 µg/L	95.7	70	122
EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	10 µg/L	93.8	69	123
EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	10 µg/L	92.3	71	121

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3809537) - continued								
EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	10 µg/L	91.6	70	122
EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	10 µg/L	95.6	67	123
EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	10 µg/L	94.8	62	126
EP074B: Oxygenated Compounds (QCLot: 3809537)								
EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	100 µg/L	103	61.4	134
EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	100 µg/L	89.2	73.6	130
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	100 µg/L	90.9	61	139
EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	100 µg/L	91.6	65	137
EP074C: Sulfonated Compounds (QCLot: 3809537)								
EP074: Carbon disulfide	75-15-0	5	µg/L	<5	10 µg/L	83.6	72.8	127
EP074D: Fumigants (QCLot: 3809537)								
EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	10 µg/L	93.9	61	119
EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	10 µg/L	95.3	76	120
EP074: cis-1.3-Dichloropropylene	10061-01-5	10	µg/L	<10	10 µg/L	96.2	62	120
EP074: trans-1.3-Dichloropropylene	10061-02-6	10	µg/L	<10	10 µg/L	103	61	119
EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	10 µg/L	91.0	69	117
EP074E: Halogenated Aliphatic Compounds (QCLot: 3809537)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	94.4	60.6	138
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	86.8	67.4	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	104	69.4	129
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	98.8	56	140
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	110	63	135
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	94.8	65	131
EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	96.1	69	123
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	98.1	70.2	128
EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	90.4	71	119
EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	87.2	75	119
EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	91.2	77	117
EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	89.9	61	119
EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	90.6	73	119

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 3809537) - continued								
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	89.4	63	121
EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	91.2	78	122
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	87.4	74	120
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	91.8	74	118
EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	91.1	75	123
EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	91.0	79	121
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	85.2	72	124
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	90.0	66	114
EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	91.1	60	120
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	92.0	70.6	128
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	92.9	70	124
EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	91.4	74	128
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	109	71.8	126
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	100	66.4	136
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	100	58	132
EP074F: Halogenated Aromatic Compounds (QCLot: 3809537)								
EP074: Chlorobenzene	108-90-7	5	µg/L	<5	10 µg/L	90.4	80	118
EP074: Bromobenzene	108-86-1	5	µg/L	<5	10 µg/L	91.6	76	116
EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	10 µg/L	93.2	71	121
EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	10 µg/L	94.4	71	121
EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	10 µg/L	93.8	74	120
EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	10 µg/L	90.5	72	120
EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	10 µg/L	91.4	77	117
EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	10 µg/L	103	60	126
EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	10 µg/L	98.8	67	125
EP074G: Trihalomethanes (QCLot: 3809537)								
EP074: Chloroform	67-66-3	5	µg/L	<5	10 µg/L	91.7	76	118
EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	10 µg/L	89.5	64	118
EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	10 µg/L	86.3	65	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074G: Trihalomethanes (QCLot: 3809537) - continued								
EP074: Bromoform	75-25-2	5	µg/L	<5	10 µg/L	90.8	73.5	126
EP075(SIM)A: Phenolic Compounds (QCLot: 3809655)								
EP075(SIM): Phenol	108-95-2	0.2	µg/L	<1.0	5 µg/L	34.8	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	<1.0	5 µg/L	70.5	63.8	110
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	<1.0	5 µg/L	71.3	55.9	112
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	<2.0	10 µg/L	62.2	42.5	114
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	<1.0	5 µg/L	73.1	62.7	117
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.2	µg/L	<1.0	5 µg/L	80.2	59.9	112
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.2	µg/L	<1.0	5 µg/L	84.1	59.3	122
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.2	µg/L	<1.0	5 µg/L	88.3	64.3	118
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	<1.0	5 µg/L	76.9	63	119
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.2	µg/L	<1.0	5 µg/L	82.9	58.7	118
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.2	µg/L	<1.0	5 µg/L	77.4	50	108
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	<2.0	10 µg/L	40.5	10	95
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3809655)								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	<1.0	5 µg/L	86.4	58.6	119
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	<1.0	5 µg/L	93.1	63.6	114
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	<1.0	5 µg/L	88.2	62.2	113
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	<1.0	5 µg/L	92.3	63.9	115
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	<1.0	5 µg/L	91.3	62.6	116
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	<1.0	5 µg/L	92.0	64.3	116
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	<1.0	5 µg/L	94.7	63.6	118
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	<1.0	5 µg/L	92.3	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	<1.0	5 µg/L	94.0	64.1	117
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	<1.0	5 µg/L	91.8	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.2	µg/L	<1.0	5 µg/L	88.3	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<1.0	5 µg/L	99.0	61.7	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.5	5 µg/L	96.2	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<1.0	5 µg/L	91.9	59.9	118

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3809655) - continued								
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<1.0	5 µg/L	87.9	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<1.0	5 µg/L	85.5	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3809538)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	116	75	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3809654)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	91.5	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	100	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	92.5	62	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3809538)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	117	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3809654)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	97.2	58.9	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	91.4	73.9	138
EP071: >C34 - C40 Fraction	----	50	µg/L	<100	1500 µg/L	104	67	127
EP080: BTEXN (QCLot: 3809538)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	118	70	124
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	114	65	129
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	116	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	119	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	118	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	106	70	124
EP262: Ethanolamines (QCLot: 3809514)								
EP262: Ethanolamine	141-43-5	1	µg/L	<1	10 µg/L	110	50	130
EP262: Diethanolamine	111-42-2	1	µg/L	<1	10 µg/L	108	50	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED009: Anions (QCLot: 3809806)							
ES1502485-001	WK11	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3810027)							
ES1502325-020	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	100	70	130
ED045G: Chloride Discrete analyser (QCLot: 3810026)							
ES1502325-020	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	99.0	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3810085)							
ES1502485-002	WK11U/S	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	125	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	93.5	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	# Not Determined	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	89.2	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	85.8	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	117	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	92.7	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	# 37.1	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	91.2	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	107	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	# 32.0	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	103	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3810083)							
ES1502485-001	WK11	EG035F: Mercury	7439-97-6	0.0100 mg/L	87.7	70	130
EG052G: Silica by Discrete Analyser (QCLot: 3810028)							
ES1502485-001	WK11	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	70	130
EK040P: Fluoride by PC Titrator (QCLot: 3810125)							
ES1502485-001	WK11	EK040P: Fluoride	16984-48-8	5.0 mg/L	107	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3809972)							
ES1502425-005	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	115	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3810024)							
ES1502325-020	Anonymous	EK057G: Nitrite as N	----	0.5 mg/L	95.0	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3809971)							
ES1502425-005	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	107	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3809965)							
ES1502485-002	WK11U/S	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	98.2	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3809966)							
ES1502485-002	WK11U/S	EK067G: Total Phosphorus as P	----	1.0 mg/L	# 140	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3810025)							
ES1502325-020	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	103	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 3811138)							
ES1502485-002	WK11U/S	EP005: Total Organic Carbon	----	100 mg/L	97.8	70	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3809672)							
ES1502485-001	WK11	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	70	130
		EP033: Ethene	74-85-1	50.29 µg/L	99.9	70	130
		EP033: Ethane	74-84-0	54.43 µg/L	# Not Determined	70	130
		EP033: Propene	115-07-1	73.97 µg/L	98.4	70	130
		EP033: Propane	74-98-6	78.28 µg/L	90.9	70	130
		EP033: Butene	25167-67-3	99.61 µg/L	98.7	70	130
		EP033: Butane	106-97-8	102.18 µg/L	98.8	70	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 3809537)							
ES1502485-003	WK13	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	87.0	70	130
		EP074: Trichloroethene	79-01-6	25 µg/L	83.9	70	130
EP074F: Halogenated Aromatic Compounds (QCLot: 3809537)							
ES1502485-003	WK13	EP074: Chlorobenzene	108-90-7	25 µg/L	91.0	70	130
EP075(SIM)A: Phenolic Compounds (QCLot: 3809655)							
ES1502485-001	WK11	EP075(SIM): Phenol	108-95-2	20 µg/L	40.8	20	130
		EP075(SIM): 2-Chlorophenol	95-57-8	20 µg/L	77.9	60	130
		EP075(SIM): 2-Nitrophenol	88-75-5	20 µg/L	70.7	60	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	20 µg/L	97.0	70	130
		EP075(SIM): Pentachlorophenol	87-86-5	20 µg/L	67.2	20	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3809655)							
ES1502485-001	WK11	EP075(SIM): Acenaphthene	83-32-9	20 µg/L	75.1	70	130
		EP075(SIM): Pyrene	129-00-0	20 µg/L	93.2	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3809538)							
ES1502485-002	WK11U/S	EP080: C6 - C9 Fraction	----	325 µg/L	130	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3809654)							
ES1502485-001	WK11	EP071: C10 - C14 Fraction	----	200 µg/L	105	74	150
		EP071: C15 - C28 Fraction	----	300 µg/L	100	77	153
		EP071: C29 - C36 Fraction	----	200 µg/L	100	67	153

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3809538)							
ES1502485-002	WK11U/S	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	107	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3809654)							
ES1502485-001	WK11	EP071: >C10 - C16 Fraction	>C10_C16	250 µg/L	100	74	150
		EP071: >C16 - C34 Fraction	----	350 µg/L	103	77	153
		EP071: >C34 - C40 Fraction	----	150 µg/L	100	67	153
EP080: BTEXN (QCLot: 3809538)							
ES1502485-002	WK11U/S	EP080: Benzene	71-43-2	25 µg/L	# Not Determined	70	130
		EP080: Toluene	108-88-3	25 µg/L	# Not Determined	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	101	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	100	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	103	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	96.1	70	130
EP262: Ethanolamines (QCLot: 3809514)							
ES1502485-001	WK11	EP262: Ethanolamine	141-43-5	10 µg/L	# Not Determined	50	130
		EP262: Diethanolamine	111-42-2	10 µg/L	126	50	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP262: Ethanolamines (QCLot: 3809514)										
ES1502485-001	WK11	EP262: Ethanolamine	141-43-5	10 µg/L	# Not Determined	----	50	130	----	----
		EP262: Diethanolamine	111-42-2	10 µg/L	126	----	50	130	----	----
EP074E: Halogenated Aliphatic Compounds (QCLot: 3809537)										
ES1502485-003	WK13	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	87.0	----	70	130	----	----
		EP074: Trichloroethene	79-01-6	25 µg/L	83.9	----	70	130	----	----
EP074F: Halogenated Aromatic Compounds (QCLot: 3809537)										
ES1502485-003	WK13	EP074: Chlorobenzene	108-90-7	25 µg/L	91.0	----	70	130	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3809538)										
ES1502485-002	WK11U/S	EP080: C6 - C9 Fraction	----	325 µg/L	130	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3809538)										
ES1502485-002	WK11U/S	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	107	----	70	130	----	----
EP080: BTEXN (QCLot: 3809538)										
ES1502485-002	WK11U/S	EP080: Benzene	71-43-2	25 µg/L	# Not Determined	----	70	130	----	----
		EP080: Toluene	108-88-3	25 µg/L	# Not Determined	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	25 µg/L	101	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	100	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	25 µg/L	103	----	70	130	----	----
		EP080: Naphthalene	91-20-3	25 µg/L	96.1	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3809654)										
ES1502485-001	WK11	EP071: C10 - C14 Fraction	----	200 µg/L	105	----	74	150	----	----
		EP071: C15 - C28 Fraction	----	300 µg/L	100	----	77	153	----	----
		EP071: C29 - C36 Fraction	----	200 µg/L	100	----	67	153	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3809654)										
ES1502485-001	WK11	EP071: >C10 - C16 Fraction	>C10_C16	250 µg/L	100	----	74	150	----	----
		EP071: >C16 - C34 Fraction	----	350 µg/L	103	----	77	153	----	----
		EP071: >C34 - C40 Fraction	----	150 µg/L	100	----	67	153	----	----
EP075(SIM)A: Phenolic Compounds (QCLot: 3809655)										
ES1502485-001	WK11	EP075(SIM): Phenol	108-95-2	20 µg/L	40.8	----	20	130	----	----
		EP075(SIM): 2-Chlorophenol	95-57-8	20 µg/L	77.9	----	60	130	----	----
		EP075(SIM): 2-Nitrophenol	88-75-5	20 µg/L	70.7	----	60	130	----	----
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	20 µg/L	97.0	----	70	130	----	----
		EP075(SIM): Pentachlorophenol	87-86-5	20 µg/L	67.2	----	20	130	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3809655)										
ES1502485-001	WK11	EP075(SIM): Acenaphthene	83-32-9	20 µg/L	75.1	----	70	130	----	----
		EP075(SIM): Pyrene	129-00-0	20 µg/L	93.2	----	70	130	----	----
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3809672)										
ES1502485-001	WK11	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	----	70	130	----	----
		EP033: Ethene	74-85-1	50.29 µg/L	99.9	----	70	130	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3809672) - continued										
ES1502485-001	WK11	EP033: Ethane	74-84-0	54.43 µg/L	# Not Determined	----	70	130	----	----
		EP033: Propene	115-07-1	73.97 µg/L	98.4	----	70	130	----	----
		EP033: Propane	74-98-6	78.28 µg/L	90.9	----	70	130	----	----
		EP033: Butene	25167-67-3	99.61 µg/L	98.7	----	70	130	----	----
		EP033: Butane	106-97-8	102.18 µg/L	98.8	----	70	130	----	----
ED009: Anions (QCLot: 3809806)										
ES1502485-001	WK11	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	----	70	130	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3809965)										
ES1502485-002	WK11U/S	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	98.2	----	70	130	----	----
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3809966)										
ES1502485-002	WK11U/S	EK067G: Total Phosphorus as P	----	1.0 mg/L	# 140	----	70	130	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3809971)										
ES1502425-005	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	107	----	70	130	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3809972)										
ES1502425-005	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	115	----	70	130	----	----
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3810024)										
ES1502325-020	Anonymous	EK057G: Nitrite as N	----	0.5 mg/L	95.0	----	70	130	----	----
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3810025)										
ES1502325-020	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	103	----	70	130	----	----
ED045G: Chloride Discrete analyser (QCLot: 3810026)										
ES1502325-020	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	99.0	----	70	130	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3810027)										
ES1502325-020	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	100	----	70	130	----	----
EG052G: Silica by Discrete Analyser (QCLot: 3810028)										
ES1502485-001	WK11	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	----	70	130	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3810083)										
ES1502485-001	WK11	EG035F: Mercury	7439-97-6	0.0100 mg/L	87.7	----	70	130	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3810085)										
ES1502485-002	WK11U/S	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	125	----	70	130	----	----
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	93.5	----	70	130	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EG020F: Dissolved Metals by ICP-MS (QCLot: 3810085) - continued										
ES1502485-002	WK11U/S	EG020A-F: Barium	7440-39-3	0.2 mg/L	# Not Determined	----	70	130	----	----
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	89.2	----	70	130	----	----
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	85.8	----	70	130	----	----
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	117	----	70	130	----	----
		EG020A-F: Copper	7440-50-8	0.2 mg/L	92.7	----	70	130	----	----
		EG020A-F: Lead	7439-92-1	0.2 mg/L	# 37.1	----	70	130	----	----
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	91.2	----	70	130	----	----
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	107	----	70	130	----	----
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	# 32.0	----	70	130	----	----
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	103	----	70	130	----	----
EK040P: Fluoride by PC Titrator (QCLot: 3810125)										
ES1502485-001	WK11	EK040P: Fluoride	16984-48-8	5.0 mg/L	107	----	70	130	----	----
EP005: Total Organic Carbon (TOC) (QCLot: 3811138)										
ES1502485-002	WK11U/S	EP005: Total Organic Carbon	----	100 mg/L	97.8	----	70	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1502485**	Page	: 1 of 13
Amendment	: **3**		
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
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Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 04-FEB-2015
Sampler	: CS/AM	Issue Date	: 22-MAY-2015
Order number	: ----		
		No. of samples received	: 12
Quote number	: SY/933/14	No. of samples analysed	: 3

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P)							
WK13	**03-FEB-2015**	**---**	04-FEB-2015	----	**04-FEB-2015**	04-FEB-2015	✓
Clear Plastic Bottle - Natural (EA005-P)							
WK11	**03-FEB-2015**	**---**	03-FEB-2015	----	**04-FEB-2015**	03-FEB-2015	×
Clear Plastic Bottle - Natural (EA005-P)							
AST2	**03-FEB-2015**	**---**	04-FEB-2015	----	**04-FEB-2015**	04-FEB-2015	✓
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P)							
WK11, WK13, AST2	**03-FEB-2015**	**---**	03-MAR-2015	----	**04-FEB-2015**	03-MAR-2015	✓
EA015: Total Dissolved Solids							
Clear Plastic Bottle - Natural (EA015H)							
WK11, WK13, AST2	**03-FEB-2015**	**---**	10-FEB-2015	----	**05-FEB-2015**	10-FEB-2015	✓
EA025: Suspended Solids							
Clear Plastic Bottle - Natural (EA025H)							
WK11, WK13, AST2	**03-FEB-2015**	**---**	10-FEB-2015	----	**05-FEB-2015**	10-FEB-2015	✓
ED009: Anions							
Clear Plastic Bottle - Natural (ED009-X)							
WK11, WK13, AST2	**03-FEB-2015**	**----**	----	----	**04-FEB-2015**	03-MAR-2015	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
WK11, WK13, AST2	**03-FEB-2015**	**---**	17-FEB-2015	----	**04-FEB-2015**	17-FEB-2015	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
WK11, WK13, AST2	**03-FEB-2015**	**---**	03-MAR-2015	----	**04-FEB-2015**	03-MAR-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED045G: Chloride Discrete analyser							
Clear Plastic Bottle - Natural (ED045G)							
WK11, AST2 WK13,	**03-FEB-2015**	---	03-MAR-2015	----	**04-FEB-2015**	03-MAR-2015	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
WK11, AST2 WK13,	**03-FEB-2015**	---	03-MAR-2015	----	**04-FEB-2015**	03-MAR-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
WK11, AST2 WK13,	**03-FEB-2015**	---	02-AUG-2015	----	**04-FEB-2015**	02-AUG-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)							
WK11, AST2 WK13,	**03-FEB-2015**	---	02-AUG-2015	----	**04-FEB-2015**	02-AUG-2015	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
WK11, AST2 WK13,	**03-FEB-2015**	---	03-MAR-2015	----	**05-FEB-2015**	03-MAR-2015	✓
EG052G: Silica by Discrete Analyser							
Clear Plastic Bottle - Natural (EG052G)							
WK11, AST2 WK13,	**03-FEB-2015**	---	03-MAR-2015	----	**04-FEB-2015**	03-MAR-2015	✓
EK010/011: Chlorine							
Clear Plastic Bottle - Natural (EK010)							
WK13	**03-FEB-2015**	----	----	----	**04-FEB-2015**	04-FEB-2015	✓
Clear Plastic Bottle - Natural (EK010)							
WK11	**03-FEB-2015**	----	----	----	**04-FEB-2015**	03-FEB-2015	×
Clear Plastic Bottle - Natural (EK010)							
AST2	**03-FEB-2015**	----	----	----	**04-FEB-2015**	04-FEB-2015	✓
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
WK11, AST2 WK13,	**03-FEB-2015**	---	03-MAR-2015	----	**04-FEB-2015**	03-MAR-2015	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
WK11, AST2 WK13,	**03-FEB-2015**	---	03-MAR-2015	----	**04-FEB-2015**	03-MAR-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
WK11, AST2 WK13,	**03-FEB-2015**	---	05-FEB-2015	----	**04-FEB-2015**	05-FEB-2015	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
WK11, AST2 WK13,	**03-FEB-2015**	---	03-MAR-2015	----	**04-FEB-2015**	03-MAR-2015	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
WK11, AST2 WK13,	**03-FEB-2015**	**04-FEB-2015**	03-MAR-2015	✓	**04-FEB-2015**	03-MAR-2015	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
WK11, AST2 WK13,	**03-FEB-2015**	**04-FEB-2015**	03-MAR-2015	✓	**04-FEB-2015**	03-MAR-2015	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
WK11, AST2 WK13,	**03-FEB-2015**	---	05-FEB-2015	----	**04-FEB-2015**	05-FEB-2015	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005)							
WK11, AST2 WK13,	**03-FEB-2015**	**----**	----	----	**05-FEB-2015**	03-MAR-2015	✓
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - Sulfuric Acid (EP033)							
WK11, AST2 WK13,	**03-FEB-2015**	**----**	----	----	**04-FEB-2015**	17-FEB-2015	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
WK11, AST2 WK13,	**03-FEB-2015**	**04-FEB-2015**	10-FEB-2015	✓	**05-FEB-2015**	16-MAR-2015	✓
EP074D: Fumigants							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK11, AST2 WK13,	**03-FEB-2015**	**04-FEB-2015**	17-FEB-2015	✓	**04-FEB-2015**	17-FEB-2015	✓
EP074E: Halogenated Aliphatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK11, AST2 WK13,	**03-FEB-2015**	**04-FEB-2015**	17-FEB-2015	✓	**04-FEB-2015**	17-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074F: Halogenated Aromatic Compounds								
Amber VOC Vial - Sulfuric Acid (EP074)								
WK11, AST2	WK13,	**03-FEB-2015**	**04-FEB-2015**	17-FEB-2015	✓	**04-FEB-2015**	17-FEB-2015	✓
EP074A: Monocyclic Aromatic Hydrocarbons								
Amber VOC Vial - Sulfuric Acid (EP074)								
WK11, AST2	WK13,	**03-FEB-2015**	**04-FEB-2015**	17-FEB-2015	✓	**04-FEB-2015**	17-FEB-2015	✓
EP074B: Oxygenated Compounds								
Amber VOC Vial - Sulfuric Acid (EP074)								
WK11, AST2	WK13,	**03-FEB-2015**	**04-FEB-2015**	17-FEB-2015	✓	**04-FEB-2015**	17-FEB-2015	✓
EP074C: Sulfonated Compounds								
Amber VOC Vial - Sulfuric Acid (EP074)								
WK11, AST2	WK13,	**03-FEB-2015**	**04-FEB-2015**	17-FEB-2015	✓	**04-FEB-2015**	17-FEB-2015	✓
EP074G: Trihalomethanes								
Amber VOC Vial - Sulfuric Acid (EP074)								
WK11, AST2	WK13,	**03-FEB-2015**	**04-FEB-2015**	17-FEB-2015	✓	**04-FEB-2015**	17-FEB-2015	✓
EP075(SIM)A: Phenolic Compounds								
Amber Glass Bottle - Unpreserved (EP075(SIM))								
WK11, AST2	WK13,	**03-FEB-2015**	**04-FEB-2015**	10-FEB-2015	✓	**05-FEB-2015**	16-MAR-2015	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM))								
WK11, AST2	WK13,	**03-FEB-2015**	**04-FEB-2015**	10-FEB-2015	✓	**05-FEB-2015**	16-MAR-2015	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
WK11, AST2	WK13,	**03-FEB-2015**	**04-FEB-2015**	17-FEB-2015	✓	**04-FEB-2015**	17-FEB-2015	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber VOC Vial - Sulfuric Acid (EP080)								
WK11, AST2	WK13,	**03-FEB-2015**	**04-FEB-2015**	17-FEB-2015	✓	**04-FEB-2015**	17-FEB-2015	✓
EP262: Ethanolamines								
Amber Glass Bottle - Unpreserved (EP262)								
WK11, AST2	WK13,	**03-FEB-2015**	**----**	----	----	**04-FEB-2015**	10-FEB-2015	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	1	7	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	1	7	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	13	**15.4**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	2	17	**11.8**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	4	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	13	**15.4**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	2	18	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH by PC Titrator	EA005-P	2	18	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	11	**18.2**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	13	**15.4**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	14	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	8	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	13	**15.4**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	11	**9.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	3	**66.7**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	3	**66.7**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	14	**21.4**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	3	8	**37.5**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	11	**9.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	11	**9.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Standard Anions -by IC (Extended Method)	ED009-X	WATER	In house: Referenced to APHA 4110. This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Silica (Reactive) by Discrete Analyser	EG052G	WATER	In house: Referenced to APHA 4500-SiO2 D: Under Acdic conditions reactive silicon combines with ammonium molybdate to form a yellow molybdosilicic acid complex. This is reduced by 1-amino-2-naphthol-4-sulfonic acid to a silicomolybdenum blue complex which is measured by discrete analyser at 670 nm. This method is compliant with NEPM (2013) Schedule B(3)
Chlorine	EK010	WATER	In-house (DPD colourimetry)
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500 F--C CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ammonium as N	EK055G-NH4	WATER	Ammonium in the sample is reported as the ionised / unionised fractions by the use of a nomograph and the initial pH and Temperature. Ammonia is determined by direct colorimetry by Discrete Analyser according to APHA 4500-NH3 G. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Volatile Organic Compounds	EP074	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Ethanolamines by LCMSMS	EP262	WATER	In-house LC-MSMS: Benzoyl derivatives of target compounds are analysed by LC/MSMS in ESI Positive Mode.

Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED009: Anions	ES1502485-001	WK11	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG020F: Dissolved Metals by ICP-MS	ES1502485-002	Anonymous	**Barium**	7440-39-3	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG020F: Dissolved Metals by ICP-MS	ES1502485-002	Anonymous	**Lead**	7439-92-1	37.1 %	70-130%	**Recovery less than lower data quality objective**
EG020F: Dissolved Metals by ICP-MS	ES1502485-002	Anonymous	**Vanadium**	7440-62-2	32.0 %	70-130%	**Recovery less than lower data quality objective**
EG052G: Silica by Discrete Analyser	ES1502485-001	WK11	**Reactive Silica**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK067G: Total Phosphorus as P by Discrete Analyser	ES1502485-002	Anonymous	**Total Phosphorus as P**	----	140 %	70-130%	**Recovery greater than upper data quality objective**
EP033: C1 - C4 Hydrocarbon Gases	ES1502485-001	WK11	**Methane**	74-82-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP033: C1 - C4 Hydrocarbon Gases	ES1502485-001	WK11	**Ethane**	74-84-0	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP080: BTEXN	ES1502485-002	Anonymous	**Benzene**	71-43-2	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP080: BTEXN	ES1502485-002	Anonymous	**Toluene**	108-88-3	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP262: Ethanolamines	ES1502485-001	WK11	**Ethanolamine**	141-43-5	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural						
WK11	----	----	----	04-FEB-2015	03-FEB-2015	**1**
EK010/011: Chlorine						
Clear Plastic Bottle - Natural						
WK11	----	----	----	04-FEB-2015	03-FEB-2015	**1**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1502614**	Page	: 1 of 21
Amendment	: **2**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
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Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 04-FEB-2015
Sampler	: CS & AM	Issue Date	: 21-MAY-2015
Order number	: ----		
		No. of samples received	: 10
Quote number	: SY/933/14	No. of samples analysed	: 2

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA005P: pH by PC Titrator (QC Lot: 3810450)									
ES1502509-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.24	7.21	0.4	0% - 20%
ES1502614-004	WK12 U/S	EA005-P: pH Value	----	0.01	pH Unit	7.61	7.62	0.1	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 3810449)									
ES1502509-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	3810	3770	1.0	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 3811989)									
ES1502614-001	WK14	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	5980	5720	4.5	0% - 20%
ES1502642-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	4580	4770	4.0	0% - 20%
EA025: Suspended Solids (QC Lot: 3811991)									
ES1502614-001	WK14	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	10	68.8	No Limit
ES1502642-006	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	7	12	52.6	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 3810448)									
ES1502509-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	637	625	1.9	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	637	625	1.9	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3810482)									
ES1502614-001	WK14	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	<10	0.0	No Limit
ED045G: Chloride Discrete analyser (QC Lot: 3810480)									
ES1502614-001	WK14	ED045G: Chloride	16887-00-6	1	mg/L	564	569	0.8	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 3810910)									
ES1502614-002	WK14 U/S	ED093F: Calcium	7440-70-2	1	mg/L	56	56	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	6	6	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	2530	2490	1.4	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	13	13	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3810911)									
ES1502614-002	WK14 U/S	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	10.1	9.96	1.2	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.012	0.012	0.0	0% - 50%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3810911) - continued									
ES1502614-002	WK14 U/S	EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.093	0.092	1.2	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.007	0.007	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	11.2	11.2	0.4	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	3.63	3.59	1.0	0% - 20%
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	0.7	0.7	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3810912)									
ES1502614-002	WK14 U/S	EG020B-F: Strontium	7440-24-6	0.001	mg/L	6.57	6.50	1.1	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 3810909)									
ES1502614-003	WK12	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG052G: Silica by Discrete Analyser (QC Lot: 3810481)									
ES1502614-001	WK14	EG052G: Reactive Silica	----	0.05	mg/L	33.2	33.5	1.0	0% - 20%
EK010/011: Chlorine (QC Lot: 3810490)									
ES1502614-001	WK14	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
		EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3810451)									
ES1502509-001	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.2	0.2	0.0	No Limit
ES1502614-004	WK12 U/S	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.9	0.9	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3810991)									
ES1502581-009	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.10	0.11	0.0	0% - 50%
ES1502629-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.01	0.02	75.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3810478)									
ES1502614-001	WK14	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3810992)									
ES1502581-010	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.03	0.03	0.0	No Limit
ES1502629-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.05	0.07	32.7	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3810986)									
ES1502581-010	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.2	40.0	No Limit
EW1500311-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.7	1.5	10.1	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3810985)									
ES1502388-010	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	43.8	42.3	3.3	0% - 20%
ES1502560-003	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	1.31	1.32	0.0	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3810479)									
ES1502614-001	WK14	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.04	79.6	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 3811138)									
ES1502485-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	2	2	0.0	No Limit
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 3810884)									
ES1502614-001	WK14	EP033: Methane	74-82-8	10	µg/L	6810	6560	3.8	0% - 20%
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	946	962	1.6	0% - 20%
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	53	49	7.4	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 3810461)									
ES1502614-001	WK14	EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
EP074B: Oxygenated Compounds (QC Lot: 3810461)									
ES1502614-001	WK14	EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit
EP074C: Sulfonated Compounds (QC Lot: 3810461)									
ES1502614-001	WK14	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
EP074D: Fumigants (QC Lot: 3810461)									
ES1502614-001	WK14	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3810461)									
ES1502614-001	WK14	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3810461) - continued									
ES1502614-001	WK14	EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 3810461)									
ES1502614-001	WK14	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 3810461)									
ES1502614-001	WK14	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 3811351)									

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)A: Phenolic Compounds (QC Lot: 3811351) - continued									
ES1502614-001	WK14	EP075(SIM): Phenol	108-95-2	1.0	µg/L	4.2	4.5	6.1	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	1.0	µg/L	2.6	2.9	9.9	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	1.0	µg/L	1.0	1.2	18.8	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2.0	µg/L	40.0	45.9	13.7	0% - 20%
		EP075(SIM): Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3811351)									
ES1502614-001	WK14	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Naphthalene	91-20-3	1.0	µg/L	<1.0	1.2	14.3	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3810462)									
ES1502614-001	WK14	EP080: C6 - C9 Fraction	----	20	µg/L	770	710	7.8	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3811350)									
ES1502614-001	WK14	EP071: C15 - C28 Fraction	----	100	µg/L	210	220	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	150	150	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3810462)									
ES1502614-001	WK14	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	820	760	7.8	0% - 20%
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3811350)									
ES1502614-001	WK14	EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	<100	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3811350) - continued									
ES1502614-001	WK14	EP071: >C16 - C34 Fraction	----	100	µg/L	320	310	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
EP080: BTEXN (QC Lot: 3810462)									
ES1502614-001	WK14	EP080: Benzene	71-43-2	1	µg/L	257	249	3.4	0% - 20%
		EP080: Toluene	108-88-3	2	µg/L	294	257	13.6	0% - 20%
		EP080: Ethylbenzene	100-41-4	2	µg/L	4	4	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	49	48	2.6	0% - 20%
		EP080: ortho-Xylene	95-47-6	2	µg/L	13	13	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP262: Ethanolamines (QC Lot: 3812947)									
ES1502614-001	WK14	EP262: Ethanolamine	141-43-5	1	µg/L	16	17	6.4	0% - 50%
		EP262: Diethanolamine	111-42-2	1	µg/L	15	13	16.0	0% - 50%
ES1502642-001	Anonymous	EP262: Ethanolamine	141-43-5	1	µg/L	45	40	11.8	0% - 20%
		EP262: Diethanolamine	111-42-2	1	µg/L	38	31	19.1	0% - 20%

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010P: Conductivity by PC Titrator (QCLot: 3810449)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	104	95	113
EA015: Total Dissolved Solids (QCLot: 3811989)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	293 mg/L	114	67	125
				----	2000 mg/L	88.0	87	109
EA025: Suspended Solids (QCLot: 3811991)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	1000 mg/L	89.8	83	129
				----	150 mg/L	92.0	86	110
ED037P: Alkalinity by PC Titrator (QCLot: 3810448)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	104	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3810482)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	108	86	122
ED045G: Chloride Discrete analyser (QCLot: 3810480)								
ED045G: Chloride	16887-00-6	1	mg/L	----	1000 mg/L	107	77	119
				<1	10 mg/L	116	75	123
ED093F: Dissolved Major Cations (QCLot: 3810910)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	# 89.0	90	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	103	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	101	82	118
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	99.7	87	117
EG020F: Dissolved Metals by ICP-MS (QCLot: 3810911)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	102	85	115
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.01 mg/L	103	85	115
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.1	85	115
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	101	85	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	99.2	85	115
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.0	85	115
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	100	85	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3810911) - continued								
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	91.4	85	115
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	93.2	85	115
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	96.6	85	115
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	95.8	85	115
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	86.3	85	115
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	90.8	85	115
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	89.5	85	115
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	98.9	85	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	96.9	85	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	95.1	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	----	----	----	----
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	102	85	115
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3810912)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	91.5	80	112
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3810909)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	99.2	78	114
EG052G: Silica by Discrete Analyser (QCLot: 3810481)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.10	5 mg/L	104	94	114
EK010/011: Chlorine (QCLot: 3810490)								
EK010: Chlorine - Free	----	0.2	mg/L	<0.2	----	----	----	----
EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	----	----	----	----
EK040P: Fluoride by PC Titrator (QCLot: 3810451)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5.0 mg/L	98.2	75	119
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3810991)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.0 mg/L	110	86	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3810478)								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.5 mg/L	95.7	83	119
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3810992)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3810992) - continued								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	95.1	87	119
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3810986)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	1.0 mg/L	109	66	126
				<0.1	10 mg/L	84.7	66	114
				----	5 mg/L	105	66	119
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3810985)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	----	0.442 mg/L	97.3	63	123
				<0.01	4.42 mg/L	90.5	67	117
				----	1.0 mg/L	100	66	124
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3810479)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	97.5	82	122
EP005: Total Organic Carbon (TOC) (QCLot: 3811138)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	88.3	76	120
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3810884)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	99.2	86	114
EP033: Ethene	74-85-1	10	µg/L	<10	50.29 µg/L	98.5	87	111
EP033: Ethane	74-84-0	10	µg/L	<10	54.43 µg/L	99.0	87	111
EP033: Propene	115-07-1	10	µg/L	<10	73.97 µg/L	98.2	85	113
EP033: Propane	74-98-6	10	µg/L	<10	78.28 µg/L	99.0	84	112
EP033: Butene	25167-67-3	20	µg/L	<20	99.61 µg/L	98.6	83	115
EP033: Butane	106-97-8	20	µg/L	<20	102.18 µg/L	97.7	85	115
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3810461)								
EP074: Styrene	100-42-5	5	µg/L	<5	10 µg/L	76.8	74	118
EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	10 µg/L	78.2	75	121
EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	10 µg/L	91.4	67	123
EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	10 µg/L	87.2	70	122
EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	10 µg/L	88.6	69	123
EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	10 µg/L	86.7	71	121
EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	10 µg/L	86.1	70	122
EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	10 µg/L	87.4	67	123

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3810461) - continued								
EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	10 µg/L	83.1	62	126
EP074B: Oxygenated Compounds (QCLot: 3810461)								
EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	100 µg/L	100	61.4	134
EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	100 µg/L	123	73.6	130
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	100 µg/L	91.8	61	139
EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	100 µg/L	79.2	65	137
EP074C: Sulfonated Compounds (QCLot: 3810461)								
EP074: Carbon disulfide	75-15-0	5	µg/L	<5	10 µg/L	84.9	72.8	127
EP074D: Fumigants (QCLot: 3810461)								
EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	10 µg/L	83.2	61	119
EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	10 µg/L	89.6	76	120
EP074: cis-1.3-Dichloropropylene	10061-01-5	10	µg/L	<10	10 µg/L	93.1	62	120
EP074: trans-1.3-Dichloropropylene	10061-02-6	10	µg/L	<10	10 µg/L	81.6	61	119
EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	10 µg/L	80.5	69	117
EP074E: Halogenated Aliphatic Compounds (QCLot: 3810461)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	97.0	60.6	138
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	109	67.4	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	82.1	69.4	129
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	87.7	56	140
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	80.6	63	135
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	101	65	131
EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	92.5	69	123
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	73.0	70.2	128
EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	87.6	71	119
EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	90.7	75	119
EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	83.3	77	117
EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	82.1	61	119
EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	89.0	73	119
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	90.0	63	121
EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	92.9	78	122

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 3810461) - continued								
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	83.2	74	120
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	83.4	74	118
EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	93.4	75	123
EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	89.5	79	121
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	76.0	72	124
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	72.9	66	114
EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	90.7	60	120
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	105	70.6	128
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	90.4	70	124
EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	82.4	74	128
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	73.8	71.8	126
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	81.3	66.4	136
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	84.1	58	132
EP074F: Halogenated Aromatic Compounds (QCLot: 3810461)								
EP074: Chlorobenzene	108-90-7	5	µg/L	<5	10 µg/L	# 77.4	80	118
EP074: Bromobenzene	108-86-1	5	µg/L	<5	10 µg/L	81.7	76	116
EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	10 µg/L	90.3	71	121
EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	10 µg/L	89.6	71	121
EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	10 µg/L	85.6	74	120
EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	10 µg/L	84.7	72	120
EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	10 µg/L	82.6	77	117
EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	10 µg/L	82.5	60	126
EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	10 µg/L	82.4	67	125
EP074G: Trihalomethanes (QCLot: 3810461)								
EP074: Chloroform	67-66-3	5	µg/L	<5	10 µg/L	84.4	76	118
EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	10 µg/L	89.8	64	118
EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	10 µg/L	80.5	65	115
EP074: Bromoform	75-25-2	5	µg/L	<5	10 µg/L	79.8	73.5	126
EP075(SIM)A: Phenolic Compounds (QCLot: 3811351)								
EP075(SIM): Phenol	108-95-2	0.2	µg/L	<1.0	5 µg/L	37.7	24.5	61.9

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)A: Phenolic Compounds (QCLot: 3811351) - continued								
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	<1.0	5 µg/L	73.0	63.8	110
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	<1.0	5 µg/L	67.6	55.9	112
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	<2.0	10 µg/L	64.7	42.5	114
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	<1.0	5 µg/L	75.7	62.7	117
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.2	µg/L	<1.0	5 µg/L	79.7	59.9	112
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.2	µg/L	<1.0	5 µg/L	75.6	59.3	122
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.2	µg/L	<1.0	5 µg/L	89.0	64.3	118
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	<1.0	5 µg/L	77.1	63	119
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.2	µg/L	<1.0	5 µg/L	68.3	58.7	118
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.2	µg/L	<1.0	5 µg/L	69.5	50	108
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	<2.0	10 µg/L	23.6	10	95
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3811351)								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	<1.0	5 µg/L	83.1	58.6	119
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	<1.0	5 µg/L	75.5	63.6	114
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	<1.0	5 µg/L	71.7	62.2	113
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	<1.0	5 µg/L	76.2	63.9	115
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	<1.0	5 µg/L	76.5	62.6	116
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	<1.0	5 µg/L	78.8	64.3	116
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	<1.0	5 µg/L	82.6	63.6	118
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	<1.0	5 µg/L	75.4	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	<1.0	5 µg/L	65.4	64.1	117
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	<1.0	5 µg/L	79.6	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.2	µg/L	<1.0	5 µg/L	74.9	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<1.0	5 µg/L	77.0	61.7	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.5	5 µg/L	77.1	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<1.0	5 µg/L	78.5	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<1.0	5 µg/L	75.3	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<1.0	5 µg/L	78.2	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3810462)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3810462) - continued								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	108	75	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3811350)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	96.0	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	96.3	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	94.0	62	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3810462)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	106	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3811350)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	97.6	58.9	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	93.1	73.9	138
EP071: >C34 - C40 Fraction	----	50	µg/L	<100	1500 µg/L	101	67	127
EP080: BTEXN (QCLot: 3810462)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	107	70	124
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	109	65	129
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	107	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	108	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	108	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	91.0	70	124
EP262: Ethanolamines (QCLot: 3812947)								
EP262: Ethanolamine	141-43-5	1	µg/L	<1	10 µg/L	110	50	130
EP262: Diethanolamine	111-42-2	1	µg/L	<1	10 µg/L	102	50	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3810482)							
ES1502614-001	WK14	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	105	70	130
ED045G: Chloride Discrete analyser (QCLot: 3810480)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045G: Chloride Discrete analyser (QCLot: 3810480) - continued							
ES1502614-001	WK14	ED045G: Chloride	16887-00-6	250 mg/L	87.2	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3810911)							
ES1502614-004	WK12 U/S	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	108	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	83.3	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	# Not Determined	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	# 40.6	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	82.0	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	# 67.8	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	93.0	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	# 69.8	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	74.9	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	# 62.5	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	# 35.1	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	# 43.0	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3810909)							
ES1502614-001	WK14	EG035F: Mercury	7439-97-6	0.0100 mg/L	71.7	70	130
EG052G: Silica by Discrete Analyser (QCLot: 3810481)							
ES1502614-001	WK14	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	70	130
EK040P: Fluoride by PC Titrator (QCLot: 3810451)							
ES1502509-001	Anonymous	EK040P: Fluoride	16984-48-8	5.0 mg/L	92.8	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3810991)							
ES1502581-009	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	124	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3810478)							
ES1502614-001	WK14	EK057G: Nitrite as N	----	0.5 mg/L	91.2	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3810992)							
ES1502581-010	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	96.8	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3810986)							
ES1502613-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	87.0	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3810985)							
ES1502560-001	Anonymous	EK067G: Total Phosphorus as P	----	2 mg/L	104	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3810479)							
ES1502614-001	WK14	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	93.8	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP005: Total Organic Carbon (TOC) (QCLot: 3811138)							
ES1502485-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	97.8	70	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3810884)							
ES1502614-002	WK14 U/S	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	70	130
		EP033: Ethene	74-85-1	50.29 µg/L	98.3	70	130
		EP033: Ethane	74-84-0	54.43 µg/L	# Not Determined	70	130
		EP033: Propene	115-07-1	73.97 µg/L	95.5	70	130
		EP033: Propane	74-98-6	78.28 µg/L	92.5	70	130
		EP033: Butene	25167-67-3	99.61 µg/L	97.2	70	130
		EP033: Butane	106-97-8	102.18 µg/L	97.8	70	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 3810461)							
ES1502614-003	WK12	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	82.5	70	130
		EP074: Trichloroethene	79-01-6	25 µg/L	83.3	70	130
EP074F: Halogenated Aromatic Compounds (QCLot: 3810461)							
ES1502614-003	WK12	EP074: Chlorobenzene	108-90-7	25 µg/L	86.5	70	130
EP075(SIM)A: Phenolic Compounds (QCLot: 3811351)							
ES1502614-001	WK14	EP075(SIM): Phenol	108-95-2	20 µg/L	40.8	20	130
		EP075(SIM): 2-Chlorophenol	95-57-8	20 µg/L	73.5	60	130
		EP075(SIM): 2-Nitrophenol	88-75-5	20 µg/L	73.3	60	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	20 µg/L	82.5	70	130
		EP075(SIM): Pentachlorophenol	87-86-5	20 µg/L	60.7	20	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3811351)							
ES1502614-001	WK14	EP075(SIM): Acenaphthene	83-32-9	20 µg/L	80.8	70	130
		EP075(SIM): Pyrene	129-00-0	20 µg/L	84.7	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3810462)							
ES1502614-002	WK14 U/S	EP080: C6 - C9 Fraction	----	325 µg/L	116	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3811350)							
ES1502614-001	WK14	EP071: C10 - C14 Fraction	----	200 µg/L	100	74	150
		EP071: C15 - C28 Fraction	----	300 µg/L	98.6	77	153
		EP071: C29 - C36 Fraction	----	200 µg/L	103	67	153
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3810462)							
ES1502614-002	WK14 U/S	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	116	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3811350)							
ES1502614-001	WK14	EP071: >C10 - C16 Fraction	>C10_C16	250 µg/L	104	74	150

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3811350) - continued							
ES1502614-001	WK14	EP071: >C16 - C34 Fraction	----	350 µg/L	98.2	77	153
		EP071: >C34 - C40 Fraction	----	150 µg/L	106	67	153
EP080: BTEXN (QCLot: 3810462)							
ES1502614-002	WK14 U/S	EP080: Benzene	71-43-2	25 µg/L	# Not Determined	70	130
		EP080: Toluene	108-88-3	25 µg/L	# Not Determined	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	105	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	104	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	101	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	92.1	70	130
EP262: Ethanolamines (QCLot: 3812947)							
ES1502614-001	WK14	EP262: Ethanolamine	141-43-5	10 µg/L	121	50	130
		EP262: Diethanolamine	111-42-2	10 µg/L	117	50	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EK040P: Fluoride by PC Titrator (QCLot: 3810451)										
ES1502509-001	Anonymous	EK040P: Fluoride	16984-48-8	5.0 mg/L	92.8	----	70	130	----	----
EP074E: Halogenated Aliphatic Compounds (QCLot: 3810461)										
ES1502614-003	WK12	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	82.5	----	70	130	----	----
		EP074: Trichloroethene	79-01-6	25 µg/L	83.3	----	70	130	----	----
EP074F: Halogenated Aromatic Compounds (QCLot: 3810461)										
ES1502614-003	WK12	EP074: Chlorobenzene	108-90-7	25 µg/L	86.5	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3810462)										
ES1502614-002	WK14 U/S	EP080: C6 - C9 Fraction	----	325 µg/L	116	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3810462)										
ES1502614-002	WK14 U/S	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	116	----	70	130	----	----
EP080: BTEXN (QCLot: 3810462)										
ES1502614-002	WK14 U/S									

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080: BTEXN (QCLot: 3810462) - continued										
ES1502614-002	WK14 U/S	EP080: Benzene	71-43-2	25 µg/L	# Not Determined	----	70	130	----	----
		EP080: Toluene	108-88-3	25 µg/L	# Not Determined	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	25 µg/L	105	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	104	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	25 µg/L	101	----	70	130	----	----
		EP080: Naphthalene	91-20-3	25 µg/L	92.1	----	70	130	----	----
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3810478)										
ES1502614-001	WK14	EK057G: Nitrite as N	----	0.5 mg/L	91.2	----	70	130	----	----
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3810479)										
ES1502614-001	WK14	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	93.8	----	70	130	----	----
ED045G: Chloride Discrete analyser (QCLot: 3810480)										
ES1502614-001	WK14	ED045G: Chloride	16887-00-6	250 mg/L	87.2	----	70	130	----	----
EG052G: Silica by Discrete Analyser (QCLot: 3810481)										
ES1502614-001	WK14	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	----	70	130	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3810482)										
ES1502614-001	WK14	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	105	----	70	130	----	----
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3810884)										
ES1502614-002	WK14 U/S	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	----	70	130	----	----
		EP033: Ethene	74-85-1	50.29 µg/L	98.3	----	70	130	----	----
		EP033: Ethane	74-84-0	54.43 µg/L	# Not Determined	----	70	130	----	----
		EP033: Propene	115-07-1	73.97 µg/L	95.5	----	70	130	----	----
		EP033: Propane	74-98-6	78.28 µg/L	92.5	----	70	130	----	----
		EP033: Butene	25167-67-3	99.61 µg/L	97.2	----	70	130	----	----
		EP033: Butane	106-97-8	102.18 µg/L	97.8	----	70	130	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3810909)										
ES1502614-001	WK14	EG035F: Mercury	7439-97-6	0.0100 mg/L	71.7	----	70	130	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3810911)										
ES1502614-004	WK12 U/S	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	108	----	70	130	----	----
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	83.3	----	70	130	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EG020F: Dissolved Metals by ICP-MS (QCLot: 3810911) - continued										
ES1502614-004	WK12 U/S	EG020A-F: Barium	7440-39-3	0.2 mg/L	# Not Determined	----	70	130	----	----
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	# 40.6	----	70	130	----	----
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	82.0	----	70	130	----	----
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	# 67.8	----	70	130	----	----
		EG020A-F: Copper	7440-50-8	0.2 mg/L	93.0	----	70	130	----	----
		EG020A-F: Lead	7439-92-1	0.2 mg/L	# 69.8	----	70	130	----	----
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	74.9	----	70	130	----	----
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	# 62.5	----	70	130	----	----
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	# 35.1	----	70	130	----	----
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	# 43.0	----	70	130	----	----
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3810985)										
ES1502560-001	Anonymous	EK067G: Total Phosphorus as P	----	2 mg/L	104	----	70	130	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3810986)										
ES1502613-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	87.0	----	70	130	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3810991)										
ES1502581-009	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	124	----	70	130	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3810992)										
ES1502581-010	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	96.8	----	70	130	----	----
EP005: Total Organic Carbon (TOC) (QCLot: 3811138)										
ES1502485-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	97.8	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3811350)										
ES1502614-001	WK14	EP071: C10 - C14 Fraction	----	200 µg/L	100	----	74	150	----	----
		EP071: C15 - C28 Fraction	----	300 µg/L	98.6	----	77	153	----	----
		EP071: C29 - C36 Fraction	----	200 µg/L	103	----	67	153	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3811350)										
ES1502614-001	WK14	EP071: >C10 - C16 Fraction	>C10_C16	250 µg/L	104	----	74	150	----	----
		EP071: >C16 - C34 Fraction	----	350 µg/L	98.2	----	77	153	----	----
		EP071: >C34 - C40 Fraction	----	150 µg/L	106	----	67	153	----	----
EP075(SIM)A: Phenolic Compounds (QCLot: 3811351)										
ES1502614-001	WK14	EP075(SIM): Phenol	108-95-2	20 µg/L	40.8	----	20	130	----	----
		EP075(SIM): 2-Chlorophenol	95-57-8	20 µg/L	73.5	----	60	130	----	----
		EP075(SIM): 2-Nitrophenol	88-75-5	20 µg/L	73.3	----	60	130	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP075(SIM)A: Phenolic Compounds (QCLot: 3811351) - continued										
ES1502614-001	WK14	EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	20 µg/L	82.5	----	70	130	----	----
		EP075(SIM): Pentachlorophenol	87-86-5	20 µg/L	60.7	----	20	130	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3811351)										
ES1502614-001	WK14	EP075(SIM): Acenaphthene	83-32-9	20 µg/L	80.8	----	70	130	----	----
		EP075(SIM): Pyrene	129-00-0	20 µg/L	84.7	----	70	130	----	----
EP262: Ethanolamines (QCLot: 3812947)										
ES1502614-001	WK14	EP262: Ethanolamine	141-43-5	10 µg/L	121	----	50	130	----	----
		EP262: Diethanolamine	111-42-2	10 µg/L	117	----	50	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1502614**	Page	: 1 of 12
Amendment	: **2**		
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
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Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 04-FEB-2015
Sampler	: CS & AM	Issue Date	: 21-MAY-2015
Order number	: ----		
		No. of samples received	: 10
Quote number	: SY/933/14	No. of samples analysed	: 2

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P)							
WK14, WK12	**04-FEB-2015**	**---**	04-FEB-2015	----	**04-FEB-2015**	04-FEB-2015	✓
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P)							
WK14, WK12	**04-FEB-2015**	**---**	04-MAR-2015	----	**04-FEB-2015**	04-MAR-2015	✓
EA015: Total Dissolved Solids							
Clear Plastic Bottle - Natural (EA015H)							
WK14, WK12	**04-FEB-2015**	**---**	11-FEB-2015	----	**05-FEB-2015**	11-FEB-2015	✓
EA025: Suspended Solids							
Clear Plastic Bottle - Natural (EA025H)							
WK14, WK12	**04-FEB-2015**	**---**	11-FEB-2015	----	**05-FEB-2015**	11-FEB-2015	✓
ED009: Anions							
Clear Plastic Bottle - Natural (ED009-X)							
WK14, WK12	**04-FEB-2015**	**----**	----	----	**05-FEB-2015**	04-MAR-2015	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
WK14, WK12	**04-FEB-2015**	**---**	18-FEB-2015	----	**04-FEB-2015**	18-FEB-2015	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
WK14, WK12	**04-FEB-2015**	**---**	04-MAR-2015	----	**04-FEB-2015**	04-MAR-2015	✓
ED045G: Chloride Discrete analyser							
Clear Plastic Bottle - Natural (ED045G)							
WK14, WK12	**04-FEB-2015**	**---**	04-MAR-2015	----	**04-FEB-2015**	04-MAR-2015	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
WK14, WK12	**04-FEB-2015**	**---**	04-MAR-2015	----	**05-FEB-2015**	04-MAR-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
WK14, WK12	**04-FEB-2015**	**---**	03-AUG-2015	----	**05-FEB-2015**	03-AUG-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)							
WK14, WK12	**04-FEB-2015**	**---**	03-AUG-2015	----	**05-FEB-2015**	03-AUG-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
WK14, WK12	**04-FEB-2015**	---	04-MAR-2015	----	**05-FEB-2015**	04-MAR-2015	✓
EG052G: Silica by Discrete Analyser							
Clear Plastic Bottle - Natural (EG052G)							
WK14, WK12	**04-FEB-2015**	---	04-MAR-2015	----	**04-FEB-2015**	04-MAR-2015	✓
EK010/011: Chlorine							
Clear Plastic Bottle - Natural (EK010)							
WK14, WK12	**04-FEB-2015**	----	----	----	**04-FEB-2015**	04-FEB-2015	✓
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
WK14, WK12	**04-FEB-2015**	---	04-MAR-2015	----	**04-FEB-2015**	04-MAR-2015	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
WK14, WK12	**04-FEB-2015**	---	04-MAR-2015	----	**05-FEB-2015**	04-MAR-2015	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
WK14, WK12	**04-FEB-2015**	---	06-FEB-2015	----	**04-FEB-2015**	06-FEB-2015	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
WK14, WK12	**04-FEB-2015**	---	04-MAR-2015	----	**05-FEB-2015**	04-MAR-2015	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
WK14, WK12	**04-FEB-2015**	**05-FEB-2015**	04-MAR-2015	✓	**05-FEB-2015**	04-MAR-2015	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
WK14, WK12	**04-FEB-2015**	**05-FEB-2015**	04-MAR-2015	✓	**05-FEB-2015**	04-MAR-2015	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
WK14, WK12	**04-FEB-2015**	---	06-FEB-2015	----	**04-FEB-2015**	06-FEB-2015	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005)							
WK14, WK12	**04-FEB-2015**	----	----	----	**05-FEB-2015**	04-MAR-2015	✓
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - Sulfuric Acid (EP033)							
WK14, WK12	**04-FEB-2015**	----	----	----	**05-FEB-2015**	18-FEB-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
WK14, WK12	**04-FEB-2015**	**05-FEB-2015**	11-FEB-2015	✓	**05-FEB-2015**	17-MAR-2015	✓
EP074D: Fumigants							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK14, WK12	**04-FEB-2015**	**04-FEB-2015**	18-FEB-2015	✓	**04-FEB-2015**	18-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074E: Halogenated Aliphatic Compounds								
Amber VOC Vial - Sulfuric Acid (EP074)								
WK14,	WK12	**04-FEB-2015**	**04-FEB-2015**	18-FEB-2015	✓	**04-FEB-2015**	18-FEB-2015	✓
EP074F: Halogenated Aromatic Compounds								
Amber VOC Vial - Sulfuric Acid (EP074)								
WK14,	WK12	**04-FEB-2015**	**04-FEB-2015**	18-FEB-2015	✓	**04-FEB-2015**	18-FEB-2015	✓
EP074A: Monocyclic Aromatic Hydrocarbons								
Amber VOC Vial - Sulfuric Acid (EP074)								
WK14,	WK12	**04-FEB-2015**	**04-FEB-2015**	18-FEB-2015	✓	**04-FEB-2015**	18-FEB-2015	✓
EP074B: Oxygenated Compounds								
Amber VOC Vial - Sulfuric Acid (EP074)								
WK14,	WK12	**04-FEB-2015**	**04-FEB-2015**	18-FEB-2015	✓	**04-FEB-2015**	18-FEB-2015	✓
EP074C: Sulfonated Compounds								
Amber VOC Vial - Sulfuric Acid (EP074)								
WK14,	WK12	**04-FEB-2015**	**04-FEB-2015**	18-FEB-2015	✓	**04-FEB-2015**	18-FEB-2015	✓
EP074G: Trihalomethanes								
Amber VOC Vial - Sulfuric Acid (EP074)								
WK14,	WK12	**04-FEB-2015**	**04-FEB-2015**	18-FEB-2015	✓	**04-FEB-2015**	18-FEB-2015	✓
EP075(SIM)A: Phenolic Compounds								
Amber Glass Bottle - Unpreserved (EP075(SIM))								
WK14,	WK12	**04-FEB-2015**	**05-FEB-2015**	11-FEB-2015	✓	**05-FEB-2015**	17-MAR-2015	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM))								
WK14,	WK12	**04-FEB-2015**	**05-FEB-2015**	11-FEB-2015	✓	**05-FEB-2015**	17-MAR-2015	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
WK14,	WK12	**04-FEB-2015**	**04-FEB-2015**	18-FEB-2015	✓	**04-FEB-2015**	18-FEB-2015	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber VOC Vial - Sulfuric Acid (EP080)								
WK14,	WK12	**04-FEB-2015**	**04-FEB-2015**	18-FEB-2015	✓	**04-FEB-2015**	18-FEB-2015	✓
EP262: Ethanolamines								
Amber Glass Bottle - Unpreserved (EP262)								
WK14,	WK12	**04-FEB-2015**	**----**	----	----	**06-FEB-2015**	11-FEB-2015	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	1	7	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	2	13	**15.4**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	7	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	2	6	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	2	18	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	10	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH by PC Titrator	EA005-P	2	18	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	6	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	6	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	7	**28.6**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	2	18	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	2	**100.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Ethanolamines by LCMSMS	EP262	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	10	**10.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	6	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	6	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	7	**42.9**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	3	18	**16.7**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	10	**10.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
TRH - Semivolatile Fraction	EP071	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	10	**10.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Standard Anions -by IC (Extended Method)	ED009-X	WATER	In house: Referenced to APHA 4110. This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Silica (Reactive) by Discrete Analyser	EG052G	WATER	In house: Referenced to APHA 4500-SiO2 D: Under Acdic conditions reactive silicon combines with ammonium molybdate to form a yellow molybdosilicic acid complex. This is reduced by 1-amino-2-naphthol-4-sulfonic acid to a silicomolybdenum blue complex which is measured by discrete analyser at 670 nm. This method is compliant with NEPM (2013) Schedule B(3)
Chlorine	EK010	WATER	In-house (DPD colourimetry)
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500 F--C CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ammonium as N	EK055G-NH4	WATER	Ammonium in the sample is reported as the ionised / unionised fractions by the use of a nomograph and the initial pH and Temperature. Ammonia is determined by direct colorimetry by Discrete Analyser according to APHA 4500-NH3 G. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Volatile Organic Compounds	EP074	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Ethanolamines by LCMSMS	EP262	WATER	In-house LC-MSMS: Benzoyl derivatives of target compounds are analysed by LC/MSMS in ESI Positive Mode.

Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	* ORG16	AIR	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	AIR	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
ED093F: Dissolved Major Cations	4589402-009	----	**Calcium**	7440-70-2	89.0 %	90-114%	**Recovery less than lower control limit**
EP074F: Halogenated Aromatic Compounds	4588639-002	----	**Chlorobenzene**	108-90-7	77.4 %	80-118%	**Recovery less than lower control limit**
Matrix Spike (MS) Recoveries							
EG020F: Dissolved Metals by ICP-MS	ES1502614-004	Anonymous	**Barium**	7440-39-3	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG020F: Dissolved Metals by ICP-MS	ES1502614-004	Anonymous	**Cadmium**	7440-43-9	40.6 %	70-130%	**Recovery less than lower data quality objective**
EG020F: Dissolved Metals by ICP-MS	ES1502614-004	Anonymous	**Cobalt**	7440-48-4	67.8 %	70-130%	**Recovery less than lower data quality objective**
EG020F: Dissolved Metals by ICP-MS	ES1502614-004	Anonymous	**Lead**	7439-92-1	69.8 %	70-130%	**Recovery less than lower data quality objective**
EG020F: Dissolved Metals by ICP-MS	ES1502614-004	Anonymous	**Nickel**	7440-02-0	62.5 %	70-130%	**Recovery less than lower data quality objective**
EG020F: Dissolved Metals by ICP-MS	ES1502614-004	Anonymous	**Vanadium**	7440-62-2	35.1 %	70-130%	**Recovery less than lower data quality objective**
EG020F: Dissolved Metals by ICP-MS	ES1502614-004	Anonymous	**Zinc**	7440-66-6	43.0 %	70-130%	**Recovery less than lower data quality objective**
EG052G: Silica by Discrete Analyser	ES1502614-001	WK14	**Reactive Silica**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP033: C1 - C4 Hydrocarbon Gases	ES1502614-002	Anonymous	**Methane**	74-82-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP033: C1 - C4 Hydrocarbon Gases	ES1502614-002	Anonymous	**Ethane**	74-84-0	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP080: BTEXN	ES1502614-002	Anonymous	**Benzene**	71-43-2	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP080: BTEXN	ES1502614-002	Anonymous	**Toluene**	108-88-3	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

- **For all matrices, no Method Blank value outliers occur.**

- **For all matrices, no Duplicate outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

QUALITY CONTROL REPORT

Work Order	: **ES1502642**	Page	: 1 of 21
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
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Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 05-FEB-2015
Sampler	: CS/AM	Issue Date	: 19-MAY-2015
Order number	: ----		
		No. of samples received	: 21
Quote number	: SY/933/14	No. of samples analysed	: 4

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA005P: pH by PC Titrator (QC Lot: 3811669)									
ES1502630-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.00	7.63	8.6	0% - 20%
ES1502630-003	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	6.91	6.89	0.3	0% - 20%
EA005P: pH by PC Titrator (QC Lot: 3811673)									
ES1502642-004	WK14	EA005-P: pH Value	----	0.01	pH Unit	7.85	7.88	0.4	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 3811668)									
ES1502630-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	74	75	2.0	0% - 20%
ES1502630-003	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	83	83	0.0	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 3811672)									
ES1502642-004	WK14	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	8780	8760	0.2	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 3811989)									
ES1502614-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	5980	5720	4.5	0% - 20%
ES1502642-006	WK13	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	4580	4770	4.0	0% - 20%
EA025: Suspended Solids (QC Lot: 3811991)									
ES1502614-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	10	68.8	No Limit
ES1502642-006	WK13	EA025H: Suspended Solids (SS)	----	5	mg/L	7	12	52.6	No Limit
ED009: Anions (QC Lot: 3811975)									
ES1502642-001	WK11 U/S	ED009-X: Chloride	16887-00-6	0.100	mg/L	727	710	2.4	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3811667)									
ES1502630-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	22	21	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	22	21	0.0	0% - 20%
ES1502630-003	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	24	24	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	24	24	0.0	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3811671)									
ES1502642-004	WK14	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	4500	4520	0.6	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	4500	4520	0.6	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3811661)									
ES1502642-001	WK11 U/S	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	<10	0.0	No Limit
ES1502630-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3811665)									
ES1502642-002	WK11	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	<10	0.0	No Limit
ED045G: Chloride Discrete analyser (QC Lot: 3811659)									
ES1502642-001	WK11 U/S	ED045G: Chloride	16887-00-6	1	mg/L	726	730	0.5	0% - 20%
ES1502630-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	8	8	0.0	No Limit
ED093F: Dissolved Major Cations (QC Lot: 3811522)									
ES1502642-001	WK11 U/S	ED093F: Calcium	7440-70-2	1	mg/L	72	69	4.8	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	6	5	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	3290	3160	4.1	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	20	19	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3811524)									
ES1502642-001	WK11 U/S	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.004	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	12.4	12.5	0.8	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.001	0.002	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.006	0.005	28.2	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.122	0.115	5.8	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.007	0.008	17.6	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.008	0.014	53.1	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	22.2	24.7	10.4	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	14.7	14.3	2.5	0% - 20%
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	1.3	1.4	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3811525)									
ES1502642-001	WK11 U/S	EG020B-F: Strontium	7440-24-6	0.001	mg/L	8.38	8.74	4.3	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 3811521)									
ES1502642-002	WK11	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG052G: Silica by Discrete Analyser (QC Lot: 3811660)									
ES1502642-001	WK11 U/S	EG052G: Reactive Silica	----	0.05	mg/L	36.7	35.4	3.7	0% - 20%
EK010/011: Chlorine (QC Lot: 3811995)									
ES1502642-001	WK11 U/S	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK010/011: Chlorine (QC Lot: 3811995) - continued									
ES1502642-001	WK11 U/S	EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3811670)									
ES1502630-001	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.0	No Limit
ES1502630-003	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3811951)									
ES1502642-001	WK11 U/S	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	7.47	7.45	0.3	0% - 20%
EW1500429-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3811662)									
ES1502642-002	WK11	EK057G: Nitrite as N	----	0.01	mg/L	<0.10	0.06	42.4	0% - 50%
ES1502642-004	WK14	EK057G: Nitrite as N	----	0.01	mg/L	<0.10	<0.10	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3811950)									
ES1502642-001	WK11 U/S	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.10	<0.10	0.0	No Limit
EW1500429-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.19	0.19	0.0	0% - 50%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3811946)									
ES1502642-001	WK11 U/S	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	9.7	9.5	2.5	0% - 20%
EW1500416-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<1.0	<1.0	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3811947)									
ES1502642-001	WK11 U/S	EK067G: Total Phosphorus as P	----	0.01	mg/L	4.18	4.06	2.9	0% - 20%
EW1500416-004	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.10	<0.10	0.0	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3811664)									
ES1502642-002	WK11	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.10	<0.10	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 3811973)									
ES1502642-001	WK11 U/S	EP005: Total Organic Carbon	----	1	mg/L	1070	1020	5.0	0% - 20%
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 3811380)									
ES1502642-001	WK11 U/S	EP033: Methane	74-82-8	10	µg/L	7940	8020	1.1	0% - 20%
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	1370	1320	3.7	0% - 20%
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	145	146	0.0	0% - 50%
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 3811373)									
ES1502642-001	WK11 U/S	EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 3811373) - continued									
ES1502642-001	WK11 U/S	EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
EP074B: Oxygenated Compounds (QC Lot: 3811373)									
ES1502642-001	WK11 U/S	EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit
EP074C: Sulfonated Compounds (QC Lot: 3811373)									
ES1502642-001	WK11 U/S	EP074: Carbon disulfide	75-15-0	5	µg/L	5	<5	0.0	No Limit
EP074D: Fumigants (QC Lot: 3811373)									
ES1502642-001	WK11 U/S	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3811373)									
ES1502642-001	WK11 U/S	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3811373) - continued									
ES1502642-001	WK11 U/S	EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 3811373)									
ES1502642-001	WK11 U/S	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 3811373)									
ES1502642-001	WK11 U/S	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 3811353)									
ES1502642-002	WK11	EP075(SIM): Phenol	108-95-2	1.0	µg/L	14.2	13.7	3.6	0% - 50%
		EP075(SIM): 2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	1.0	µg/L	12.2	11.8	3.8	0% - 50%
		EP075(SIM): 2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	1.0	µg/L	4.7	4.6	0.0	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2.0	µg/L	75.5	75.0	0.6	0% - 20%
		EP075(SIM): Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3811353)									
ES1502642-002	WK11	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Naphthalene	91-20-3	1.0	µg/L	2.4	2.2	6.3	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3811353) - continued									
ES1502642-002	WK11	EP075(SIM): Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3811352)									
ES1502642-002	WK11	EP071: C15 - C28 Fraction	----	100	µg/L	200	210	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	200	190	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3811374)									
ES1502642-001	WK11 U/S	EP080: C6 - C9 Fraction	----	20	µg/L	1090	1160	5.4	0% - 20%
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3811352)									
ES1502642-002	WK11	EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	350	350	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3811374)									
ES1502642-001	WK11 U/S	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	1100	1160	5.4	0% - 20%
EP080: BTEXN (QC Lot: 3811374)									
ES1502642-001	WK11 U/S	EP080: Benzene	71-43-2	1	µg/L	356	348	2.1	0% - 20%
		EP080: Toluene	108-88-3	2	µg/L	396	394	0.4	0% - 20%
		EP080: Ethylbenzene	100-41-4	2	µg/L	7	7	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	91	93	2.6	0% - 20%
		EP080: ortho-Xylene	95-47-6	2	µg/L	20	21	6.0	0% - 50%
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP262: Ethanolamines (QC Lot: 3812947)									
ES1502614-001	Anonymous	EP262: Ethanolamine	141-43-5	1	µg/L	16	17	6.4	0% - 50%
		EP262: Diethanolamine	111-42-2	1	µg/L	15	13	16.0	0% - 50%
ES1502642-001	WK11 U/S	EP262: Ethanolamine	141-43-5	1	µg/L	45	40	11.8	0% - 20%
		EP262: Diethanolamine	111-42-2	1	µg/L	38	31	19.1	0% - 20%

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EA010P: Conductivity by PC Titrator (QCLot: 3811668)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	105	95	113
EA010P: Conductivity by PC Titrator (QCLot: 3811672)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	104	95	113
EA015: Total Dissolved Solids (QCLot: 3811989)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	----	2000 mg/L	88.0	87	109
				<10	293 mg/L	114	67	125
EA025: Suspended Solids (QCLot: 3811991)								
EA025H: Suspended Solids (SS)	----	5	mg/L	----	150 mg/L	92.0	86	110
				<5	1000 mg/L	89.8	83	129
ED009: Anions (QCLot: 3811975)								
ED009-X: Chloride	16887-00-6	0.1	mg/L	<0.100	2 mg/L	99.6	89	107
ED037P: Alkalinity by PC Titrator (QCLot: 3811667)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	102	81	111
ED037P: Alkalinity by PC Titrator (QCLot: 3811671)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	102	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3811661)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	102	86	122
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3811665)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	109	86	122
ED045G: Chloride Discrete analyser (QCLot: 3811659)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	94.3	75	123
				----	1000 mg/L	98.1	77	119
ED093F: Dissolved Major Cations (QCLot: 3811522)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	# 87.9	90	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	107	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	112	82	118
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	102	87	117

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3811524)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	100	85	115
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.01 mg/L	91.8	85	115
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.4	85	115
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	93.2	85	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	97.0	85	115
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	98.1	85	115
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.6	85	115
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	95.2	85	115
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	94.7	85	115
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.6	85	115
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	96.3	85	115
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	85.2	85	115
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	93.4	85	115
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	96.0	85	115
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	93.7	85	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	95.9	85	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.8	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	----	----	----	----
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	104	85	115
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3811525)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	95.3	80	112
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3811521)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	86.2	78	114
EG052G: Silica by Discrete Analyser (QCLot: 3811660)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.10	5 mg/L	103	94	114
EK010/011: Chlorine (QCLot: 3811995)								
EK010: Chlorine - Free	----	0.2	mg/L	<0.2	----	----	----	----
EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	----	----	----	----

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EK040P: Fluoride by PC Titrator (QCLot: 3811670)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5.0 mg/L	101	75	119
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3811951)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.0 mg/L	101	86	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3811662)								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.5 mg/L	98.2	83	119
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3811950)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	94.8	87	119
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3811946)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	1.0 mg/L	107	66	126
				----	5 mg/L	102	66	119
				<0.1	10 mg/L	80.4	66	114
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3811947)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	----	1.0 mg/L	105	66	124
				<0.01	4.42 mg/L	84.2	67	117
				----	0.442 mg/L	92.8	63	123
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3811664)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	112	82	122
EP005: Total Organic Carbon (TOC) (QCLot: 3811973)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	87.3	76	120
EP020: Oil and Grease (O&G) (QCLot: 3811848)								
EP020: Oil & Grease	----	5	mg/L	<5	5000 mg/L	102	80	120
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3811380)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	96.2	86	114
EP033: Ethene	74-85-1	10	µg/L	<10	50.29 µg/L	95.6	87	111
EP033: Ethane	74-84-0	10	µg/L	<10	54.43 µg/L	95.8	87	111
EP033: Propene	115-07-1	10	µg/L	<10	73.97 µg/L	95.3	85	113
EP033: Propane	74-98-6	10	µg/L	<10	78.28 µg/L	93.3	84	112
EP033: Butene	25167-67-3	20	µg/L	<20	99.61 µg/L	95.8	83	115
EP033: Butane	106-97-8	20	µg/L	<20	102.18 µg/L	97.5	85	115
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3811373)								
EP074: Styrene	100-42-5	5	µg/L	<5	10 µg/L	85.6	74	118

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3811373) - continued								
EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	10 µg/L	88.5	75	121
EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	10 µg/L	88.9	67	123
EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	10 µg/L	88.8	70	122
EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	10 µg/L	91.0	69	123
EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	10 µg/L	89.5	71	121
EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	10 µg/L	88.4	70	122
EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	10 µg/L	87.2	67	123
EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	10 µg/L	88.3	62	126
EP074B: Oxygenated Compounds (QCLot: 3811373)								
EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	100 µg/L	84.1	61.4	134
EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	100 µg/L	88.1	73.6	130
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	100 µg/L	91.4	61	139
EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	100 µg/L	91.6	65	137
EP074C: Sulfonated Compounds (QCLot: 3811373)								
EP074: Carbon disulfide	75-15-0	5	µg/L	<5	10 µg/L	76.1	72.8	127
EP074D: Fumigants (QCLot: 3811373)								
EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	10 µg/L	86.6	61	119
EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	10 µg/L	92.3	76	120
EP074: cis-1.3-Dichloropropylene	10061-01-5	10	µg/L	<10	10 µg/L	73.7	62	120
EP074: trans-1.3-Dichloropropylene	10061-02-6	10	µg/L	<10	10 µg/L	75.2	61	119
EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	10 µg/L	86.3	69	117
EP074E: Halogenated Aliphatic Compounds (QCLot: 3811373)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	92.5	60.6	138
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	104	67.4	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	107	69.4	129
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	97.0	56	140
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	97.5	63	135
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	93.9	65	131
EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	92.4	69	123
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	86.8	70.2	128

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 3811373) - continued								
EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	92.0	71	119
EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	95.2	75	119
EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	91.0	77	117
EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	82.6	61	119
EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	90.7	73	119
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	69.5	63	121
EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	98.0	78	122
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	91.7	74	120
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	87.6	74	118
EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	91.0	75	123
EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	92.7	79	121
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	88.9	72	124
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	78.2	66	114
EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	79.3	60	120
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	85.8	70.6	128
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	86.2	70	124
EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	91.7	74	128
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	72.3	71.8	126
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	72.1	66.4	136
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	83.5	58	132
EP074F: Halogenated Aromatic Compounds (QCLot: 3811373)								
EP074: Chlorobenzene	108-90-7	5	µg/L	<5	10 µg/L	91.1	80	118
EP074: Bromobenzene	108-86-1	5	µg/L	<5	10 µg/L	92.5	76	116
EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	10 µg/L	93.4	71	121
EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	10 µg/L	93.0	71	121
EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	10 µg/L	93.5	74	120
EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	10 µg/L	92.3	72	120
EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	10 µg/L	94.3	77	117
EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	10 µg/L	88.6	60	126

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074F: Halogenated Aromatic Compounds (QCLot: 3811373) - continued								
EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	10 µg/L	94.3	67	125
EP074G: Trihalomethanes (QCLot: 3811373)								
EP074: Chloroform	67-66-3	5	µg/L	<5	10 µg/L	93.0	76	118
EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	10 µg/L	73.8	64	118
EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	10 µg/L	78.5	65	115
EP074: Bromoform	75-25-2	5	µg/L	<5	10 µg/L	81.4	73.5	126
EP075(SIM)A: Phenolic Compounds (QCLot: 3811353)								
EP075(SIM): Phenol	108-95-2	0.2	µg/L	<1.0	5 µg/L	40.1	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	<1.0	5 µg/L	66.3	63.8	110
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	<1.0	5 µg/L	63.7	55.9	112
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	<2.0	10 µg/L	58.3	42.5	114
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	<1.0	5 µg/L	66.0	62.7	117
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.2	µg/L	<1.0	5 µg/L	62.8	59.9	112
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.2	µg/L	<1.0	5 µg/L	61.2	59.3	122
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.2	µg/L	<1.0	5 µg/L	72.6	64.3	118
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	<1.0	5 µg/L	66.2	63	119
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.2	µg/L	<1.0	5 µg/L	72.2	58.7	118
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.2	µg/L	<1.0	5 µg/L	66.6	50	108
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	<2.0	10 µg/L	56.8	10	95
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3811353)								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	<1.0	5 µg/L	63.8	58.6	119
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	<1.0	5 µg/L	76.0	63.6	114
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	<1.0	5 µg/L	71.8	62.2	113
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	<1.0	5 µg/L	80.2	63.9	115
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	<1.0	5 µg/L	98.3	62.6	116
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	<1.0	5 µg/L	87.8	64.3	116
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	<1.0	5 µg/L	97.6	63.6	118
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	<1.0	5 µg/L	92.5	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	<1.0	5 µg/L	88.0	64.1	117
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	<1.0	5 µg/L	95.3	62.5	116

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3811353) - continued								
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.2	µg/L	<1.0	5 µg/L	87.0	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<1.0	5 µg/L	96.7	61.7	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.5	5 µg/L	96.8	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<1.0	5 µg/L	94.0	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<1.0	5 µg/L	89.8	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<1.0	5 µg/L	91.6	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3811352)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	104	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	96.7	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	97.0	62	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3811374)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	104	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3811352)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	100	58.9	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	98.6	73.9	138
EP071: >C34 - C40 Fraction	----	50	µg/L	<100	1500 µg/L	106	67	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3811374)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	103	75	127
EP080: BTEXN (QCLot: 3811374)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	108	70	124
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	107	65	129
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	97.0	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	100	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	101	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	98.4	70	124
EP262: Ethanolamines (QCLot: 3812947)								
EP262: Ethanolamine	141-43-5	1	µg/L	<1	10 µg/L	110	50	130
EP262: Diethanolamine	111-42-2	1	µg/L	<1	10 µg/L	102	50	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED009: Anions (QCLot: 3811975)							
ES1502642-001	WK11 U/S	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3811661)							
ES1502642-001	WK11 U/S	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	103	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3811665)							
ES1502642-002	WK11	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	104	70	130
ED045G: Chloride Discrete analyser (QCLot: 3811659)							
ES1502642-001	WK11 U/S	ED045G: Chloride	16887-00-6	2500 mg/L	100	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3811524)							
ES1502642-003	WK14 U/S	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	94.8	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	75.8	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	# Not Determined	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	# 66.8	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	# 62.2	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	82.6	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	75.4	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	# 24.3	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	90.6	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	76.1	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	# 19.4	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	89.6	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3811521)							
ES1502642-001	WK11 U/S	EG035F: Mercury	7439-97-6	0.0100 mg/L	71.4	70	130
EG052G: Silica by Discrete Analyser (QCLot: 3811660)							
ES1502642-001	WK11 U/S	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	70	130
EK040P: Fluoride by PC Titrator (QCLot: 3811670)							
ES1502630-001	Anonymous	EK040P: Fluoride	16984-48-8	5.0 mg/L	96.4	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3811951)							
ES1502642-001	WK11 U/S						

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3811951) - continued							
ES1502642-001	WK11 U/S	EK055G: Ammonia as N	7664-41-7	1 mg/L	# Not Determined	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3811662)							
ES1502642-002	WK11	EK057G: Nitrite as N	----	0.5 mg/L	87.0	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3811950)							
ES1502642-001	WK11 U/S	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	107	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3811946)							
ES1502642-002	WK11	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	105	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3811947)							
ES1502642-002	WK11	EK067G: Total Phosphorus as P	----	1.0 mg/L	# Not Determined	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3811664)							
ES1502642-002	WK11	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	110	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 3811973)							
ES1502642-002	WK11	EP005: Total Organic Carbon	----	100 mg/L	# Not Determined	70	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3811380)							
ES1502642-001	WK11 U/S	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	70	130
		EP033: Ethene	74-85-1	50.29 µg/L	107	70	130
		EP033: Ethane	74-84-0	54.43 µg/L	# Not Determined	70	130
		EP033: Propene	115-07-1	73.97 µg/L	104	70	130
		EP033: Propane	74-98-6	78.28 µg/L	102	70	130
		EP033: Butene	25167-67-3	99.61 µg/L	102	70	130
		EP033: Butane	106-97-8	102.18 µg/L	106	70	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 3811373)							
ES1502642-002	WK11	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	89.8	70	130
		EP074: Trichloroethene	79-01-6	25 µg/L	89.3	70	130
EP074F: Halogenated Aromatic Compounds (QCLot: 3811373)							
ES1502642-002	WK11	EP074: Chlorobenzene	108-90-7	25 µg/L	94.6	70	130
EP075(SIM)A: Phenolic Compounds (QCLot: 3811353)							
ES1502642-002	WK11	EP075(SIM): Phenol	108-95-2	20 µg/L	48.9	20	130
		EP075(SIM): 2-Chlorophenol	95-57-8	20 µg/L	60.8	60	130
		EP075(SIM): 2-Nitrophenol	88-75-5	20 µg/L	60.3	60	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP075(SIM)A: Phenolic Compounds (QCLot: 3811353) - continued							
ES1502642-002	WK11	EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	20 µg/L	77.9	70	130
		EP075(SIM): Pentachlorophenol	87-86-5	20 µg/L	87.8	20	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3811353)							
ES1502642-002	WK11	EP075(SIM): Acenaphthene	83-32-9	20 µg/L	70.4	70	130
		EP075(SIM): Pyrene	129-00-0	20 µg/L	71.5	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3811352)							
ES1502642-002	WK11	EP071: C10 - C14 Fraction	----	200 µg/L	100	74	150
		EP071: C15 - C28 Fraction	----	300 µg/L	98.6	77	153
		EP071: C29 - C36 Fraction	----	200 µg/L	93.0	67	153
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3811374)							
ES1502642-002	WK11	EP080: C6 - C9 Fraction	----	325 µg/L	124	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3811352)							
ES1502642-002	WK11	EP071: >C10 - C16 Fraction	>C10_C16	250 µg/L	104	74	150
		EP071: >C16 - C34 Fraction	----	350 µg/L	98.0	77	153
		EP071: >C34 - C40 Fraction	----	150 µg/L	147	67	153
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3811374)							
ES1502642-002	WK11	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	120	70	130
EP080: BTEXN (QCLot: 3811374)							
ES1502642-002	WK11	EP080: Benzene	71-43-2	25 µg/L	# Not Determined	70	130
		EP080: Toluene	108-88-3	25 µg/L	# Not Determined	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	101	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	87.0	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	103	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	102	70	130
EP262: Ethanolamines (QCLot: 3812947)							
ES1502614-001	Anonymous	EP262: Ethanolamine	141-43-5	10 µg/L	121	50	130
		EP262: Diethanolamine	111-42-2	10 µg/L	117	50	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3811352)										
ES1502642-002	WK11	EP071: C10 - C14 Fraction	----	200 µg/L	100	----	74	150	----	----
		EP071: C15 - C28 Fraction	----	300 µg/L	98.6	----	77	153	----	----
		EP071: C29 - C36 Fraction	----	200 µg/L	93.0	----	67	153	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3811352)										
ES1502642-002	WK11	EP071: >C10 - C16 Fraction	>C10_C16	250 µg/L	104	----	74	150	----	----
		EP071: >C16 - C34 Fraction	----	350 µg/L	98.0	----	77	153	----	----
		EP071: >C34 - C40 Fraction	----	150 µg/L	147	----	67	153	----	----
EP075(SIM)A: Phenolic Compounds (QCLot: 3811353)										
ES1502642-002	WK11	EP075(SIM): Phenol	108-95-2	20 µg/L	48.9	----	20	130	----	----
		EP075(SIM): 2-Chlorophenol	95-57-8	20 µg/L	60.8	----	60	130	----	----
		EP075(SIM): 2-Nitrophenol	88-75-5	20 µg/L	60.3	----	60	130	----	----
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	20 µg/L	77.9	----	70	130	----	----
		EP075(SIM): Pentachlorophenol	87-86-5	20 µg/L	87.8	----	20	130	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3811353)										
ES1502642-002	WK11	EP075(SIM): Acenaphthene	83-32-9	20 µg/L	70.4	----	70	130	----	----
		EP075(SIM): Pyrene	129-00-0	20 µg/L	71.5	----	70	130	----	----
EP074E: Halogenated Aliphatic Compounds (QCLot: 3811373)										
ES1502642-002	WK11	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	89.8	----	70	130	----	----
		EP074: Trichloroethene	79-01-6	25 µg/L	89.3	----	70	130	----	----
EP074F: Halogenated Aromatic Compounds (QCLot: 3811373)										
ES1502642-002	WK11	EP074: Chlorobenzene	108-90-7	25 µg/L	94.6	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3811374)										
ES1502642-002	WK11	EP080: C6 - C9 Fraction	----	325 µg/L	124	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3811374)										
ES1502642-002	WK11	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	120	----	70	130	----	----
EP080: BTEXN (QCLot: 3811374)										
ES1502642-002	WK11	EP080: Benzene	71-43-2	25 µg/L	# Not Determined	----	70	130	----	----
		EP080: Toluene	108-88-3	25 µg/L	# Not Determined	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	25 µg/L	101	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	87.0	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	25 µg/L	103	----	70	130	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080: BTEXN (QCLot: 3811374) - continued										
ES1502642-002	WK11	EP080: Naphthalene	91-20-3	25 µg/L	102	----	70	130	----	----
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3811380)										
ES1502642-001	WK11 U/S	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	----	70	130	----	----
		EP033: Ethene	74-85-1	50.29 µg/L	107	----	70	130	----	----
		EP033: Ethane	74-84-0	54.43 µg/L	# Not Determined	----	70	130	----	----
		EP033: Propene	115-07-1	73.97 µg/L	104	----	70	130	----	----
		EP033: Propane	74-98-6	78.28 µg/L	102	----	70	130	----	----
		EP033: Butene	25167-67-3	99.61 µg/L	102	----	70	130	----	----
		EP033: Butane	106-97-8	102.18 µg/L	106	----	70	130	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3811521)										
ES1502642-001	WK11 U/S	EG035F: Mercury	7439-97-6	0.0100 mg/L	71.4	----	70	130	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3811524)										
ES1502642-003	WK14 U/S	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	94.8	----	70	130	----	----
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	75.8	----	70	130	----	----
		EG020A-F: Barium	7440-39-3	0.2 mg/L	# Not Determined	----	70	130	----	----
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	# 66.8	----	70	130	----	----
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	# 62.2	----	70	130	----	----
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	82.6	----	70	130	----	----
		EG020A-F: Copper	7440-50-8	0.2 mg/L	75.4	----	70	130	----	----
		EG020A-F: Lead	7439-92-1	0.2 mg/L	# 24.3	----	70	130	----	----
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	90.6	----	70	130	----	----
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	76.1	----	70	130	----	----
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	# 19.4	----	70	130	----	----
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	89.6	----	70	130	----	----
ED045G: Chloride Discrete analyser (QCLot: 3811659)										
ES1502642-001	WK11 U/S	ED045G: Chloride	16887-00-6	2500 mg/L	100	----	70	130	----	----
EG052G: Silica by Discrete Analyser (QCLot: 3811660)										
ES1502642-001	WK11 U/S	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	----	70	130	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3811661)										
ES1502642-001	WK11 U/S	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	103	----	70	130	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3811662)										
ES1502642-002	WK11	EK057G: Nitrite as N	----	0.5 mg/L	87.0	----	70	130	----	----
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3811664)										
ES1502642-002	WK11	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	110	----	70	130	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3811665)										
ES1502642-002	WK11	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	104	----	70	130	----	----
EK040P: Fluoride by PC Titrator (QCLot: 3811670)										
ES1502630-001	Anonymous	EK040P: Fluoride	16984-48-8	5.0 mg/L	96.4	----	70	130	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3811946)										
ES1502642-002	WK11	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	105	----	70	130	----	----
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3811947)										
ES1502642-002	WK11	EK067G: Total Phosphorus as P	----	1.0 mg/L	# Not Determined	----	70	130	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3811950)										
ES1502642-001	WK11 U/S	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	107	----	70	130	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3811951)										
ES1502642-001	WK11 U/S	EK055G: Ammonia as N	7664-41-7	1 mg/L	# Not Determined	----	70	130	----	----
EP005: Total Organic Carbon (TOC) (QCLot: 3811973)										
ES1502642-002	WK11	EP005: Total Organic Carbon	----	100 mg/L	# Not Determined	----	70	130	----	----
ED009: Anions (QCLot: 3811975)										
ES1502642-001	WK11 U/S	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	----	70	130	----	----
EP262: Ethanolamines (QCLot: 3812947)										
ES1502614-001	Anonymous	EP262: Ethanolamine	141-43-5	10 µg/L	121	----	50	130	----	----
		EP262: Diethanolamine	111-42-2	10 µg/L	117	----	50	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1502642**	Page	: 1 of 14
Amendment	: **1**		
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
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Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 05-FEB-2015
Sampler	: CS/AM	Issue Date	: 19-MAY-2015
Order number	: ----		
		No. of samples received	: 21
Quote number	: SY/933/14	No. of samples analysed	: 4

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P)							
WK13	**04-FEB-2015**	**---**	05-FEB-2015	----	**05-FEB-2015**	05-FEB-2015	✓
Clear Plastic Bottle - Natural (EA005-P)							
WK11, WK14	**04-FEB-2015**	**---**	04-FEB-2015	----	**05-FEB-2015**	04-FEB-2015	×
Clear Plastic Bottle - Natural (EA005-P)							
AST2	**04-FEB-2015**	**---**	05-FEB-2015	----	**05-FEB-2015**	05-FEB-2015	✓
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**---**	04-MAR-2015	----	**05-FEB-2015**	04-MAR-2015	✓
EA015: Total Dissolved Solids							
Clear Plastic Bottle - Natural (EA015H)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**---**	11-FEB-2015	----	**05-FEB-2015**	11-FEB-2015	✓
EA025: Suspended Solids							
Clear Plastic Bottle - Natural (EA025H)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**---**	11-FEB-2015	----	**05-FEB-2015**	11-FEB-2015	✓
ED009: Anions							
Clear Plastic Bottle - Natural (ED009-X)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**----**	----	----	**05-FEB-2015**	04-MAR-2015	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**---**	18-FEB-2015	----	**05-FEB-2015**	18-FEB-2015	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**---**	04-MAR-2015	----	**05-FEB-2015**	04-MAR-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED045G: Chloride Discrete analyser							
Clear Plastic Bottle - Natural (ED045G)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	---	04-MAR-2015	----	**05-FEB-2015**	04-MAR-2015	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	---	04-MAR-2015	----	**05-FEB-2015**	04-MAR-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	---	03-AUG-2015	----	**05-FEB-2015**	03-AUG-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	---	03-AUG-2015	----	**05-FEB-2015**	03-AUG-2015	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	---	04-MAR-2015	----	**06-FEB-2015**	04-MAR-2015	✓
EG052G: Silica by Discrete Analyser							
Clear Plastic Bottle - Natural (EG052G)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	---	04-MAR-2015	----	**05-FEB-2015**	04-MAR-2015	✓
EK010/011: Chlorine							
Clear Plastic Bottle - Natural (EK010)							
WK11	**04-FEB-2015**	**----**	----	----	**05-FEB-2015**	04-FEB-2015	×
Clear Plastic Bottle - Natural (EK010)							
WK13, AST2	**04-FEB-2015**	**----**	----	----	**05-FEB-2015**	05-FEB-2015	✓
Clear Plastic Bottle - Natural (EK010)							
WK14	**04-FEB-2015**	**----**	----	----	**05-FEB-2015**	04-FEB-2015	×
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	---	04-MAR-2015	----	**05-FEB-2015**	04-MAR-2015	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	---	04-MAR-2015	----	**05-FEB-2015**	04-MAR-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	---	06-FEB-2015	----	**05-FEB-2015**	06-FEB-2015	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	---	04-MAR-2015	----	**05-FEB-2015**	04-MAR-2015	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**05-FEB-2015**	04-MAR-2015	✓	**05-FEB-2015**	04-MAR-2015	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**05-FEB-2015**	04-MAR-2015	✓	**05-FEB-2015**	04-MAR-2015	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	---	06-FEB-2015	----	**05-FEB-2015**	06-FEB-2015	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**----**	----	----	**05-FEB-2015**	04-MAR-2015	✓
EP020: Oil and Grease (O&G)							
Amber Glass Bottle - Sulfuric Acid (EP020)							
WK14, WK13, AST2	**04-FEB-2015**	**----**	----	----	**05-FEB-2015**	04-MAR-2015	✓
Amber Glass Bottle - Unpreserved (EP020)							
WK11	**04-FEB-2015**	**----**	----	----	**05-FEB-2015**	04-MAR-2015	✓
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - Sulfuric Acid (EP033)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**----**	----	----	**05-FEB-2015**	18-FEB-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**05-FEB-2015**	11-FEB-2015	✓	**05-FEB-2015**	17-MAR-2015	✓
EP074D: Fumigants							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**05-FEB-2015**	18-FEB-2015	✓	**05-FEB-2015**	18-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074E: Halogenated Aliphatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**05-FEB-2015**	18-FEB-2015	✓	**05-FEB-2015**	18-FEB-2015	✓
EP074F: Halogenated Aromatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**05-FEB-2015**	18-FEB-2015	✓	**05-FEB-2015**	18-FEB-2015	✓
EP074A: Monocyclic Aromatic Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**05-FEB-2015**	18-FEB-2015	✓	**05-FEB-2015**	18-FEB-2015	✓
EP074B: Oxygenated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**05-FEB-2015**	18-FEB-2015	✓	**05-FEB-2015**	18-FEB-2015	✓
EP074C: Sulfonated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**05-FEB-2015**	18-FEB-2015	✓	**05-FEB-2015**	18-FEB-2015	✓
EP074G: Trihalomethanes							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**05-FEB-2015**	18-FEB-2015	✓	**05-FEB-2015**	18-FEB-2015	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**05-FEB-2015**	11-FEB-2015	✓	**06-FEB-2015**	17-MAR-2015	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**05-FEB-2015**	11-FEB-2015	✓	**06-FEB-2015**	17-MAR-2015	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**05-FEB-2015**	18-FEB-2015	✓	**05-FEB-2015**	18-FEB-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**05-FEB-2015**	18-FEB-2015	✓	**05-FEB-2015**	18-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP262: Ethanolamines							
Amber Glass Bottle - Unpreserved (EP262)							
WK11, WK14, WK13, AST2	**04-FEB-2015**	**----**	----	----	**06-FEB-2015**	11-FEB-2015	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	3	21	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	2	17	**11.8**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	4	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	16	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	1	4	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	3	23	**13.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	4	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	4	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	4	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	2	6	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	2	16	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	4	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	17	**11.8**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	2	16	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	4	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH by PC Titrator	EA005-P	3	23	**13.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	4	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	4	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	3	23	**13.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	6	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	6	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	15	**13.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	4	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	2	17	**11.8**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	4	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	4	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	4	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	2	21	**9.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	16	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	2	23	**8.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Oil and Grease	EP020	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	23	**8.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	6	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	6	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	15	**20.0**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	3	17	**17.6**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	2	23	**8.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Oil and Grease	EP020	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	23	**8.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Suspended Solids (High Level)	EA025H	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	23	**8.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Standard Anions -by IC (Extended Method)	ED009-X	WATER	In house: Referenced to APHA 4110. This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Silica (Reactive) by Discrete Analyser	EG052G	WATER	In house: Referenced to APHA 4500-SiO2 D: Under Acdic conditions reactive silicon combines with ammonium molybdate to form a yellow molybdosilicic acid complex. This is reduced by 1-amino-2-naphthol-4-sulfonic acid to a silicomolybdenum blue complex which is measured by discrete analyser at 670 nm. This method is compliant with NEPM (2013) Schedule B(3)
Chlorine	EK010	WATER	In-house (DPD colourimetry)
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500 F--C CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ammonium as N	EK055G-NH4	WATER	Ammonium in the sample is reported as the ionised / unionised fractions by the use of a nomograph and the initial pH and Temperature. Ammonia is determined by direct colorimetry by Discrete Analyser according to APHA 4500-NH3 G. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
Oil and Grease	EP020	WATER	In house: Referenced to APHA 5520 B. Oil & grease is a gravimetric procedure to determine the amount of oil & grease residue in an aqueous sample. The sample is serially extracted three times n-hexane. The resultant extracts are combined, dehydrated and concentrated prior to gravimetric determination. This method is compliant with NEPM (2013) Schedule B(3)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Volatile Organic Compounds	EP074	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Ethanolamines by LCMSMS	EP262	WATER	In-house LC-MSMS: Benzoyl derivatives of target compounds are analysed by LC/MSMS in ESI Positive Mode.

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
ED093F: Dissolved Major Cations	4589947-009	----	**Calcium**	7440-70-2	87.9 %	90-114%	**Recovery less than lower control limit**
Matrix Spike (MS) Recoveries							
ED009: Anions	ES1502642-001	Anonymous	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG020F: Dissolved Metals by ICP-MS	ES1502642-003	Anonymous	**Barium**	7440-39-3	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG020F: Dissolved Metals by ICP-MS	ES1502642-003	Anonymous	**Cadmium**	7440-43-9	66.8 %	70-130%	**Recovery less than lower data quality objective**
EG020F: Dissolved Metals by ICP-MS	ES1502642-003	Anonymous	**Chromium**	7440-47-3	62.2 %	70-130%	**Recovery less than lower data quality objective**
EG020F: Dissolved Metals by ICP-MS	ES1502642-003	Anonymous	**Lead**	7439-92-1	24.3 %	70-130%	**Recovery less than lower data quality objective**
EG020F: Dissolved Metals by ICP-MS	ES1502642-003	Anonymous	**Vanadium**	7440-62-2	19.4 %	70-130%	**Recovery less than lower data quality objective**
EG052G: Silica by Discrete Analyser	ES1502642-001	Anonymous	**Reactive Silica**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK055G: Ammonia as N by Discrete Analyser	ES1502642-001	Anonymous	**Ammonia as N**	7664-41-7	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK067G: Total Phosphorus as P by Discrete Analyser	ES1502642-002	WK11	**Total Phosphorus as P**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP005: Total Organic Carbon (TOC)	ES1502642-002	WK11	**Total Organic Carbon**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP033: C1 - C4 Hydrocarbon Gases	ES1502642-001	Anonymous	**Methane**	74-82-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP033: C1 - C4 Hydrocarbon Gases	ES1502642-001	Anonymous	**Ethane**	74-84-0	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries - Continued							
EP080: BTEXN	ES1502642-002	WK11	**Benzene**	71-43-2	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP080: BTEXN	ES1502642-002	WK11	**Toluene**	108-88-3	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **WATER**

Method	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)	*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural						
WK11, WK14	----	----	----	05-FEB-2015	04-FEB-2015	**1**
EK010/011: Chlorine						
Clear Plastic Bottle - Natural						
WK11, WK14	----	----	----	05-FEB-2015	04-FEB-2015	**1**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1502776**	Page	: 1 of 5
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
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E-mail	: SDaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 05-FEB-2015
Sampler	: ----	Issue Date	: 13-MAY-2015
Order number	: ----		
		No. of samples received	: 20
Quote number	: SY/933/14	No. of samples analysed	: 5

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out ir compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 3812353)									
ES1502776-001	WK13 U/S	EP080: Benzene	71-43-2	1	µg/L	212	212	0.0	0% - 20%
		EP080: Toluene	108-88-3	2	µg/L	251	259	3.1	0% - 20%
		EP080: Ethylbenzene	100-41-4	2	µg/L	5	5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	70	66	6.3	0% - 20%
		EP080: ortho-Xylene	95-47-6	2	µg/L	15	14	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP080: BTEXN (QCLot: 3812353)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	93.2	70	124
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	96.9	65	129
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	91.4	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	89.7	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	91.6	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	93.7	70	124

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080: BTEXN (QCLot: 3812353)							
ES1502776-002	WK13	EP080: Benzene	71-43-2	25 µg/L	# Not Determined	70	130
		EP080: Toluene	108-88-3	25 µg/L	# Not Determined	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	99.6	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	93.8	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	99.8	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	89.2	70	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080: BTEXN (QCLot: 3812353)										
ES1502776-002	WK13	EP080: Benzene	71-43-2	25 µg/L	# Not Determined	----	70	130	----	----
		EP080: Toluene	108-88-3	25 µg/L	# Not Determined	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	25 µg/L	99.6	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	93.8	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	25 µg/L	99.8	----	70	130	----	----
		EP080: Naphthalene	91-20-3	25 µg/L	89.2	----	70	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1502776**	Page	: 1 of 5
Amendment	: **1**		
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: SDaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
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Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 05-FEB-2015
Sampler	: ----	Issue Date	: 13-MAY-2015
Order number	: ----		
		No. of samples received	: 20
Quote number	: SY/933/14	No. of samples analysed	: 5

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**05-FEB-2015**	19-FEB-2015	✓	**05-FEB-2015**	19-FEB-2015	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
TRH Volatiles/BTEX	EP080	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
TRH Volatiles/BTEX	EP080	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
TRH Volatiles/BTEX	EP080	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
TRH Volatiles/BTEX	EP080	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP080: BTEXN	ES1502776-002	WK13	**Benzene**	71-43-2	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP080: BTEXN	ES1502776-002	WK13	**Toluene**	108-88-3	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1502783**	Page	: 1 of 22
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
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Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523 A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 05-FEB-2015
Sampler	: CS/AM	Issue Date	: 13-MAY-2015
Order number	: ----		
		No. of samples received	: 9
Quote number	: SY/933/14	No. of samples analysed	: 5

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Alex Rossi	Organic Chemist	Sydney Organics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA005P: pH by PC Titrator (QC Lot: 3812526)									
ES1502584-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.86	7.89	0.4	0% - 20%
ES1502715-002	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.45	7.42	0.4	0% - 20%
EA005P: pH by PC Titrator (QC Lot: 3812528)									
ES1502783-001	WK13 U/S	EA005-P: pH Value	----	0.01	pH Unit	8.06	8.07	0.1	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 3812525)									
ES1502584-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	3450	3430	0.6	0% - 20%
ES1502715-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	106	105	0.0	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 3812765)									
ES1502481-003	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	874	772	12.3	0% - 20%
ES1502783-008	WK11 U/S	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	7990	7420	7.5	0% - 20%
EA025: Suspended Solids (QC Lot: 3812766)									
ES1502481-003	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	135	125	7.3	0% - 20%
ES1502783-008	WK11 U/S	EA025H: Suspended Solids (SS)	----	5	mg/L	23	21	8.0	No Limit
ED009: Anions (QC Lot: 3813271)									
EP1500658-009	Anonymous	ED009-X: Chloride	16887-00-6	0.100	mg/L	85.0	87.0	2.3	0% - 20%
EP1500679-009	Anonymous	ED009-X: Chloride	16887-00-6	0.100	mg/L	97.5	96.9	0.6	0% - 20%
ED009: Anions (QC Lot: 3813272)									
ES1502783-007	WK14	ED009-X: Chloride	16887-00-6	0.100	mg/L	504	506	0.5	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3812524)									
ES1502584-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	716	719	0.4	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	716	719	0.4	0% - 20%
ES1502783-001	WK13 U/S	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	3520	3500	0.7	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	3520	3500	0.7	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3812849)									
ES1502783-001	WK13 U/S	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	<10	0.0	No Limit
ED045G: Chloride Discrete analyser (QC Lot: 3812844)									
ES1502311-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	6	6	0.0	No Limit
ES1502438-007	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	10	10	0.0	0% - 50%
ED045G: Chloride Discrete analyser (QC Lot: 3812850)									
ES1502783-008	WK11 U/S	ED045G: Chloride	16887-00-6	1	mg/L	744	752	1.0	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED093F: Dissolved Major Cations (QC Lot: 3812775)									
ES1502750-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	4	4	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
ES1502783-003	AST2	ED093F: Calcium	7440-70-2	1	mg/L	21	21	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	4	4	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	1500	1510	0.8	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	14	14	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3812776)									
ES1502750-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.006	0.005	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.021	0.022	6.4	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.012	0.008	32.9	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.17	0.18	8.0	0% - 50%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.01	mg/L	0.42	0.45	7.8	0% - 20%
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	<0.1	0.0	No Limit
ES1502783-003	AST2	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	2.81	2.79	0.7	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.020	0.020	0.0	0% - 50%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.005	0.005	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.029	0.029	0.0	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.006	0.006	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3812776) - continued									
ES1502783-003	AST2	EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.016	0.016	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.06	0.05	22.9	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	9.27	9.95	7.1	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	2.65	2.67	0.8	0% - 20%
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	0.7	0.7	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3812778)									
ES1502783-003	AST2	EG020B-F: Strontium	7440-24-6	0.001	mg/L	2.75	2.71	1.6	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 3812777)									
ES1502783-002	WK13	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG052G: Silica by Discrete Analyser (QC Lot: 3812848)									
ES1502783-001	WK13 U/S	EG052G: Reactive Silica	----	0.05	mg/L	29.1	29.4	1.0	0% - 20%
EK010/011: Chlorine (QC Lot: 3812571)									
ES1502742-001	Anonymous	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
		EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
ES1502783-008	WK11 U/S	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
		EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3812527)									
ES1502783-001	WK13 U/S	EK040P: Fluoride	16984-48-8	0.1	mg/L	1.5	1.6	0.0	0% - 50%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3812803)									
ES1502458-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.08	0.07	0.0	No Limit
ES1502783-003	AST2	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.06	0.04	40.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3812846)									
ES1502783-001	WK13 U/S	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3812802)									
ES1502458-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	10.5	10.5	0.2	0% - 20%
ES1502715-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.14	0.14	0.0	0% - 50%
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3812804)									
ES1502783-003	AST2	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.01	0.01	0.0	No Limit
EW1500433-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3812851)									
ES1502380-006	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.2	1.2	0.0	0% - 50%
ES1502715-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	0.7	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3812854)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3812854) - continued									
ES1502783-004	WK12 U/S	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.4	3.4	0.0	0% - 20%
EW1500433-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.2	41.8	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3812852)									
ES1502380-006	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.05	0.06	0.0	No Limit
ES1502715-002	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.16	0.14	13.3	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3812853)									
ES1502783-004	WK12 U/S	EK067G: Total Phosphorus as P	----	0.01	mg/L	1.57	1.60	2.1	0% - 20%
EW1500433-003	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.07	0.02	132	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3812847)									
ES1502783-001	WK13 U/S	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.09	0.09	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 3813114)									
ES1502775-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	107	110	3.1	0% - 50%
ES1502775-011	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	11	11	0.0	0% - 50%
EP005: Total Organic Carbon (TOC) (QC Lot: 3813115)									
ES1502833-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	1460	1450	0.6	0% - 20%
EW1500272-006	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	4	4	0.0	No Limit
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 3813042)									
ES1502783-003	AST2	EP033: Methane	74-82-8	10	µg/L	1430	1520	6.0	0% - 20%
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	96	100	4.4	0% - 50%
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	12	12	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 3812935)									
ES1502783-001	WK13 U/S	EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
EP074B: Oxygenated Compounds (QC Lot: 3812935)									
ES1502783-001	WK13 U/S	EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	70	80	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074C: Sulfonated Compounds (QC Lot: 3812935)									
ES1502783-001	WK13 U/S	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
EP074D: Fumigants (QC Lot: 3812935)									
ES1502783-001	WK13 U/S	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3812935)									
ES1502783-001	WK13 U/S	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 3812935)									
ES1502783-001	WK13 U/S	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP074F: Halogenated Aromatic Compounds (QC Lot: 3812935) - continued									
ES1502783-001	WK13 U/S	EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 3812935)									
ES1502783-001	WK13 U/S	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 3812954)									
ES1502783-001	WK13 U/S	EP075(SIM): Phenol	108-95-2	1.0	µg/L	10.8	9.5	12.0	0% - 50%
		EP075(SIM): 2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	1.0	µg/L	10.0	9.0	10.0	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	1.0	µg/L	4.4	3.9	10.4	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2.0	µg/L	178	159	11.2	0% - 20%
		EP075(SIM): Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3812954)									
ES1502783-001	WK13 U/S	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Naphthalene	91-20-3	1.0	µg/L	1.9	1.7	12.8	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3812954) - continued									
ES1502783-001	WK13 U/S	EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3812936)									
ES1502783-001	WK13 U/S	EP080: C6 - C9 Fraction	----	20	µg/L	760	720	5.1	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3812953)									
ES1502783-001	WK13 U/S	EP071: C15 - C28 Fraction	----	100	µg/L	140	140	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	260	280	6.9	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	150	160	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3812936)									
ES1502783-001	WK13 U/S	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	780	740	5.2	0% - 20%
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3812953)									
ES1502783-001	WK13 U/S	EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	240	240	0.0	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	230	210	8.7	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
EP262: Ethanolamines (QC Lot: 3812742)									
ES1502783-001	WK13 U/S	EP262: Ethanolamine	141-43-5	1	µg/L	12	14	14.4	0% - 50%
		EP262: Diethanolamine	111-42-2	1	µg/L	15	19	24.2	0% - 50%

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010P: Conductivity by PC Titrator (QCLot: 3812525)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	105	95	113
EA015: Total Dissolved Solids (QCLot: 3812765)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	----	2000 mg/L	91.0	87	109
				<10	293 mg/L	108	67	125
EA025: Suspended Solids (QCLot: 3812766)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	86.7	83	129
				----	1000 mg/L	87.5	86	110
ED009: Anions (QCLot: 3813271)								
ED009-X: Chloride	16887-00-6	0.1	mg/L	<0.100	2 mg/L	102	89	107
ED009: Anions (QCLot: 3813272)								
ED009-X: Chloride	16887-00-6	0.1	mg/L	<0.100	2 mg/L	101	89	107
ED037P: Alkalinity by PC Titrator (QCLot: 3812524)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	102	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3812849)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	114	86	122
ED045G: Chloride Discrete analyser (QCLot: 3812844)								
ED045G: Chloride	16887-00-6	1	mg/L	----	1000 mg/L	106	77	119
				<1	10 mg/L	121	75	123
ED045G: Chloride Discrete analyser (QCLot: 3812850)								
ED045G: Chloride	16887-00-6	1	mg/L	----	1000 mg/L	106	77	119
				<1	10 mg/L	113	75	123
ED093F: Dissolved Major Cations (QCLot: 3812775)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	# 89.6	90	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	102	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	100	82	118
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	99.2	87	117
EG020F: Dissolved Metals by ICP-MS (QCLot: 3812776)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3812776) - continued								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	109	85	115
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.01 mg/L	103	85	115
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.7	85	115
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	97.7	85	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	98.9	85	115
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	105	85	115
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	109	85	115
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	99.6	85	115
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	98.6	85	115
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	97.9	85	115
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	98.4	85	115
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	98.6	85	115
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	101	85	115
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	104	85	115
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	103	85	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	107	85	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	99.1	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	98.3	85	115
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	95.9	85	115
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3812778)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	101	80	112
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3812777)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	96.9	78	114
EG052G: Silica by Discrete Analyser (QCLot: 3812848)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.10	5 mg/L	104	94	114
EK010/011: Chlorine (QCLot: 3812571)								
EK010: Chlorine - Free	----	0.2	mg/L	<0.2	----	----	----	----
EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	----	----	----	----

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EK040P: Fluoride by PC Titrator (QCLot: 3812527)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5.0 mg/L	101	75	119
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3812803)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.0 mg/L	108	86	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3812846)								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.5 mg/L	98.3	83	119
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3812802)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	94.0	87	119
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3812804)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	94.2	87	119
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3812851)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	1.0 mg/L	99.6	66	126
				<0.1	10 mg/L	79.6	66	114
				----	5 mg/L	99.9	66	119
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3812854)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	81.2	66	114
				----	1.0 mg/L	97.4	66	126
				----	5 mg/L	93.6	66	119
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3812852)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	----	1.0 mg/L	103	66	124
				----	0.442 mg/L	91.8	63	123
				<0.01	4.42 mg/L	87.3	67	117
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3812853)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	87.8	67	117
				----	0.442 mg/L	88.7	63	123
				----	1.0 mg/L	91.2	66	124
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3812847)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	98.2	82	122
EP005: Total Organic Carbon (TOC) (QCLot: 3813114)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	88.0	76	120
EP005: Total Organic Carbon (TOC) (QCLot: 3813115)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	88.4	76	120

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP020: Oil and Grease (O&G) (QCLot: 3812928)								
EP020: Oil & Grease	----	5	mg/L	<5	5000 mg/L	113	80	120
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3813042)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	107	86	114
EP033: Ethene	74-85-1	10	µg/L	<10	50.29 µg/L	107	87	111
EP033: Ethane	74-84-0	10	µg/L	<10	54.43 µg/L	107	87	111
EP033: Propene	115-07-1	10	µg/L	<10	73.97 µg/L	108	85	113
EP033: Propane	74-98-6	10	µg/L	<10	78.28 µg/L	108	84	112
EP033: Butene	25167-67-3	20	µg/L	<20	99.61 µg/L	107	83	115
EP033: Butane	106-97-8	20	µg/L	<20	102.18 µg/L	108	85	115
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3812935)								
EP074: Styrene	100-42-5	5	µg/L	<5	10 µg/L	98.8	74	118
EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	10 µg/L	104	75	121
EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	10 µg/L	109	67	123
EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	10 µg/L	106	70	122
EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	10 µg/L	108	69	123
EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	10 µg/L	106	71	121
EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	10 µg/L	106	70	122
EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	10 µg/L	109	67	123
EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	10 µg/L	110	62	126
EP074B: Oxygenated Compounds (QCLot: 3812935)								
EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	100 µg/L	109	61.4	134
EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	100 µg/L	74.2	73.6	130
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	100 µg/L	90.0	61	139
EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	100 µg/L	75.6	65	137
EP074C: Sulfonated Compounds (QCLot: 3812935)								
EP074: Carbon disulfide	75-15-0	5	µg/L	<5	10 µg/L	88.2	72.8	127
EP074D: Fumigants (QCLot: 3812935)								
EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	10 µg/L	94.1	61	119
EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	10 µg/L	100	76	120
EP074: cis-1.3-Dichloropropylene	10061-01-5	10	µg/L	<10	10 µg/L	85.9	62	120

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074D: Fumigants (QCLot: 3812935) - continued								
EP074: trans-1.3-Dichloropropylene	10061-02-6	10	µg/L	<10	10 µg/L	86.3	61	119
EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	10 µg/L	96.6	69	117
EP074E: Halogenated Aliphatic Compounds (QCLot: 3812935)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	87.7	60.6	138
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	95.3	67.4	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	101	69.4	129
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	90.6	56	140
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	110	63	135
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	100	65	131
EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	93.5	69	123
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	93.6	70.2	128
EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	98.4	71	119
EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	99.5	75	119
EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	102	77	117
EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	94.3	61	119
EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	103	73	119
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	94.5	63	121
EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	104	78	122
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	104	74	120
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	98.2	74	118
EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	98.2	75	123
EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	101	79	121
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	87.7	72	124
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	89.1	66	114
EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	94.8	60	120
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	90.3	70.6	128
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	96.5	70	124
EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	96.8	74	128
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	110	71.8	126

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 3812935) - continued								
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	70.6	66.4	136
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	107	58	132
EP074F: Halogenated Aromatic Compounds (QCLot: 3812935)								
EP074: Chlorobenzene	108-90-7	5	µg/L	<5	10 µg/L	101	80	118
EP074: Bromobenzene	108-86-1	5	µg/L	<5	10 µg/L	102	76	116
EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	10 µg/L	107	71	121
EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	10 µg/L	106	71	121
EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	10 µg/L	108	74	120
EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	10 µg/L	108	72	120
EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	10 µg/L	107	77	117
EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	10 µg/L	105	60	126
EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	10 µg/L	103	67	125
EP074G: Trihalomethanes (QCLot: 3812935)								
EP074: Chloroform	67-66-3	5	µg/L	<5	10 µg/L	103	76	118
EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	10 µg/L	90.4	64	118
EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	10 µg/L	86.6	65	115
EP074: Bromoform	75-25-2	5	µg/L	<5	10 µg/L	86.4	73.5	126
EP075(SIM)A: Phenolic Compounds (QCLot: 3812954)								
EP075(SIM): Phenol	108-95-2	0.2	µg/L	<1.0	5 µg/L	37.5	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	<1.0	5 µg/L	65.6	63.8	110
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	<1.0	5 µg/L	65.5	55.9	112
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	<2.0	10 µg/L	67.0	42.5	114
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	<1.0	5 µg/L	88.0	62.7	117
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.2	µg/L	<1.0	5 µg/L	72.0	59.9	112
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.2	µg/L	<1.0	5 µg/L	78.1	59.3	122
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.2	µg/L	<1.0	5 µg/L	73.7	64.3	118
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	<1.0	5 µg/L	80.8	63	119
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.2	µg/L	<1.0	5 µg/L	82.4	58.7	118
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.2	µg/L	<1.0	5 µg/L	94.2	50	108
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	<2.0	10 µg/L	75.6	10	95

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3812954)								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	<1.0	5 µg/L	63.3	58.6	119
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	<1.0	5 µg/L	76.2	63.6	114
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	<1.0	5 µg/L	67.2	62.2	113
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	<1.0	5 µg/L	80.5	63.9	115
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	<1.0	5 µg/L	91.9	62.6	116
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	<1.0	5 µg/L	95.2	64.3	116
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	<1.0	5 µg/L	102	63.6	118
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	<1.0	5 µg/L	101	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	<1.0	5 µg/L	95.9	64.1	117
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	<1.0	5 µg/L	98.8	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.2	µg/L	<1.0	5 µg/L	94.6	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<1.0	5 µg/L	102	61.7	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.5	5 µg/L	97.8	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<1.0	5 µg/L	88.2	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<1.0	5 µg/L	88.4	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<1.0	5 µg/L	90.2	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3812936)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	85.7	75	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3812953)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	87.5	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	100	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	102	62	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3812936)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	88.4	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3812953)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	102	58.9	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	101	73.9	138
EP071: >C34 - C40 Fraction	----	50	µg/L	<100	1500 µg/L	98.0	67	127
EP262: Ethanolamines (QCLot: 3812742)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP262: Ethanolamines (QCLot: 3812742) - continued								
EP262: Ethanolamine	141-43-5	1	µg/L	<1	10 µg/L	72.9	50	130
EP262: Diethanolamine	111-42-2	1	µg/L	<1	10 µg/L	124	50	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
ED009: Anions (QCLot: 3813271)							
EP1500658-009	Anonymous	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	70	130
ED009: Anions (QCLot: 3813272)							
ES1502783-007	WK14	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3812849)							
ES1502783-001	WK13 U/S	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	108	70	130
ED045G: Chloride Discrete analyser (QCLot: 3812844)							
ES1502311-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	104	70	130
ED045G: Chloride Discrete analyser (QCLot: 3812850)							
ES1502783-008	WK11 U/S	ED045G: Chloride	16887-00-6	250 mg/L	86.7	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3812776)							
ES1502750-002	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	109	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	120	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	107	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	112	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	116	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	107	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	120	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	104	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	113	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	107	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	114	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	127	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG035F: Dissolved Mercury by FIMS (QCLot: 3812777)							
ES1502783-001	WK13 U/S	EG035F: Mercury	7439-97-6	0.0100 mg/L	70.6	70	130
EG052G: Silica by Discrete Analyser (QCLot: 3812848)							
ES1502783-001	WK13 U/S	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	70	130
EK040P: Fluoride by PC Titrator (QCLot: 3812527)							
ES1502783-001	WK13 U/S	EK040P: Fluoride	16984-48-8	5.0 mg/L	94.0	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3812803)							
ES1502458-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	106	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3812846)							
ES1502783-001	WK13 U/S	EK057G: Nitrite as N	----	0.5 mg/L	94.3	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3812802)							
ES1502458-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3812804)							
ES1502783-003	AST2	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	102	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3812851)							
ES1502458-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	10 mg/L	90.9	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3812854)							
ES1502783-005	WK12	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	75.8	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3812852)							
ES1502458-001	Anonymous	EK067G: Total Phosphorus as P	----	2 mg/L	99.0	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3812853)							
ES1502783-005	WK12	EK067G: Total Phosphorus as P	----	2 mg/L	83.0	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3812847)							
ES1502783-001	WK13 U/S	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	93.8	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 3813114)							
ES1502775-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	93.9	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 3813115)							
EW1500272-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	89.5	70	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3813042)							
ES1502783-003	AST2	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	70	130
		EP033: Ethene	74-85-1	50.29 µg/L	104	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3813042) - continued							
ES1502783-003	AST2	EP033: Ethane	74-84-0	54.43 µg/L	83.2	70	130
		EP033: Propene	115-07-1	73.97 µg/L	104	70	130
		EP033: Propane	74-98-6	78.28 µg/L	100	70	130
		EP033: Butene	25167-67-3	99.61 µg/L	105	70	130
		EP033: Butane	106-97-8	102.18 µg/L	105	70	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 3812935)							
ES1502783-003	AST2	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	80.6	70	130
		EP074: Trichloroethene	79-01-6	25 µg/L	95.4	70	130
EP074F: Halogenated Aromatic Compounds (QCLot: 3812935)							
ES1502783-003	AST2	EP074: Chlorobenzene	108-90-7	25 µg/L	97.7	70	130
EP075(SIM)A: Phenolic Compounds (QCLot: 3812954)							
ES1502783-001	WK13 U/S	EP075(SIM): Phenol	108-95-2	20 µg/L	24.0	20	130
		EP075(SIM): 2-Chlorophenol	95-57-8	20 µg/L	62.9	60	130
		EP075(SIM): 2-Nitrophenol	88-75-5	20 µg/L	99.3	60	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	20 µg/L	73.8	70	130
		EP075(SIM): Pentachlorophenol	87-86-5	20 µg/L	37.6	20	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3812954)							
ES1502783-001	WK13 U/S	EP075(SIM): Acenaphthene	83-32-9	20 µg/L	70.8	70	130
		EP075(SIM): Pyrene	129-00-0	20 µg/L	70.3	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3812936)							
ES1502783-002	WK13	EP080: C6 - C9 Fraction	----	325 µg/L	96.0	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3812953)							
ES1502783-001	WK13 U/S	EP071: C10 - C14 Fraction	----	200 µg/L	95.0	74	150
		EP071: C15 - C28 Fraction	----	300 µg/L	100	77	153
		EP071: C29 - C36 Fraction	----	200 µg/L	100	67	153
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3812936)							
ES1502783-002	WK13	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	96.8	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3812953)							
ES1502783-001	WK13 U/S	EP071: >C10 - C16 Fraction	>C10_C16	250 µg/L	84.0	74	150
		EP071: >C16 - C34 Fraction	----	350 µg/L	103	77	153
		EP071: >C34 - C40 Fraction	----	150 µg/L	100	67	153
EP262: Ethanolamines (QCLot: 3812742)							
ES1502783-001	WK13 U/S	EP262: Ethanolamine	141-43-5	10 µg/L	107	50	130
		EP262: Diethanolamine	111-42-2	10 µg/L	81.4	50	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EK040P: Fluoride by PC Titrator (QCLot: 3812527)										
ES1502783-001	WK13 U/S	EK040P: Fluoride	16984-48-8	5.0 mg/L	94.0	----	70	130	----	----
EP262: Ethanolamines (QCLot: 3812742)										
ES1502783-001	WK13 U/S	EP262: Ethanolamine	141-43-5	10 µg/L	107	----	50	130	----	----
		EP262: Diethanolamine	111-42-2	10 µg/L	81.4	----	50	130	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3812776)										
ES1502750-002	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	109	----	70	130	----	----
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	120	----	70	130	----	----
		EG020A-F: Barium	7440-39-3	0.2 mg/L	107	----	70	130	----	----
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	112	----	70	130	----	----
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	116	----	70	130	----	----
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	107	----	70	130	----	----
		EG020A-F: Copper	7440-50-8	0.2 mg/L	120	----	70	130	----	----
		EG020A-F: Lead	7439-92-1	0.2 mg/L	104	----	70	130	----	----
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	113	----	70	130	----	----
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	107	----	70	130	----	----
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	114	----	70	130	----	----
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	127	----	70	130	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3812777)										
ES1502783-001	WK13 U/S	EG035F: Mercury	7439-97-6	0.0100 mg/L	70.6	----	70	130	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3812802)										
ES1502458-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	----	70	130	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3812803)										
ES1502458-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	106	----	70	130	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3812804)										
ES1502783-003	AST2	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	102	----	70	130	----	----
ED045G: Chloride Discrete analyser (QCLot: 3812844)										
ES1502311-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	104	----	70	130	----	----
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3812846)										

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3812846) - continued										
ES1502783-001	WK13 U/S	EK057G: Nitrite as N	----	0.5 mg/L	94.3	----	70	130	----	----
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3812847)										
ES1502783-001	WK13 U/S	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	93.8	----	70	130	----	----
EG052G: Silica by Discrete Analyser (QCLot: 3812848)										
ES1502783-001	WK13 U/S	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	----	70	130	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3812849)										
ES1502783-001	WK13 U/S	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	108	----	70	130	----	----
ED045G: Chloride Discrete analyser (QCLot: 3812850)										
ES1502783-008	WK11 U/S	ED045G: Chloride	16887-00-6	250 mg/L	86.7	----	70	130	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3812851)										
ES1502458-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	10 mg/L	90.9	----	70	130	----	----
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3812852)										
ES1502458-001	Anonymous	EK067G: Total Phosphorus as P	----	2 mg/L	99.0	----	70	130	----	----
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3812853)										
ES1502783-005	WK12	EK067G: Total Phosphorus as P	----	2 mg/L	83.0	----	70	130	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3812854)										
ES1502783-005	WK12	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	75.8	----	70	130	----	----
EP074E: Halogenated Aliphatic Compounds (QCLot: 3812935)										
ES1502783-003	AST2	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	80.6	----	70	130	----	----
		EP074: Trichloroethene	79-01-6	25 µg/L	95.4	----	70	130	----	----
EP074F: Halogenated Aromatic Compounds (QCLot: 3812935)										
ES1502783-003	AST2	EP074: Chlorobenzene	108-90-7	25 µg/L	97.7	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3812936)										
ES1502783-002	WK13	EP080: C6 - C9 Fraction	----	325 µg/L	96.0	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3812936)										
ES1502783-002	WK13	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	96.8	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3812953)										
ES1502783-001	WK13 U/S	EP071: C10 - C14 Fraction	----	200 µg/L	95.0	----	74	150	----	----
		EP071: C15 - C28 Fraction	----	300 µg/L	100	----	77	153	----	----
		EP071: C29 - C36 Fraction	----	200 µg/L	100	----	67	153	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3812953)										
ES1502783-001	WK13 U/S	EP071: >C10 - C16 Fraction	>C10_C16	250 µg/L	84.0	----	74	150	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3812953) - continued										
ES1502783-001	WK13 U/S	EP071: >C16 - C34 Fraction	----	350 µg/L	103	----	77	153	----	----
		EP071: >C34 - C40 Fraction	----	150 µg/L	100	----	67	153	----	----
EP075(SIM)A: Phenolic Compounds (QCLot: 3812954)										
ES1502783-001	WK13 U/S	EP075(SIM): Phenol	108-95-2	20 µg/L	24.0	----	20	130	----	----
		EP075(SIM): 2-Chlorophenol	95-57-8	20 µg/L	62.9	----	60	130	----	----
		EP075(SIM): 2-Nitrophenol	88-75-5	20 µg/L	99.3	----	60	130	----	----
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	20 µg/L	73.8	----	70	130	----	----
		EP075(SIM): Pentachlorophenol	87-86-5	20 µg/L	37.6	----	20	130	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3812954)										
ES1502783-001	WK13 U/S	EP075(SIM): Acenaphthene	83-32-9	20 µg/L	70.8	----	70	130	----	----
		EP075(SIM): Pyrene	129-00-0	20 µg/L	70.3	----	70	130	----	----
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3813042)										
ES1502783-003	AST2	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	----	70	130	----	----
		EP033: Ethene	74-85-1	50.29 µg/L	104	----	70	130	----	----
		EP033: Ethane	74-84-0	54.43 µg/L	83.2	----	70	130	----	----
		EP033: Propene	115-07-1	73.97 µg/L	104	----	70	130	----	----
		EP033: Propane	74-98-6	78.28 µg/L	100	----	70	130	----	----
		EP033: Butene	25167-67-3	99.61 µg/L	105	----	70	130	----	----
		EP033: Butane	106-97-8	102.18 µg/L	105	----	70	130	----	----
EP005: Total Organic Carbon (TOC) (QCLot: 3813114)										
ES1502775-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	93.9	----	70	130	----	----
EP005: Total Organic Carbon (TOC) (QCLot: 3813115)										
EW1500272-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	89.5	----	70	130	----	----
ED009: Anions (QCLot: 3813271)										
EP1500658-009	Anonymous	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	----	70	130	----	----
ED009: Anions (QCLot: 3813272)										
ES1502783-007	WK14	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	----	70	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1502783**	Page	: 1 of 13
Amendment	: **1**		
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
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Project	: 2268523 A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 05-FEB-2015
Sampler	: CS/AM	Issue Date	: 13-MAY-2015
Order number	: ----		
		No. of samples received	: 9
Quote number	: SY/933/14	No. of samples analysed	: 5

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	05-FEB-2015	----	**05-FEB-2015**	05-FEB-2015	✓
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	05-MAR-2015	----	**05-FEB-2015**	05-MAR-2015	✓
EA015: Total Dissolved Solids							
Clear Plastic Bottle - Natural (EA015H)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	12-FEB-2015	----	**06-FEB-2015**	12-FEB-2015	✓
EA025: Suspended Solids							
Clear Plastic Bottle - Natural (EA025H)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	12-FEB-2015	----	**06-FEB-2015**	12-FEB-2015	✓
ED009: Anions							
Clear Plastic Bottle - Natural (ED009-X)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**----**	----	----	**08-FEB-2015**	05-MAR-2015	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	19-FEB-2015	----	**05-FEB-2015**	19-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	05-MAR-2015	----	**06-FEB-2015**	05-MAR-2015	✓
ED045G: Chloride Discrete analyser							
Clear Plastic Bottle - Natural (ED045G)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	05-MAR-2015	----	**06-FEB-2015**	05-MAR-2015	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	05-MAR-2015	----	**06-FEB-2015**	05-MAR-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	04-AUG-2015	----	**06-FEB-2015**	04-AUG-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	04-AUG-2015	----	**06-FEB-2015**	04-AUG-2015	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	05-MAR-2015	----	**06-FEB-2015**	05-MAR-2015	✓
EG052G: Silica by Discrete Analyser							
Clear Plastic Bottle - Natural (EG052G)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	05-MAR-2015	----	**06-FEB-2015**	05-MAR-2015	✓
EK010/011: Chlorine							
Clear Plastic Bottle - Natural (EK010)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**----**	----	----	**05-FEB-2015**	05-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	05-MAR-2015	----	**05-FEB-2015**	05-MAR-2015	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	05-MAR-2015	----	**06-FEB-2015**	05-MAR-2015	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	07-FEB-2015	----	**06-FEB-2015**	07-FEB-2015	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	05-MAR-2015	----	**06-FEB-2015**	05-MAR-2015	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**06-FEB-2015**	05-MAR-2015	✓	**06-FEB-2015**	05-MAR-2015	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**06-FEB-2015**	05-MAR-2015	✓	**06-FEB-2015**	05-MAR-2015	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**---**	07-FEB-2015	----	**06-FEB-2015**	07-FEB-2015	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**----**	----	----	**06-FEB-2015**	05-MAR-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP020: Oil and Grease (O&G)							
Amber Glass Bottle - Sulfuric Acid (EP020)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**----**	----	----	**06-FEB-2015**	05-MAR-2015	✓
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - Sulfuric Acid (EP033)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**----**	----	----	**06-FEB-2015**	19-FEB-2015	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**06-FEB-2015**	12-FEB-2015	✓	**06-FEB-2015**	18-MAR-2015	✓
EP074D: Fumigants							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**06-FEB-2015**	19-FEB-2015	✓	**06-FEB-2015**	19-FEB-2015	✓
EP074E: Halogenated Aliphatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**06-FEB-2015**	19-FEB-2015	✓	**06-FEB-2015**	19-FEB-2015	✓
EP074F: Halogenated Aromatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**06-FEB-2015**	19-FEB-2015	✓	**06-FEB-2015**	19-FEB-2015	✓
EP074A: Monocyclic Aromatic Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**06-FEB-2015**	19-FEB-2015	✓	**06-FEB-2015**	19-FEB-2015	✓
EP074B: Oxygenated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**06-FEB-2015**	19-FEB-2015	✓	**06-FEB-2015**	19-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074C: Sulfonated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**06-FEB-2015**	19-FEB-2015	✓	**06-FEB-2015**	19-FEB-2015	✓
EP074G: Trihalomethanes							
Amber VOC Vial - Sulfuric Acid (EP074)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**06-FEB-2015**	19-FEB-2015	✓	**06-FEB-2015**	19-FEB-2015	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**06-FEB-2015**	12-FEB-2015	✓	**07-FEB-2015**	18-MAR-2015	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**06-FEB-2015**	12-FEB-2015	✓	**07-FEB-2015**	18-MAR-2015	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber VOC Vial - Sulfuric Acid (EP080)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**06-FEB-2015**	19-FEB-2015	✓	**06-FEB-2015**	19-FEB-2015	✓
EP262: Ethanolamines							
Amber Glass Bottle - Unpreserved (EP262)							
WK13, AST2, WK12, WK14, WK11	**05-FEB-2015**	**----**	----	----	**06-FEB-2015**	12-FEB-2015	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	2	12	**16.7**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	2	16	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	3	17	**17.6**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	2	7	**28.6**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	2	15	**13.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	14	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	2	14	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	4	31	**12.9**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH by PC Titrator	EA005-P	3	19	**15.8**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	3	19	**15.8**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	10	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	10	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	4	29	**13.8**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	4	36	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	4	34	**11.8**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	12	**8.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	4	17	**23.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	31	**6.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Oil and Grease	EP020	1	12	**8.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	2	19	**10.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	10	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	10	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	6	29	**20.7**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	36	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	6	34	**17.6**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	17	**11.8**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	31	**6.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Oil and Grease	EP020	1	12	**8.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	2	19	**10.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Suspended Solids (High Level)	EA025H	1	10	**10.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	10	**10.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	29	**6.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	36	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	2	34	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	17	**11.8**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	31	**6.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	2	19	**10.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	29	**6.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	36	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	2	34	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Standard Anions -by IC (Extended Method)	ED009-X	WATER	In house: Referenced to APHA 4110. This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Silica (Reactive) by Discrete Analyser	EG052G	WATER	In house: Referenced to APHA 4500-SiO2 D: Under Acdic conditions reactive silicon combines with ammonium molybdate to form a yellow molybdosilicic acid complex. This is reduced by 1-amino-2-naphthol-4-sulfonic acid to a silicomolybdenum blue complex which is measured by discrete analyser at 670 nm. This method is compliant with NEPM (2013) Schedule B(3)
Chlorine	EK010	WATER	In-house (DPD colourimetry)
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500 F--C CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ammonium as N	EK055G-NH4	WATER	Ammonium in the sample is reported as the ionised / unionised fractions by the use of a nomograph and the initial pH and Temperature. Ammonia is determined by direct colorimetry by Discrete Analyser according to APHA 4500-NH3 G. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
Oil and Grease	EP020	WATER	In house: Referenced to APHA 5520 B. Oil & grease is a gravimetric procedure to determine the amount of oil & grease residue in an aqueous sample. The sample is serially extracted three times n-hexane. The resultant extracts are combined, dehydrated and concentrated prior to gravimetric determination. This method is compliant with NEPM (2013) Schedule B(3)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Volatile Organic Compounds	EP074	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Ethanolamines by LCMSMS	EP262	WATER	In-house LC-MSMS: Benzoyl derivatives of target compounds are analysed by LC/MSMS in ESI Positive Mode.

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
ED093F: Dissolved Major Cations	4591620-003	----	**Calcium**	7440-70-2	89.6 %	90-114%	**Recovery less than lower control limit**
Matrix Spike (MS) Recoveries							
ED009: Anions	EP1500658-009	Anonymous	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED009: Anions	ES1502783-007	WK14	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG052G: Silica by Discrete Analyser	ES1502783-001	Anonymous	**Reactive Silica**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	ES1502458-001	Anonymous	**Nitrite + Nitrate as N**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP033: C1 - C4 Hydrocarbon Gases	ES1502783-003	AST2	**Methane**	74-82-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1502916**	Page	: 1 of 20
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: SDaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523 A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 06-FEB-2015
Sampler	: CS & AM	Issue Date	: 13-MAY-2015
Order number	: ----		
		No. of samples received	: 9
Quote number	: SY/933/14	No. of samples analysed	: 5

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Alex Rossi	Organic Chemist	Sydney Organics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Merrin Avery	Supervisor - Inorganic	Newcastle - Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA005: pH (QC Lot: 3815389)									
ES1502686-001	Anonymous	EA005: pH Value	----	0.01	pH Unit	9.44	9.45	0.1	0% - 20%
ES1502916-005	WK12	EA005: pH Value	----	0.01	pH Unit	7.69	7.71	0.2	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 3814165)									
ES1502725-008	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	265	265	0.0	0% - 20%
ES1502916-006	WK14 U/S	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	8860	8870	0.1	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 3814580)									
ES1502916-001	AST2	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	3920	4340	10.2	0% - 20%
EA025: Suspended Solids (QC Lot: 3814581)									
ES1502916-001	AST2	EA025H: Suspended Solids (SS)	----	5	mg/L	78	80	1.6	0% - 50%
ED009: Anions (QC Lot: 3814707)									
ES1502916-001	AST2	ED009-X: Chloride	16887-00-6	0.100	mg/L	524	488	7.0	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3814164)									
ES1502388-008	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	190	195	2.8	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	190	195	2.8	0% - 20%
ES1502916-006	WK14 U/S	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	4520	4500	0.6	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	4520	4500	0.6	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3814130)									
ES1502916-001	AST2	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	<10	0.0	No Limit
ED045G: Chloride Discrete analyser (QC Lot: 3814128)									
ES1502916-001	AST2	ED045G: Chloride	16887-00-6	1	mg/L	504	508	0.7	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 3814552)									
ES1502916-002	WK13 U/S	ED093F: Calcium	7440-70-2	1	mg/L	42	42	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	3	4	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	2490	2540	2.1	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	15	15	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3814553)									
ES1502916-002	WK13 U/S	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.005	0.006	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3814553) - continued									
ES1502916-002	WK13 U/S	EG020A-F: Barium	7440-39-3	0.001	mg/L	5.84	5.78	1.0	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.005	0.005	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.020	0.021	0.0	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.004	0.005	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	6.65	6.33	4.9	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.12	0.12	0.0	No Limit
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	1.1	1.1	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3814554)									
ES1502916-002	WK13 U/S	EG020B-F: Strontium	7440-24-6	0.001	mg/L	5.17	5.01	3.2	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 3814551)									
ES1502916-003	WK13	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG052G: Silica by Discrete Analyser (QC Lot: 3814129)									
ES1502916-001	AST2	EG052G: Reactive Silica	----	0.05	mg/L	20.1	20.2	0.2	0% - 20%
EK010/011: Chlorine (QC Lot: 3814221)									
ES1502915-002	Anonymous	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
		EK010: Chlorine - Total Residual	----	0.2	mg/L	0.4	0.4	0.0	No Limit
ES1502916-009	WK11	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
		EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3814162)									
ES1502462-007	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	1.3	1.4	0.0	0% - 50%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3814148)									
ES1502916-001	AST2	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.04	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3814126)									
ES1502916-001	AST2	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3814147)									
ES1502916-001	AST2	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3814143)									
ES1502916-001	AST2	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	7.0	6.9	0.0	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3814144)									
ES1502916-001	AST2	EK067G: Total Phosphorus as P	----	0.01	mg/L	2.60	2.58	0.8	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3814127)									
ES1502916-001	AST2	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.01	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 3814706)									
ES1502916-001	AST2	EP005: Total Organic Carbon	----	1	mg/L	455	459	1.0	0% - 20%
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 3814207)									
ES1502916-001	AST2	EP033: Methane	74-82-8	10	µg/L	1580	1810	13.1	0% - 20%
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	108	122	11.8	0% - 50%
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	14	15	8.8	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 3814109)									
ES1502916-001	AST2	EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
EP074B: Oxygenated Compounds (QC Lot: 3814109)									
ES1502916-001	AST2	EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit
EP074C: Sulfonated Compounds (QC Lot: 3814109)									
ES1502916-001	AST2	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
EP074D: Fumigants (QC Lot: 3814109)									
ES1502916-001	AST2	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3814109)									
ES1502916-001	AST2	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3814109) - continued									
ES1502916-001	AST2	EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 3814109)									
ES1502916-001	AST2	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 3814109)									
ES1502916-001	AST2	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074G: Trihalomethanes (QC Lot: 3814109) - continued									
ES1502916-001	AST2	EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 3814670)									
ES1502916-001	AST2	EP075(SIM): Phenol	108-95-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	<2.0	0.0	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3814670)									
ES1502916-001	AST2	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3814110)									
ES1502916-001	AST2	EP080: C6 - C9 Fraction	----	20	µg/L	150	160	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3814669)									
ES1502916-001	AST2	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3814110)									
ES1502916-001	AST2	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	160	160	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3814669)									
ES1502916-001	AST2	EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
EP262: Ethanolamines (QC Lot: 3814951)									
ES1502916-001	AST2	EP262: Ethanolamine	141-43-5	1	µg/L	5	5	0.0	No Limit
		EP262: Diethanolamine	111-42-2	1	µg/L	4	5	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010P: Conductivity by PC Titrator (QCLot: 3814165)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	103	95	113
EA015: Total Dissolved Solids (QCLot: 3814580)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	293 mg/L	114	67	125
				----	2000 mg/L	91.5	87	109
EA025: Suspended Solids (QCLot: 3814581)								
EA025H: Suspended Solids (SS)	----	5	mg/L	----	1000 mg/L	100	86	110
				<5	150 mg/L	92.0	83	129
ED009: Anions (QCLot: 3814707)								
ED009-X: Chloride	16887-00-6	0.1	mg/L	<0.100	2 mg/L	107	89	107
ED037P: Alkalinity by PC Titrator (QCLot: 3814164)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	103	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3814130)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	103	86	122
ED045G: Chloride Discrete analyser (QCLot: 3814128)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	104	75	123
				----	1000 mg/L	99.5	77	119
ED093F: Dissolved Major Cations (QCLot: 3814552)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	93.9	90	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	107	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	115	82	118
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	104	87	117
EG020F: Dissolved Metals by ICP-MS (QCLot: 3814553)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	94.4	85	115
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.01 mg/L	92.8	85	115
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.9	85	115
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	103	85	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	94.8	85	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3814553) - continued								
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.0	85	115
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	93.5	85	115
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	98.4	85	115
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	96.0	85	115
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	96.2	85	115
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	89.9	85	115
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	93.1	85	115
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.2	85	115
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	96.1	85	115
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	97.5	85	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	93.2	85	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	99.2	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	108	85	115
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	88.7	85	115
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3814554)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	96.8	80	112
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3814551)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	85.2	78	114
EG052G: Silica by Discrete Analyser (QCLot: 3814129)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.10	5 mg/L	104	94	114
EK010/011: Chlorine (QCLot: 3814221)								
EK010: Chlorine - Free	----	0.2	mg/L	<0.2	----	----	----	----
EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	----	----	----	----
EK040P: Fluoride by PC Titrator (QCLot: 3814162)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5.0 mg/L	101	75	119
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3814148)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.0 mg/L	104	86	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3814126)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3814126) - continued								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.5 mg/L	97.3	83	119
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3814147)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	93.6	87	119
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3814143)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	1.0 mg/L	97.2	66	126
				<0.1	10 mg/L	80.5	66	114
				----	5 mg/L	96.4	66	119
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3814144)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	----	0.442 mg/L	90.5	63	123
				<0.01	4.42 mg/L	87.9	67	117
				----	1.0 mg/L	102	66	124
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3814127)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	112	82	122
EP005: Total Organic Carbon (TOC) (QCLot: 3814706)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	90.8	76	120
EP020: Oil and Grease (O&G) (QCLot: 3814203)								
EP020: Oil & Grease	----	5	mg/L	<5	5000 mg/L	99.4	80	120
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3814207)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	100	86	114
EP033: Ethene	74-85-1	10	µg/L	<10	50.29 µg/L	100	87	111
EP033: Ethane	74-84-0	10	µg/L	<10	54.43 µg/L	101	87	111
EP033: Propene	115-07-1	10	µg/L	<10	73.97 µg/L	100	85	113
EP033: Propane	74-98-6	10	µg/L	<10	78.28 µg/L	101	84	112
EP033: Butene	25167-67-3	20	µg/L	<20	99.61 µg/L	101	83	115
EP033: Butane	106-97-8	20	µg/L	<20	102.18 µg/L	101	85	115
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3814109)								
EP074: Styrene	100-42-5	5	µg/L	<5	10 µg/L	102	74	118
EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	10 µg/L	103	75	121
EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	10 µg/L	95.9	67	123
EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	10 µg/L	94.1	70	122

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3814109) - continued								
EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	10 µg/L	96.0	69	123
EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	10 µg/L	95.2	71	121
EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	10 µg/L	92.2	70	122
EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	10 µg/L	95.1	67	123
EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	10 µg/L	98.3	62	126
EP074B: Oxygenated Compounds (QCLot: 3814109)								
EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	100 µg/L	102	61.4	134
EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	100 µg/L	93.4	73.6	130
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	100 µg/L	93.7	61	139
EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	100 µg/L	99.6	65	137
EP074C: Sulfonated Compounds (QCLot: 3814109)								
EP074: Carbon disulfide	75-15-0	5	µg/L	<5	10 µg/L	73.8	72.8	127
EP074D: Fumigants (QCLot: 3814109)								
EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	10 µg/L	96.4	61	119
EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	10 µg/L	98.6	76	120
EP074: cis-1.3-Dichloropropylene	10061-01-5	10	µg/L	<10	10 µg/L	83.9	62	120
EP074: trans-1.3-Dichloropropylene	10061-02-6	10	µg/L	<10	10 µg/L	89.6	61	119
EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	10 µg/L	102	69	117
EP074E: Halogenated Aliphatic Compounds (QCLot: 3814109)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	104	60.6	138
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	109	67.4	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	89.5	69.4	129
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	92.6	56	140
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	89.7	63	135
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	88.8	65	131
EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	99.6	69	123
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	87.2	70.2	128
EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	100	71	119
EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	96.6	75	119
EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	99.0	77	117

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 3814109) - continued								
EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	92.1	61	119
EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	99.7	73	119
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	87.1	63	121
EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	92.8	78	122
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	88.7	74	120
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	96.0	74	118
EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	105	75	123
EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	106	79	121
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	102	72	124
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	95.2	66	114
EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	102	60	120
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	102	70.6	128
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	102	70	124
EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	111	74	128
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	74.1	71.8	126
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	88.6	66.4	136
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	94.1	58	132
EP074F: Halogenated Aromatic Compounds (QCLot: 3814109)								
EP074: Chlorobenzene	108-90-7	5	µg/L	<5	10 µg/L	105	80	118
EP074: Bromobenzene	108-86-1	5	µg/L	<5	10 µg/L	97.0	76	116
EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	10 µg/L	96.3	71	121
EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	10 µg/L	95.4	71	121
EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	10 µg/L	96.4	74	120
EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	10 µg/L	97.2	72	120
EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	10 µg/L	97.7	77	117
EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	10 µg/L	97.8	60	126
EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	10 µg/L	95.4	67	125
EP074G: Trihalomethanes (QCLot: 3814109)								
EP074: Chloroform	67-66-3	5	µg/L	<5	10 µg/L	97.0	76	118

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074G: Trihalomethanes (QCLot: 3814109) - continued								
EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	10 µg/L	84.1	64	118
EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	10 µg/L	92.6	65	115
EP074: Bromoform	75-25-2	5	µg/L	<5	10 µg/L	86.8	73.5	126
EP075(SIM)A: Phenolic Compounds (QCLot: 3814670)								
EP075(SIM): Phenol	108-95-2	0.2	µg/L	<1.0	5 µg/L	37.0	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	<1.0	5 µg/L	63.9	63.8	110
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	<1.0	5 µg/L	71.4	55.9	112
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	<2.0	10 µg/L	59.1	42.5	114
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	<1.0	5 µg/L	88.1	62.7	117
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.2	µg/L	<1.0	5 µg/L	66.3	59.9	112
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.2	µg/L	<1.0	5 µg/L	70.8	59.3	122
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.2	µg/L	<1.0	5 µg/L	75.4	64.3	118
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	<1.0	5 µg/L	65.2	63	119
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.2	µg/L	<1.0	5 µg/L	74.0	58.7	118
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.2	µg/L	<1.0	5 µg/L	67.3	50	108
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	<2.0	10 µg/L	20.5	10	95
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3814670)								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	<1.0	5 µg/L	67.7	58.6	119
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	<1.0	5 µg/L	72.3	63.6	114
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	<1.0	5 µg/L	67.4	62.2	113
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	<1.0	5 µg/L	77.6	63.9	115
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	<1.0	5 µg/L	82.1	62.6	116
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	<1.0	5 µg/L	83.6	64.3	116
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	<1.0	5 µg/L	94.2	63.6	118
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	<1.0	5 µg/L	87.1	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	<1.0	5 µg/L	79.9	64.1	117
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	<1.0	5 µg/L	87.7	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.2	µg/L	<1.0	5 µg/L	82.8	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<1.0	5 µg/L	79.3	61.7	117

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3814670) - continued								
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.5	5 µg/L	90.4	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<1.0	5 µg/L	93.2	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<1.0	5 µg/L	89.9	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<1.0	5 µg/L	78.5	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3814110)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	93.2	75	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3814669)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	104	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	101	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	86.5	62	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3814110)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	93.2	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3814669)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	98.0	58.9	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	101	73.9	138
EP071: >C34 - C40 Fraction	----	50	µg/L	<100	1500 µg/L	98.0	67	127
EP262: Ethanolamines (QCLot: 3814951)								
EP262: Ethanolamine	141-43-5	1	µg/L	<1	10 µg/L	92.8	50	130
EP262: Diethanolamine	111-42-2	1	µg/L	<1	10 µg/L	66.4	50	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
ED009: Anions (QCLot: 3814707)							
ES1502916-001	AST2	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3814130)							
ES1502916-001	AST2	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	127	70	130
ED045G: Chloride Discrete analyser (QCLot: 3814128)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045G: Chloride Discrete analyser (QCLot: 3814128) - continued							
ES1502916-001	AST2	ED045G: Chloride	16887-00-6	250 mg/L	83.0	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3814553)							
ES1502916-005	WK12	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	127	70	130
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	106	70	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	# Not Determined	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	85.8	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	76.8	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	86.4	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	93.0	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	93.5	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	105	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	77.7	70	130
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	78.8	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	89.5	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3814551)							
ES1502916-001	AST2	EG035F: Mercury	7439-97-6	0.0100 mg/L	70.6	70	130
EG052G: Silica by Discrete Analyser (QCLot: 3814129)							
ES1502916-001	AST2	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3814148)							
ES1502916-001	AST2	EK055G: Ammonia as N	7664-41-7	1 mg/L	97.4	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3814126)							
ES1502916-001	AST2	EK057G: Nitrite as N	----	0.5 mg/L	92.8	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3814147)							
ES1502916-001	AST2	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	102	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3814143)							
ES1502916-002	WK13 U/S	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	75.0	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3814144)							
ES1502916-002	WK13 U/S	EK067G: Total Phosphorus as P	----	1.0 mg/L	87.4	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3814127)							
ES1502916-001	AST2	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	100	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 3814706)							
ES1502916-002	WK13 U/S	EP005: Total Organic Carbon	----	100 mg/L	# Not Determined	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3814207)							
ES1502916-001	AST2	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	70	130
		EP033: Ethene	74-85-1	50.29 µg/L	102	70	130
		EP033: Ethane	74-84-0	54.43 µg/L	106	70	130
		EP033: Propene	115-07-1	73.97 µg/L	100	70	130
		EP033: Propane	74-98-6	78.28 µg/L	97.8	70	130
		EP033: Butene	25167-67-3	99.61 µg/L	102	70	130
		EP033: Butane	106-97-8	102.18 µg/L	101	70	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 3814109)							
ES1502916-003	WK13	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	84.3	70	130
		EP074: Trichloroethene	79-01-6	25 µg/L	87.2	70	130
EP074F: Halogenated Aromatic Compounds (QCLot: 3814109)							
ES1502916-003	WK13	EP074: Chlorobenzene	108-90-7	25 µg/L	85.3	70	130
EP075(SIM)A: Phenolic Compounds (QCLot: 3814670)							
ES1502916-001	AST2	EP075(SIM): Phenol	108-95-2	20 µg/L	40.8	20	130
		EP075(SIM): 2-Chlorophenol	95-57-8	20 µg/L	79.8	60	130
		EP075(SIM): 2-Nitrophenol	88-75-5	20 µg/L	75.6	60	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	20 µg/L	73.4	70	130
		EP075(SIM): Pentachlorophenol	87-86-5	20 µg/L	41.6	20	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3814670)							
ES1502916-001	AST2	EP075(SIM): Acenaphthene	83-32-9	20 µg/L	88.8	70	130
		EP075(SIM): Pyrene	129-00-0	20 µg/L	88.7	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3814110)							
ES1502916-005	WK12	EP080: C6 - C9 Fraction	----	325 µg/L	120	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3814669)							
ES1502916-001	AST2	EP071: C10 - C14 Fraction	----	200 µg/L	100	74	150
		EP071: C15 - C28 Fraction	----	300 µg/L	100	77	153
		EP071: C29 - C36 Fraction	----	200 µg/L	105	67	153
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3814110)							
ES1502916-005	WK12	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	113	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3814669)							
ES1502916-001	AST2	EP071: >C10 - C16 Fraction	>C10_C16	250 µg/L	96.0	74	150
		EP071: >C16 - C34 Fraction	----	350 µg/L	106	77	153
		EP071: >C34 - C40 Fraction	----	150 µg/L	100	67	153
EP262: Ethanolamines (QCLot: 3814951)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP262: Ethanolamines (QCLot: 3814951) - continued							
ES1502916-001	AST2	EP262: Ethanolamine	141-43-5	10 µg/L	95.4	50	130
		EP262: Diethanolamine	111-42-2	10 µg/L	123	50	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP074E: Halogenated Aliphatic Compounds (QCLot: 3814109)										
ES1502916-003	WK13	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	84.3	----	70	130	----	----
		EP074: Trichloroethene	79-01-6	25 µg/L	87.2	----	70	130	----	----
EP074F: Halogenated Aromatic Compounds (QCLot: 3814109)										
ES1502916-003	WK13	EP074: Chlorobenzene	108-90-7	25 µg/L	85.3	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3814110)										
ES1502916-005	WK12	EP080: C6 - C9 Fraction	----	325 µg/L	120	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3814110)										
ES1502916-005	WK12	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	113	----	70	130	----	----
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3814126)										
ES1502916-001	AST2	EK057G: Nitrite as N	----	0.5 mg/L	92.8	----	70	130	----	----
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3814127)										
ES1502916-001	AST2	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	100	----	70	130	----	----
ED045G: Chloride Discrete analyser (QCLot: 3814128)										
ES1502916-001	AST2	ED045G: Chloride	16887-00-6	250 mg/L	83.0	----	70	130	----	----
EG052G: Silica by Discrete Analyser (QCLot: 3814129)										
ES1502916-001	AST2	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	----	70	130	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3814130)										
ES1502916-001	AST2	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	127	----	70	130	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3814143)										
ES1502916-002	WK13 U/S	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	75.0	----	70	130	----	----
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3814144)										
ES1502916-002	WK13 U/S	EK067G: Total Phosphorus as P	----	1.0 mg/L	87.4	----	70	130	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3814147)										
ES1502916-001	AST2	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	102	----	70	130	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3814148)										
ES1502916-001	AST2	EK055G: Ammonia as N	7664-41-7	1 mg/L	97.4	----	70	130	----	----
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3814207)										
ES1502916-001	AST2	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	----	70	130	----	----
		EP033: Ethene	74-85-1	50.29 µg/L	102	----	70	130	----	----
		EP033: Ethane	74-84-0	54.43 µg/L	106	----	70	130	----	----
		EP033: Propene	115-07-1	73.97 µg/L	100	----	70	130	----	----
		EP033: Propane	74-98-6	78.28 µg/L	97.8	----	70	130	----	----
		EP033: Butene	25167-67-3	99.61 µg/L	102	----	70	130	----	----
		EP033: Butane	106-97-8	102.18 µg/L	101	----	70	130	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3814551)										
ES1502916-001	AST2	EG035F: Mercury	7439-97-6	0.0100 mg/L	70.6	----	70	130	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3814553)										
ES1502916-005	WK12	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	127	----	70	130	----	----
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	106	----	70	130	----	----
		EG020A-F: Barium	7440-39-3	0.2 mg/L	# Not Determined	----	70	130	----	----
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	85.8	----	70	130	----	----
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	76.8	----	70	130	----	----
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	86.4	----	70	130	----	----
		EG020A-F: Copper	7440-50-8	0.2 mg/L	93.0	----	70	130	----	----
		EG020A-F: Lead	7439-92-1	0.2 mg/L	93.5	----	70	130	----	----
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	105	----	70	130	----	----
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	77.7	----	70	130	----	----
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	78.8	----	70	130	----	----
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	89.5	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3814669)										
ES1502916-001	AST2	EP071: C10 - C14 Fraction	----	200 µg/L	100	----	74	150	----	----
		EP071: C15 - C28 Fraction	----	300 µg/L	100	----	77	153	----	----
		EP071: C29 - C36 Fraction	----	200 µg/L	105	----	67	153	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3814669)										
ES1502916-001	AST2									

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3814669) - continued										
ES1502916-001	AST2	EP071: >C10 - C16 Fraction	>C10_C16	250 µg/L	96.0	----	74	150	----	----
		EP071: >C16 - C34 Fraction	----	350 µg/L	106	----	77	153	----	----
		EP071: >C34 - C40 Fraction	----	150 µg/L	100	----	67	153	----	----
EP075(SIM)A: Phenolic Compounds (QCLot: 3814670)										
ES1502916-001	AST2	EP075(SIM): Phenol	108-95-2	20 µg/L	40.8	----	20	130	----	----
		EP075(SIM): 2-Chlorophenol	95-57-8	20 µg/L	79.8	----	60	130	----	----
		EP075(SIM): 2-Nitrophenol	88-75-5	20 µg/L	75.6	----	60	130	----	----
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	20 µg/L	73.4	----	70	130	----	----
		EP075(SIM): Pentachlorophenol	87-86-5	20 µg/L	41.6	----	20	130	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3814670)										
ES1502916-001	AST2	EP075(SIM): Acenaphthene	83-32-9	20 µg/L	88.8	----	70	130	----	----
		EP075(SIM): Pyrene	129-00-0	20 µg/L	88.7	----	70	130	----	----
EP005: Total Organic Carbon (TOC) (QCLot: 3814706)										
ES1502916-002	WK13 U/S	EP005: Total Organic Carbon	----	100 mg/L	# Not Determined	----	70	130	----	----
ED009: Anions (QCLot: 3814707)										
ES1502916-001	AST2	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	----	70	130	----	----
EP262: Ethanolamines (QCLot: 3814951)										
ES1502916-001	AST2	EP262: Ethanolamine	141-43-5	10 µg/L	95.4	----	50	130	----	----
		EP262: Diethanolamine	111-42-2	10 µg/L	123	----	50	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1502916**	Page	: 1 of 14
Amendment	: **1**		
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
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Project	: 2268523 A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 06-FEB-2015
Sampler	: CS & AM	Issue Date	: 13-MAY-2015
Order number	: ----		
		No. of samples received	: 9
Quote number	: SY/933/14	No. of samples analysed	: 5

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005: pH							
Clear Plastic Bottle - Natural (EA005)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**----**	----	----	**06-FEB-2015**	06-FEB-2015	✓
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**---**	06-MAR-2015	----	**06-FEB-2015**	06-MAR-2015	✓
EA015: Total Dissolved Solids							
Clear Plastic Bottle - Natural (EA015H)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**---**	13-FEB-2015	----	**07-FEB-2015**	13-FEB-2015	✓
EA025: Suspended Solids							
Clear Plastic Bottle - Natural (EA025H)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**---**	13-FEB-2015	----	**07-FEB-2015**	13-FEB-2015	✓
ED009: Anions							
Clear Plastic Bottle - Natural (ED009-X)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**----**	----	----	**08-FEB-2015**	06-MAR-2015	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**---**	20-FEB-2015	----	**06-FEB-2015**	20-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	---	06-MAR-2015	----	**06-FEB-2015**	06-MAR-2015	✓
ED045G: Chloride Discrete analyser							
Clear Plastic Bottle - Natural (ED045G)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	---	06-MAR-2015	----	**06-FEB-2015**	06-MAR-2015	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F)							
WK12	**06-FEB-2015**	---	13-FEB-2015	----	**07-FEB-2015**	13-FEB-2015	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
AST2, WK13, WK14, WK11	**06-FEB-2015**	---	06-MAR-2015	----	**07-FEB-2015**	06-MAR-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
AST2, WK13, WK14, WK11	**06-FEB-2015**	---	05-AUG-2015	----	**07-FEB-2015**	05-AUG-2015	✓
Clear Plastic Bottle - Nitric Acid; Unspecified (EG020A-F)							
WK12	**06-FEB-2015**	---	05-AUG-2015	----	**07-FEB-2015**	05-AUG-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Natural (EG020B-F)							
WK12	**06-FEB-2015**	---	05-AUG-2015	----	**07-FEB-2015**	05-AUG-2015	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)							
AST2, WK13, WK14, WK11	**06-FEB-2015**	---	05-AUG-2015	----	**07-FEB-2015**	05-AUG-2015	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Natural (EG035F)							
WK12	**06-FEB-2015**	---	06-MAR-2015	----	**09-FEB-2015**	06-MAR-2015	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
AST2, WK13, WK14, WK11	**06-FEB-2015**	---	06-MAR-2015	----	**09-FEB-2015**	06-MAR-2015	✓
EG052G: Silica by Discrete Analyser							
Clear Plastic Bottle - Natural (EG052G)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	---	06-MAR-2015	----	**06-FEB-2015**	06-MAR-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK010/011: Chlorine							
Clear Plastic Bottle - Natural (EK010)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**----**	----	----	**06-FEB-2015**	06-FEB-2015	✓
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**---**	06-MAR-2015	----	**06-FEB-2015**	06-MAR-2015	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**---**	06-MAR-2015	----	**06-FEB-2015**	06-MAR-2015	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**---**	08-FEB-2015	----	**06-FEB-2015**	08-FEB-2015	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**---**	06-MAR-2015	----	**06-FEB-2015**	06-MAR-2015	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**06-FEB-2015**	06-MAR-2015	✓	**06-FEB-2015**	06-MAR-2015	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**06-FEB-2015**	06-MAR-2015	✓	**06-FEB-2015**	06-MAR-2015	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**---**	08-FEB-2015	----	**06-FEB-2015**	08-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**----**	----	----	**08-FEB-2015**	06-MAR-2015	✓
EP020: Oil and Grease (O&G)							
Amber Glass Bottle - Sulfuric Acid (EP020)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**----**	----	----	**06-FEB-2015**	06-MAR-2015	✓
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - Sulfuric Acid (EP033)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**----**	----	----	**08-FEB-2015**	20-FEB-2015	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**09-FEB-2015**	13-FEB-2015	✓	**09-FEB-2015**	21-MAR-2015	✓
EP074D: Fumigants							
Amber VOC Vial - Sulfuric Acid (EP074)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**06-FEB-2015**	20-FEB-2015	✓	**06-FEB-2015**	20-FEB-2015	✓
EP074E: Halogenated Aliphatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**06-FEB-2015**	20-FEB-2015	✓	**06-FEB-2015**	20-FEB-2015	✓
EP074F: Halogenated Aromatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**06-FEB-2015**	20-FEB-2015	✓	**06-FEB-2015**	20-FEB-2015	✓
EP074A: Monocyclic Aromatic Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP074)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**06-FEB-2015**	20-FEB-2015	✓	**06-FEB-2015**	20-FEB-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074B: Oxygenated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**06-FEB-2015**	20-FEB-2015	✓	**06-FEB-2015**	20-FEB-2015	✓
EP074C: Sulfonated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**06-FEB-2015**	20-FEB-2015	✓	**06-FEB-2015**	20-FEB-2015	✓
EP074G: Trihalomethanes							
Amber VOC Vial - Sulfuric Acid (EP074)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**06-FEB-2015**	20-FEB-2015	✓	**06-FEB-2015**	20-FEB-2015	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**09-FEB-2015**	13-FEB-2015	✓	**09-FEB-2015**	21-MAR-2015	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**09-FEB-2015**	13-FEB-2015	✓	**09-FEB-2015**	21-MAR-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**06-FEB-2015**	20-FEB-2015	✓	**06-FEB-2015**	20-FEB-2015	✓
EP262: Ethanolamines							
Amber Glass Bottle - Unpreserved (EP262)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**----**	----	----	**09-FEB-2015**	13-FEB-2015	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	2	16	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	2	6	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	2	8	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	14	**7.1**	**10.0**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH	EA005	2	10	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	5	**40.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Oil and Grease	EP020	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	5	**40.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	5	**40.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	5	**60.0**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	3	5	**60.0**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	8	**12.5**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Oil and Grease	EP020	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Suspended Solids (High Level)	EA025H	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH	EA005	WATER	In house: Referenced to APHA 4500 H+ B. pH of water samples is determined by ISE either manually or by automated pH meter. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Standard Anions -by IC (Extended Method)	ED009-X	WATER	In house: Referenced to APHA 4110. This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Silica (Reactive) by Discrete Analyser	EG052G	WATER	In house: Referenced to APHA 4500-SiO2 D: Under Acdic conditions reactive silicon combines with ammonium molybdate to form a yellow molybdosilicic acid complex. This is reduced by 1-amino-2-naphthol-4-sulfonic acid to a silicomolybdenum blue complex which is measured by discrete analyser at 670 nm. This method is compliant with NEPM (2013) Schedule B(3)
Chlorine	EK010	WATER	In-house (DPD colourimetry)
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500 F--C CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ammonium as N	EK055G-NH4	WATER	Ammonium in the sample is reported as the ionised / unionised fractions by the use of a nomograph and the initial pH and Temperature. Ammonia is determined by direct colorimetry by Discrete Analyser according to APHA 4500-NH3 G. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
Oil and Grease	EP020	WATER	In house: Referenced to APHA 5520 B. Oil & grease is a gravimetric procedure to determine the amount of oil & grease residue in an aqueous sample. The sample is serially extracted three times n-hexane. The resultant extracts are combined, dehydrated and concentrated prior to gravimetric determination. This method is compliant with NEPM (2013) Schedule B(3)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Volatile Organic Compounds	EP074	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Ethanolamines by LCMSMS	EP262	WATER	In-house LC-MSMS: Benzoyl derivatives of target compounds are analysed by LC/MSMS in ESI Positive Mode.

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED009: Anions	ES1502916-001	AST2	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG020F: Dissolved Metals by ICP-MS	ES1502916-005	WK12	**Barium**	7440-39-3	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG052G: Silica by Discrete Analyser	ES1502916-001	AST2	**Reactive Silica**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP005: Total Organic Carbon (TOC)	ES1502916-002	Anonymous	**Total Organic Carbon**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP033: C1 - C4 Hydrocarbon Gases	ES1502916-001	AST2	**Methane**	74-82-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP) - Continued					
Fluoride by PC Titrator	1	14	7.1	10.0	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

QUALITY CONTROL REPORT

Work Order	: **ES1502917**	Page	: 1 of 5
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
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Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523 A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 06-FEB-2015
Sampler	: CS & AM	Issue Date	: 13-MAY-2015
Order number	: ----		
		No. of samples received	: 18
Quote number	: SY/933/14	No. of samples analysed	: 5

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out ir compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 3814011)									
ES1502917-001	AST2	EP080: Benzene	71-43-2	1	µg/L	20	19	6.4	0% - 20%
		EP080: Toluene	108-88-3	2	µg/L	25	24	4.6	0% - 50%
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	3	3	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES1502917-011	WK13 U/S FILTERED	EP080: Benzene	71-43-2	1	µg/L	142	142	0.0	0% - 20%
		EP080: Toluene	108-88-3	2	µg/L	195	193	1.5	0% - 20%
		EP080: Ethylbenzene	100-41-4	2	µg/L	3	3	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	44	46	3.7	0% - 20%
		EP080: ortho-Xylene	95-47-6	2	µg/L	9	9	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP080: BTEXN (QCLot: 3814011)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	87.1	70	124
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	83.0	65	129
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	72.5	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	71.2	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	72.9	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	84.4	70	124

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080: BTEXN (QCLot: 3814011)							
ES1502917-002	WK13 U/S	EP080: Benzene	71-43-2	25 µg/L	# Not Determined	70	130
		EP080: Toluene	108-88-3	25 µg/L	# Not Determined	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	98.8	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	126	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	105	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	97.6	70	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080: BTEXN (QCLot: 3814011)										
ES1502917-002	WK13 U/S	EP080: Benzene	71-43-2	25 µg/L	# Not Determined	----	70	130	----	----
		EP080: Toluene	108-88-3	25 µg/L	# Not Determined	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	25 µg/L	98.8	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	126	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	25 µg/L	105	----	70	130	----	----
		EP080: Naphthalene	91-20-3	25 µg/L	97.6	----	70	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1502917**	Page	: 1 of 5
Amendment	: **1**		
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
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Project	: 2268523 A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 06-FEB-2015
Sampler	: CS & AM	Issue Date	: 13-MAY-2015
Order number	: ----		
		No. of samples received	: 18
Quote number	: SY/933/14	No. of samples analysed	: 5

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
AST2, WK13, WK12, WK14, WK11	**06-FEB-2015**	**06-FEB-2015**	20-FEB-2015	✓	**06-FEB-2015**	20-FEB-2015	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
TRH Volatiles/BTEX	EP080	2	5	**40.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
TRH Volatiles/BTEX	EP080	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
TRH Volatiles/BTEX	EP080	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
TRH Volatiles/BTEX	EP080	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP080: BTEXN	ES1502917-002	Anonymous	**Benzene**	71-43-2	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP080: BTEXN	ES1502917-002	Anonymous	**Toluene**	108-88-3	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

QUALITY CONTROL REPORT

Work Order	: **ES1504724**	Page	: 1 of 20
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
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Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 26-FEB-2015
Sampler	: CS,AM	Issue Date	: 11-MAY-2015
Order number	: ----		
		No. of samples received	: 1
Quote number	: SY/933/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Alex Rossi	Organic Chemist	Sydney Organics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Barbara Coupland	Quality Officer	Newcastle - Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA005: pH (QC Lot: 3839880)									
ES1504520-001	Anonymous	EA005: pH Value	----	0.01	pH Unit	8.31	8.33	0.2	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 3839024)									
ES1504529-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	118	113	4.8	0% - 20%
ES1504533-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	2230	2230	0.0	0% - 20%
EA015: Total Dissolved Solids (QC Lot: 3841466)									
ES1504724-001	AST2	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	4690	4720	0.6	0% - 20%
EA025: Suspended Solids (QC Lot: 3841467)									
ES1504724-001	AST2	EA025H: Suspended Solids (SS)	----	5	mg/L	90	96	6.2	0% - 50%
ED009: Anions (QC Lot: 3839669)									
ES1504672-001	Anonymous	ED009-X: Chloride	16887-00-6	0.100	mg/L	1450	1450	0.02	0% - 20%
ES1504783-008	Anonymous	ED009-X: Chloride	16887-00-6	0.100	mg/L	160	176	9.2	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3839026)									
ES1504533-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	5	5	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	5	5	0.0	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3840002)									
ES1504524-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	90	89	0.0	0% - 20%
ES1504524-010	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	18	18	0.0	0% - 50%
ED045G: Chloride Discrete analyser (QC Lot: 3840001)									
ES1504524-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	2560	2520	1.7	0% - 20%
ES1504524-010	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	45	46	2.3	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 3840993)									
ES1504724-001	AST2	ED093F: Calcium	7440-70-2	1	mg/L	16	16	0.0	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	3	3	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	1780	1770	0.6	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	16	16	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3840994)									
ES1504724-001	AST2	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.004	0.005	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	2.87	2.88	0.3	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3840994) - continued									
ES1504724-001	AST2	EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.012	0.011	0.0	0% - 50%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.006	0.006	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.008	0.007	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	10.1	9.86	2.4	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.25	0.26	0.0	No Limit
		EG020A-F: Bromine	7726-95-6	0.1	mg/L	0.7	0.7	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3840995)									
ES1504724-001	AST2	EG020B-F: Strontium	7440-24-6	0.001	mg/L	2.40	2.46	2.7	0% - 20%
		EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG052G: Silica by Discrete Analyser (QC Lot: 3840005)									
ES1504724-001	AST2	EG052G: Reactive Silica	----	0.05	mg/L	20.8	21.2	1.9	0% - 20%
EK010/011: Chlorine (QC Lot: 3838979)									
ES1504724-001	AST2	EK010: Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
		EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3839027)									
ES1504724-001	AST2	EK040P: Fluoride	16984-48-8	0.1	mg/L	1.0	0.9	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3839506)									
ES1504529-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.39	0.39	0.0	0% - 20%
ES1504691-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.01	0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3840003)									
ES1504524-010	Anonymous	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES1504724-001	AST2	EK057G: Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3839505)									
ES1504529-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.03	0.02	0.0	No Limit
ES1504691-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3839524)									
ES1504529-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.2	1.2	0.0	0% - 50%
ES1504708-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	44.6	42.2	5.6	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3839525)									
ES1504529-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.07	0.08	13.3	No Limit
ES1504708-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	9.50	8.74	8.3	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3840004)									
ES1504524-010	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	1.36	1.36	0.0	0% - 20%
EP005: Total Organic Carbon (TOC) (QC Lot: 3839553)									
ES1504488-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	5	5	0.0	No Limit
ES1504686-006	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	15	14	0.0	0% - 50%
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 3839650)									
EM1502092-002	Anonymous	EP033: Methane	74-82-8	10	µg/L	2690	2890	7.2	0% - 20%
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EP1501251-005	Anonymous	EP033: Methane	74-82-8	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 3839661)									
ES1504120-038	Anonymous	EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
ES1504463-001	Anonymous	EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
EP074B: Oxygenated Compounds (QC Lot: 3839661)									
ES1504120-038	Anonymous	EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074B: Oxygenated Compounds (QC Lot: 3839661) - continued									
ES1504120-038	Anonymous	EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit
ES1504463-001	Anonymous	EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit
EP074C: Sulfonated Compounds (QC Lot: 3839661)									
ES1504120-038	Anonymous	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
ES1504463-001	Anonymous	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
EP074D: Fumigants (QC Lot: 3839661)									
ES1504120-038	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
ES1504463-001	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3839661)									
ES1504120-038	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3839661) - continued									
ES1504120-038	Anonymous	EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
ES1504463-001	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 3839661)									
ES1504120-038	Anonymous	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP074F: Halogenated Aromatic Compounds (QC Lot: 3839661) - continued									
ES1504120-038	Anonymous	EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
ES1504463-001	Anonymous	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 3839661)									
ES1504120-038	Anonymous	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
ES1504463-001	Anonymous	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3839662)									
ES1504120-038	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES1504463-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3839662)									
ES1504120-038	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES1504463-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 3839662)									
ES1504120-038	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 3839662) - continued									
ES1504463-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP262: Ethanolamines (QC Lot: 3839417)									
ES1504724-001	AST2	EP262: Ethanolamine	141-43-5	1	µg/L	<1	<1	0.0	No Limit
		EP262: Diethanolamine	111-42-2	1	µg/L	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010P: Conductivity by PC Titrator (QCLot: 3839024)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	103	95	113
EA015: Total Dissolved Solids (QCLot: 3841466)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	----	2000 mg/L	91.0	87	109
				<10	293 mg/L	97.4	67	125
EA025: Suspended Solids (QCLot: 3841467)								
EA025H: Suspended Solids (SS)	----	5	mg/L	----	1000 mg/L	93.0	86	110
				<5	150 mg/L	101	83	129
ED009: Anions (QCLot: 3839669)								
ED009-X: Chloride	16887-00-6	0.1	mg/L	<0.100	2 mg/L	105	89	107
ED037P: Alkalinity by PC Titrator (QCLot: 3839026)								
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	----	200 mg/L	97.8	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3840002)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	110	86	122
ED045G: Chloride Discrete analyser (QCLot: 3840001)								
ED045G: Chloride	16887-00-6	1	mg/L	----	1000 mg/L	100	77	119
				<1	10 mg/L	107	75	123
ED093F: Dissolved Major Cations (QCLot: 3840993)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	# 87.0	90	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	103	90	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	99.8	82	118
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	98.3	87	117
EG020F: Dissolved Metals by ICP-MS (QCLot: 3840994)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	94.6	85	115
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.01 mg/L	100	85	115
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.0	85	115
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	94.5	85	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	91.9	85	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3840994) - continued								
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.1	85	115
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	88.6	85	115
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	91.2	85	115
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	90.3	85	115
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	90.8	85	115
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	93.2	85	115
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	95.4	85	115
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	95.4	85	115
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	98.1	85	115
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	97.8	85	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	98.2	85	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.7	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.1 mg/L	97.6	85	115
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	87.3	85	115
EG020A-F: Bromine	7726-95-6	0.1	mg/L	<0.1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3840995)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	94.6	80	112
EG020B-F: Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3840992)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	96.8	78	114
EG052G: Silica by Discrete Analyser (QCLot: 3840005)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.10	5 mg/L	108	94	114
EK010/011: Chlorine (QCLot: 3838979)								
EK010: Chlorine - Free	----	0.2	mg/L	<0.2	----	----	----	----
EK010: Chlorine - Total Residual	----	0.2	mg/L	<0.2	----	----	----	----
EK040P: Fluoride by PC Titrator (QCLot: 3839027)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5.0 mg/L	98.2	75	119
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3839506)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.0 mg/L	101	86	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3840003)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3840003) - continued								
EK057G: Nitrite as N	----	0.01	mg/L	<0.01	0.5 mg/L	103	83	119
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3839505)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	101	87	119
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3839524)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	87.3	66	114
				----	5 mg/L	101	66	119
				----	1.0 mg/L	93.0	66	126
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3839525)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	----	1.0 mg/L	93.7	66	124
				----	0.442 mg/L	81.4	63	123
				<0.01	4.42 mg/L	87.6	67	117
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3840004)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	110	82	122
EP005: Total Organic Carbon (TOC) (QCLot: 3839553)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	87.8	76	120
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3839650)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	99.0	86	114
EP033: Ethene	74-85-1	10	µg/L	<10	50.29 µg/L	99.3	87	111
EP033: Ethane	74-84-0	10	µg/L	<10	54.43 µg/L	99.0	87	111
EP033: Propene	115-07-1	10	µg/L	<10	73.97 µg/L	95.8	85	113
EP033: Propane	74-98-6	10	µg/L	<10	78.28 µg/L	100	84	112
EP033: Butene	25167-67-3	20	µg/L	<20	99.61 µg/L	97.2	83	115
EP033: Butane	106-97-8	20	µg/L	<20	102.18 µg/L	98.0	85	115
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3839661)								
EP074: Styrene	100-42-5	5	µg/L	<5	10 µg/L	106	74	118
EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	10 µg/L	100	75	121
EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	10 µg/L	104	67	123
EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	10 µg/L	104	70	122
EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	10 µg/L	105	69	123
EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	10 µg/L	105	71	121

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 3839661) - continued								
EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	10 µg/L	104	70	122
EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	10 µg/L	105	67	123
EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	10 µg/L	104	62	126
EP074B: Oxygenated Compounds (QCLot: 3839661)								
EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	100 µg/L	104	61.4	134
EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	100 µg/L	119	73.6	130
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	100 µg/L	108	61	139
EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	100 µg/L	122	65	137
EP074C: Sulfonated Compounds (QCLot: 3839661)								
EP074: Carbon disulfide	75-15-0	5	µg/L	<5	10 µg/L	110	72.8	127
EP074D: Fumigants (QCLot: 3839661)								
EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	10 µg/L	105	61	119
EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	10 µg/L	104	76	120
EP074: cis-1.3-Dichloropropylene	10061-01-5	10	µg/L	<10	10 µg/L	117	62	120
EP074: trans-1.3-Dichloropropylene	10061-02-6	10	µg/L	<10	10 µg/L	95.0	61	119
EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	10 µg/L	111	69	117
EP074E: Halogenated Aliphatic Compounds (QCLot: 3839661)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	74.8	60.6	138
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	104	67.4	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	103	69.4	129
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	120	56	140
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	113	63	135
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	112	65	131
EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	104	69	123
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	75.7	70.2	128
EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	106	71	119
EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	106	75	119
EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	107	77	117
EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	110	61	119
EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	104	73	119

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 3839661) - continued								
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	112	63	121
EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	105	78	122
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	106	74	120
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	106	74	118
EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	117	75	123
EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	118	79	121
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	104	72	124
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	92.6	66	114
EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	116	60	120
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	90.0	70.6	128
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	93.2	70	124
EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	110	74	128
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	80.1	71.8	126
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	93.2	66.4	136
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	93.6	58	132
EP074F: Halogenated Aromatic Compounds (QCLot: 3839661)								
EP074: Chlorobenzene	108-90-7	5	µg/L	<5	10 µg/L	107	80	118
EP074: Bromobenzene	108-86-1	5	µg/L	<5	10 µg/L	104	76	116
EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	10 µg/L	106	71	121
EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	10 µg/L	106	71	121
EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	10 µg/L	106	74	120
EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	10 µg/L	106	72	120
EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	10 µg/L	106	77	117
EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	10 µg/L	103	60	126
EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	10 µg/L	104	67	125
EP074G: Trihalomethanes (QCLot: 3839661)								
EP074: Chloroform	67-66-3	5	µg/L	<5	10 µg/L	105	76	118
EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	10 µg/L	91.3	64	118
EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	10 µg/L	93.5	65	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074G: Trihalomethanes (QCLot: 3839661) - continued								
EP074: Bromoform	75-25-2	5	µg/L	<5	10 µg/L	103	73.5	126
EP075(SIM)A: Phenolic Compounds (QCLot: 3839860)								
EP075(SIM): Phenol	108-95-2	0.2	µg/L	<1.0	5 µg/L	35.5	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	0.2	µg/L	<1.0	5 µg/L	64.4	63.8	110
EP075(SIM): 2-Methylphenol	95-48-7	0.2	µg/L	<1.0	5 µg/L	62.9	55.9	112
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	0.4	µg/L	<2.0	10 µg/L	59.9	42.5	114
EP075(SIM): 2-Nitrophenol	88-75-5	0.2	µg/L	<1.0	5 µg/L	65.8	62.7	117
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.2	µg/L	<1.0	5 µg/L	70.7	59.9	112
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.2	µg/L	<1.0	5 µg/L	77.0	59.3	122
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.2	µg/L	<1.0	5 µg/L	79.8	64.3	118
EP075(SIM): 4-Chloro-3-Methylphenol	59-50-7	0.2	µg/L	<1.0	5 µg/L	73.5	63	119
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.2	µg/L	<1.0	5 µg/L	64.0	58.7	118
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.2	µg/L	<1.0	5 µg/L	64.2	50	108
EP075(SIM): Pentachlorophenol	87-86-5	0.4	µg/L	<2.0	10 µg/L	40.1	10	95
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3839860)								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	<1.0	5 µg/L	64.2	58.6	119
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	<1.0	5 µg/L	65.8	63.6	114
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	<1.0	5 µg/L	66.5	62.2	113
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	<1.0	5 µg/L	69.3	63.9	115
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	<1.0	5 µg/L	71.2	62.6	116
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	<1.0	5 µg/L	73.2	64.3	116
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	<1.0	5 µg/L	81.8	63.6	118
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	<1.0	5 µg/L	82.0	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	<1.0	5 µg/L	80.7	64.1	117
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	<1.0	5 µg/L	83.5	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.2	µg/L	<1.0	5 µg/L	78.0	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<1.0	5 µg/L	79.2	61.7	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.5	5 µg/L	68.1	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<1.0	5 µg/L	62.2	59.9	118

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3839860) - continued								
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<1.0	5 µg/L	65.3	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<1.0	5 µg/L	68.4	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3839662)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	92.1	75	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3839862)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	95.8	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	95.6	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	99.3	62	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3839662)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	91.2	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3839862)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	98.6	58.9	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	97.7	73.9	138
EP071: >C34 - C40 Fraction	----	50	µg/L	<100	1500 µg/L	105	67	127
EP080: BTEXN (QCLot: 3839662)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	103	70	124
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	102	65	129
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	98.1	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	95.4	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	98.6	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	94.3	70	124
EP262: Ethanolamines (QCLot: 3839417)								
EP262: Ethanolamine	141-43-5	1	µg/L	<1	10 µg/L	104	50	130
EP262: Diethanolamine	111-42-2	1	µg/L	<1	10 µg/L	106	50	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED009: Anions (QCLot: 3839669)							
ES1504672-001	Anonymous	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3840002)							
ES1504524-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70	130
ED045G: Chloride Discrete analyser (QCLot: 3840001)							
ES1504524-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	# Not Determined	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3840992)							
ES1504724-001	AST2	EG035F: Mercury	7439-97-6	0.0100 mg/L	76.0	70	130
EG052G: Silica by Discrete Analyser (QCLot: 3840005)							
ES1504724-001	AST2	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	70	130
EK040P: Fluoride by PC Titrator (QCLot: 3839027)							
ES1504724-001	AST2	EK040P: Fluoride	16984-48-8	5.0 mg/L	105	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3839506)							
ES1504529-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	83.4	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3840003)							
ES1504724-001	AST2	EK057G: Nitrite as N	----	0.5 mg/L	103	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3839505)							
ES1504529-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	97.1	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3839524)							
ES1504529-007	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	94.8	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3839525)							
ES1504529-007	Anonymous	EK067G: Total Phosphorus as P	----	1.0 mg/L	90.8	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3840004)							
ES1504724-001	AST2	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	101	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 3839553)							
ES1504491-001	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	86.4	70	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3839650)							
EM1502092-008	Anonymous	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	70	130
		EP033: Ethene	74-85-1	50.29 µg/L	108	70	130
		EP033: Ethane	74-84-0	54.43 µg/L	108	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3839650) - continued							
EM1502092-008	Anonymous	EP033: Propene	115-07-1	73.97 µg/L	104	70	130
		EP033: Propane	74-98-6	78.28 µg/L	109	70	130
		EP033: Butene	25167-67-3	99.61 µg/L	107	70	130
		EP033: Butane	106-97-8	102.18 µg/L	110	70	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 3839661)							
ES1504120-038	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	86.7	70	130
		EP074: Trichloroethene	79-01-6	25 µg/L	94.8	70	130
EP074F: Halogenated Aromatic Compounds (QCLot: 3839661)							
ES1504120-038	Anonymous	EP074: Chlorobenzene	108-90-7	25 µg/L	99.0	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3839662)							
ES1504120-038	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	108	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3839662)							
ES1504120-038	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	104	70	130
EP080: BTEXN (QCLot: 3839662)							
ES1504120-038	Anonymous	EP080: Benzene	71-43-2	25 µg/L	98.1	70	130
		EP080: Toluene	108-88-3	25 µg/L	100	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	101	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	99.5	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	101	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	108	70	130
EP262: Ethanolamines (QCLot: 3839417)							
ES1504724-001	AST2	EP262: Ethanolamine	141-43-5	10 µg/L	75.2	50	130
		EP262: Diethanolamine	111-42-2	10 µg/L	94.4	50	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EK040P: Fluoride by PC Titrator (QCLot: 3839027)										
ES1504724-001	AST2	EK040P: Fluoride	16984-48-8	5.0 mg/L	105	----	70	130	----	----
EP262: Ethanolamines (QCLot: 3839417)										

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP262: Ethanolamines (QCLot: 3839417) - continued										
ES1504724-001	AST2	EP262: Ethanolamine	141-43-5	10 µg/L	75.2	----	50	130	----	----
		EP262: Diethanolamine	111-42-2	10 µg/L	94.4	----	50	130	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3839505)										
ES1504529-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	97.1	----	70	130	----	----
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3839506)										
ES1504529-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	83.4	----	70	130	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3839524)										
ES1504529-007	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	94.8	----	70	130	----	----
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3839525)										
ES1504529-007	Anonymous	EK067G: Total Phosphorus as P	----	1.0 mg/L	90.8	----	70	130	----	----
EP005: Total Organic Carbon (TOC) (QCLot: 3839553)										
ES1504491-001	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	86.4	----	70	130	----	----
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3839650)										
EM1502092-008	Anonymous	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	----	70	130	----	----
		EP033: Ethene	74-85-1	50.29 µg/L	108	----	70	130	----	----
		EP033: Ethane	74-84-0	54.43 µg/L	108	----	70	130	----	----
		EP033: Propene	115-07-1	73.97 µg/L	104	----	70	130	----	----
		EP033: Propane	74-98-6	78.28 µg/L	109	----	70	130	----	----
		EP033: Butene	25167-67-3	99.61 µg/L	107	----	70	130	----	----
		EP033: Butane	106-97-8	102.18 µg/L	110	----	70	130	----	----
EP074E: Halogenated Aliphatic Compounds (QCLot: 3839661)										
ES1504120-038	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	86.7	----	70	130	----	----
		EP074: Trichloroethene	79-01-6	25 µg/L	94.8	----	70	130	----	----
EP074F: Halogenated Aromatic Compounds (QCLot: 3839661)										
ES1504120-038	Anonymous	EP074: Chlorobenzene	108-90-7	25 µg/L	99.0	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3839662)										
ES1504120-038	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	108	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3839662)										
ES1504120-038	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	104	----	70	130	----	----
EP080: BTEXN (QCLot: 3839662)										
ES1504120-038	Anonymous	EP080: Benzene	71-43-2	25 µg/L	98.1	----	70	130	----	----
		EP080: Toluene	108-88-3	25 µg/L	100	----	70	130	----	----

Sub-Matrix: **WATER**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080: BTEXN (QCLot: 3839662) - continued										
ES1504120-038	Anonymous	EP080: Ethylbenzene	100-41-4	25 µg/L	101	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	99.5	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	25 µg/L	101	----	70	130	----	----
		EP080: Naphthalene	91-20-3	25 µg/L	108	----	70	130	----	----
ED009: Anions (QCLot: 3839669)										
ES1504672-001	Anonymous	ED009-X: Chloride	16887-00-6	4 mg/L	# Not Determined	----	70	130	----	----
ED045G: Chloride Discrete analyser (QCLot: 3840001)										
ES1504524-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	# Not Determined	----	70	130	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3840002)										
ES1504524-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	----	70	130	----	----
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3840003)										
ES1504724-001	AST2	EK057G: Nitrite as N	----	0.5 mg/L	103	----	70	130	----	----
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3840004)										
ES1504724-001	AST2	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	101	----	70	130	----	----
EG052G: Silica by Discrete Analyser (QCLot: 3840005)										
ES1504724-001	AST2	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	----	70	130	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3840992)										
ES1504724-001	AST2	EG035F: Mercury	7439-97-6	0.0100 mg/L	76.0	----	70	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1504724**	Page	: 1 of 11
Amendment	: **1**		
Client	: PARSONS BRINCKERHOFF AUST P/L	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
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Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 26-FEB-2015
Sampler	: CS,AM	Issue Date	: 11-MAY-2015
Order number	: ----		
		No. of samples received	: 1
Quote number	: SY/933/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005: pH							
Clear Plastic Bottle - Natural (EA005)							
AST2	**26-FEB-2015**	**----**	----	----	**26-FEB-2015**	26-FEB-2015	✓
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P)							
AST2	**26-FEB-2015**	**---**	26-MAR-2015	----	**26-FEB-2015**	26-MAR-2015	✓
EA015: Total Dissolved Solids							
Clear Plastic Bottle - Natural (EA015H)							
AST2	**26-FEB-2015**	**---**	05-MAR-2015	----	**27-FEB-2015**	05-MAR-2015	✓
EA025: Suspended Solids							
Clear Plastic Bottle - Natural (EA025H)							
AST2	**26-FEB-2015**	**---**	05-MAR-2015	----	**27-FEB-2015**	05-MAR-2015	✓
ED009: Anions							
Clear Plastic Bottle - Natural (ED009-X)							
AST2	**26-FEB-2015**	**----**	----	----	**27-FEB-2015**	26-MAR-2015	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
AST2	**26-FEB-2015**	**---**	12-MAR-2015	----	**26-FEB-2015**	12-MAR-2015	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
AST2	**26-FEB-2015**	**---**	26-MAR-2015	----	**27-FEB-2015**	26-MAR-2015	✓
ED045G: Chloride Discrete analyser							
Clear Plastic Bottle - Natural (ED045G)							
AST2	**26-FEB-2015**	**---**	26-MAR-2015	----	**27-FEB-2015**	26-MAR-2015	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
AST2	**26-FEB-2015**	**---**	26-MAR-2015	----	**01-MAR-2015**	26-MAR-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
AST2	**26-FEB-2015**	**---**	25-AUG-2015	----	**01-MAR-2015**	25-AUG-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020B-F)							
AST2	**26-FEB-2015**	**---**	25-AUG-2015	----	**01-MAR-2015**	25-AUG-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
AST2	**26-FEB-2015**	---	26-MAR-2015	----	**01-MAR-2015**	26-MAR-2015	✓
EG052G: Silica by Discrete Analyser							
Clear Plastic Bottle - Natural (EG052G)							
AST2	**26-FEB-2015**	---	26-MAR-2015	----	**27-FEB-2015**	26-MAR-2015	✓
EK010/011: Chlorine							
Clear Plastic Bottle - Natural (EK010)							
AST2	**26-FEB-2015**	----	----	----	**26-FEB-2015**	26-FEB-2015	✓
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
AST2	**26-FEB-2015**	---	26-MAR-2015	----	**26-FEB-2015**	26-MAR-2015	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
AST2	**26-FEB-2015**	---	26-MAR-2015	----	**27-FEB-2015**	26-MAR-2015	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
AST2	**26-FEB-2015**	---	28-FEB-2015	----	**27-FEB-2015**	28-FEB-2015	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
AST2	**26-FEB-2015**	---	26-MAR-2015	----	**27-FEB-2015**	26-MAR-2015	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
AST2	**26-FEB-2015**	**27-FEB-2015**	26-MAR-2015	✓	**27-FEB-2015**	26-MAR-2015	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
AST2	**26-FEB-2015**	**27-FEB-2015**	26-MAR-2015	✓	**27-FEB-2015**	26-MAR-2015	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
AST2	**26-FEB-2015**	---	28-FEB-2015	----	**27-FEB-2015**	28-FEB-2015	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005)							
AST2	**26-FEB-2015**	----	----	----	**27-FEB-2015**	26-MAR-2015	✓
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - Sulfuric Acid (EP033)							
AST2	**26-FEB-2015**	----	----	----	**27-FEB-2015**	12-MAR-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
AST2	**26-FEB-2015**	**27-FEB-2015**	05-MAR-2015	✓	**28-FEB-2015**	08-APR-2015	✓
EP074D: Fumigants							
Amber VOC Vial - Sulfuric Acid (EP074)							
AST2	**26-FEB-2015**	**27-FEB-2015**	12-MAR-2015	✓	**27-FEB-2015**	12-MAR-2015	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074E: Halogenated Aliphatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074) AST2	**26-FEB-2015**	**27-FEB-2015**	12-MAR-2015	✓	**27-FEB-2015**	12-MAR-2015	✓
EP074F: Halogenated Aromatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074) AST2	**26-FEB-2015**	**27-FEB-2015**	12-MAR-2015	✓	**27-FEB-2015**	12-MAR-2015	✓
EP074A: Monocyclic Aromatic Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP074) AST2	**26-FEB-2015**	**27-FEB-2015**	12-MAR-2015	✓	**27-FEB-2015**	12-MAR-2015	✓
EP074B: Oxygenated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074) AST2	**26-FEB-2015**	**27-FEB-2015**	12-MAR-2015	✓	**27-FEB-2015**	12-MAR-2015	✓
EP074C: Sulfonated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074) AST2	**26-FEB-2015**	**27-FEB-2015**	12-MAR-2015	✓	**27-FEB-2015**	12-MAR-2015	✓
EP074G: Trihalomethanes							
Amber VOC Vial - Sulfuric Acid (EP074) AST2	**26-FEB-2015**	**27-FEB-2015**	12-MAR-2015	✓	**27-FEB-2015**	12-MAR-2015	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM)) AST2	**26-FEB-2015**	**27-FEB-2015**	05-MAR-2015	✓	**28-FEB-2015**	08-APR-2015	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM)) AST2	**26-FEB-2015**	**27-FEB-2015**	05-MAR-2015	✓	**28-FEB-2015**	08-APR-2015	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) AST2	**26-FEB-2015**	**27-FEB-2015**	12-MAR-2015	✓	**27-FEB-2015**	12-MAR-2015	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber VOC Vial - Sulfuric Acid (EP080) AST2	**26-FEB-2015**	**27-FEB-2015**	12-MAR-2015	✓	**27-FEB-2015**	12-MAR-2015	✓
EP262: Ethanolamines							
Amber Glass Bottle - Unpreserved (EP262) AST2	**26-FEB-2015**	**----**	----	----	**02-MAR-2015**	05-MAR-2015	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	1	2	**50.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	2	15	**13.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	1	1	**100.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	2	13	**15.4**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	1	**100.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	1	**100.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	1	**100.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	1	**100.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	1	**100.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH	EA005	1	7	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	9	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	1	**100.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	2	13	**15.4**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	1	1	**100.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	1	**100.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	18	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ammonia as N by Discrete analyser	EK055G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Major Cations - Dissolved	ED093F	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	1	**200.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	1	**200.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	19	**15.8**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	3	20	**15.0**	**15.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chlorine	EK010	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Conductivity by PC Titrator	EA010-P	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
TRH - Semivolatile Fraction	EP071	1	2	**50.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C1 - C4 Gases	EP033	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ethanolamines by LCMSMS	EP262	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Silica (Reactive) by Discrete Analyser	EG052G	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Standard Anions -by IC (Extended Method)	ED009-X	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH	EA005	WATER	In house: Referenced to APHA 4500 H+ B. pH of water samples is determined by ISE either manually or by automated pH meter. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Standard Anions -by IC (Extended Method)	ED009-X	WATER	In house: Referenced to APHA 4110. This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Silica (Reactive) by Discrete Analyser	EG052G	WATER	In house: Referenced to APHA 4500-SiO2 D: Under Acdic conditions reactive silicon combines with ammonium molybdate to form a yellow molybdosilicic acid complex. This is reduced by 1-amino-2-naphthol-4-sulfonic acid to a silicomolybdenum blue complex which is measured by discrete analyser at 670 nm. This method is compliant with NEPM (2013) Schedule B(3)
Chlorine	EK010	WATER	In-house (DPD colourimetry)
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500 F--C CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ammonium as N	EK055G-NH4	WATER	Ammonium in the sample is reported as the ionised / unionised fractions by the use of a nomograph and the initial pH and Temperature. Ammonia is determined by direct colorimetry by Discrete Analyser according to APHA 4500-NH3 G. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Volatile Organic Compounds	EP074	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Ethanolamines by LCMSMS	EP262	WATER	In-house LC-MSMS: Benzoyl derivatives of target compounds are analysed by LC/MSMS in ESI Positive Mode.

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
ED093F: Dissolved Major Cations	4628998-009	----	**Calcium**	7440-70-2	87.0 %	90-114%	**Recovery less than lower control limit**
Matrix Spike (MS) Recoveries							
ED009: Anions	ES1504672-001	Anonymous	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1504524-001	Anonymous	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED045G: Chloride Discrete analyser	ES1504524-001	Anonymous	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG052G: Silica by Discrete Analyser	ES1504724-001	AST2	**Reactive Silica**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP033: C1 - C4 Hydrocarbon Gases	EM1502092-008	Anonymous	**Methane**	74-82-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

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CERTIFICATE OF ANALYSIS 121884

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	1 Water		
Date samples received / completed instructions received	13/01/2015	/	13/01/2015

This report supersedes the previous report R00 due to an amendment to client sample ID.

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	20/01/15	/	5/05/15
Date of Preliminary Report:	Not Issued		

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics		
Our Reference:	UNITS	121884-1
Your Reference	----------	AST2
Date Sampled	----------	12/01/2015
Type of sample		Water
Date prepared	-	14/01/2015
Date analysed	-	14/01/2015
THPS in Water by uHPLC*	µg/L	61
Sulphate, SO4	mg/L	4

Metals in Waters - Acid extractable		
Our Reference:	UNITS	121884-1
Your Reference	----------	AST2
Date Sampled	----------	12/01/2015
Type of sample		Water
Date prepared	-	15/01/2015
Date analysed	-	15/01/2015
Phosphorus - Total	mg/L	3.2

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 2268523A

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			14/01/2015	121884-1	14/01/2015 || 14/01/2015	LCS-W1	14/01/2015
Date analysed	-			14/01/2015	121884-1	14/01/2015 || 14/01/2015	LCS-W1	14/01/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	121884-1	61 || 62 || RPD: 2	LCS-W1	96%
Sulphate, SO4	mg/L	1	Inorg-081	<1	121884-1	4 || [N/T]	LCS-W1	99%

QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			15/01/2015	[NT]	[NT]	LCS-W1	15/01/2015
Date analysed	-			15/01/2015	[NT]	[NT]	LCS-W1	15/01/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	[NT]	[NT]	LCS-W1	115%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	121884-1	14/01/2015
Date analysed	-	[NT]	[NT]	121884-1	14/01/2015
THPS in Water by uHPLC*	µg/L	[NT]	[NT]	121884-1	100%
Sulphate, SO4	mg/L	[NT]	[NT]	[NR]	[NR]

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

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CERTIFICATE OF ANALYSIS 122757

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	12 Waters		
Date samples received / completed instructions received	30/01/15	/	30/01/15

This report supersedes the previous report R00 due to an amendment to client sample ID (ELS #1).

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	6/02/15	/	5/05/15
Date of Preliminary Report:	Not Issued		

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics						
Our Reference:	UNITS	122757-1	122757-2	122757-3	122757-4	122757-5
Your Reference	----------	AST2	WKSW01	WKMB01	WKMB02	WKMB03
Date Sampled	----------	28/01/2015	28/01/2015	29/01/2015	29/01/2015	29/01/2015
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	02/02/2015	02/02/2015	02/02/2015	02/02/2015	02/02/2015
Date analysed	-	02/02/2015	02/02/2015	02/02/2015	02/02/2015	02/02/2015
THPS in Water by uHPLC*	µg/L	65	<50	89	<50	<50
Sulphate, SO4	mg/L	<1	4	91	15	<1

Miscellaneous Inorganics						
Our Reference:	UNITS	122757-6	122757-7	122757-8	122757-9	122757-10
Your Reference	----------	WKMB06A	WKMB06B	WKSW02	WKSW03	GR-P3
Date Sampled	----------	29/01/2015	29/01/2015	29/01/2015	29/01/2015	29/01/2015
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	02/02/2015	02/02/2015	02/02/2015	02/02/2015	02/02/2015
Date analysed	-	02/02/2015	02/02/2015	02/02/2015	02/02/2015	02/02/2015
THPS in Water by uHPLC*	µg/L	<50	<50	<50	<50	<50
Sulphate, SO4	mg/L	42	38	11	6	74

Miscellaneous Inorganics			
Our Reference:	UNITS	122757-11	122757-12
Your Reference	----------	GW080487	QA2
Date Sampled	----------	30/01/2015	30/01/2015
Type of sample		Water	Water
Date prepared	-	02/02/2015	02/02/2015
Date analysed	-	02/02/2015	02/02/2015
THPS in Water by uHPLC*	µg/L	<50	<50
Sulphate, SO4	mg/L	92	91

Metals in Waters - Acid extractable						
Our Reference:	UNITS	122757-1	122757-2	122757-3	122757-4	122757-5
Your Reference	----------	AST2	WKSW01	WKMB01	WKMB02	WKMB03
Date Sampled	----------	28/01/2015	28/01/2015	29/01/2015	29/01/2015	29/01/2015
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	03/02/2015	03/02/2015	03/02/2015	03/02/2015	03/02/2015
Date analysed	-	03/02/2015	03/02/2015	03/02/2015	03/02/2015	03/02/2015
Phosphorus - Total	mg/L	2.8	0.2	0.09	0.09	0.1

Metals in Waters - Acid extractable						
Our Reference:	UNITS	122757-6	122757-7	122757-8	122757-9	122757-10
Your Reference	----------	WKMB06A	WKMB06B	WKSW02	WKSW03	GR-P3
Date Sampled	----------	29/01/2015	29/01/2015	29/01/2015	29/01/2015	29/01/2015
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	03/02/2015	03/02/2015	03/02/2015	03/02/2015	03/02/2015
Date analysed	-	03/02/2015	03/02/2015	03/02/2015	03/02/2015	03/02/2015
Phosphorus - Total	mg/L	0.3	0.9	0.2	0.1	<0.05

Metals in Waters - Acid extractable			
Our Reference:	UNITS	122757-11	122757-12
Your Reference	----------	GW080487	QA2
Date Sampled	----------	30/01/2015	30/01/2015
Type of sample		Water	Water
Date prepared	-	03/02/2015	03/02/2015
Date analysed	-	03/02/2015	03/02/2015
Phosphorus - Total	mg/L	<0.05	<0.05

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 2268523A

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			02/02/2015	122757-1	02/02/2015 || 02/02/2015	122757-2	02/02/2015
Date analysed	-			02/02/2015	122757-1	02/02/2015 || 02/02/2015	122757-2	02/02/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	122757-1	65 || 64 || RPD: 2	122757-2	104%
Sulphate, SO4	mg/L	1	Inorg-081	<1	122757-1	<1 || <1	122757-2	114%

QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			03/02/2015	122757-1	03/02/2015 || 03/02/2015	LCS-1	03/02/2015
Date analysed	-			03/02/2015	122757-1	03/02/2015 || 03/02/2015	LCS-1	03/02/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	122757-1	2.8 || 2.8 || RPD: 0	LCS-1	106%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	122757-11	02/02/2015 || 02/02/2015	LCS-1	03/02/2015
Date analysed	-	122757-11	02/02/2015 || 02/02/2015	LCS-1	03/02/2015
THPS in Water by uHPLC*	µg/L	122757-11	<50 || <50	LCS-1	94%
Sulphate, SO4	mg/L	122757-11	92 || 91 || RPD: 1	LCS-1	109%

QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	122757-11	03/02/2015 || 03/02/2015
Date analysed	-	122757-11	03/02/2015 || 03/02/2015
Phosphorus - Total	mg/L	122757-11	<0.05 || <0.05

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

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CERTIFICATE OF ANALYSIS 122818

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	2 Waters		
Date samples received / completed instructions received	02/02/15	/	02/02/15

This report supersedes the previous report R01 due to an amendment to client sample ID (ELS #1).

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	3/02/15	/	5/05/15
Date of Preliminary Report:	Not Issued		

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	122818-1 AST2 02/02/2015 Water	122818-2 QA 02/02/2015 Water
Date prepared	-	02/02/2015	02/02/2015
Date analysed	-	02/02/2015	02/02/2015
THPS in Water by uHPLC*	µg/L	72	59
Sulphate, SO4	mg/L	<1	<1

Metals in Waters - Acid extractable			
Our Reference:	UNITS	122818-1	122818-2
Your Reference	----------	AST2	QA
Date Sampled	----------	02/02/2015	02/02/2015
Type of sample		Water	Water
Date prepared	-	03/02/2015	03/02/2015
Date analysed	-	03/02/2015	03/02/2015
Phosphorus - Total	mg/L	2.7	2.6

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 2268523A

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			02/02/2015	122818-1	02/02/2015 || 3/2/2015	LCS-W1	02/02/2015
Date analysed	-			02/02/2015	122818-1	02/02/2015 || 3/2/2015	LCS-W1	02/02/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	122818-1	72 || 72 || RPD: 0	LCS-W1	94%
Sulphate, SO4	mg/L	1	Inorg-081	<1	122818-1	<1 || [N/T]	LCS-W1	102%
QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			03/02/2015	[NT]	[NT]	LCS-W1	03/02/2015
Date analysed	-			03/02/2015	[NT]	[NT]	LCS-W1	03/02/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	[NT]	[NT]	LCS-W1	106%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	122818-2	3/2/2015
Date analysed	-	[NT]	[NT]	122818-2	3/2/2015
THPS in Water by uHPLC*	µg/L	[NT]	[NT]	122818-2	113%
Sulphate, SO4	mg/L	[NT]	[NT]	[NR]	[NR]

Report Comments:

Sample number 2 was received with headspace. Samples for THPS analysis should be collected in sealed vilas with no headspace.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

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CERTIFICATE OF ANALYSIS 122955

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	5 Waters		
Date samples received / completed instructions received	04/02/15	/	04/02/15

This report supersedes the previous report R00 due an amendment to client sample ID (ELS #5) and the removal of results for sample ELS #2 & 4.

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	5/02/15	/	6/05/15
Date of Preliminary Report:	Not Issued		

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	122955-1 WK11 03/02/2015 Water	122955-3 WK13 03/02/2015 Water	122955-5 AST2 03/02/2015 Water
Date prepared	-	4/2/2015	4/2/2015	4/2/2015
Date analysed	-	4/2/2015	4/2/2015	4/2/2015
THPS in Water by uHPLC*	µg/L	90	57	<50
Sulphate, SO4	mg/L	4	1	<1

Metals in Waters - Acid extractable				
Our Reference:	UNITS	122955-1	122955-3	122955-5
Your Reference	----------	WK11	WK13	AST2
Date Sampled	----------	03/02/2015	03/02/2015	03/02/2015
Type of sample		Water	Water	Water
Date prepared	-	05/02/2015	05/02/2015	05/02/2015
Date analysed	-	05/02/2015	05/02/2015	05/02/2015
Phosphorus - Total	mg/L	4.9	3.7	2.7

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 2268523A

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			04/02/2015	122955-1	4/2/2015 || 4/2/2015	LCS-1	04/02/2015
Date analysed	-			04/02/2015	122955-1	4/2/2015 || 4/2/2015	LCS-1	04/02/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	122955-1	90 || 92 || RPD: 2	LCS-1	100%
Sulphate, SO4	mg/L	1	Inorg-081	<1	122955-1	4 || 3 || RPD: 29	LCS-1	108%
QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			05/02/2015	122955-1	05/02/2015 || 05/02/2015	LCS-W1	05/02/2015
Date analysed	-			05/02/2015	122955-1	05/02/2015 || 05/02/2015	LCS-W1	05/02/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	122955-1	4.9 || 5.0 || RPD: 2	LCS-W1	110%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	122955-2	04/02/2015
Date analysed	-	[NT]	[NT]	122955-2	04/02/2015
THPS in Water by uHPLC*	µg/L	[NT]	[NT]	122955-2	73%
Sulphate, SO4	mg/L	[NT]	[NT]	122955-2	105%
QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	122955-2	05/02/2015
Date analysed	-	[NT]	[NT]	122955-2	05/02/2015
Phosphorus - Total	mg/L	[NT]	[NT]	122955-2	114%

Report Comments:

Samples for THPS analysis were collected in 250 ml amber bottles and some headspace was present in all the samples. Samples for THPS analysis should be collected in sealed vials with NO headspace, kept at <6°C and analysed within 3 days.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

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CERTIFICATE OF ANALYSIS 123059

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	7 Waters		
Date samples received / completed instructions received	05/02/2015	/	05/02/2015

This report supersedes the previous report R00 due to an amendment to client sample ID (ELS #7) and the removal of results for ELS #1, 3 & 5.

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	6/02/15	/	6/05/15
Date of Preliminary Report:	Not Issued		

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	123059-2 WK11 4/02/2015 Water	123059-4 WK14 4/02/2015 Water	123059-6 WK13 4/02/2015 Water	123059-7 AST2 4/02/2015 Water
Date prepared	-	05/02/2015	05/02/2015	05/02/2015	05/02/2015
Date analysed	-	05/02/2015	05/02/2015	05/02/2015	05/02/2015
THPS in Water by uHPLC*	µg/L	83	67	64	<50
Sulphate, SO4	mg/L	5	2	2	<1

Metals in Waters - Acid extractable					
Our Reference:	UNITS	123059-2	123059-4	123059-6	123059-7
Your Reference	----------	WK11	WK14	WK13	AST2
Date Sampled	----------	4/02/2015	4/02/2015	4/02/2015	4/02/2015
Type of sample		Water	Water	Water	Water
Date prepared	-	06/02/2015	06/02/2015	06/02/2015	06/02/2015
Date analysed	-	06/02/2015	06/02/2015	06/02/2015	06/02/2015
Phosphorus - Total	mg/L	5.1	3.3	3.7	2.9

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			05/02/2015	[NT]	[NT]	LCS-W1	05/02/2015
Date analysed	-			05/02/2015	[NT]	[NT]	LCS-W1	05/02/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	[NT]	[NT]	LCS-W1	104%
Sulphate, SO4	mg/L	1	Inorg-081	<1	[NT]	[NT]	LCS-W1	110%

QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			06/02/2015	123059-4	06/02/2015 || 06/02/2015	LCS-W1	06/02/2015
Date analysed	-			06/02/2015	123059-4	06/02/2015 || 06/02/2015	LCS-W1	06/02/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	123059-4	3.3 || 3.3 || RPD: 0	LCS-W1	115%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	123059-2	06/02/2015
Date analysed	-	[NT]	[NT]	123059-2	06/02/2015
THPS in Water by uHPLC*	µg/L	[NT]	[NT]	123059-2	60%
Sulphate, SO4	mg/L	[NT]	[NT]	[NR]	[NR]

Report Comments:

Samples for THPS analysis were collected in 250 ml amber bottles and some headspace was present in all the samples. Samples for THPS analysis should be collected in sealed vials with NO headspace, kept at <6°C and analysed within 3 days.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

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Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

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CERTIFICATE OF ANALYSIS 123060

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	4 Waters		
Date samples received / completed instructions received	05/02/2015	/	05/02/2015

This report supersedes the previous report R00 due to the removal of results for ELS #2 & 4.

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	6/02/15	/	6/05/15
Date of Preliminary Report:	Not Issued		

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	123060-1 WK14 4/02/2015 Water	123060-3 WK12 4/02/2015 Water
Date prepared	-	05/02/2015	05/02/2015
Date analysed	-	05/02/2015	05/02/2015
THPS in Water by uHPLC*	µg/L	<50	<50
Sulphate, SO4	mg/L	2	<1

Metals in Waters - Acid extractable			
Our Reference:	UNITS	123060-1	123060-3
Your Reference	----------	WK14	WK12
Date Sampled	----------	4/02/2015	4/02/2015
Type of sample		Water	Water
Date prepared	-	06/02/2015	06/02/2015
Date analysed	-	06/02/2015	06/02/2015
Phosphorus - Total	mg/L	3.3	2.2

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			05/02/2015	123060-1	05/02/2015 || 05/02/2015	LCS-W1	05/02/2015
Date analysed	-			05/02/2015	123060-1	05/02/2015 || 05/02/2015	LCS-W1	05/02/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	123060-1	<50 || <50	LCS-W1	101%
Sulphate, SO4	mg/L	1	Inorg-081	<1	123060-1	2 || [N/T]	LCS-W1	110%
QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			06/02/2015	123060-1	06/02/2015 || 06/02/2015	LCS-W1	06/02/2015
Date analysed	-			06/02/2015	123060-1	06/02/2015 || 06/02/2015	LCS-W1	06/02/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	123060-1	3.3 || 3.4 || RPD: 3	LCS-W1	115%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	123060-2	6/2/2015
Date analysed	-	[NT]	[NT]	123060-2	6/2/2015
THPS in Water by uHPLC*	µg/L	[NT]	[NT]	123060-2	58%
Sulphate, SO4	mg/L	[NT]	[NT]	[NR]	[NR]
QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	123060-2	06/02/2015
Date analysed	-	[NT]	[NT]	123060-2	06/02/2015
Phosphorus - Total	mg/L	[NT]	[NT]	123060-2	115%

Report Comments:

Samples for THPS analysis were collected in 250 ml amber bottles and some headspace was present in all the samples. Samples for THPS analysis should be collected in sealed vials with NO headspace, kept at <6°C and analysed within 3 days.
Spike recovery for sample 123060-2 for THPS at 58%, this is outside QC acceptance criteria, however, LCS recovery acceptable at 101%.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

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CERTIFICATE OF ANALYSIS 123117

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	9 Waters		
Date samples received / completed instructions received	06/02/2015	/	06/02/2015

This report supersedes the previous report R00 due to an amendment to client sample ID (ELS #3) and the removal of results for ELS #1, 4, 6 & 8.

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	10/02/15	/	6/05/15
Date of Preliminary Report:	Not Issued		

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics						
Our Reference:	UNITS	123117-2	123117-3	123117-5	123117-7	123117-9
Your Reference	----------	WK13	AST2	WK12	WK14	WK11
Date Sampled	----------	5/02/2015	5/02/2015	5/02/2015	5/02/2015	5/02/2015
Time Sampled		11:00	10:30	11:40	12:20	13:00
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	06/02/2015	06/02/2015	06/02/2015	06/02/2015	06/02/2015
Date analysed	-	06/02/2015	06/02/2015	06/02/2015	06/02/2015	06/02/2015
THPS in Water by uHPLC*	µg/L	170	87	150	140	230
Sulphate, SO4	mg/L	2	<1	<1	2	5

Metals in Waters - Acid extractable						
Our Reference:	UNITS	123117-2	123117-3	123117-5	123117-7	123117-9
Your Reference	----------	WK13	AST2	WK12	WK14	WK11
Date Sampled	----------	5/02/2015	5/02/2015	5/02/2015	5/02/2015	5/02/2015
Time Sampled		11:00	10:30	11:40	12:20	13:00
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	06/02/2015	06/02/2015	06/02/2015	06/02/2015	06/02/2015
Date analysed	-	06/02/2015	06/02/2015	06/02/2015	06/02/2015	06/02/2015
Phosphorus - Total	mg/L	4.0	2.7	2.0	3.0	4.5

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 2268523A

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			6/2/2015	[NT]	[NT]	LCS-W1	06/02/2015
Date analysed	-			6/2/2015	[NT]	[NT]	LCS-W1	06/02/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	[NT]	[NT]	LCS-W1	103%
Sulphate, SO4	mg/L	1	Inorg-081	<1	[NT]	[NT]	LCS-W1	111%
QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			06/02/2015	[NT]	[NT]	LCS-W1	06/02/2015
Date analysed	-			06/02/2015	[NT]	[NT]	LCS-W1	06/02/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	[NT]	[NT]	LCS-W1	106%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	123117-2	06/02/2015
Date analysed	-	[NT]	[NT]	123117-2	06/02/2015
THPS in Water by uHPLC*	µg/L	[NT]	[NT]	123117-2	62%
Sulphate, SO4	mg/L	[NT]	[NT]	123117-2	114%
QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	123117-2	06/02/2015
Date analysed	-	[NT]	[NT]	123117-2	06/02/2015
Phosphorus - Total	mg/L	[NT]	[NT]	123117-2	118%

Report Comments:

Samples for THPS analysis were collected in 250 ml amber bottles and some headspace was present in all the samples. Samples for THPS analysis should be collected in sealed vials with NO headspace, kept at <6°C and analysed within 3 days.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

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CERTIFICATE OF ANALYSIS 123154

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	9 Waters		
Date samples received / completed instructions received	06/02/2015	/	06/02/2015

This report supersedes the previous report R00 due to an amendment to client sample ID (ELS #1) and the removal of results for ELS #2, 4, 6 & 8.

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	9/02/15	/	6/05/15
Date of Preliminary Report:	Not Issued		

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics						
Our Reference:	UNITS	123154-1	123154-3	123154-5	123154-7	123154-9
Your Reference	----------	AST2	WK 13	WK12	WK14	WK11
Date Sampled	----------	06/02/2015	06/02/2015	06/02/2015	06/02/2015	06/02/2015
Time Sampled		09:00	09:45	10:30	11:30	12:30
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	09/02/2015	09/02/2015	09/02/2015	09/02/2015	09/02/2015
Date analysed	-	09/02/2015	09/02/2015	09/02/2015	09/02/2015	09/02/2015
THPS in Water by uHPLC*	µg/L	100	140	100	81	62
Sulphate, SO4	mg/L	<1	2	<1	2	5

Metals in Waters - Acid extractable						
Our Reference:	UNITS	123154-1	123154-3	123154-5	123154-7	123154-9
Your Reference	----------	AST2	WK 13	WK12	WK14	WK11
Date Sampled	----------	06/02/2015	06/02/2015	06/02/2015	06/02/2015	06/02/2015
Time Sampled		09:00	09:45	10:30	11:30	12:30
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	09/02/2015	09/02/2015	09/02/2015	09/02/2015	09/02/2015
Date analysed	-	09/02/2015	09/02/2015	09/02/2015	09/02/2015	09/02/2015
Phosphorus - Total	mg/L	2.9	4.6	2.0	3.0	4.5

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 2268523A

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			9/2/2015	123154-1	09/02/2015 || 09/02/2015	LCS-W1	09/02/2015
Date analysed	-			9/2/2015	123154-1	09/02/2015 || 09/02/2015	LCS-W1	09/02/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	123154-1	100 || 100 || RPD: 0	LCS-W1	104%
Sulphate, SO4	mg/L	1	Inorg-081	<1	123154-1	<1 || <1	LCS-W1	99%

QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			09/02/2015	123154-1	09/02/2015 || 09/02/2015	LCS-W1	09/02/2015
Date analysed	-			09/02/2015	123154-1	09/02/2015 || 09/02/2015	LCS-W1	09/02/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	123154-1	2.9 || 2.9 || RPD: 0	LCS-W1	113%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	123154-2	09/02/2015
Date analysed	-	[NT]	[NT]	123154-2	09/02/2015
THPS in Water by uHPLC*	µg/L	[NT]	[NT]	123154-2	78%
Sulphate, SO4	mg/L	[NT]	[NT]	123154-2	97%

QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	123154-2	09/02/2015
Date analysed	-	[NT]	[NT]	123154-2	09/02/2015
Phosphorus - Total	mg/L	[NT]	[NT]	123154-2	108%

Report Comments:

Samples for THPS analysis were collected in 250 ml amber bottles and some headspace was present in all the samples. Samples for THPS analysis should be collected in sealed vials with NO headspace, kept at <6°C and analysed within 3 days.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

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LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

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CERTIFICATE OF ANALYSIS 124237

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	1 Water		
Date samples received / completed instructions received	26/02/2015	/	26/02/2015

This report supersedes the previous report R00 due to an amendment to client sample ID.

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	27/02/15	/	5/05/15
Date of Preliminary Report:	Not Issued		

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics		
Our Reference:	UNITS	124237-1
Your Reference	----------	AST2
Date Sampled	----------	26/02/2015
Time Sampled		11:45
Type of sample		Water
Date prepared	-	26/02/2015
Date analysed	-	26/02/2015
THPS in Water by uHPLC*	µg/L	110
Sulphate, SO4	mg/L	3

Metals in Waters - Acid extractable		
Our Reference:	UNITS	124237-1
Your Reference	----------	AST2
Date Sampled	----------	26/02/2015
Time Sampled		11:45
Type of sample		Water
Date prepared	-	27/02/2015
Date analysed	-	27/02/2015
Phosphorus - Total	mg/L	2.5

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 2268523A

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			26/02/2015	124237-1	26/02/2015 || 26/02/2015	LCS-W1	26/02/2015
Date analysed	-			26/02/2015	124237-1	26/02/2015 || 26/02/2015	LCS-W1	26/02/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	124237-1	110 || 110 || RPD: 0	LCS-W1	102%
Sulphate, SO4	mg/L	1	Inorg-081	<1	124237-1	3 || [N/T]	LCS-W1	114%

QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			26/02/2015	[NT]	[NT]	LCS-W1	27/02/2015
Date analysed	-			26/02/2015	[NT]	[NT]	LCS-W1	27/02/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	[NT]	[NT]	LCS-W1	102%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	124237-1	26/02/2015
Date analysed	-	[NT]	[NT]	124237-1	26/02/2015
THPS in Water by uHPLC*	µg/L	[NT]	[NT]	124237-1	47#
Sulphate, SO4	mg/L	[NT]	[NT]	[NR]	[NR]

Report Comments:

#:A low spike recovery has been obtained for THPS sample1. However,
an acceptable recovery has been obtained for the Laboratory Control Sample.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Appendix D

Summary results of water quality

Contents of Appendix D

Table D1. Waukivory groundwater quality results

Table D2. Waukivory surface water quality results

Table D3. AST2 and Pilot well water quality results

Table D.1 Waukivory groundwater quality results

	Analyte[a]	Units	LOR	GR-P3	WKMB01	WKMB02	WKMB03	WKMB06A	WKMB06B	GW080487
Sample date				29/01/2015	29/01/2015	29/01/2015	29/01/2015	29/01/2015	29/01/2015	30/01/2015
Field parameters	Electrical conductivity	uS/cm	1	4084	4465	870	3535	2431	1297	3844
	pH	pH units	0.01	6.41	7.99	9.00	11.43	6.29	8.6	6.64
	TDS	mg/L	1	2654	2904	565	2298	1580	843	2499
	DO %	%	0.1	17	7.2	14.2	18.1	16.4	5.3	9
	DO mg/L	mg/L	0.01	1.43	0.66	1.31	1.63	1.35	0.46	0.79
	Redox	mV	0.1	-19.7	-238.3	-193.2	-230.3	-56.8	-232.3	-56.5
	Temperature	°C	0.01	20.09	19.86	19.21	19.54	24.43	21.72	21.13
Key analytes	Monoethanolamine	µg/L	1	<1	<1	<1	3	<1	<1	<1
	Diethanolamine	µg/L	1	<1	<1	<1	7	<1	<1	<1
	THPS[b]	µg/L	50	<50	89	<50	<50	<50	<50	<50
	Boron	mg/L	0.05	<0.05	0.12	<0.05	0.09	<0.05	0.06	0.06
	Chloride (Method analysis ED009)	mg/L	0.1	1110	940	60.5	375	647	195	645
	Chloride (Method analysis ED045)	mg/L	1	998	848	60	382	619	206	608
	Chlorine Free (Field)	mg/L	n/a	0.04	0	0.02	-	0	-	0.02
	Chlorine Total (Field)	mg/L	n/a	-	0.01	0.04	-	0.15	-	0.11
	Chlorine - Free (Lab)	mg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Chlorine - Total Residual (Lab)	mg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Nitrogen (Total)	mg/L	0.1	<0.1	0.8	0.4	22.8	0.5	0.7	0.6
	Sulfate as SO4	mg/L	1	73	89	17	4	45	41	91
	Sulphate as SO4 [b]	mg/L	1	74	91	15	<1	42	38	92
	Total Phosphorus	mg/L	0.01	0.04	0.06	0.08	0.05	0.22	0.75	<0.01
	Total Phosphorus[b]	mg/L	0.05	<0.05	0.09	0.09	0.1	0.3	0.9	<0.05
Lab parameters	Electrical conductivity	µS/cm	1	4050	4540	885	3440	2470	1340	3850
	pH (lab)[c]	pH_Units	0.01	7.03	8.23	9.15	11	6.9	8.7	7.3
	Total Dissolved Solids	mg/L	10	2220	2350	494	2300	1410	687	2010
	Total Suspended Solids	mg/L	5	<5	<5	<5	20	245	42	<5
Major/minor ions	Bicarbonate Alkalinity-mg CaCO3/L	mg/L	1	357	872	263	<1	218	293	1050
	Carbonate Alkalinity-mg CaCO3/L	mg/L	1	<1	4	73	1110	<1	22	<1
	Alkalinity (Hydroxide) as CaCO3	mg/L	1	<1	<1	<1	62	<1	<1	<1
	Alkalinity (total) as CaCO3	mg/L	1	357	875	336	1180	218	314	1050
	Calcium	mg/L	1	126	13	3	8	89	4	83
	Magnesium	mg/L	1	74	2	<1	<1	49	<1	40
	Potassium	mg/L	1	2	3	5	7	2	1	6
	Sodium	mg/L	1	675	1120	222	877	384	323	840
	Fluoride	mg/L	0.1	0.2	1.7	0.3	2.4	0.1	0.6	0.3
	Reactive Silica	mg/L	0.05	36	16.4	21.9	37.6	37.2	13.4	20.3
	Bromine	mg/L	0.1	1.9	2.2	0.2	0.7	1.5	0.5	1.8
	Ionic Balance	%	0.01	5.08	3.39	2.95	2.19	2.99	4.86	4.84
Nutrients	Ammonia as N	mg/L	0.01	0.04	0.59	0.3	16.5	0.38	0.37	0.46
	Ammonium as N	mg/L	0.01	0.04	0.57	0.22	0.17	0.38	0.31	0.46
	Nitrate (as N)	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Nitrite (as N)	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Nitrite + Nitrate as N	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Kjeldahl Nitrogen Total	mg/L	0.1	<0.1	0.8	0.4	22.8	0.5	0.7	0.6
	Reactive Phosphorus as P	mg/L	0.01	0.02	0.06	0.08	0.06	<0.05	0.78	<0.01
	Total Organic Carbon	mg/L	1	2	18	4	69	2	3	2
Dissolved gas	Methane	mg/L	0.01	<0.01	12.6	3.21	19.2	0.019	15.9	0.066
Dissolved metals	Aluminium	mg/L	0.01	<0.01	0.02	0.12	0.09	0.19	0.04	<0.01
	Antimony	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Arsenic	mg/L	0.001	<0.001	0.001	0.001	0.002	0.008	0.003	<0.001
	Barium	mg/L	0.001	0.53	0.235	0.071	0.958	0.592	0.105	0.265
	Berryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Cadmium	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.017	<0.0001	<0.0001
	Chromium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Cobalt	mg/L	0.001	0.001	<0.001	<0.001	<0.001	0.004	<0.001	<0.001
	Copper	mg/L	0.001	0.002	<0.001	<0.001	<0.001	0.083	<0.001	<0.001
	Iron	mg/L	0.05	0.13	<0.05	<0.05	<0.05	14.2	<0.05	0.31
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	0.011	0.008	<0.001	<0.001
	Manganese	mg/L	0.001	0.643	0.008	0.005	0.001	0.293	0.021	0.05
	Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Molybdenum	mg/L	0.001	<0.001	<0.001	<0.001	0.005	<0.001	0.003	<0.001
	Nickel	mg/L	0.001	<0.001	0.001	<0.001	0.002	0.001	<0.001	<0.001
	Selenium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Strontium	mg/L	0.001	2.45	2.08	0.216	1.29	1.98	0.284	6.62
	Tin	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Uranium	mg/L	0.001	0.002	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
	Vanadium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Zinc	mg/L	0.005	0.018	<0.005	<0.005	9.08	0.645	0.006	0.012
Oil and Grease	Oil and Grease	mg/L	5	-	-	-	-	-	-	-
Phenolic Compounds	2,4,5-trichlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	2.4.6-Trichlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	2,4-dichlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	2,4-dimethylphenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	2,6-dichlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	2-chlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	2-methylphenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	2-nitrophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	3-&4-methylphenol	µg/L	2	<2	<2	<2	<2	<2	<2	<2
	4-chloro-3-methylphenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Pentachlorophenol	µg/L	2	<2	<2	<2	<2	<2	<2	<2
	Phenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
PAH	Acenaphthene	µg/L	1	1.2	<1	<1	<1	1	<1	<1
	Acenaphthylene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Anthracene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Benz(a)anthracene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Benzo(a) pyrene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(b&j)fluoranthene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Benzo(g,h,i)perylene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Benzo(k)fluoranthene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Benzo(a)pyrene TEQ (zero)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Dibenz(a,h)anthracene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Fluoranthene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Fluorene	µg/L	1	1.3	<1	<1	<1	1.1	<1	<1
	Indeno(1,2,3-c,d)pyrene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Naphthalene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Phenanthrene	µg/L	1	2	<1	<1	<1	1.6	<1	1.2
	Pyrene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	PAHs (sum)	ug/L	0.5	4.5	<0.5	<0.5	<0.5	3.7	<0.5	1.2
TRH	TPH C6-C10	µg/L	20	<20	<20	<20	50	<20	<20	<20
	C6 - C10 Fraction minus BTEX (F1)	µg/L	20	<20	<20	<20	<20	<20	<20	<20
	C10 - C16 Fraction	µg/L	100	<100	<100	<100	<100	<100	<100	<100
	C16 - C34 Fraction	µg/L	100	<100	<100	<100	<100	<100	<100	<100
	C34 - C40 Fraction	µg/L	100	<100	<100	<100	<100	<100	<100	<100
	C10 - C40 Fraction (Sum)	µg/L	100	<100	<100	<100	<100	<100	<100	<100
	>C10-C16 less Naphthalene (F2)	µg/L	100	<100	<100	<100	<100	<100	<100	<100
TPH	C6 - C9 Fraction	µg/L	20	<20	<20	<20	50	<20	<20	<20
	C10 - C14 Fraction	µg/L	50	<50	<50	<50	<50	<50	<50	<50
	C15 - C28 Fraction	µg/L	100	<100	<100	<100	<100	<100	<100	<100
	C29-C36 Fraction	µg/L	50	<50	<50	<50	<50	<50	<50	<50
	+C10 - C36 (Sum of total)	µg/L	50	<50	<50	<50	<50	<50	<50	<50
BTEX	Benzene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Toluene	µg/L	2	<2	<2	<2	34	<2	14	<2
	Ethylbenzene	µg/L	2	<2	<2	<2	<2	<2	<2	<2
	Xylene (m & p)	µg/L	2	<2	<2	<2	<2	<2	<2	<2
	Xylene (o)	µg/L	2	<2	<2	<2	<2	<2	<2	<2
	Xylene Total	µg/L	2	<2	<2	<2	<2	<2	<2	<2
	Sum of BTEX	µg/L	1	<1	<1	<1	34	<1	14	<1

Note
- not analysed
a - All data is from ALS results unless otherwise stated.
b - Analysed by Envirolab.
c - Laboratory readings of pH (lab) is outside of the holding time, therefore field measurements of pH should be relied upon for accuracy.

Table D.2 Waukivory surface water quality results

	Analyte[a]	Units	LOR	WKSW01	WKSW02	WKSW03
Sample date				28/01/2015	29/01/2015	29/01/2015
Field parameters	Electrical conductivity	uS/cm	1	127	332	164
	pH	pH units	0.01	6.52	7.14	7.17
	TDS	mg/L	1	82	216	107
	DO %	%	0.1	50.6	33.4	68.2
	DO mg/L	mg/L	0.01	4.57	2.92	6.01
	Redox	mV	0.1	240.5	91.3	10.5
	Temperature	°C	0.01	20.28	21.85	21.37
Key analytes	Monoethanolamine	µg/L	1	<1	<1	<1
	Diethanolamine	µg/L	1	<1	<1	<1
	THPS[b]	µg/L	50	<50	<50	<50
	Boron	mg/L	0.05	<0.05	<0.05	<0.05
	Chloride (Method analysis ED009)	mg/L	0.1	20.2	55.4	30.1
	Chloride (Method analysis ED045)	mg/L	1	17	54	36
	Chlorine Free (Field)	mg/L	n/a	0.08	0.03	0.06
	Chlorine Total (Field)	mg/L	n/a	0.06	0.19	0.2
	Chlorine - Free (Lab)	mg/L	0.2	<0.2	<0.2	<0.2
	Chlorine - Total Residual (Lab)	mg/L	0.2	<0.2	<0.2	<0.2
	Nitrogen (Total)	mg/L	0.1	1.3	1.6	1.3
	Sulfate as SO4	mg/L	1	<1	14	6
	Sulphate as SO4 [b]	mg/L	1	4	11	6
	Total Phosphorus	mg/L	0.01	0.18	0.14	0.13
	Total Phosphorus[b]	mg/L	0.05	0.2	0.2	0.1
Lab parameters	Electrical conductivity	µS/cm	1	128	322	169
	pH (lab)[c]	pH_Units	0.01	6.94	7.39	7.18
	Total Dissolved Solids	mg/L	10	149	278	177
	Total Suspended Solids	mg/L	5	44	8	11
Major/minor ions	Bicarbonate Alkalinity-mg CaCO3/L	mg/L	1	22	53	23
	Carbonate Alkalinity-mg CaCO3/L	mg/L	1	<1	<1	<1
	Alkalinity (Hydroxide) as CaCO3	mg/L	1	<1	<1	<1
	Alkalinity (total) as CaCO3	mg/L	1	22	53	23
	Calcium	mg/L	1	5	14	7
	Magnesium	mg/L	1	3	9	4
	Potassium	mg/L	1	4	5	3
	Sodium	mg/L	1	16	38	25
	Fluoride	mg/L	0.1	0.1	0.2	<0.1
	Reactive Silica	mg/L	0.05	14	14.1	16.6
	Bromine	mg/L	0.1	<0.1	0.1	<0.1
	Ionic Balance	%	0.01	-	0.33	-
Nutrients	Ammonia as N	mg/L	0.01	0.02	0.01	0.01
	Ammonium as N	mg/L	0.01	0.02	<0.01	<0.01
	Nitrate (as N)	mg/L	0.01	0.09	0.28	0.06
	Nitrite (as N)	mg/L	0.01	<0.01	0.01	<0.01
	Nitrite + Nitrate as N	mg/L	0.01	0.09	0.29	0.06
	Kjeldahl Nitrogen Total	mg/L	0.1	1.2	1.3	1.2
	Reactive Phosphorus as P	mg/L	0.01	0.07	0.05	0.05
	Total Organic Carbon	mg/L	1	16	15	13
Dissolved gas	Methane	mg/L	0.01	0.018	0.029	0.014
Dissolved metals	Aluminium	mg/L	0.01	0.48	0.29	0.37
	Antimony	mg/L	0.001	<0.001	<0.001	<0.001
	Arsenic	mg/L	0.001	0.001	0.002	0.001
	Barium	mg/L	0.001	0.051	0.048	0.04
	Berryllium	mg/L	0.001	<0.001	<0.001	<0.001
	Cadmium	mg/L	0.0001	0.0013	0.0011	0.0006
	Chromium	mg/L	0.001	<0.001	<0.001	<0.001
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.008	0.005	0.005
	Iron	mg/L	0.05	0.92	0.82	0.65
	Lead	mg/L	0.001	0.004	0.002	0.001
	Manganese	mg/L	0.001	0.04	0.033	0.04
	Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001
	Molybdenum	mg/L	0.001	<0.001	<0.001	<0.001
	Nickel	mg/L	0.001	<0.001	<0.001	0.001
	Selenium	mg/L	0.01	<0.01	<0.01	<0.01
	Strontium	mg/L	0.001	0.071	0.162	0.099
	Tin	mg/L	0.001	<0.001	<0.001	<0.001
	Uranium	mg/L	0.001	<0.001	<0.001	<0.001
	Vanadium	mg/L	0.01	<0.01	<0.01	<0.01
	Zinc	mg/L	0.005	0.051	0.038	0.022
Oil and Grease	Oil and Grease	mg/L	5	-	-	-
Phenolic Compounds	2,4,5-trichlorophenol	µg/L	1	<1	<1	<1
	2.4.6-Trichlorophenol	µg/L	1	<1	<1	<1
	2,4-dichlorophenol	µg/L	1	<1	<1	<1
	2,4-dimethylphenol	µg/L	1	<1	<1	<1
	2,6-dichlorophenol	µg/L	1	<1	<1	<1
	2-chlorophenol	µg/L	1	<1	<1	<1
	2-methylphenol	µg/L	1	<1	<1	<1
	2-nitrophenol	µg/L	1	<1	<1	<1
	3-&4-methylphenol	µg/L	2	<2	<2	<2
	4-chloro-3-methylphenol	µg/L	1	<1	<1	<1
	Pentachlorophenol	µg/L	2	<2	<2	<2
	Phenol	µg/L	1	<1	<1	<1
PAH	Acenaphthene	µg/L	1	<1	<1	<1
	Acenaphthylene	µg/L	1	<1	<1	<1
	Anthracene	µg/L	1	<1	<1	<1
	Benz(a)anthracene	µg/L	1	<1	<1	<1
	Benzo(a) pyrene	µg/L	0.5	<0.5	<0.5	<0.5
	Benzo(b&j)fluoranthene	µg/L	1	<1	<1	<1
	Benzo(g,h,i)perylene	µg/L	1	<1	<1	<1
	Benzo(k)fluoranthene	µg/L	1	<1	<1	<1
	Benzo(a)pyrene TEQ (zero)	µg/L	0.5	<0.5	<0.5	<0.5
	Chrysene	µg/L	1	<1	<1	<1
	Dibenz(a,h)anthracene	µg/L	1	<1	<1	<1
	Fluoranthene	µg/L	1	<1	<1	<1
	Fluorene	µg/L	1	<1	<1	<1
	Indeno(1,2,3-c,d)pyrene	µg/L	1	<1	<1	<1
	Naphthalene	µg/L	1	<1	<1	<1
	Phenanthrene	µg/L	1	<1	<1	<1
	Pyrene	µg/L	1	<1	<1	<1
	PAHs (sum)	ug/L	0.5	<0.5	<0.5	<0.5
TRH	TPH C6-C10	µg/L	20	<20	<20	<20
	C6 - C10 Fraction minus BTEX (F1)	µg/L	20	<20	<20	<20
	C10 - C16 Fraction	µg/L	100	<100	<100	<100
	C16 - C34 Fraction	µg/L	100	<100	<100	<100
	C34 - C40 Fraction	µg/L	100	<100	<100	<100
	C10 - C40 Fraction (Sum)	µg/L	100	<100	<100	<100
	>C10-C16 less Naphthalene (F2)	µg/L	100	<100	<100	<100
TPH	C6 - C9 Fraction	µg/L	20	<20	<20	<20
	C10 - C14 Fraction	µg/L	50	<50	<50	<50
	C15 - C28 Fraction	µg/L	100	<100	<100	<100
	C29-C36 Fraction	µg/L	50	<50	<50	<50
	+C10 - C36 (Sum of total)	µg/L	50	<50	<50	<50
BTEX	Benzene	µg/L	1	<1	<1	<1
	Toluene	µg/L	2	<2	<2	<2
	Ethylbenzene	µg/L	2	<2	<2	<2
	Xylene (m & p)	µg/L	2	<2	<2	<2
	Xylene (o)	µg/L	2	<2	<2	<2
	Xylene Total	µg/L	2	<2	<2	<2
	Sum of BTEX	µg/L	1	-	<1	<1

Note
- not analysed
a - All data is from ALS results unless otherwise stated.
b - Analysed by Envirolab.
c - Laboratory readings of pH (lab) is outside of the holding time, therefore field measurements of pH should be relied upon for accuracy.

Table D.3 AST2 and Pilot wells.

	Analyte[a]	Units	LOR	AST2	AST2	AST2	AST2	AST2	AST2	AST2	AST2
Sample date				12/01/2015	28/01/2015	2/02/2015	3/02/2015	4/02/2015	5/02/2015	6/02/2015	26/02/2015
Field parameters	Electrical conductivity	uS/cm	1	5967	5481	6088	6087	6225	6481	-	6866
	pH	pH units	0.01	8.84	8.85	9.48	9.2	9.01	9.40	9.45	9.16
	TDS	mg/L	1	3880	3563	3959	3937	4047	4213	4085	4463
	DO %	%	0.1	19.7	83.1	210.7	233.6	201.5	142.1	88	31.5
	DO mg/L	mg/L	0.01	1.48	7.13	15.96	19.06	16.37	9.4	7.43	2.29
	Redox	mV	0.1	-3.8	-10.6	-140.8	-46.1	-59.8	-37.9	-55.3	-38.8
	Temperature	°C	0.01	29.15	22.19	28.76	24.68	24.72	24.58	22.51	30.87
Key analytes	Monoethanolamine	µg/L	1	118	8	8	6	13	13	5	<1
	Diethanolamine	µg/L	1	<1	<1	<1	20	2	6	4	<1
	THPS[b]	µg/L	50	61	65	72	<50	<50	87	100	110
	Boron	mg/L	0.05	11.8	10	9.55	11.2	11	9.27	11.7	10.1
	Chloride (Method analysis ED009)	mg/L	0.1	508	454	484	468	489	511	524	721
	Chloride (Method analysis ED045)	mg/L	1	512	502	518	485	483	540	504	552
	Chlorine Free (Field)	mg/L	n/a	0.14	0.09	0.05	0.04	0.02	0.02	0.06	-
	Chlorine Total (Field)	mg/L	n/a	0.28	0.25	0.23	0.22	0.06	0.15	0.16	-
	Chlorine - Free (Lab)	mg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Chlorine - Total Residual (Lab)	mg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Nitrogen (Total)	mg/L	0.1	4.4	5.8	5.6	6.3	6.9	5.4	7	7.2
	Sulfate as SO4	mg/L	1	<10	<1	<1	<1	<10	<10	<10	<1
	Sulphate as SO4 [b]	mg/L	1	4	<1	<1	<1	<1	<1	<1	3
	Total Phosphorus	mg/L	0.01	2.57	2.2	2.15	2.24	2.54	2.05	2.6	2.19
	Total Phosphorus[b]	mg/L	0.05	3.2	2.8	2.7	2.7	2.9	2.7	2.9	2.5
Lab parameters	Electrical conductivity	µS/cm	1	6310	6010	6060	6070	6220	6300	6370	6760
	pH (lab)[c]	pH_Units	0.01	8.79	8.77	9.19	9.17	9.15	8.99	8.96	9.24
	Total Dissolved Solids	mg/L	10	4870	4200	4110	4900	4450	3900	3920	4690
	Total Suspended Solids	mg/L	5	34	45	82	117	83	82	78	90
Major/minor ions	Bicarbonate Alkalinity-mg CaCO3/L	mg/L	1	2260	2360	2120	1940	2220	2420	2350	2350
	Carbonate Alkalinity-mg CaCO3/L	mg/L	1	252	340	568	525	559	350	350	600
	Alkalinity (Hydroxide) as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Alkalinity (total) as CaCO3	mg/L	1	2510	2700	2680	2470	2780	2780	2700	2950
	Calcium	mg/L	1	23	14	5	6	8	21	7	16
	Magnesium	mg/L	1	3	3	2	2	2	4	2	3
	Potassium	mg/L	1	17	14	14	19	19	14	16	16
	Sodium	mg/L	1	1520	1570	1500	1440	1600	1500	1860	1780
	Fluoride	mg/L	0.1	0.9	1	1	1	1	1	1	1
	Reactive Silica	mg/L	0.05	20.2	18.4	21.4	18.6	20.2	21.2	20.1	20.8
	Bromine	mg/L	0.1	0.8	0.7	0.8	0.7	0.7	0.7	0.7	0.7
	Ionic Balance	%	0.01	2.47	1.02	1.66	0.38	1	2.81	9.05	2.79
Nutrients	Ammonia as N	mg/L	0.01	0.06	<0.01	0.01	0.05	0.02	0.06	0.04	0.02
	Ammonium as N	mg/L	0.01	0.04	<0.01	<0.01	0.03	0.01	0.02	0.04	<0.01
	Nitrate (as N)	mg/L	0.01	<0.01	0.07	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
	Nitrite (as N)	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Nitrite + Nitrate as N	mg/L	0.01	<0.01	0.07	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
	Kjeldahl Nitrogen Total	mg/L	0.1	4.4	5.7	5.6	6.3	6.9	5.4	7	7.2
	Reactive Phosphorus as P	mg/L	0.01	0.02	<0.01	0.05	0.03	<0.1	0.01	0.02	0.01
	Total Organic Carbon	mg/L	1	<1	399	335	6	444	451	455	280
Dissolved gas	Methane	mg/L	0.01	0.403	1.5	0.925	1.37	1.13	1.43	1.58	1.83
Dissolved metals	Aluminium	mg/L	0.01	0.03	0.02	0.02	0.02	0.03	0.06	0.01	<0.01
	Antimony	mg/L	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	Arsenic	mg/L	0.001	0.008	0.005	0.004	0.005	0.004	0.004	0.005	0.004
	Barium	mg/L	0.001	2.75	2.64	2.28	2.82	3.68	2.81	2.4	2.87
	Berryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Cadmium	mg/L	0.0001	0.0028	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	<0.001	0.001	<0.001	0.001	0.002	0.002	0.002	<0.001
	Cobalt	mg/L	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.046	0.005	0.006	0.007	0.006	0.02	0.005	0.002
	Iron	mg/L	0.05	0.22	4.26	2.53	3.63	4.07	2.65	3.08	0.25
	Lead	mg/L	0.001	0.021	0.01	0.007	0.008	0.008	0.005	0.005	<0.001
	Manganese	mg/L	0.001	0.035	0.043	0.026	0.034	0.037	0.029	0.022	0.012
	Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Molybdenum	mg/L	0.001	0.005	0.008	0.006	0.008	0.007	0.006	0.014	0.006
	Nickel	mg/L	0.001	0.008	0.005	0.004	0.004	0.004	0.004	0.003	0.003
	Selenium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Strontium	mg/L	0.001	2.59	2.29	2.24	2.5	2.64	2.75	2.26	2.4
	Tin	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Uranium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Vanadium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Zinc	mg/L	0.005	0.074	0.012	0.007	0.016	0.013	0.016	0.012	0.008
Oil and Grease	Oil and Grease	mg/L	5	-	<5	8	-	<5	<5	<5	-
Phenolic Compounds	2,4,5-trichlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	2.4.6-Trichlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	2,4-dichlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	2,4-dimethylphenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	2,6-dichlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	2-chlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	2-methylphenol	µg/L	1	1.1	<1	<1	<1	<1	<1	<1	<1
	2-nitrophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	3-&4-methylphenol	µg/L	2	7.7	33	<2	<2	<2	<2	<2	10.6
	4-chloro-3-methylphenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Pentachlorophenol	µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2
	Phenol	µg/L	1	<1	2.8	2.2	<1	<1	<1	<1	1.3
PAH	Acenaphthene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Acenaphthylene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Anthracene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Benz(a)anthracene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Benzo(a) pyrene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(b&j)fluoranthene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Benzo(g,h,i)perylene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Benzo(k)fluoranthene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Benzo(a)pyrene TEQ (zero)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Dibenz(a,h)anthracene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Fluoranthene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Fluorene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Indeno(1,2,3-c,d)pyrene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Naphthalene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Phenanthrene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Pyrene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	PAHs (sum)	ug/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TRH	TPH C6-C10	µg/L	20	<20	50	40	90	60	60	160	30
	C6 - C10 Fraction minus BTEX (F1)	µg/L	20	<20	<20	30	70	20	<20	110	30
	C10 - C16 Fraction	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100
	C16 - C34 Fraction	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100
	C34 - C40 Fraction	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100
	C10 - C40 Fraction (Sum)	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100
	>C10-C16 less Naphthalene (F2)	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100
TPH	C6 - C9 Fraction	µg/L	20	<20	50	40	90	60	60	150	20
	C10 - C14 Fraction	µg/L	50	<50	<50	<50	<50	<50	<50	<50	<50
	C15 - C28 Fraction	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100
	C29-C36 Fraction	µg/L	50	<50	<50	<50	<50	<50	<50	<50	<50
	+C10 - C36 (Sum of total)	µg/L	50	<50	<50	<50	<50	<50	<50	<50	<50
BTEX	Benzene	µg/L	1	6	14	6	10	16	18	20	<1
	Toluene	µg/L	2	6	20	7	10	17	20	25	<2
	Ethylbenzene	µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2
	Xylene (m & p)	µg/L	2	<2	3	<2	<2	3	3	3	<2
	Xylene (o)	µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2
	Xylene Total	µg/L	2	<2	3	<2	<2	3	3	3	<2
	Sum of BTEX	µg/L	1	12	37	13	20	36	41	48	<1

Note
- not analysed
a - All data is from ALS results unless otherwise stated.
b - Analysed by Envirolab.
c - Laboratory readings of pH (lab) is outside of the holding time, therefore field measurements of pH should be relied upon for accuracy.

Table D.3 Continued. AST2 and Pilot wells.

	Analyte[a]	Units	LOR	WK11	WK11	WK11	WK11	WK12	WK12	WK12
Sample date				3/02/2015	4/02/2015	5/02/2015	6/02/2015	4/02/2015	5/02/2015	6/02/2015
Field parameters	Electrical conductivity	uS/cm	1	10,542	11,082	11,005	11,349	7571	7714	7853
	pH	pH units	0.01	7.74	7.13	7.56	7.60	7.48	7.94	8.37
	TDS	mg/L	1	6852	7.21	7155	7377	4922	5015	5105
	DO %	%	0.1	48	15.7	18.3	5.2	20.1	11.3	2.8
	DO mg/L	mg/L	0.01	3.89	1.21	18.3	0.4	1.52	0.92	0.22
	Redox	mV	0.1	-75.4	-133.9	-156.6	-130.6	-170.4	-186.4	-259.3
	Temperature	°C	0.01	22.5	26.17	23.24	26.07	26.92	23.58	25.31
Key analytes	Monoethanolamine	µg/L	1	41	40	26	17	17	27	21
	Diethanolamine	µg/L	1	14	27	103	26	7	9	3
	THPS[b]	µg/L	50	90	83	230	62	<50	150	100
	Boron	mg/L	0.05	22.4	21.7	14.4	11.9	6.75	6.35	7.29
	Chloride (Method analysis ED009)	mg/L	0.1	677	739	728	809	717	764	849
	Chloride (Method analysis ED045)	mg/L	1	700	736	745	709	772	781	733
	Chlorine Free (Field)	mg/L	n/a	0.03	0.26	0	0	0.06	0.28	0.12
	Chlorine Total (Field)	mg/L	n/a	0	0.34	0	0	0.1	0.33	0.1
	Chlorine - Free (Lab)	mg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Chlorine - Total Residual (Lab)	mg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2
	Nitrogen (Total)	mg/L	0.1	8.8	10	10	9.5	3.9	3.6	3.8
	Sulfate as SO4	mg/L	1	<1	<10	<10	<10	<10	<10	<1
	Sulphate as SO4 [b]	mg/L	1	4	5	5	5	<1	<1	<1
	Total Phosphorus	mg/L	0.01	3.71	4.13	2.5	3.53	1.9	1.62	1.78
	Total Phosphorus[b]	mg/L	0.05	4.9	5.1	4.5	4.5	2.2	2	2
Lab parameters	Electrical conductivity	µS/cm	1	10,500	10,600	10,600	10,700	7490	7350	7490
	pH (lab)[c]	pH_Units	0.01	7.57	8.04	8.26	7.21	7.7	7.63	7.69
	Total Dissolved Solids	mg/L	10	7450	8160	7710	7630	4210	4870	4480
	Total Suspended Solids	mg/L	5	66	186	37	17	18	130	74
Major/minor ions	Bicarbonate Alkalinity-mg CaCO3/L	mg/L	1	4620	4580	5100	4900	3380	3280	3350
	Carbonate Alkalinity-mg CaCO3/L	mg/L	1	<1	<1	<1	<1	<1	<1	<1
	Alkalinity (Hydroxide) as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1
	Alkalinity (total) as CaCO3	mg/L	1	4620	4580	5100	4900	3380	3280	3350
	Calcium	mg/L	1	15	41	71	42	44	38	17
	Magnesium	mg/L	1	5	5	6	6	4	4	4
	Potassium	mg/L	1	23	23	17	22	14	12	13
	Sodium	mg/L	1	2560	2630	2990	3480	1920	1970	2300
	Fluoride	mg/L	0.1	0.9	0.9	0.8	0.9	1	1	1
	Reactive Silica	mg/L	0.05	35.5	37.2	34.3	31.7	30.8	26	22.9
	Bromine	mg/L	0.1	1.4	1.3	1.4	1.3	0.5	0.6	0.5
	Ionic Balance	%	0.01	0.4	2.19	4.45	13.4	1.71	0.32	7.31
Nutrients	Ammonia as N	mg/L	0.01	7.66	7.4	7.93	8.12	2.87	2.63	2.74
	Ammonium as N	mg/L	0.01	7.46	7.34	7.79	7.98	2.81	2.52	2.62
	Nitrate (as N)	mg/L	0.01	0.02	<0.1	0.05	<0.1	<0.01	<0.01	<0.1
	Nitrite (as N)	mg/L	0.01	<0.01	<0.1	<0.01	<0.1	<0.01	<0.01	<0.1
	Nitrite + Nitrate as N	mg/L	0.01	0.02	<0.1	0.05	<0.1	<0.01	<0.01	<0.1
	Kjeldahl Nitrogen Total	mg/L	0.1	8.8	10	9.9	9.5	3.9	3.6	3.8
	Reactive Phosphorus as P	mg/L	0.01	<0.01	<0.1	0.06	<0.1	0.03	<0.01	<0.1
	Total Organic Carbon	mg/L	1	2	1150	1180	1200	40	51	43
Dissolved gas	Methane	mg/L	0.01	2.17	6.05	5.87	3.36	9.32	7.18	7.1
Dissolved metals	Aluminium	mg/L	0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
	Antimony	mg/L	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Arsenic	mg/L	0.001	0.002	0.005	0.003	0.003	0.004	0.002	0.002
	Barium	mg/L	0.001	9.06	17.2	17.6	12.3	5.31	5.02	1.44
	Berryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Cadmium	mg/L	0.0001	<0.0001	0.0002	<0.0001	0.0002	<0.0001	<0.0001	0.0004
	Chromium	mg/L	0.001	0.002	0.005	0.004	0.006	0.002	0.002	0.005
	Cobalt	mg/L	0.001	0.001	0.002	0.001	0.002	<0.001	<0.001	0.001
	Copper	mg/L	0.001	0.002	0.017	0.005	0.012	<0.001	0.001	0.005
	Iron	mg/L	0.05	0.4	15.5	13.4	0.18	6.63	38.8	0.06
	Lead	mg/L	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.001	0.1	0.164	0.134	0.092	0.117	0.434	0.01
	Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Molybdenum	mg/L	0.001	0.005	0.003	0.002	0.004	0.003	0.003	0.008
	Nickel	mg/L	0.001	0.011	0.008	0.006	0.007	0.02	0.004	0.004
	Selenium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Strontium	mg/L	0.001	7.69	3.47	10.5	9.91	4.07	4.78	3.48
	Tin	mg/L	0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	0.001
	Uranium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Vanadium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Zinc	mg/L	0.005	<0.005	0.025	0.012	0.015	0.013	0.006	0.006
Oil and Grease	Oil and Grease	mg/L	5	-	<5	<5	<5	-	<5	<5
Phenolic Compounds	2,4,5-trichlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	2.4.6-Trichlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	2,4-dichlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	2,4-dimethylphenol	µg/L	1	3.8	4.7	5	4.2	<1	<1	<1
	2,6-dichlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	2-chlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	2-methylphenol	µg/L	1	10.3	12.2	13.4	12.9	<1	9.5	9.6
	2-nitrophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	3-&4-methylphenol	µg/L	2	54.4	75.5	59.5	78.1	5.8	20.5	22.8
	4-chloro-3-methylphenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Pentachlorophenol	µg/L	2	<2	<2	<2	<2	<2	<2	<2
	Phenol	µg/L	1	13.5	14.2	14.9	14.4	1.1	1.4	<1
PAH	Acenaphthene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Acenaphthylene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Anthracene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Benz(a)anthracene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Benzo(a) pyrene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(b&j)fluoranthene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Benzo(g,h,i)perylene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Benzo(k)fluoranthene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Benzo(a)pyrene TEQ (zero)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Dibenz(a,h)anthracene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Fluoranthene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Fluorene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Indeno(1,2,3-c,d)pyrene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Naphthalene	µg/L	1	2.4	2.4	3.2	3.1	<1	<1	<1
	Phenanthrene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	Pyrene	µg/L	1	<1	<1	<1	<1	<1	<1	<1
	PAHs (sum)	ug/L	0.5	2.4	2.4	3.2	3.1	<0.5	<0.5	<0.5
TRH	TPH C6-C10	µg/L	20	720	1090	1280	1290	30	<20	<20
	C6 - C10 Fraction minus BTEX (F1)	µg/L	20	300	300	400	500	20	<20	<20
	C10 - C16 Fraction	µg/L	100	190	<100	<100	<100	<100	<100	<100
	C16 - C34 Fraction	µg/L	100	570	350	240	300	110	580	<100
	C34 - C40 Fraction	µg/L	100	100	<100	<100	<100	<100	200	<100
	C10 - C40 Fraction (Sum)	µg/L	100	860	350	240	300	110	780	<100
	>C10-C16 less Naphthalene (F2)	µg/L	100	190	<100	<100	<100	<100	<100	<100
TPH	C6 - C9 Fraction	µg/L	20	680	1080	1240	1200	30	<20	<20
	C10 - C14 Fraction	µg/L	50	210	<50	110	110	<50	80	<50
	C15 - C28 Fraction	µg/L	100	400	200	130	180	<100	400	<100
	C29-C36 Fraction	µg/L	50	280	200	150	190	<50	340	<50
	+C10 - C36 (Sum of total)	µg/L	50	890	400	390	480	<50	820	<50
BTEX	Benzene	µg/L	1	151	319	296	231	2	1	<1
	Toluene	µg/L	2	202	356	352	308	4	<2	<2
	Ethylbenzene	µg/L	2	4	7	9	5	<2	<2	<2
	Xylene (m & p)	µg/L	2	52	90	112	75	<2	<2	<2
	Xylene (o)	µg/L	2	13	21	26	16	<2	<2	<2
	Xylene Total	µg/L	2	65	111	138	91	<2	<2	<2
	Sum of BTEX	µg/L	1	422	793	795	635	6	1	<1

Note
- not analysed
a - All data is from ALS results unless otherwise stated.
b - Analysed by Envirolab.
c - Laboratory readings of pH (lab) is outside of the holding time, therefore field measurements of pH should be relied upon for accuracy.

Table D.3 Continued. AST2 and Pilot wells.

	Analyte[a]	Units	LOR	WK13	WK13	WK13	WK13	WK14	WK14	WK14	WK14
Sample date				3/02/2015	4/02/2015	5/02/2015	6/02/2015	4/02/2015 11:10	4/02/2015 17:30	5/02/2015	6/02/2015
Field parameters	Electrical conductivity	uS/cm	1	7045	7844	8222	8413	8907	8600	9125	9377
	pH	pH units	0.01	7.73	7.78	8.19	8.37	7.22	7.24	7.61	7.75
	TDS	mg/L	1	4380	5099	5344	5469	5791	5591	5931	6098
	DO %	%	0.1	51.3	20.1	20.8	17.3	8.9	26.6	19.1	10.7
	DO mg/L	mg/L	0.01	4.73	1.56	1.62	1.35	0.69	1.92	1.56	0.85
	Redox	mV	0.1	-141.6	-141.5	-137	-140.5	-34.7	-128.9	-131.8	-128.1
	Temperature	°C	0.01	21.92	27.03	26.53	26.43	24.93	24.59	23.59	25.01
Key analytes	Monoethanolamine	µg/L	1	12	15	18	17	16	19	13	9
	Diethanolamine	µg/L	1	7	4	19	6	15	5	27	8
	THPS[b]	µg/L	50	57	64	170	140	<50	67	140	81
	Boron	mg/L	0.05	6.48	6.43	5.28	0.08	10.9	0.3	0.45	11.9
	Chloride (Method analysis ED009)	mg/L	0.1	558	594	674	714	509	484	504	546
	Chloride (Method analysis ED045)	mg/L	1	576	591	701	694	564	488	538	531
	Chlorine Free (Field)	mg/L	n/a	0.02	0.03	0	0.03	0.03	-	0.04	0
	Chlorine Total (Field)	mg/L	n/a	0.14	0.12	0.08	0	0.05	-	0	0.06
	Chlorine - Free (Lab)	mg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Chlorine - Total Residual (Lab)	mg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Nitrogen (Total)	mg/L	0.1	5.5	5.8	5.7	6.3	6.5	6.3	5.5	6.4
	Sulfate as SO4	mg/L	1	<1	<10	<10	<10	<10	<10	<10	<10
	Sulphate as SO4 [b]	mg/L	1	1	2	2	2	2	2	2	2
	Total Phosphorus	mg/L	0.01	2.83	2.98	3.02	3.75	2.82	2.75	2.25	2.57
	Total Phosphorus[b]	mg/L	0.05	3.7	3.7	4	4.6	3.3	3.3	3	3
Lab parameters	Electrical conductivity	µS/cm	1	6950	7660	7810	7930	8790	8780	8880	8860
	pH (lab)[c]	pH_Units	0.01	8.08	8.3	8.04	7.91	7.43	7.85	7.44	7.34
	Total Dissolved Solids	mg/L	10	5410	4580	5060	4730	5980	5680	5370	5730
	Total Suspended Solids	mg/L	5	16	7	9	6	<5	11	<5	16
Major/minor ions	Bicarbonate Alkalinity-mg CaCO3/L	mg/L	1	2900	3420	3300	3220	4620	4500	4620	4720
	Carbonate Alkalinity-mg CaCO3/L	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Alkalinity (Hydroxide) as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Alkalinity (total) as CaCO3	mg/L	1	2900	3420	3300	3220	4620	4500	4620	4720
	Calcium	mg/L	1	18	27	38	21	59	34	47	34
	Magnesium	mg/L	1	2	3	5	3	6	6	5	6
	Potassium	mg/L	1	19	17	12	15	12	15	12	15
	Sodium	mg/L	1	1670	1930	1800	2270	2520	2260	2560	2720
	Fluoride	mg/L	0.1	1.8	1.1	1.5	1.8	0.6	0.6	0.6	0.6
	Reactive Silica	mg/L	0.05	29.6	29.5	29.5	28.3	33.2	35.1	32.9	32.4
	Bromine	mg/L	0.1	1	1	1	0.7	0.7	0.3	0.6	0.8
	Ionic Balance	%	0.01	0.06	0.51	2.94	8.9	2.26	1.43	3.06	4.98
Nutrients	Ammonia as N	mg/L	0.01	4.23	4.26	4.74	4.91	5.38	5.21	5.42	5.37
	Ammonium as N	mg/L	0.01	4.13	4.1	4.32	2.06	5.33	5.16	5.31	5.26
	Nitrate (as N)	mg/L	0.01	<0.01	<0.01	0.2	<0.01	<0.01	<0.1	<0.1	<0.1
	Nitrite (as N)	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.1
	Nitrite + Nitrate as N	mg/L	0.01	<0.01	<0.01	0.2	<0.01	<0.01	<0.1	<0.1	<0.1
	Kjeldahl Nitrogen Total	mg/L	0.1	5.5	5.8	5.5	6.3	6.5	6.3	5.5	6.4
	Reactive Phosphorus as P	mg/L	0.01	0.12	<0.1	0.09	0.58	0.02	0.08	0.24	<0.01
	Total Organic Carbon	mg/L	1	6	448	648	757	261	242	265	268
Dissolved gas	Methane	mg/L	0.01	13.3	7.6	8.08	7.35	6.81	7.77	6.38	5.38
Dissolved metals	Aluminium	mg/L	0.01	<0.01	0.04	0.08	<0.01	0.01	0.01	0.02	0.02
	Antimony	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Arsenic	mg/L	0.001	0.007	0.005	0.004	0.002	0.003	0.002	0.003	0.004
	Barium	mg/L	0.001	5.17	7.06	0.256	3.37	11	5.27	7.25	6.76
	Berryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Cadmium	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002
	Chromium	mg/L	0.001	0.003	0.001	0.002	<0.001	0.02	0.006	0.014	0.01
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
	Copper	mg/L	0.001	0.004	0.003	0.017	0.003	0.002	0.002	0.004	0.006
	Iron	mg/L	0.05	2.18	0.7	0.52	0.08	5.47	2.7	4.07	0.11
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.001	0.016	0.035	0.032	0.019	0.098	0.049	0.066	0.072
	Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Molybdenum	mg/L	0.001	0.008	0.002	0.002	0.002	<0.001	<0.001	0.003	0.004
	Nickel	mg/L	0.001	0.004	0.003	0.004	0.002	0.004	0.002	0.004	0.005
	Selenium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Strontium	mg/L	0.001	3.84	5.07	4.27	2.81	6.53	3.29	5.2	7
	Tin	mg/L	0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
	Uranium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Vanadium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Zinc	mg/L	0.005	<0.005	0.015	0.046	<0.005	0.011	0.006	0.008	0.006
Oil and Grease	Oil and Grease	mg/L	5	-	<5	<5	<5	-	<5	<5	<5
Phenolic Compounds	2,4,5-trichlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	2.4.6-Trichlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	2,4-dichlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	2,4-dimethylphenol	µg/L	1	4	2.3	3.7	3.5	1	1.4	1.7	1.3
	2,6-dichlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	2-chlorophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	2-methylphenol	µg/L	1	9.1	6.5	8.4	10.8	2.6	4	4.4	3.8
	2-nitrophenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	3-&4-methylphenol	µg/L	2	153	110	146	200	40	51.2	42.3	68.8
	4-chloro-3-methylphenol	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Pentachlorophenol	µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2
	Phenol	µg/L	1	10.1	6.2	8.8	11.5	4.2	5.9	6.3	6
PAH	Acenaphthene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Acenaphthylene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Anthracene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Benz(a)anthracene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Benzo(a) pyrene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(b&j)fluoranthene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Benzo(g,h,i)perylene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Benzo(k)fluoranthene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Benzo(a)pyrene TEQ (zero)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Dibenz(a,h)anthracene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Fluoranthene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Fluorene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Indeno(1,2,3-c,d)pyrene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Naphthalene	µg/L	1	1.4	1.3	1.5	1.3	<1	1.4	1.6	1.4
	Phenanthrene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	Pyrene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
	PAHs (sum)	ug/L	0.5	1.4	1.3	1.5	1.3	<0.5	1.4	1.6	1.4
TRH	TPH C6-C10	µg/L	20	1070	820	800	840	820	730	710	880
	C6 - C10 Fraction minus BTEX (F1)	µg/L	20	490	240	260	410	200	170	210	320
	C10 - C16 Fraction	µg/L	100	250	<100	150	190	<100	<100	<100	<100
	C16 - C34 Fraction	µg/L	100	<100	120	100	<100	320	180	230	<100
	C34 - C40 Fraction	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100
	C10 - C40 Fraction (Sum)	µg/L	100	250	120	250	190	320	180	230	<100
	>C10-C16 less Naphthalene (F2)	µg/L	100	250	<100	150	190	<100	<100	<100	<100
TPH	C6 - C9 Fraction	µg/L	20	990	810	770	770	770	730	690	830
	C10 - C14 Fraction	µg/L	50	250	<50	160	200	<50	<50	80	<50
	C15 - C28 Fraction	µg/L	100	<100	<100	<100	<100	210	100	150	<100
	C29-C36 Fraction	µg/L	50	<50	<50	<50	<50	150	100	110	<50
	+C10 - C36 (Sum of total)	µg/L	50	250	<50	160	200	360	200	340	<50
BTEX	Benzene	µg/L	1	199	229	202	145	257	218	190	181
	Toluene	µg/L	2	264	261	241	180	294	269	224	213
	Ethylbenzene	µg/L	2	7	5	5	3	4	4	4	3
	Xylene (m & p)	µg/L	2	88	74	72	47	49	51	53	45
	Xylene (o)	µg/L	2	18	16	16	9	13	14	13	10
	Xylene Total	µg/L	2	106	90	88	56	62	65	66	55
	Sum of BTEX	µg/L	1	576	585	536	384	617	556	484	452

Note
- not analysed
a - All data is from ALS results unless otherwise stated.
b - Analysed by Envirolab.
c - Laboratory readings of pH (lab) is outside of the holding time, therefore field measurements of pH should be relied upon for accuracy.

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Appendix E

Pilot well analyte time-series hydrographs

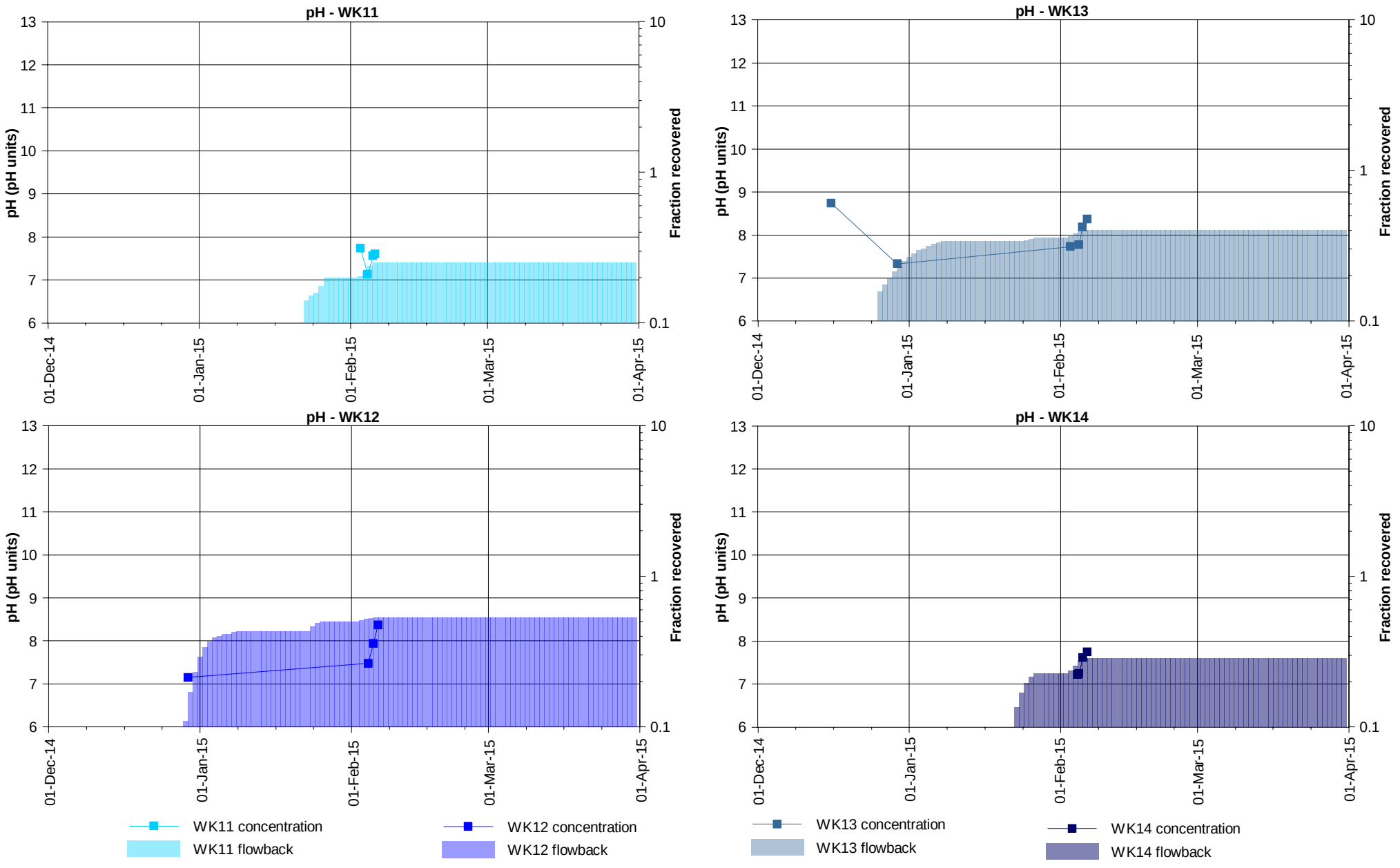

Figure E1.1: Field pH measurements and flowback volumes at the Waukivory pilot wells

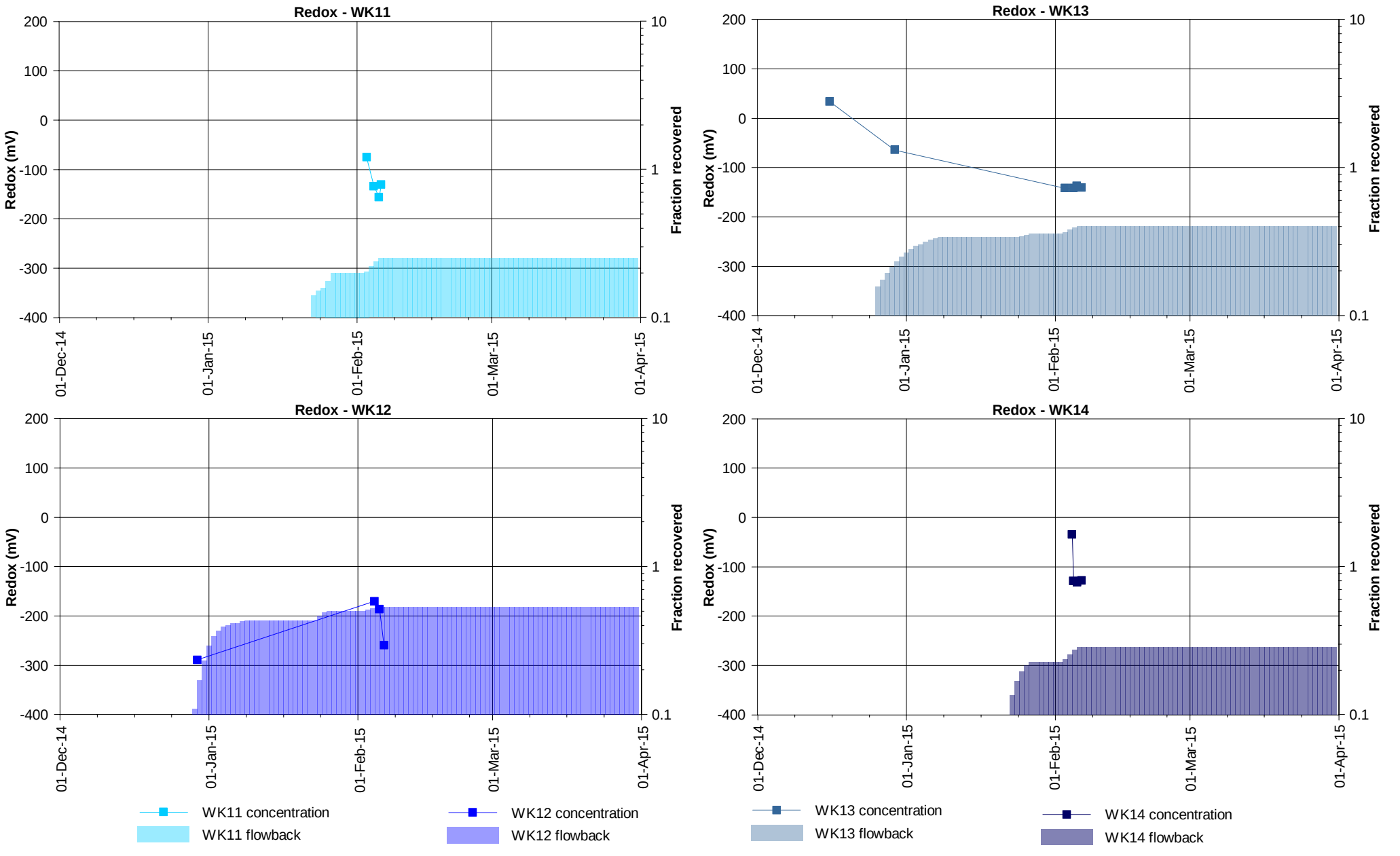

Figure E1.2: Field redox measurements and flowback volumes at the Waukivory pilot wells

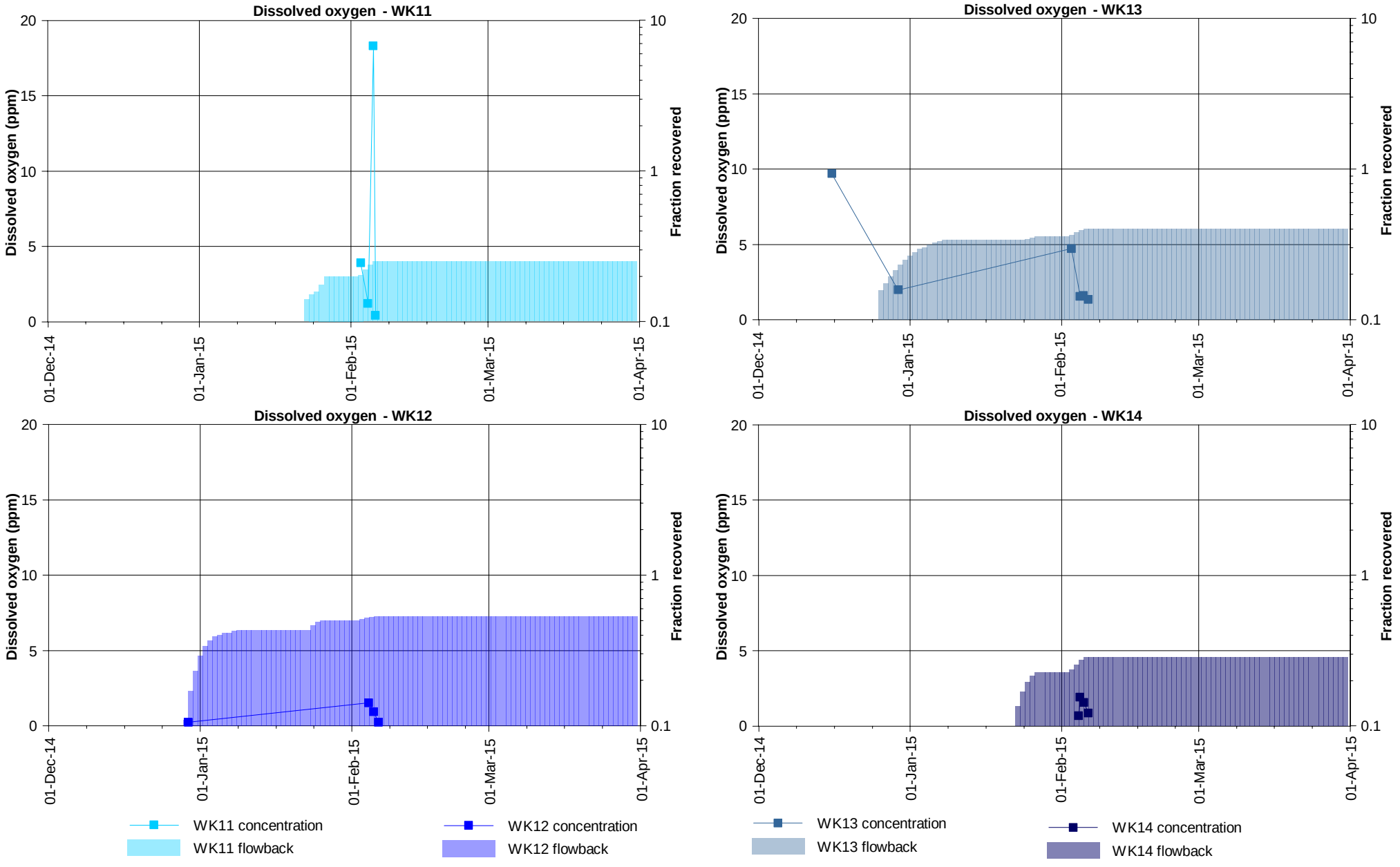

Figure E1.3: Field dissolved oxygen measurements and flowback volumes at the Waukivory pilot wells

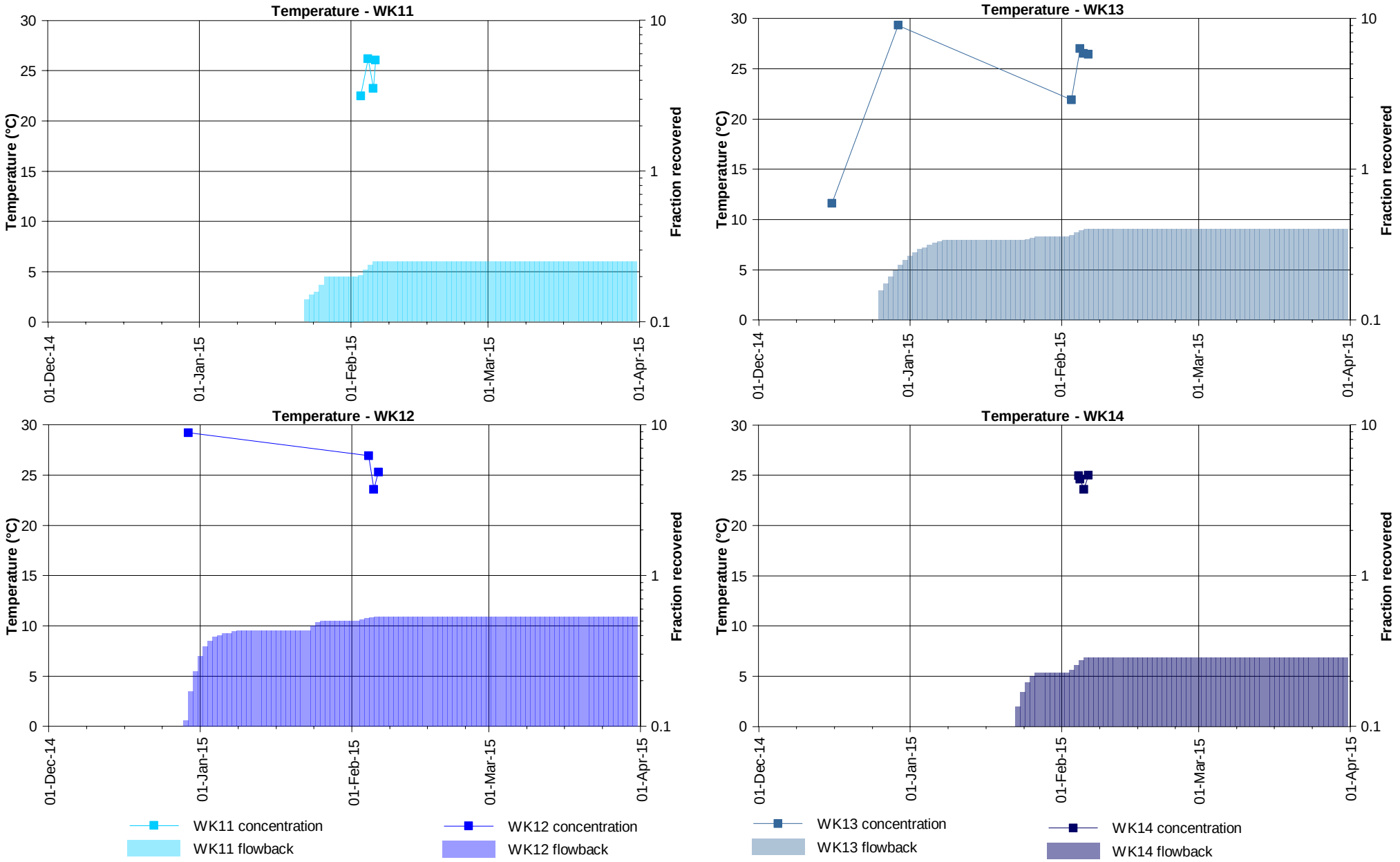

Figure E1.4: Field temperature measurements and flowback volumes at the Waukivory pilot wells

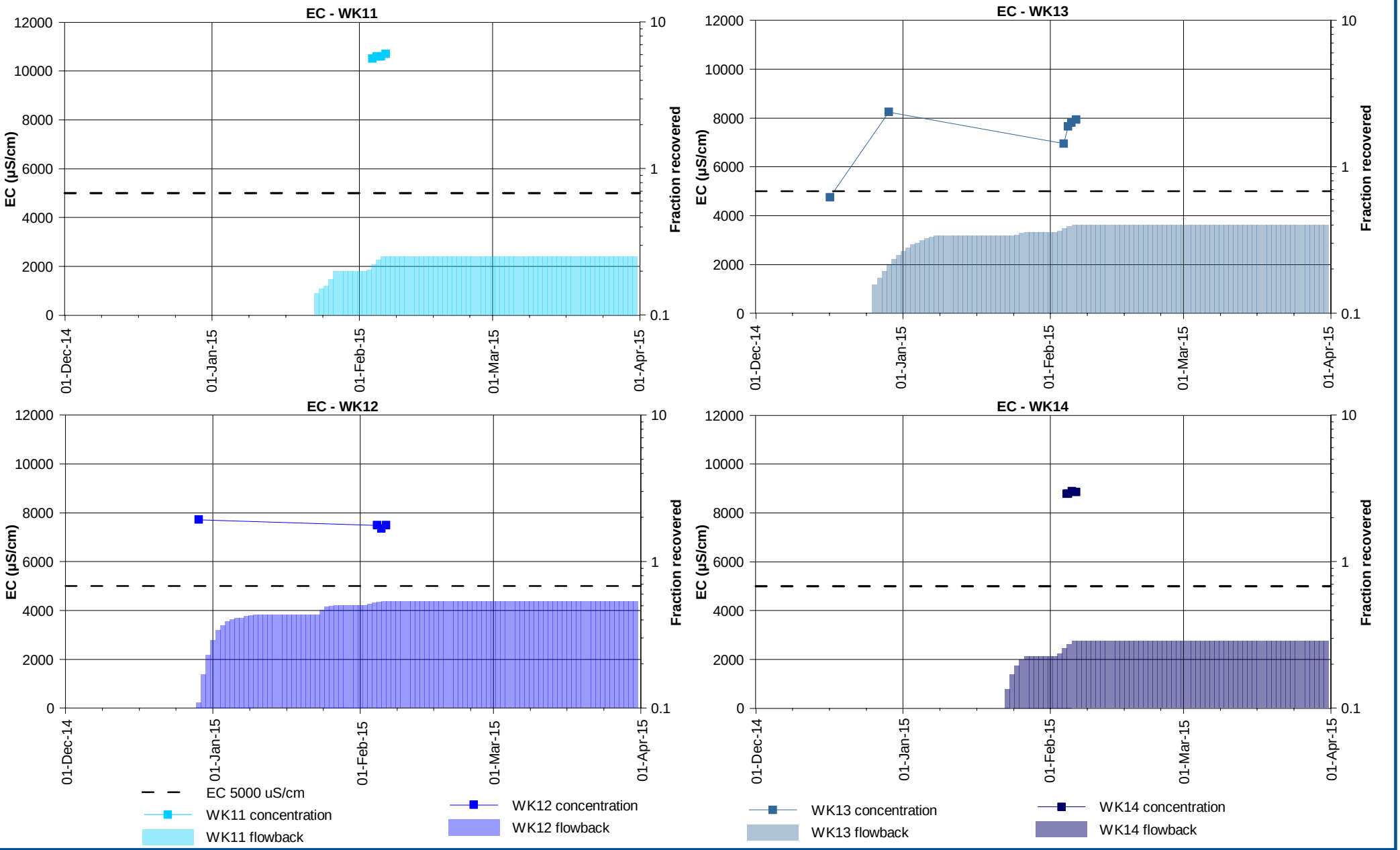

Figure E1.5: Laboratory electrical conductivity (EC) measurements and flowback volumes at the Waukivory pilot wells

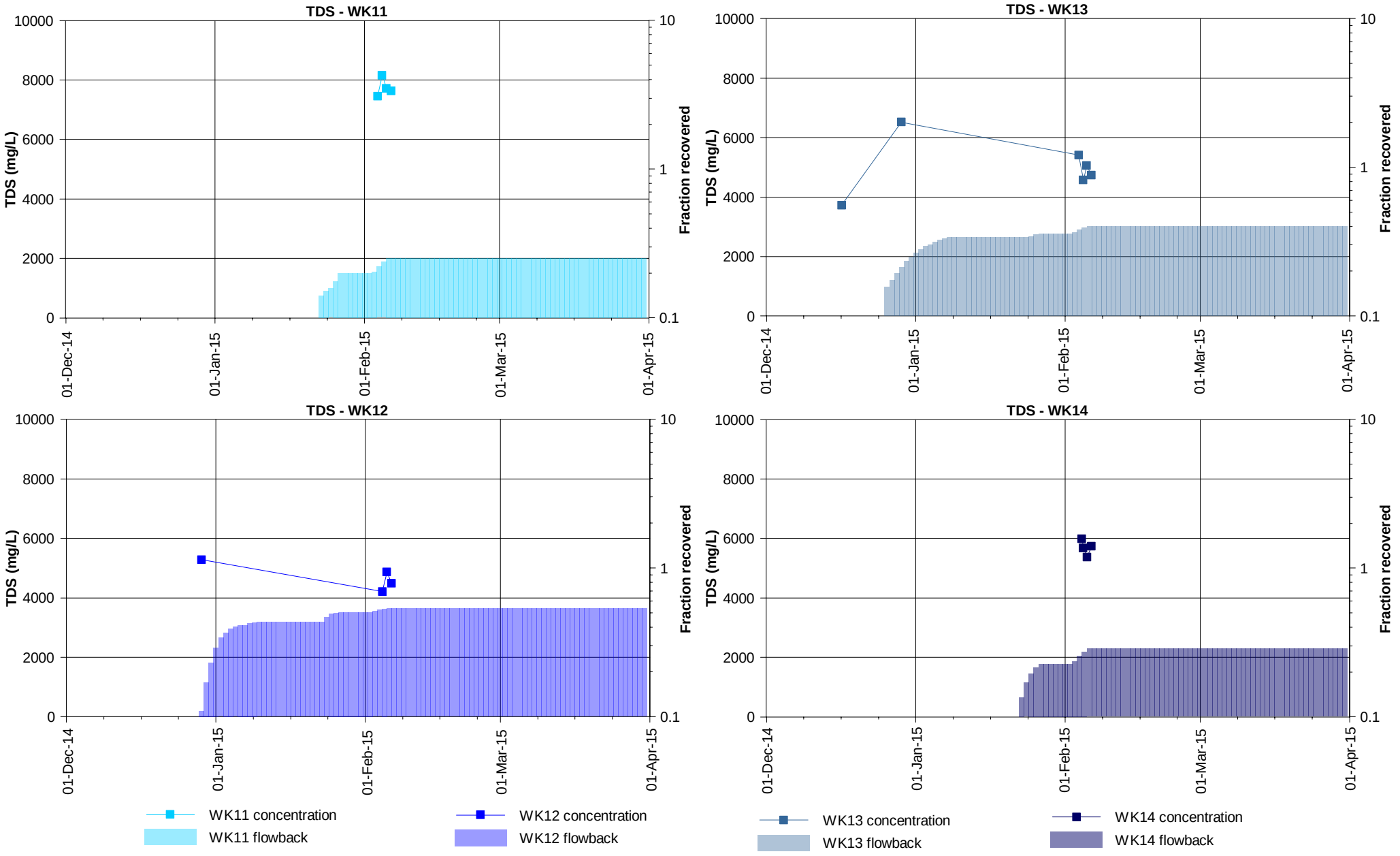

Figure E1.6: Laboratory total dissolved solids (TDS) measurements and flowback volumes at the Waukivory pilot wells

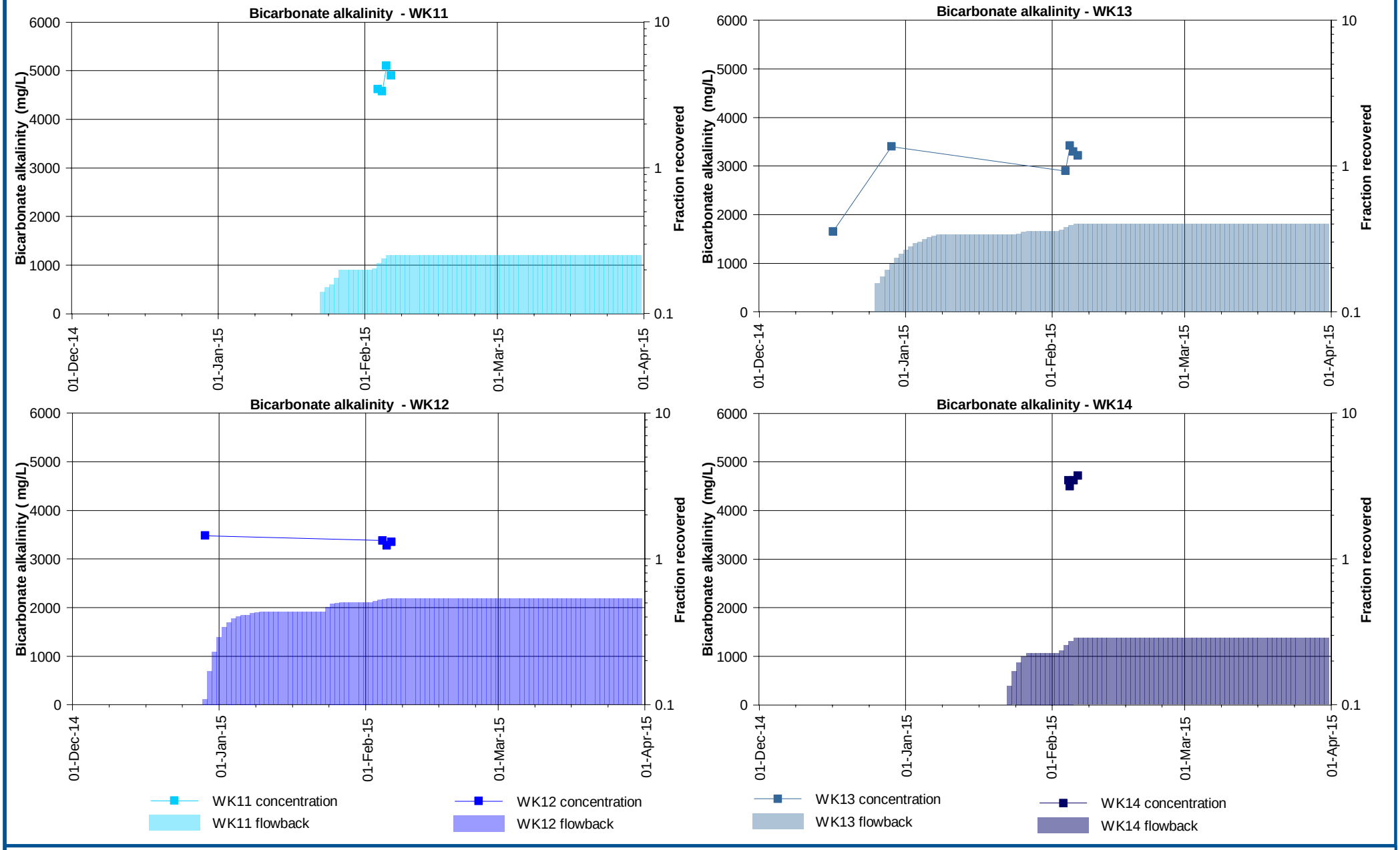

Figure E2.1: Bicarbonate alkalinity concentrations and flowback volumes at the Waukivory pilot wells

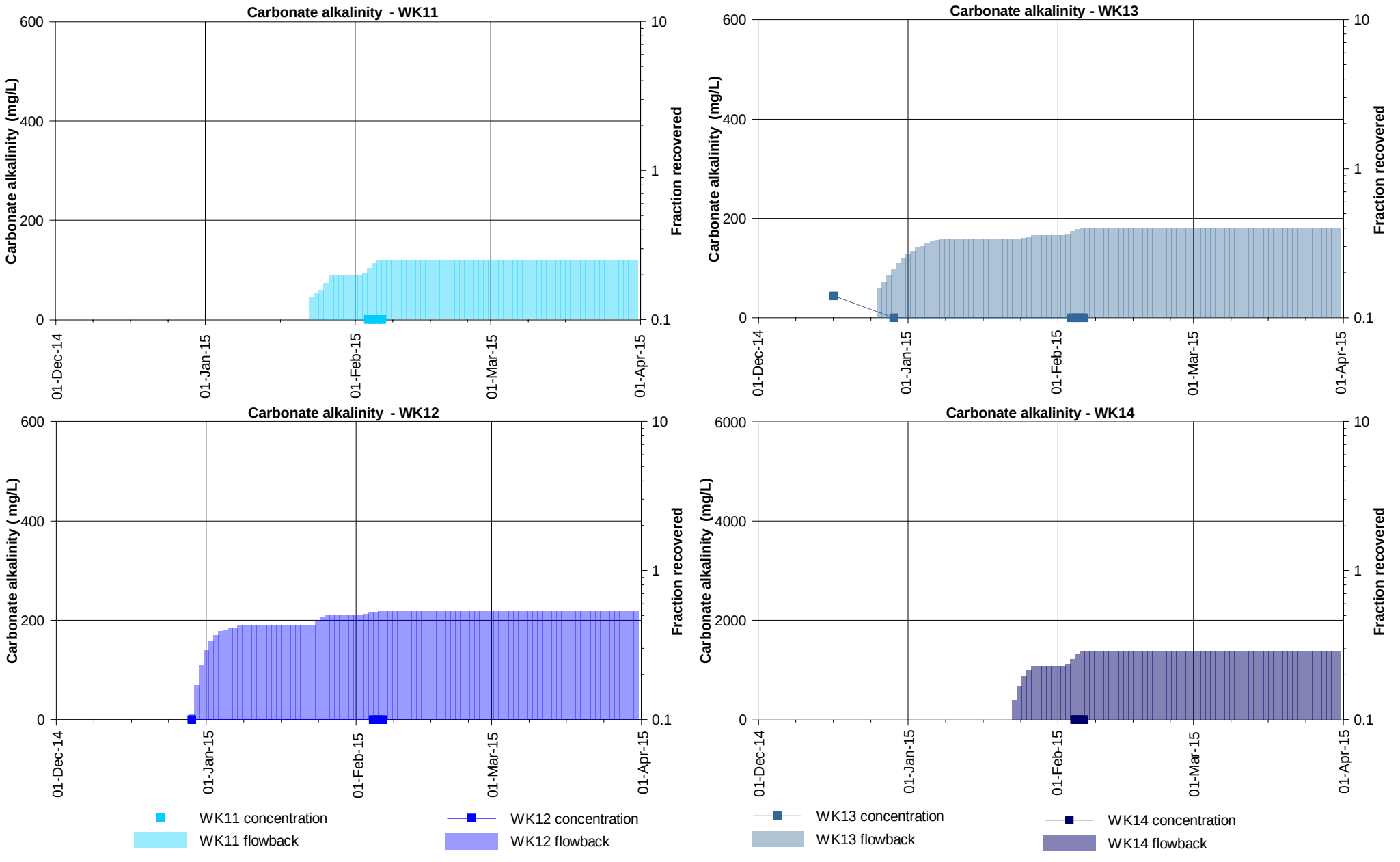

Figure E2.2: Carbonate alkalinity concentrations and flowback volumes at the Waukivory pilot wells

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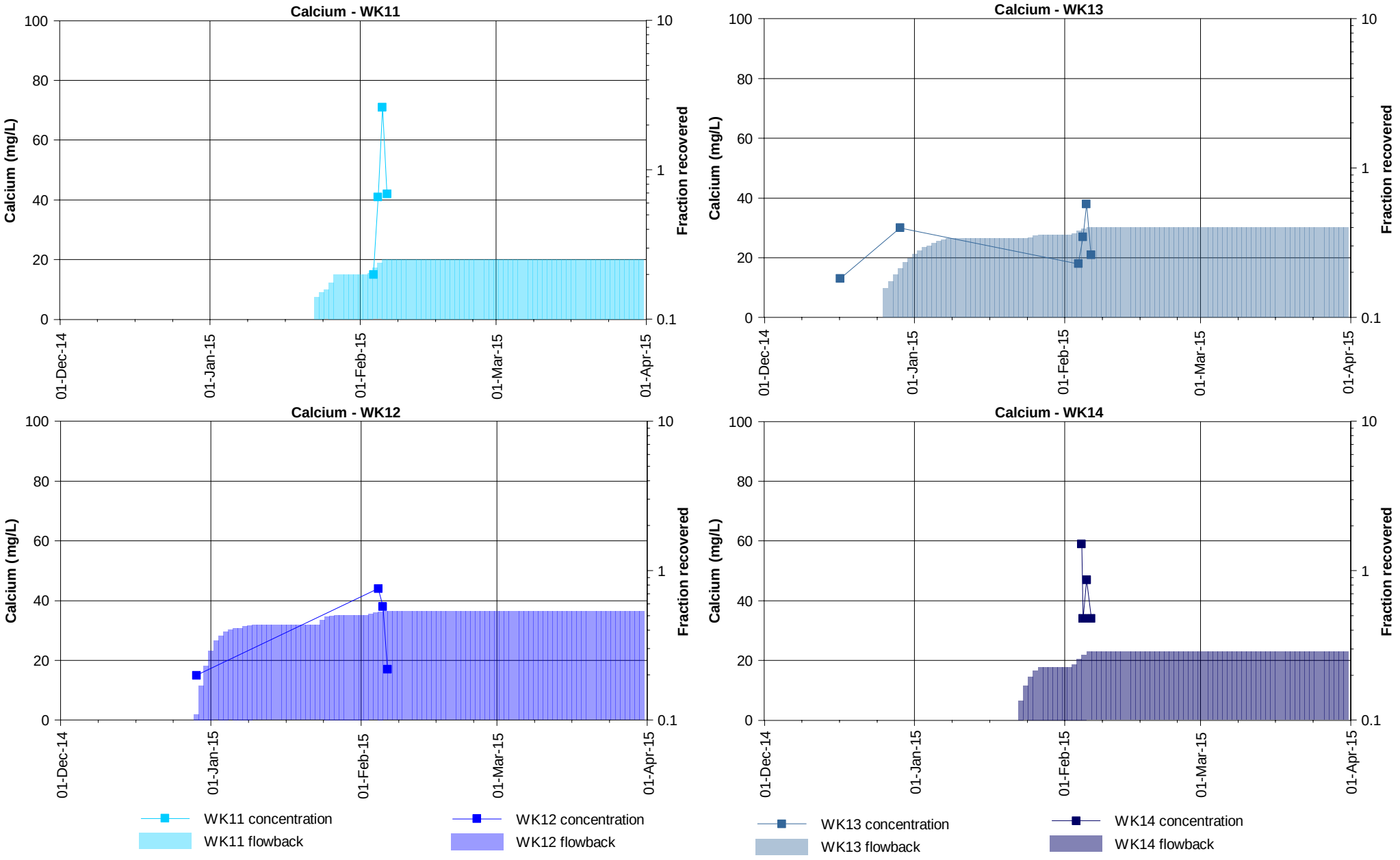

Figure E2.3: Calcium concentrations and flowback volumes at the Waukivory pilot wells

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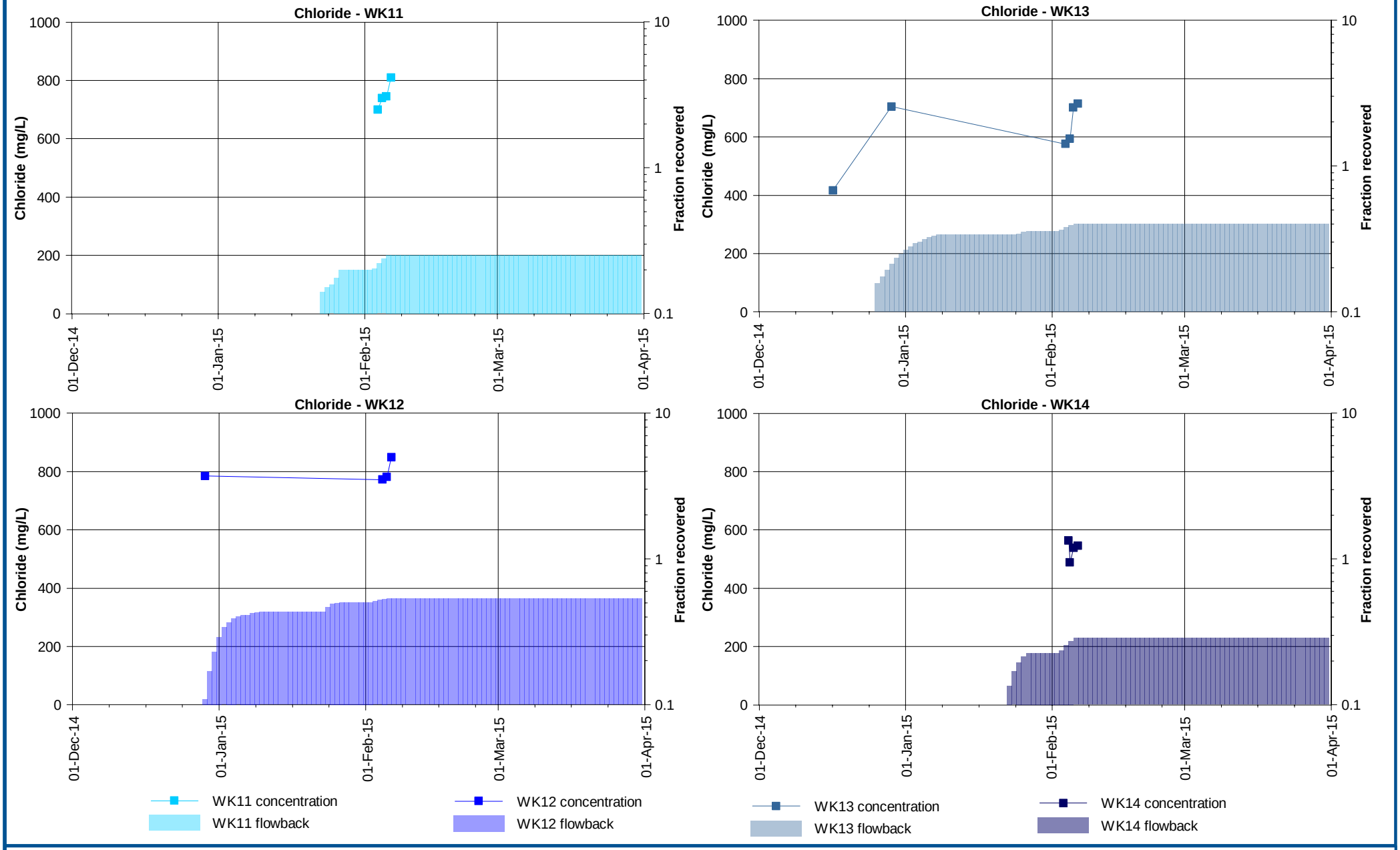

Figure E2.4: Chloride concentrations and flowback volumes at the Waukivory pilot wells

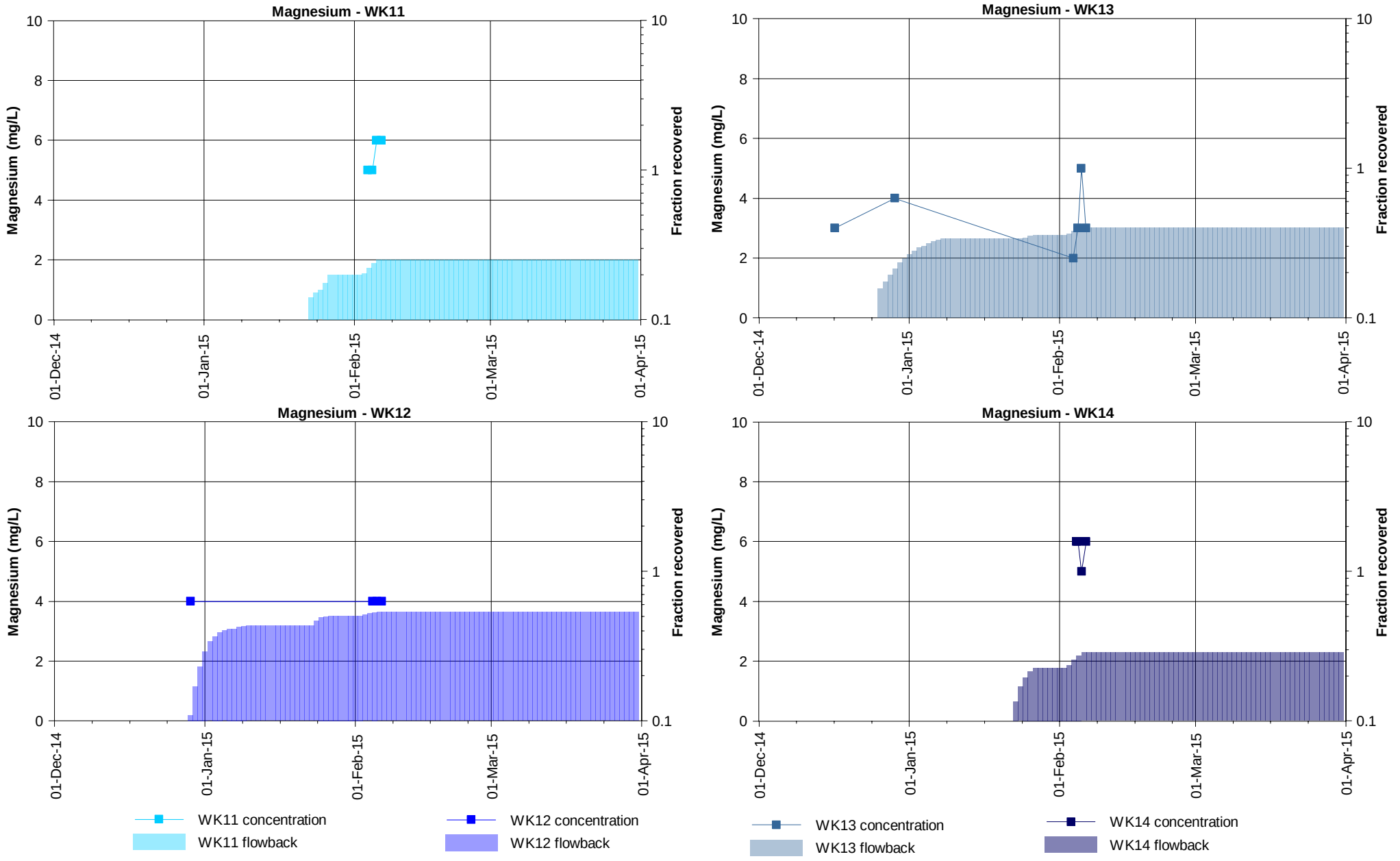

Figure E2.5: Magnesium concentrations and flowback volumes at the Waukivory pilot wells

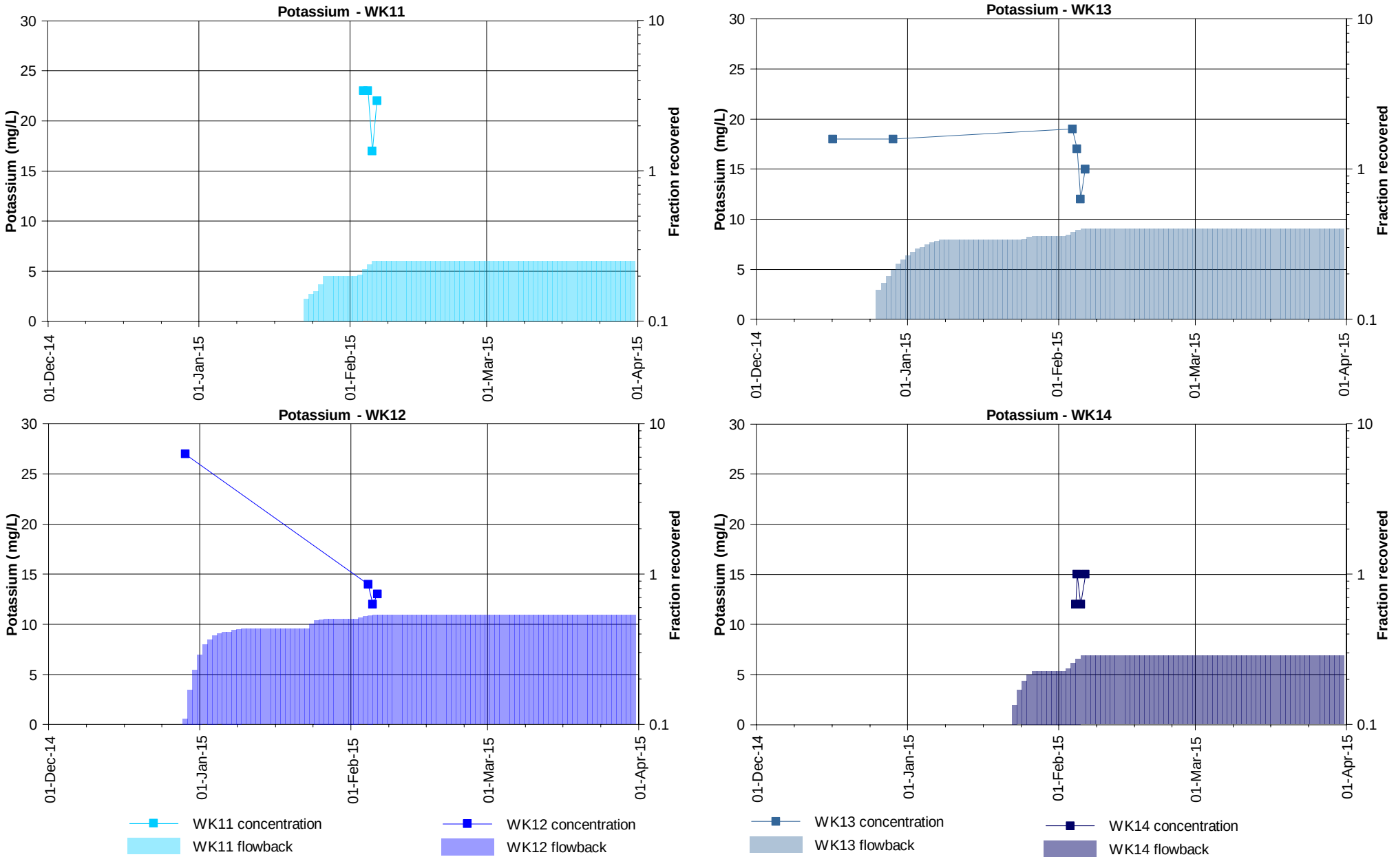

Figure E2.6: Potassium concentrations and flowback volumes at the Waukivory pilot wells

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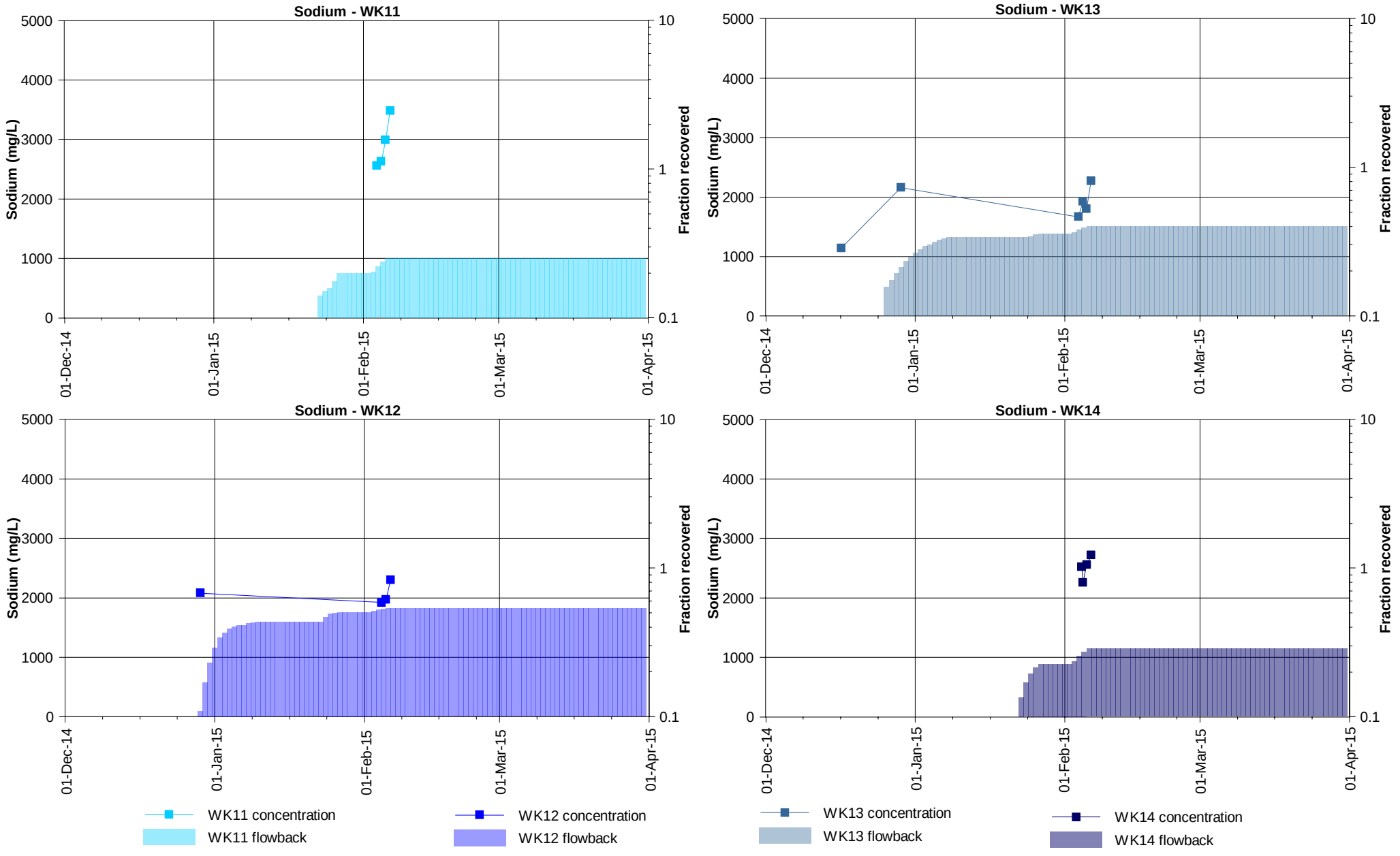

Figure E2.7: Sodium concentrations and flowback volumes at the Waukivory pilot wells

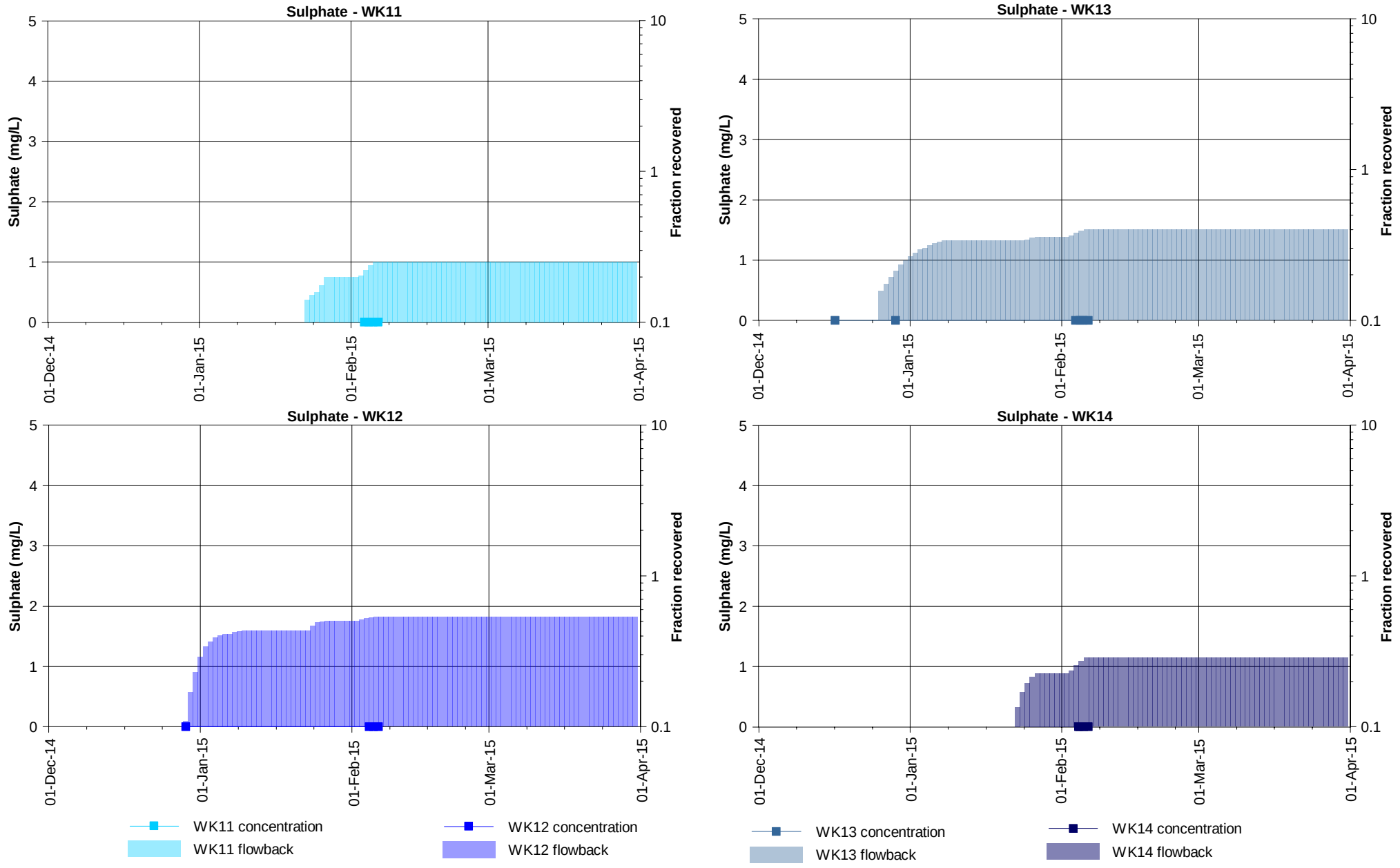

Figure E2.8: Sulphate concentrations and flowback volumes at the Waukivory pilot wells

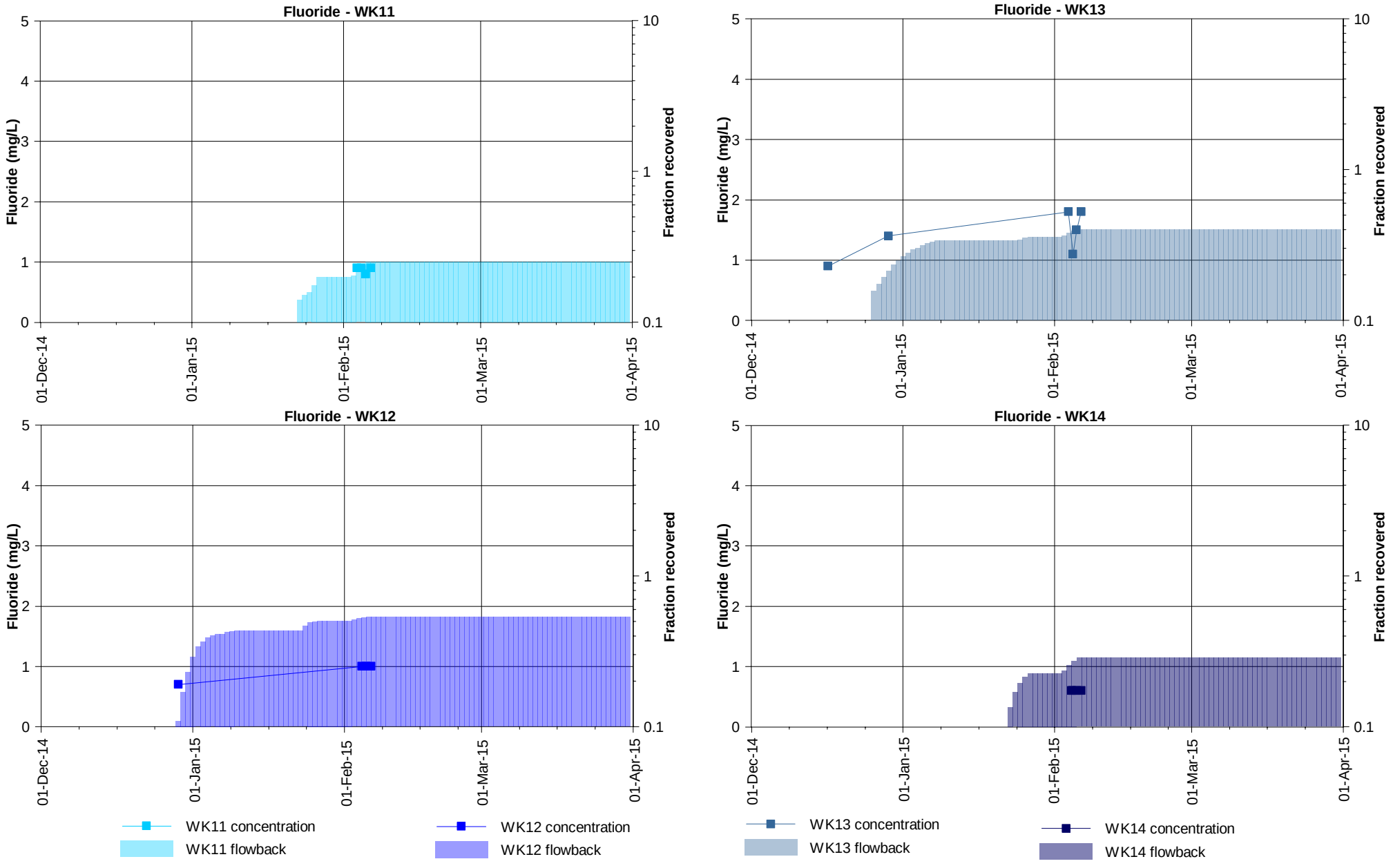

Figure E2.9: Fluoride concentrations and flowback volumes at the Waukivory pilot wells

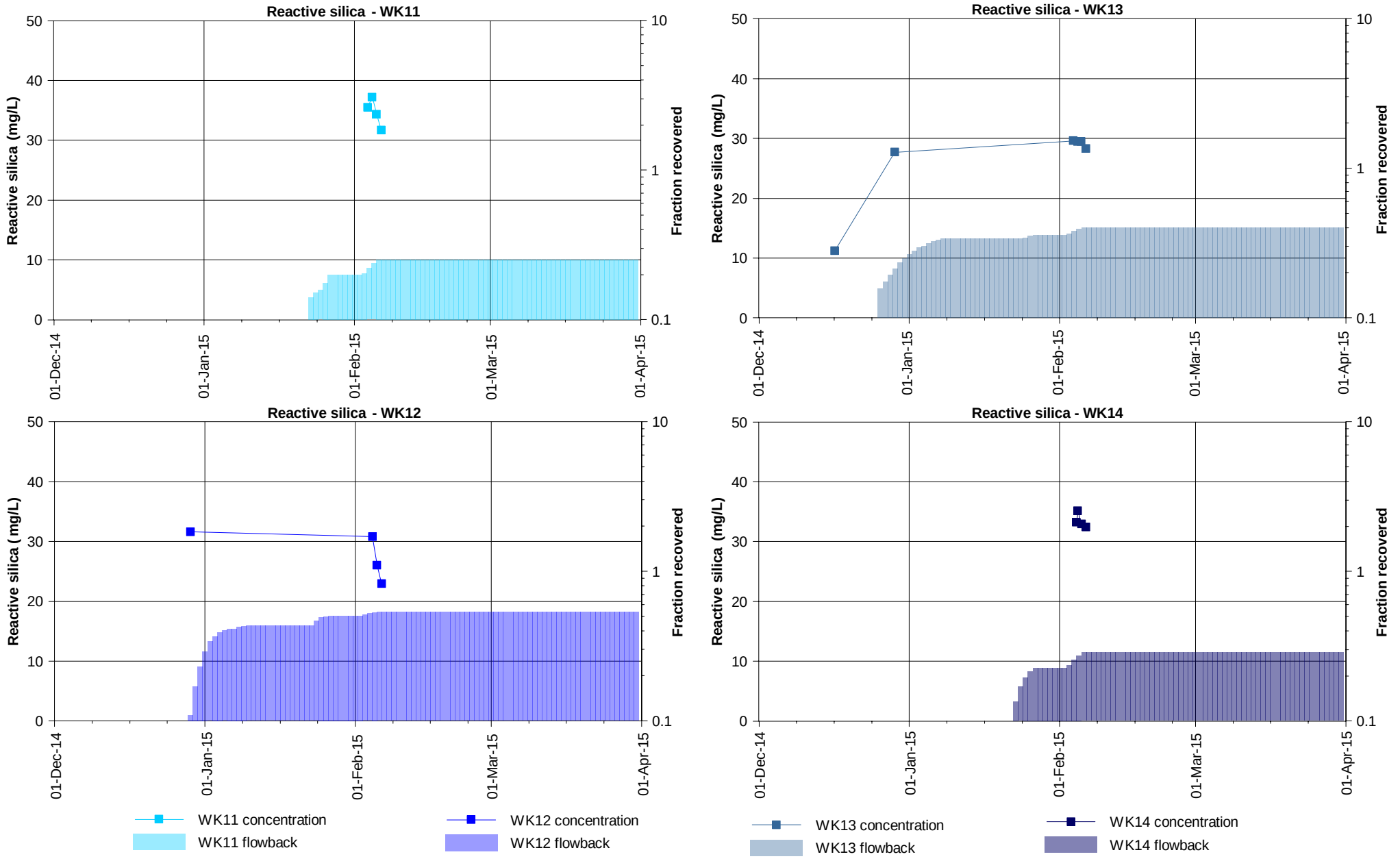

Figure E2.10: Reactive silica concentrations and flowback volumes at the Waukivory pilot wells

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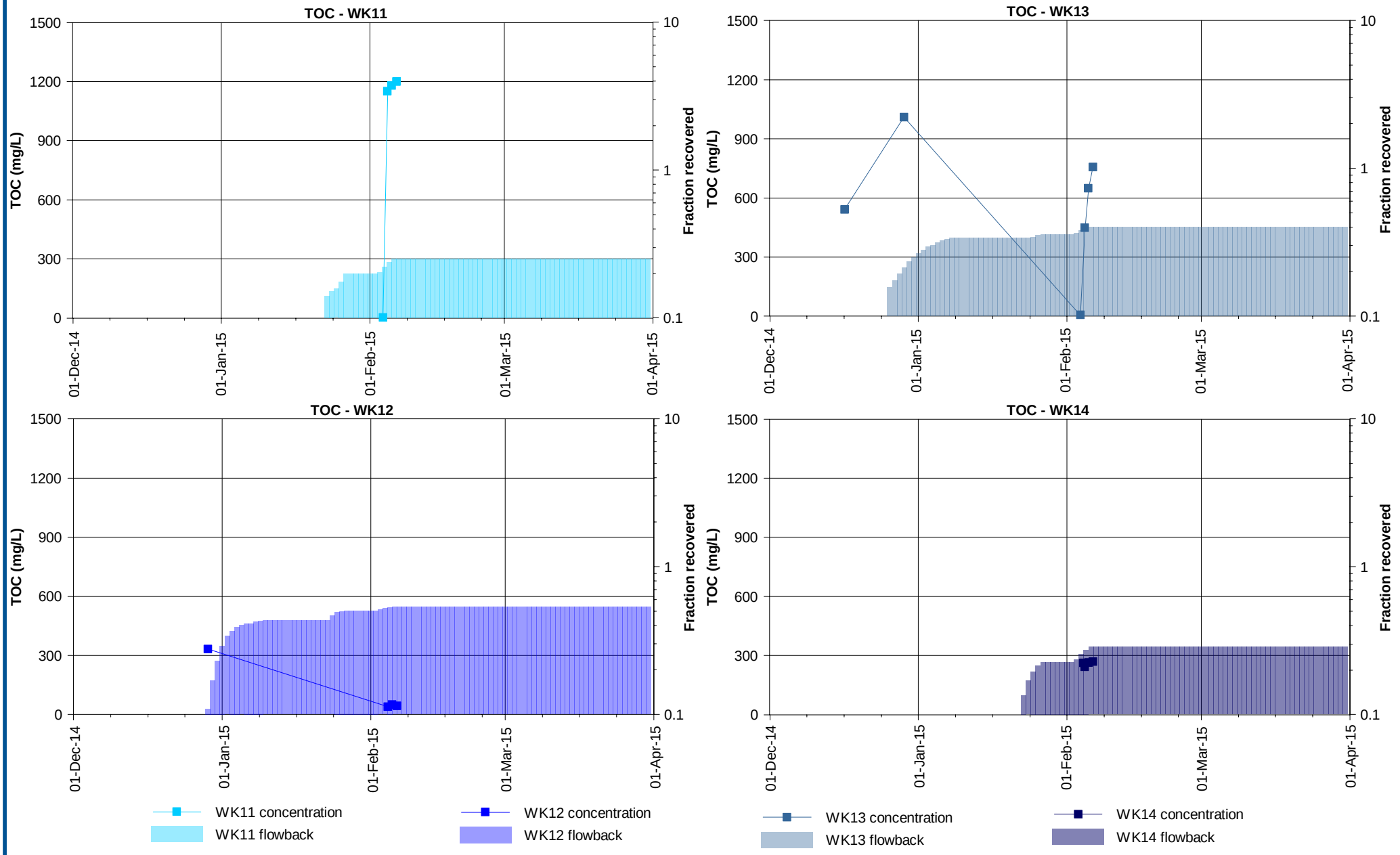

Figure E2.11: Total organic carbon (TOC) concentrations and flowback volumes at the Waukivory pilot wells

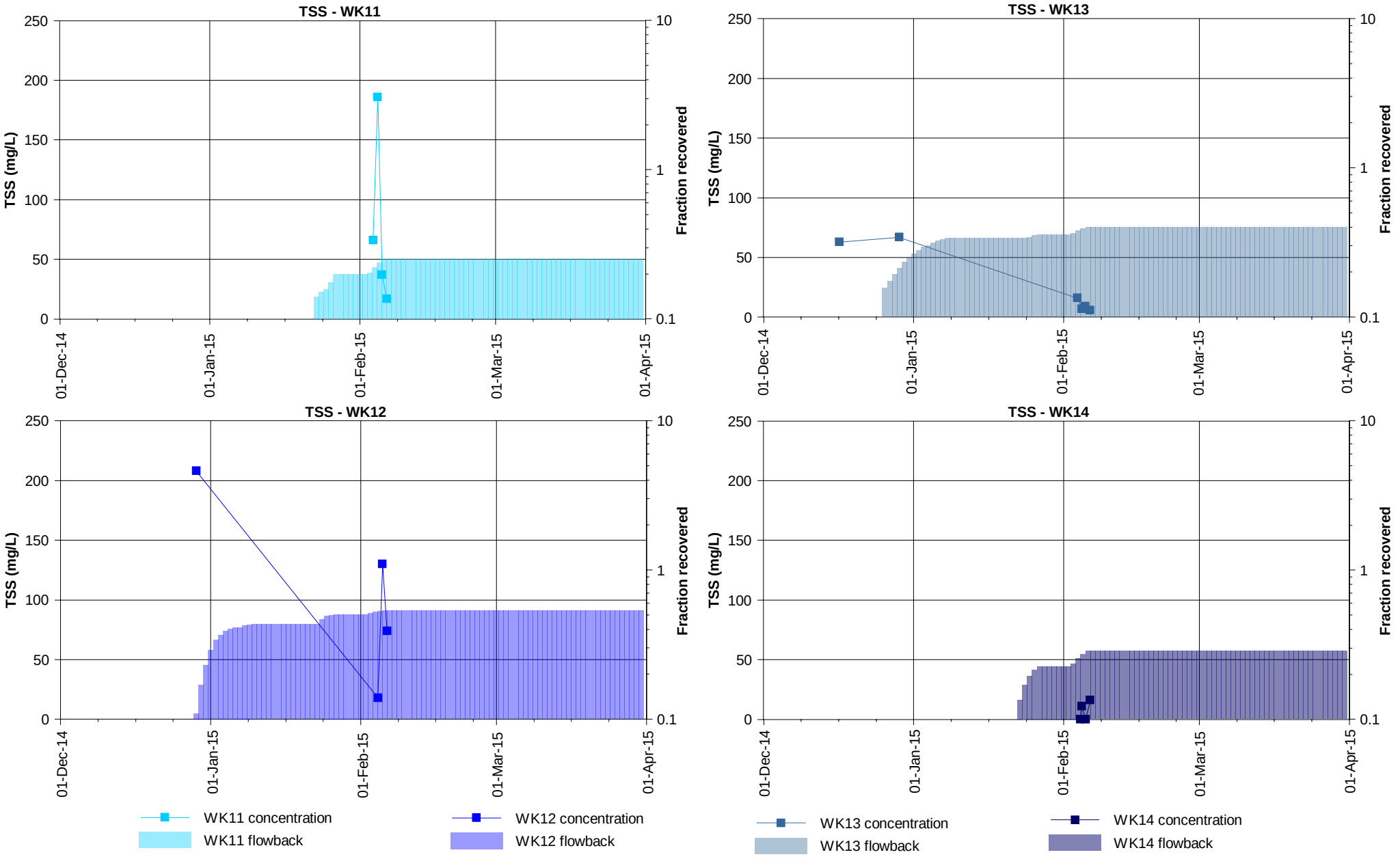

Figure E2.12: Total suspended solids (TSS) concentrations and flowback volumes at the Waukivory pilot wells

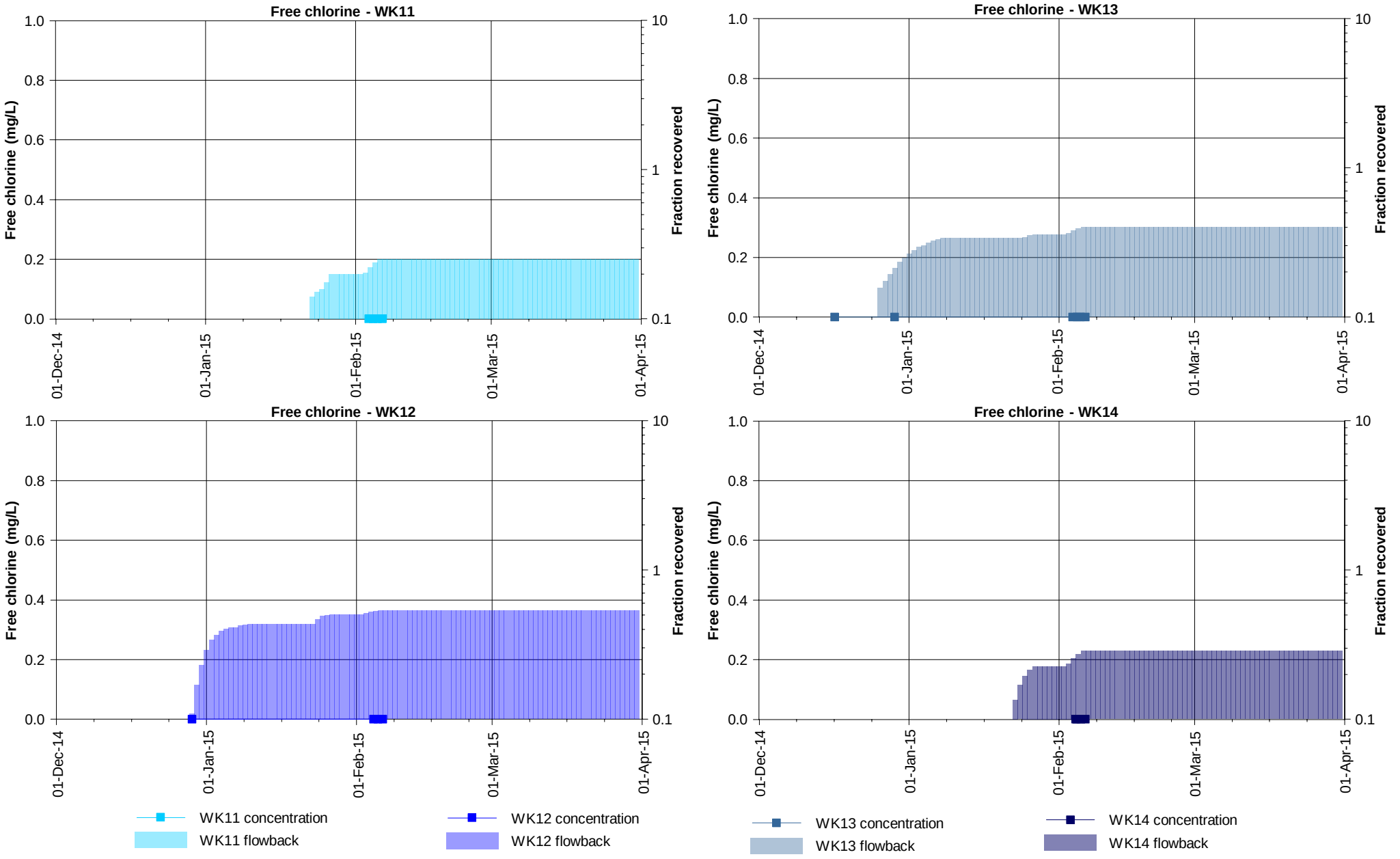

Figure E2.13: Laboratory measurements of free chlorine and flowback volumes at the Waukivory pilot wells

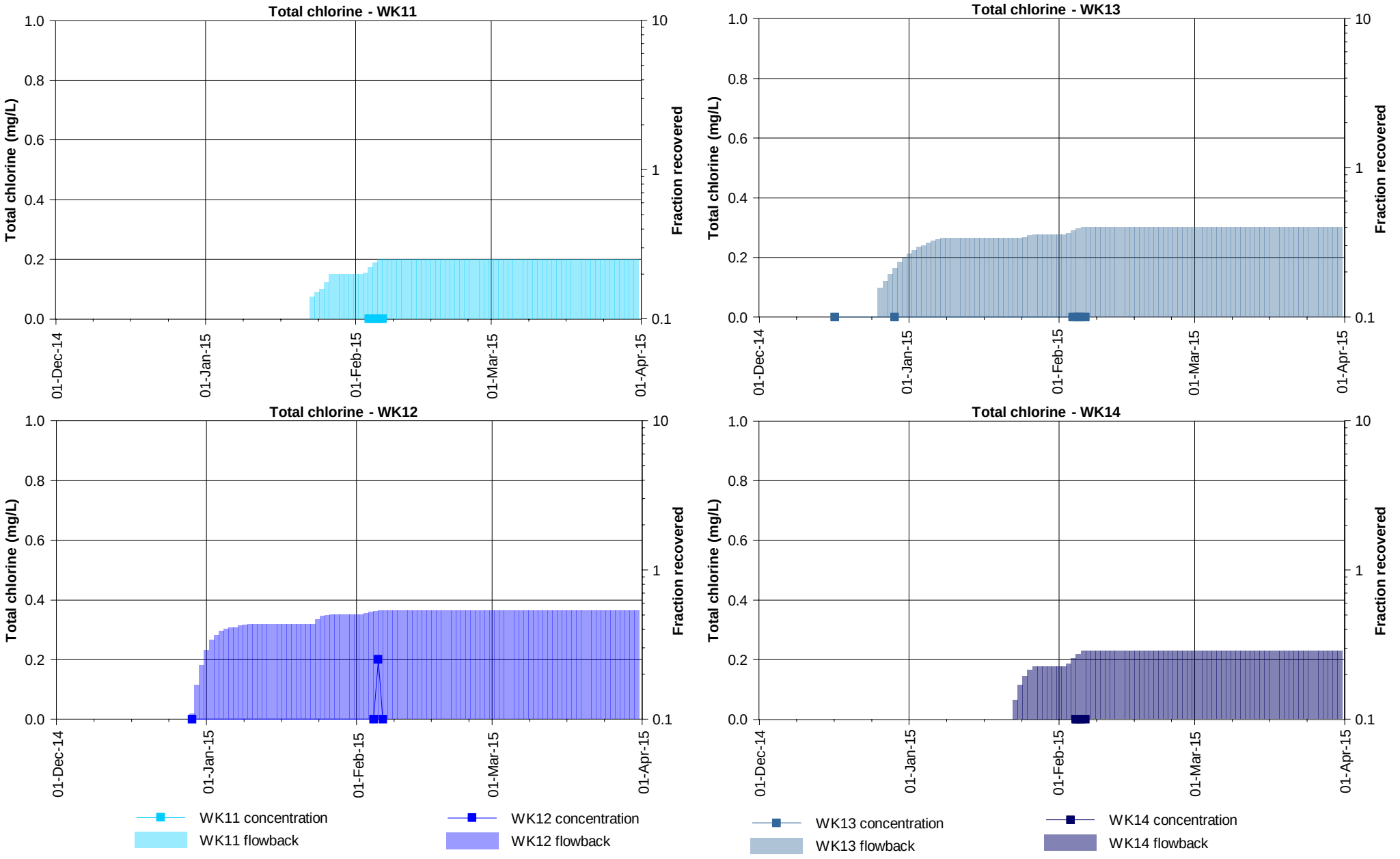

Figure E2.14: Laboratory measurements of total chlorine and flowback volumes at the Waukivory pilot wells

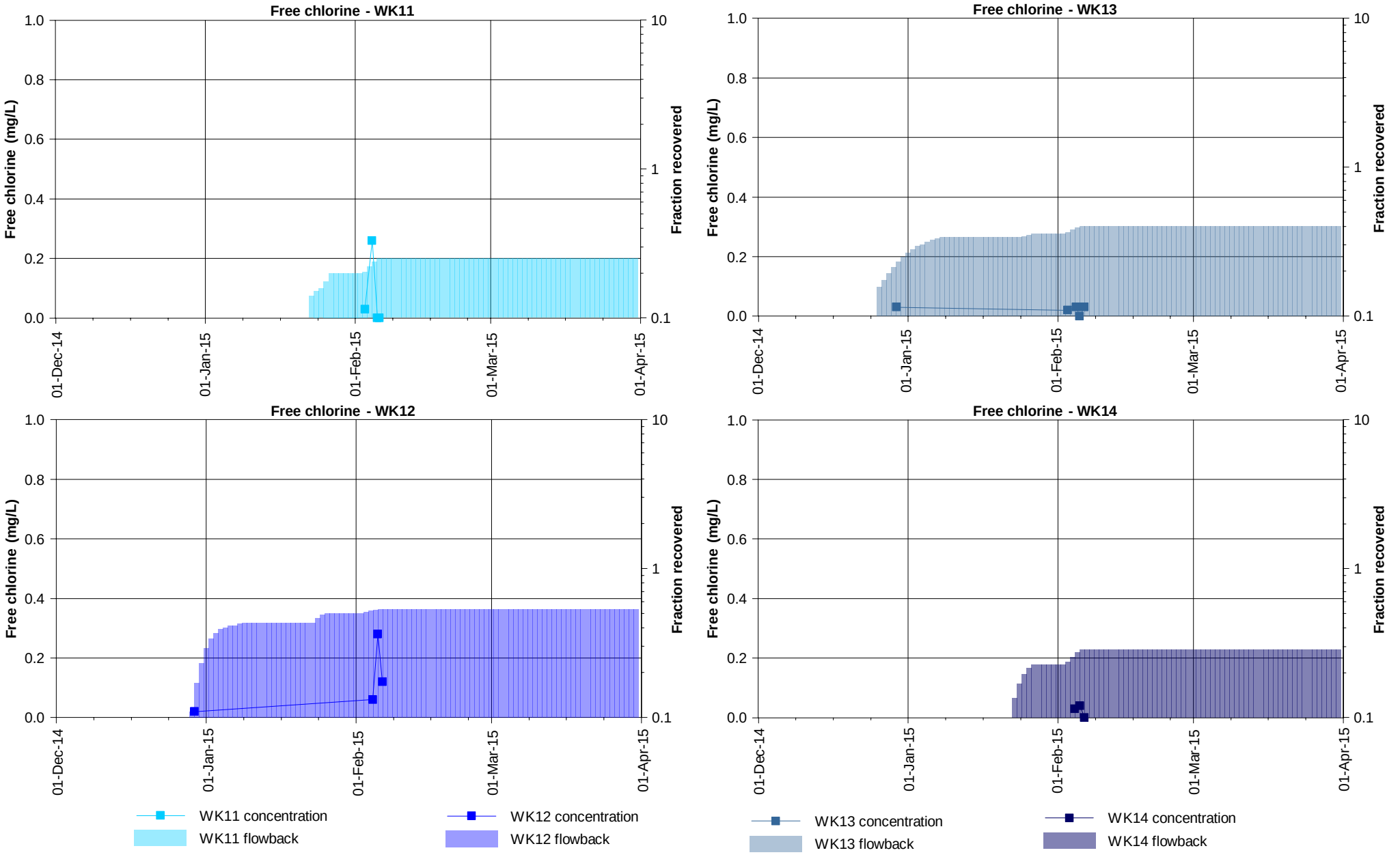

Figure E2.15: Field measurements of free chlorine and flowback volumes at the Waukivory pilot wells

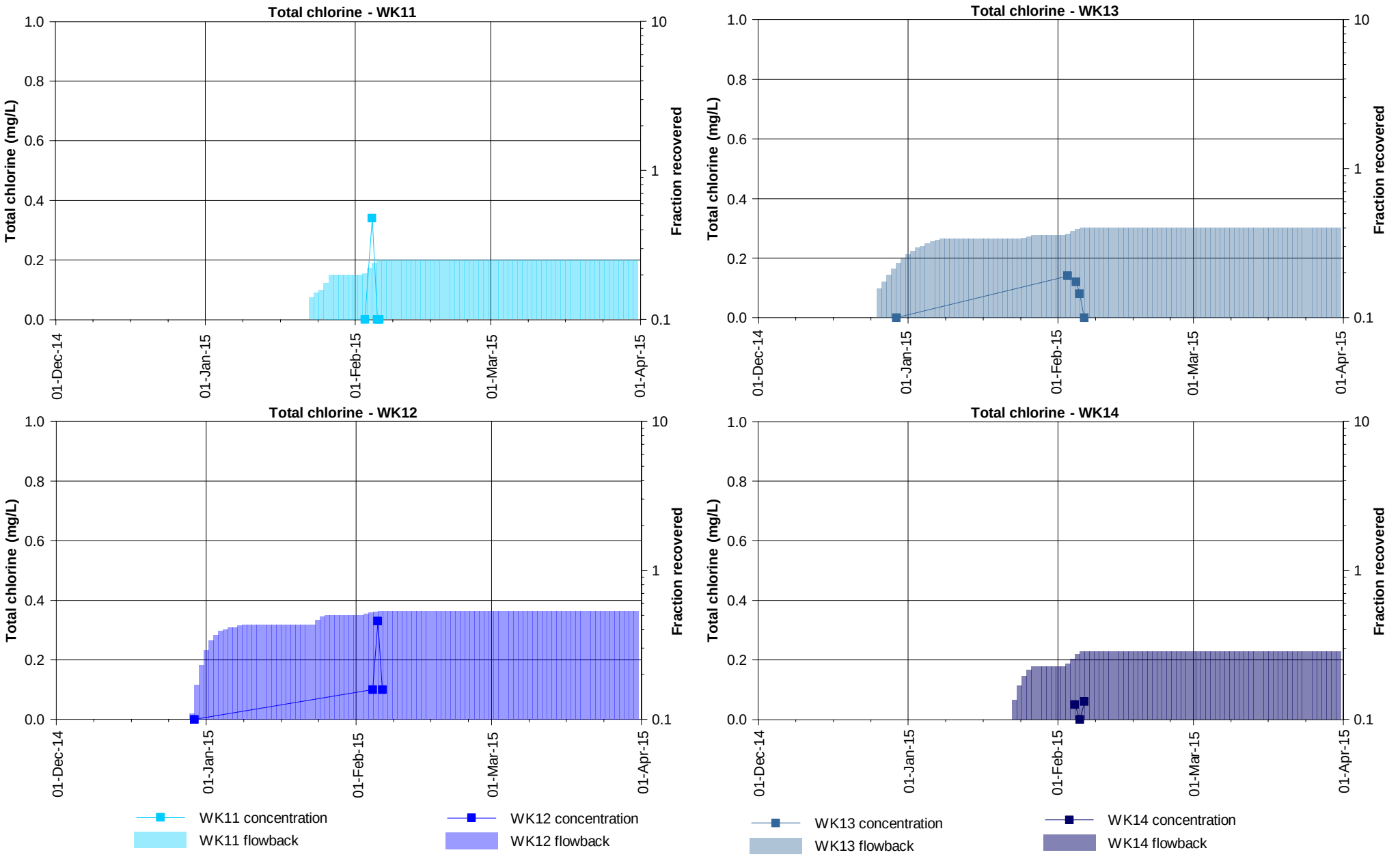

Figure E2.16: Field measurements of total chlorine and flowback volumes at the Waukivory pilot wells

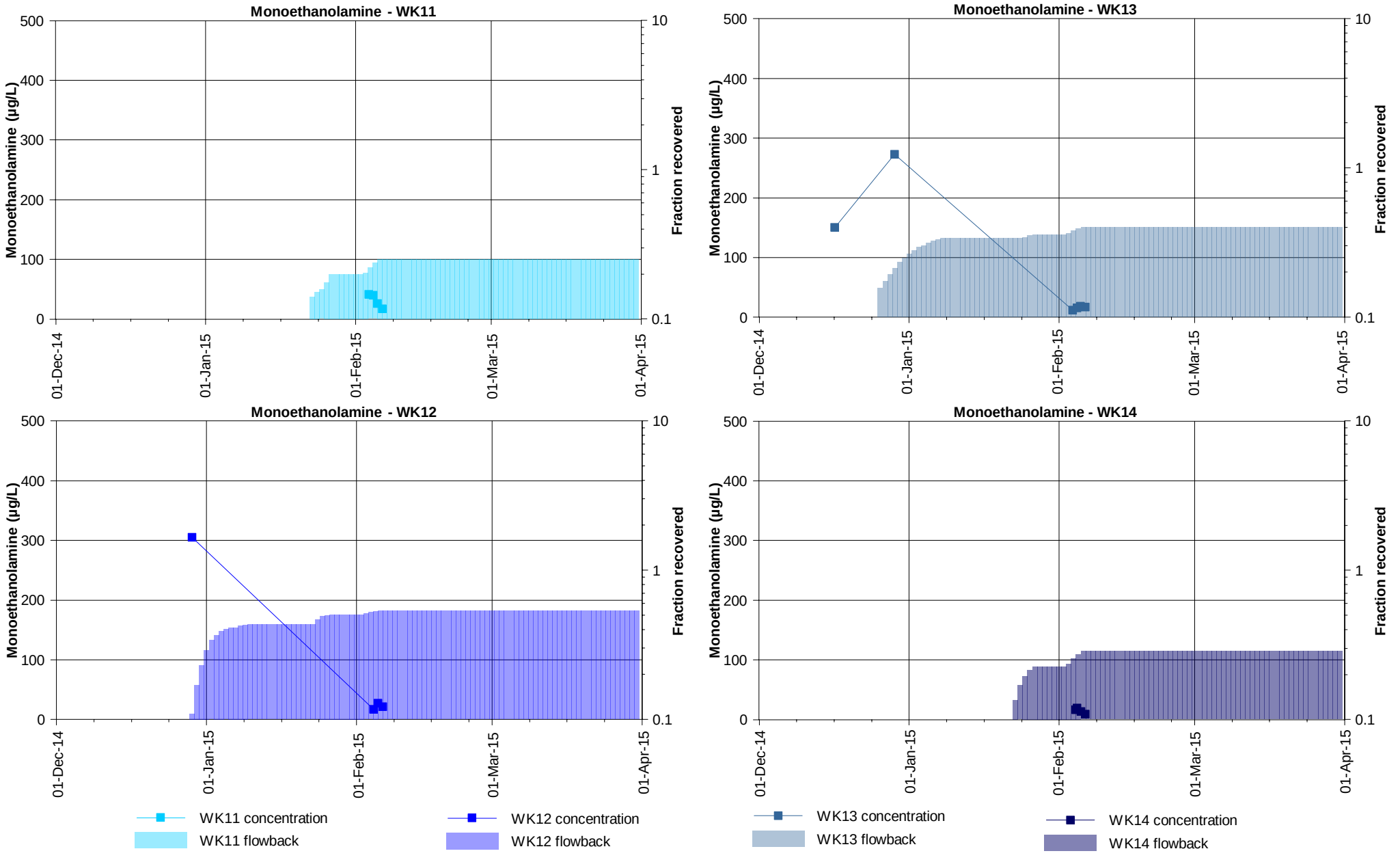

Figure E2.17: Monoethanolamoine concentrations and flowback volumes at the Waukivory pilot wells

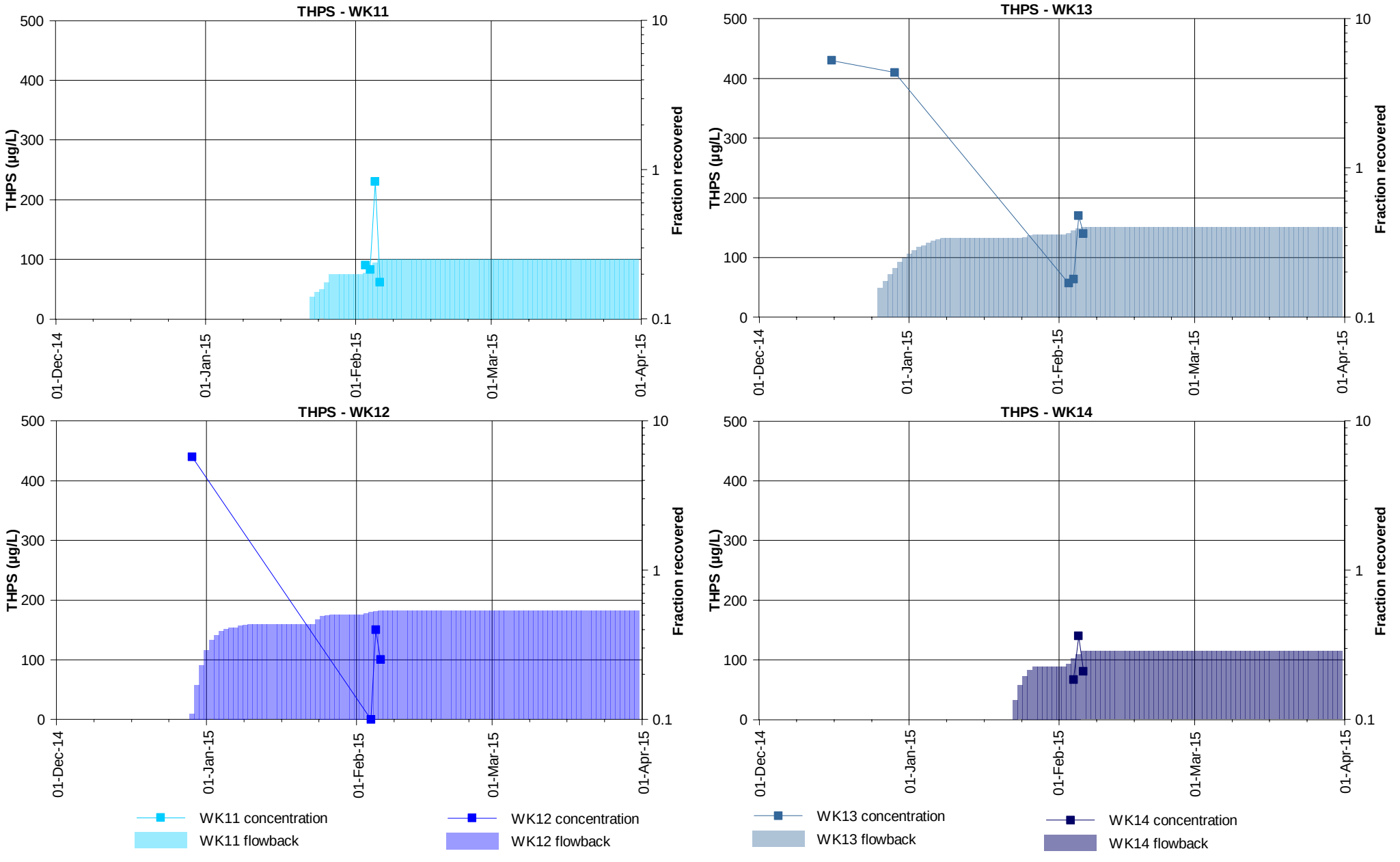

Figure E2.18: THPS concentrations and flowback volumes at the Waukivory pilot wells

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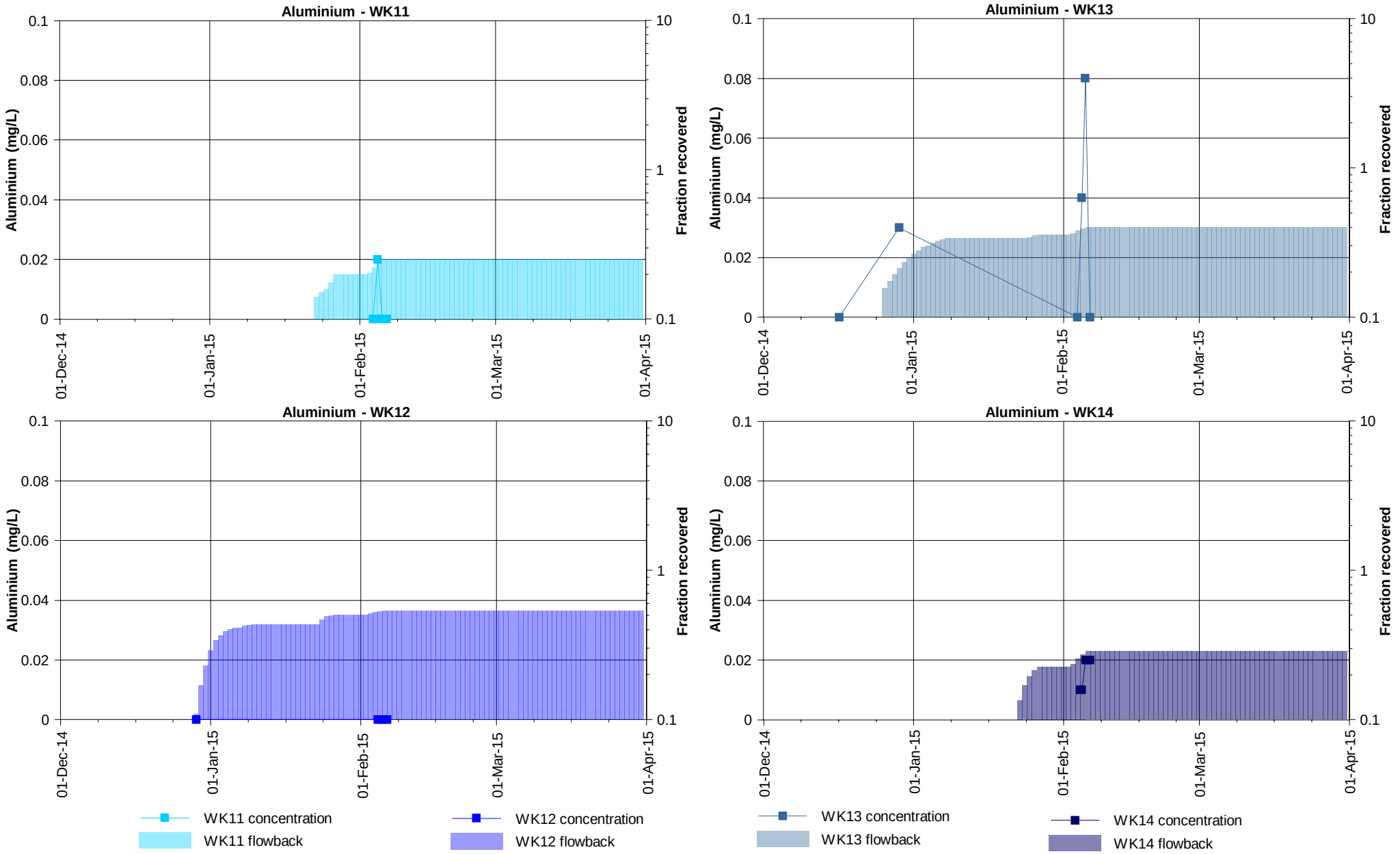

Figure E3.1: Aluminium concentrations and flowback volumes at the Waukivory pilot wells

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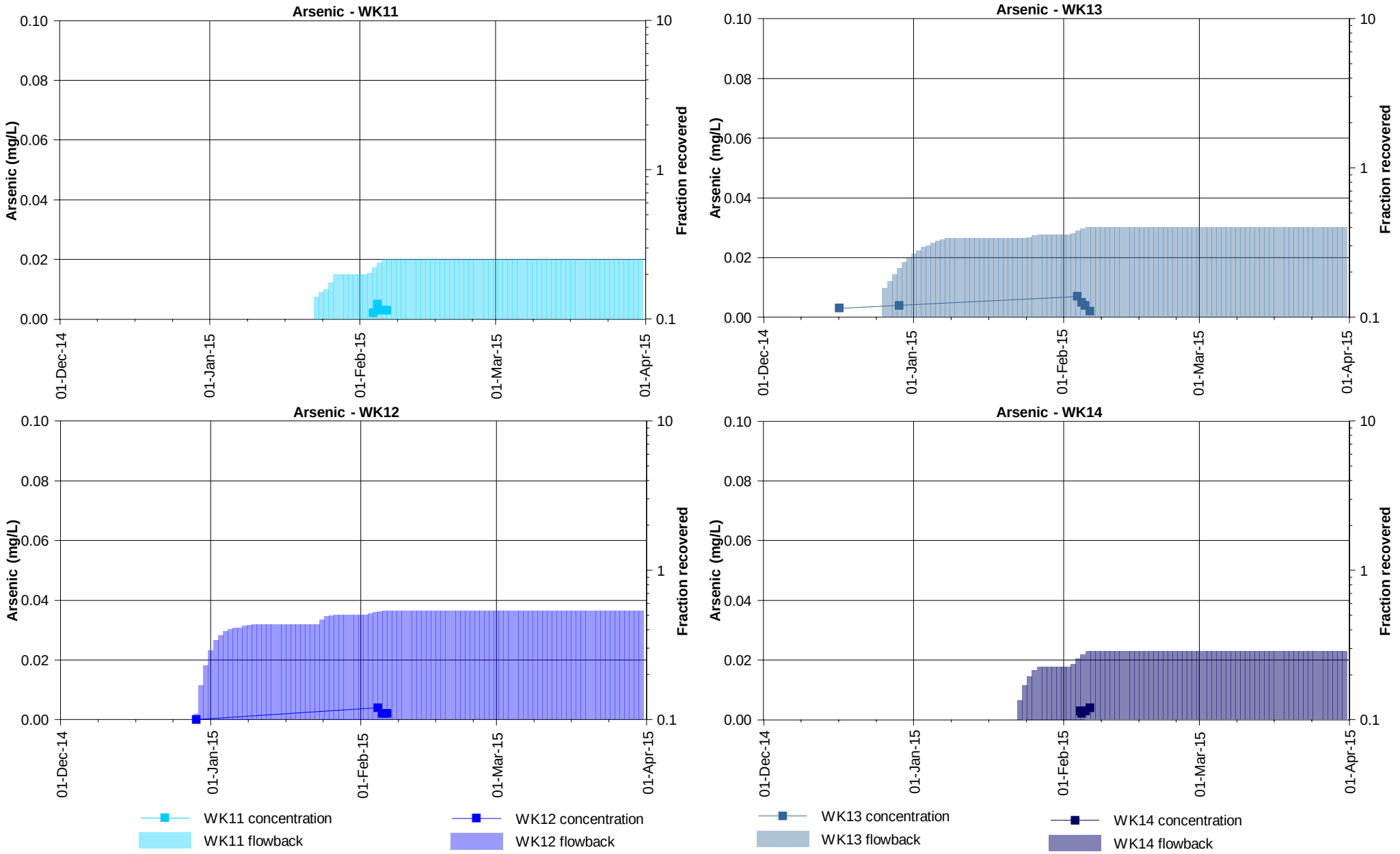

Figure E3.2: Arsenic concentrations and flowback volumes at the Waukivory pilot wells

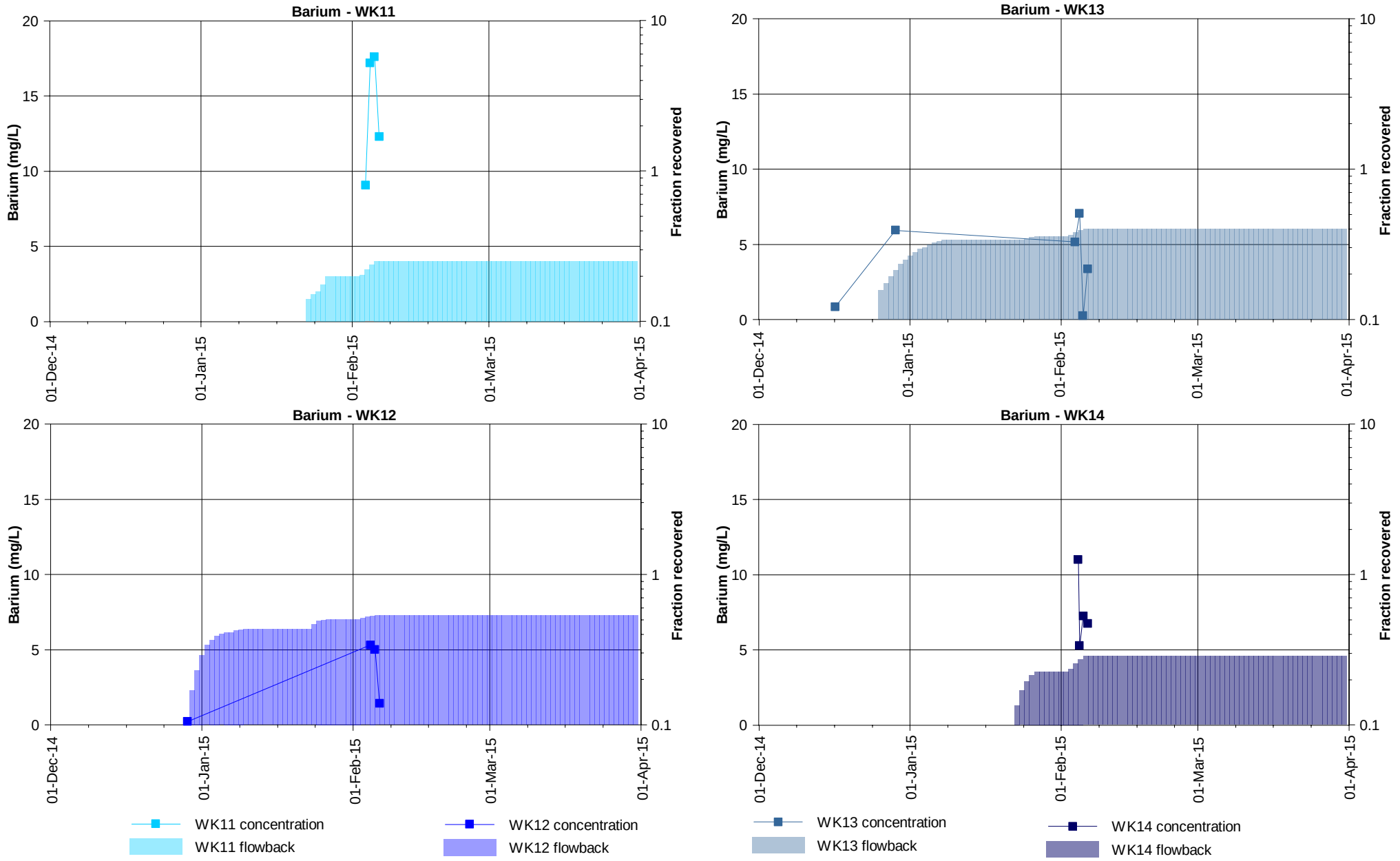

Figure E3.3: Barium concentrations and flowback volumes at the Waukivory pilot wells

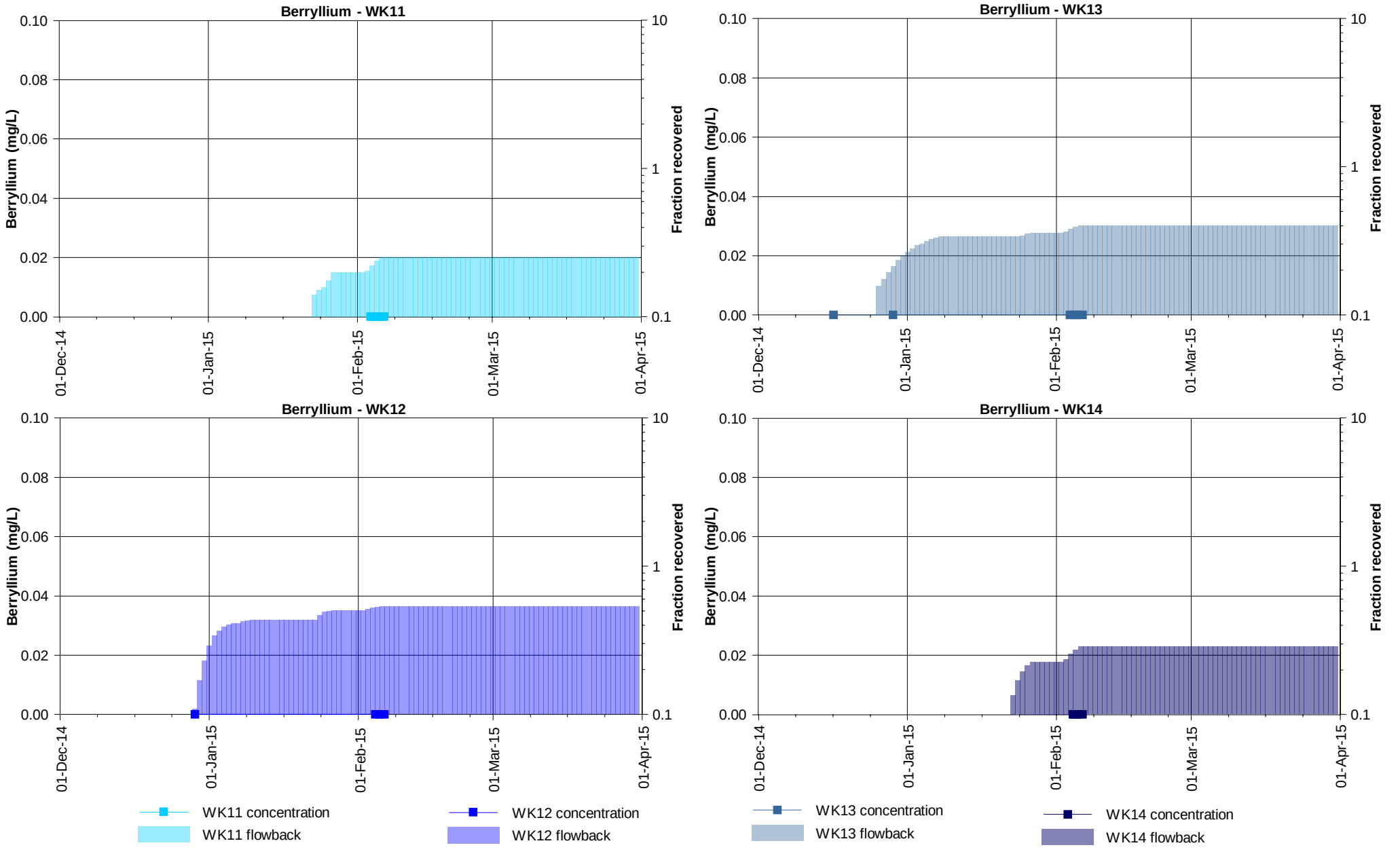

Figure E3.4: Berryllium concentrations and flowback volumes at the Waukivory pilot wells

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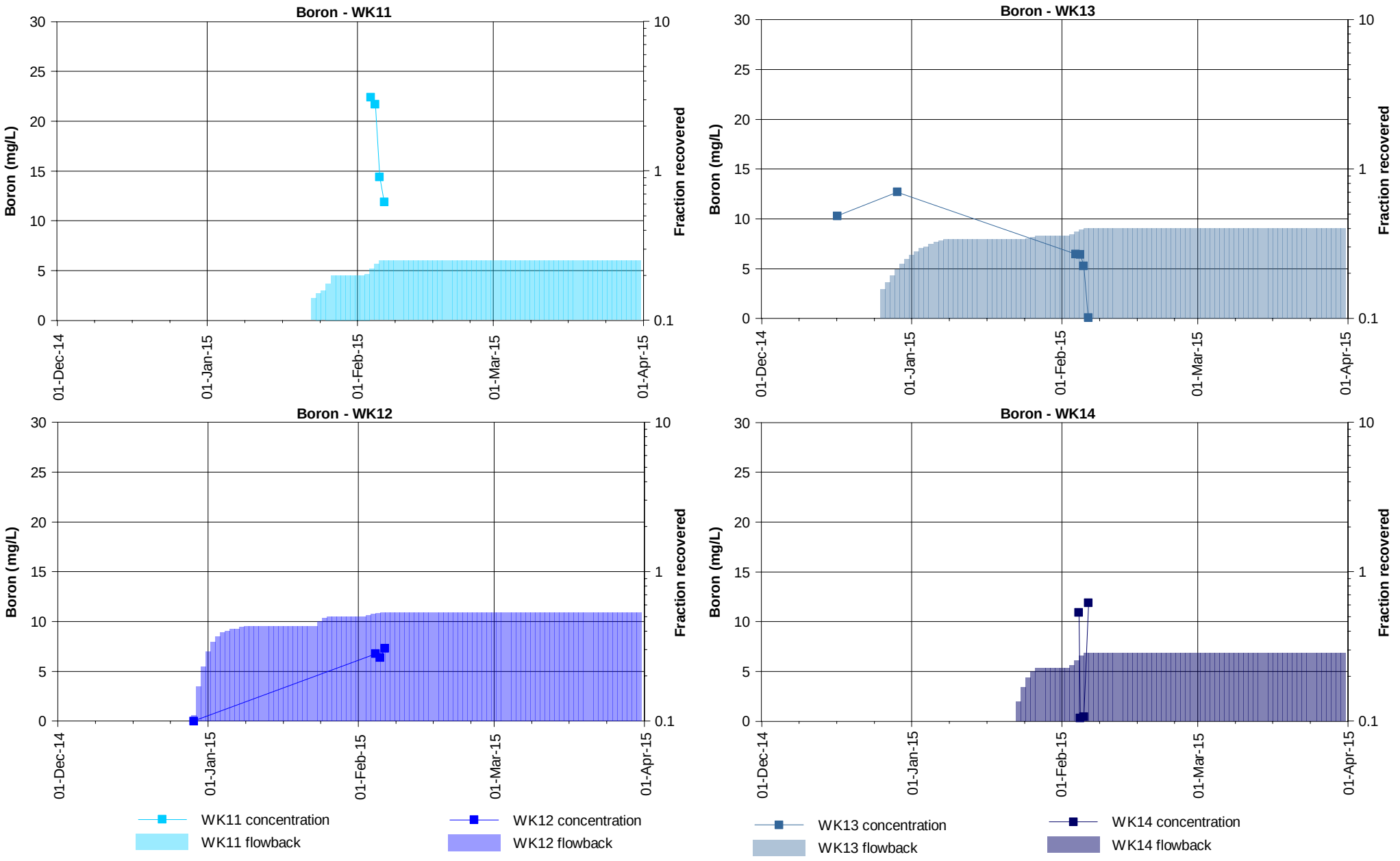

Figure E3.5: Boron concentrations and flowback volumes at the Waukivory pilot wells

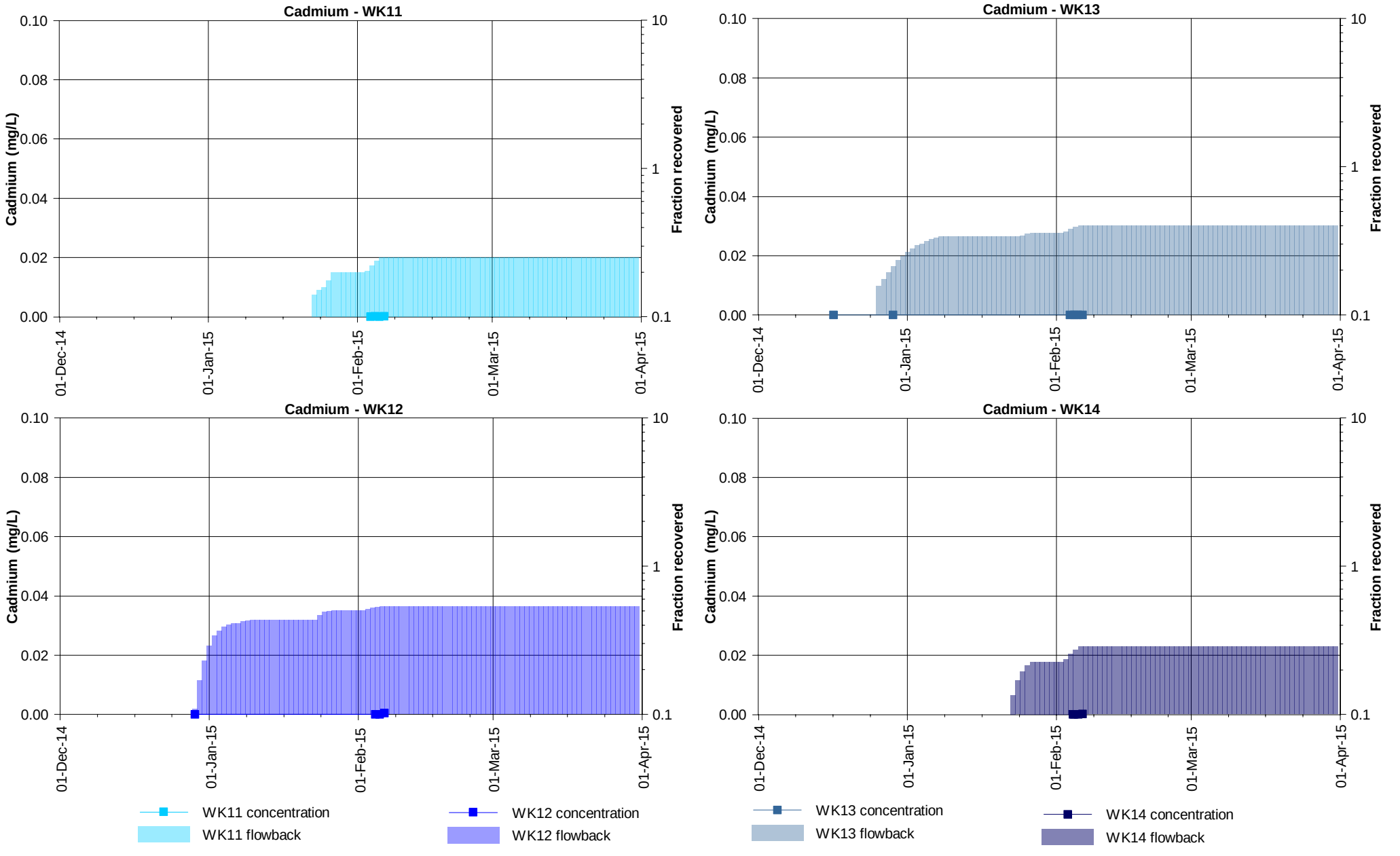

Figure E3.6: Cadmium concentrations and flowback volumes at the Waukivory pilot wells

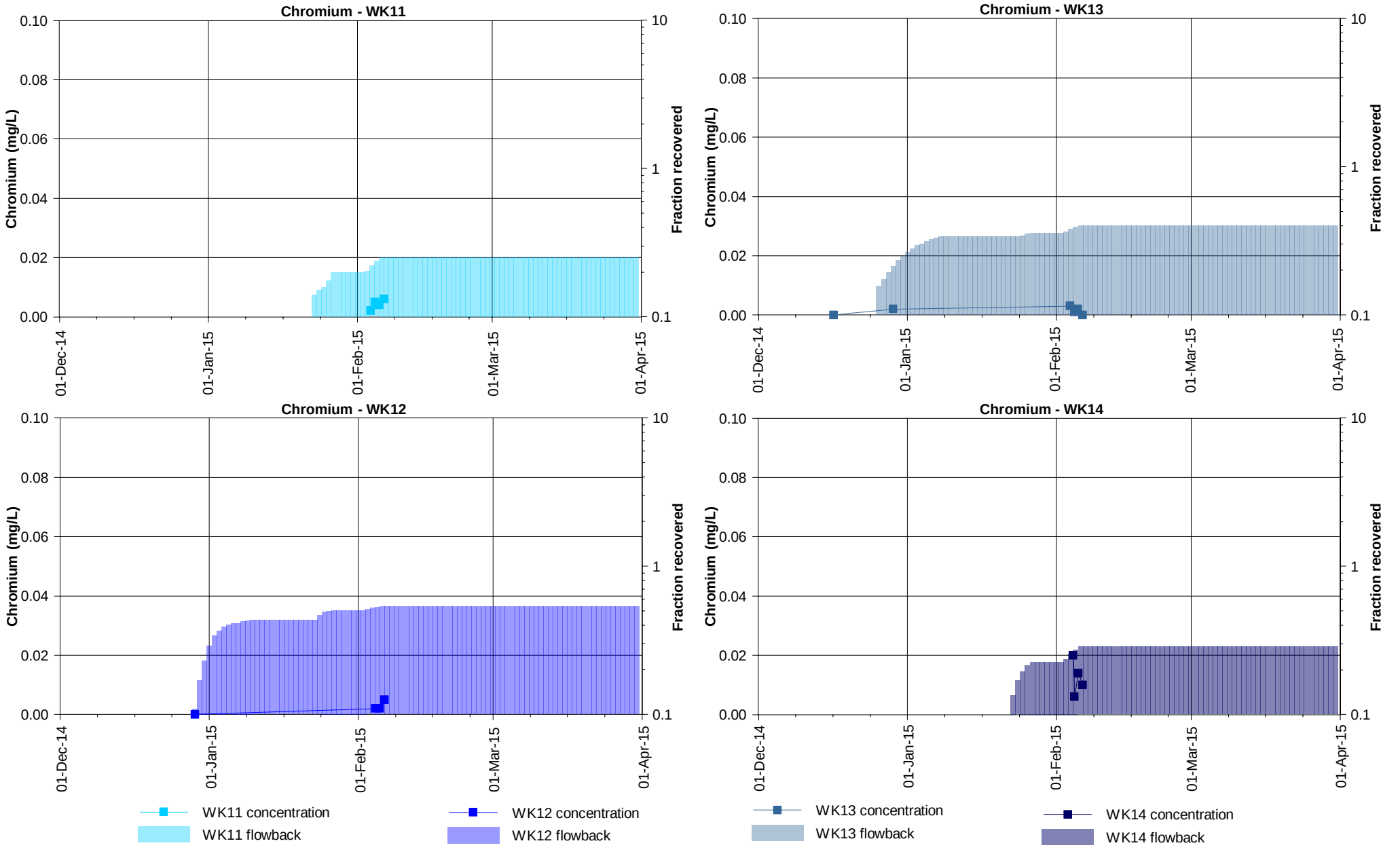

Figure E3.7: Chromium concentrations and flowback volumes at the Waukivory pilot wells

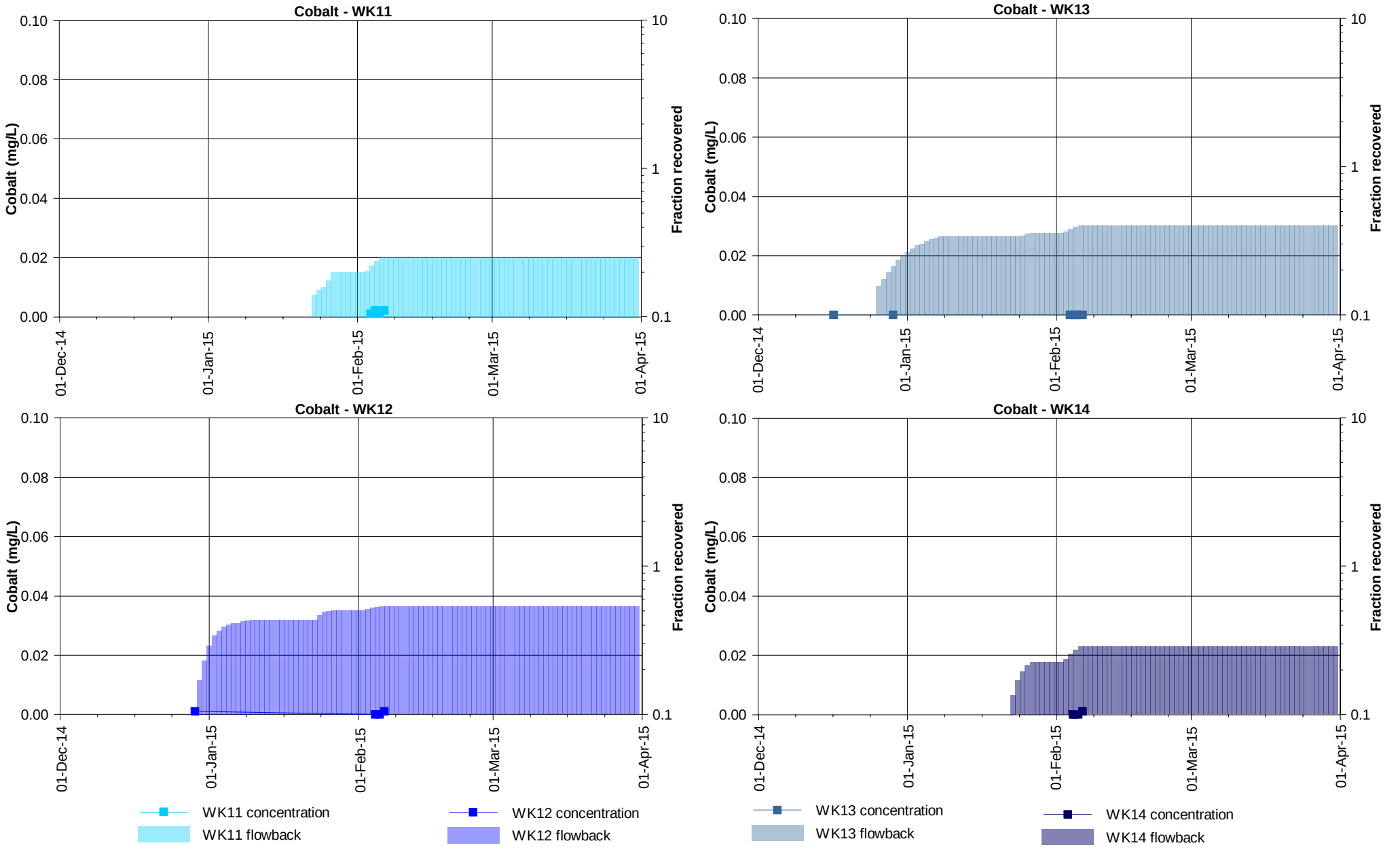

Figure E3.8: Cobalt concentrations and flowback volumes at the Waukivory pilot wells

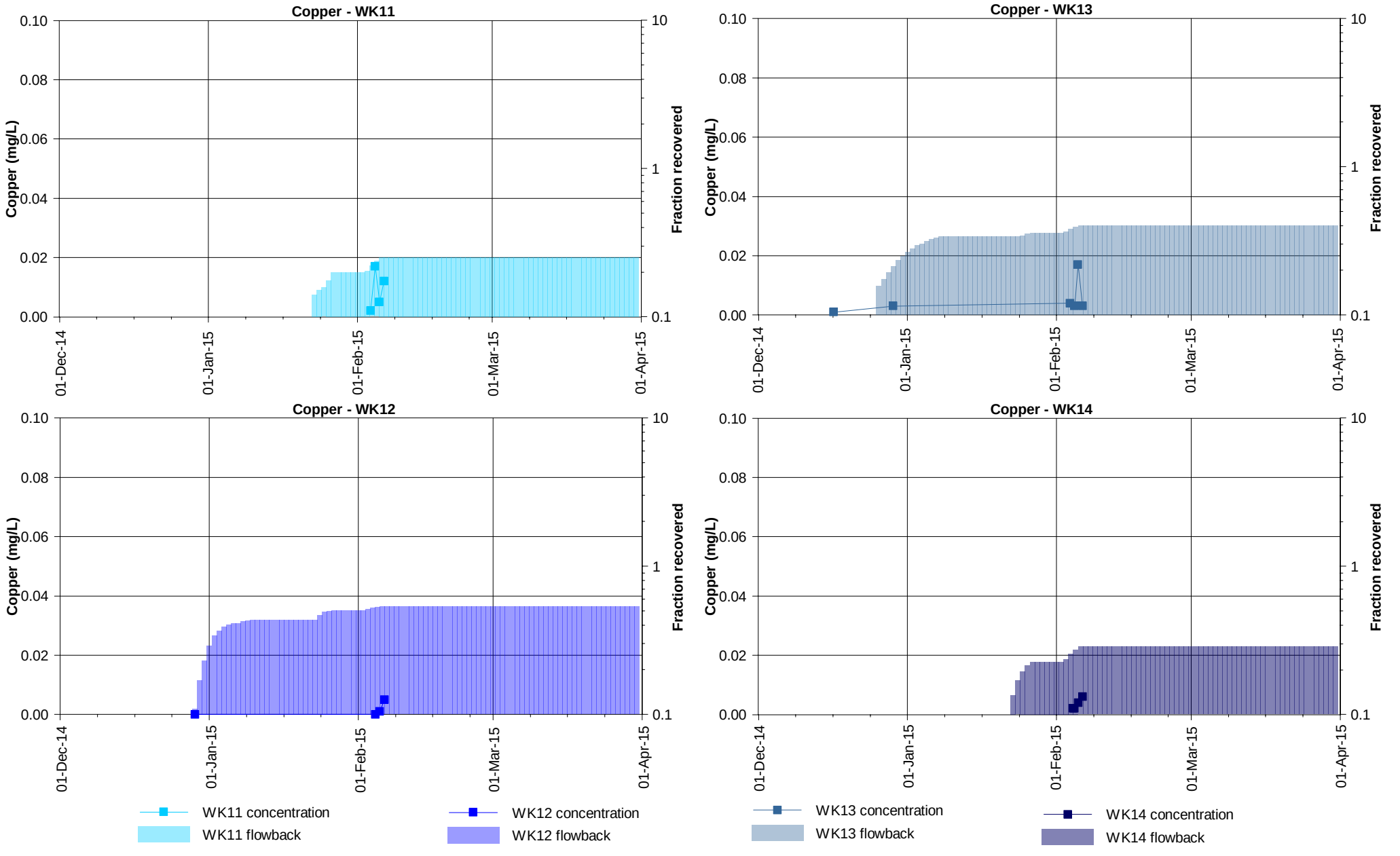

Figure E3.9: Copper concentrations and flowback volumes at the Waukivory pilot wells

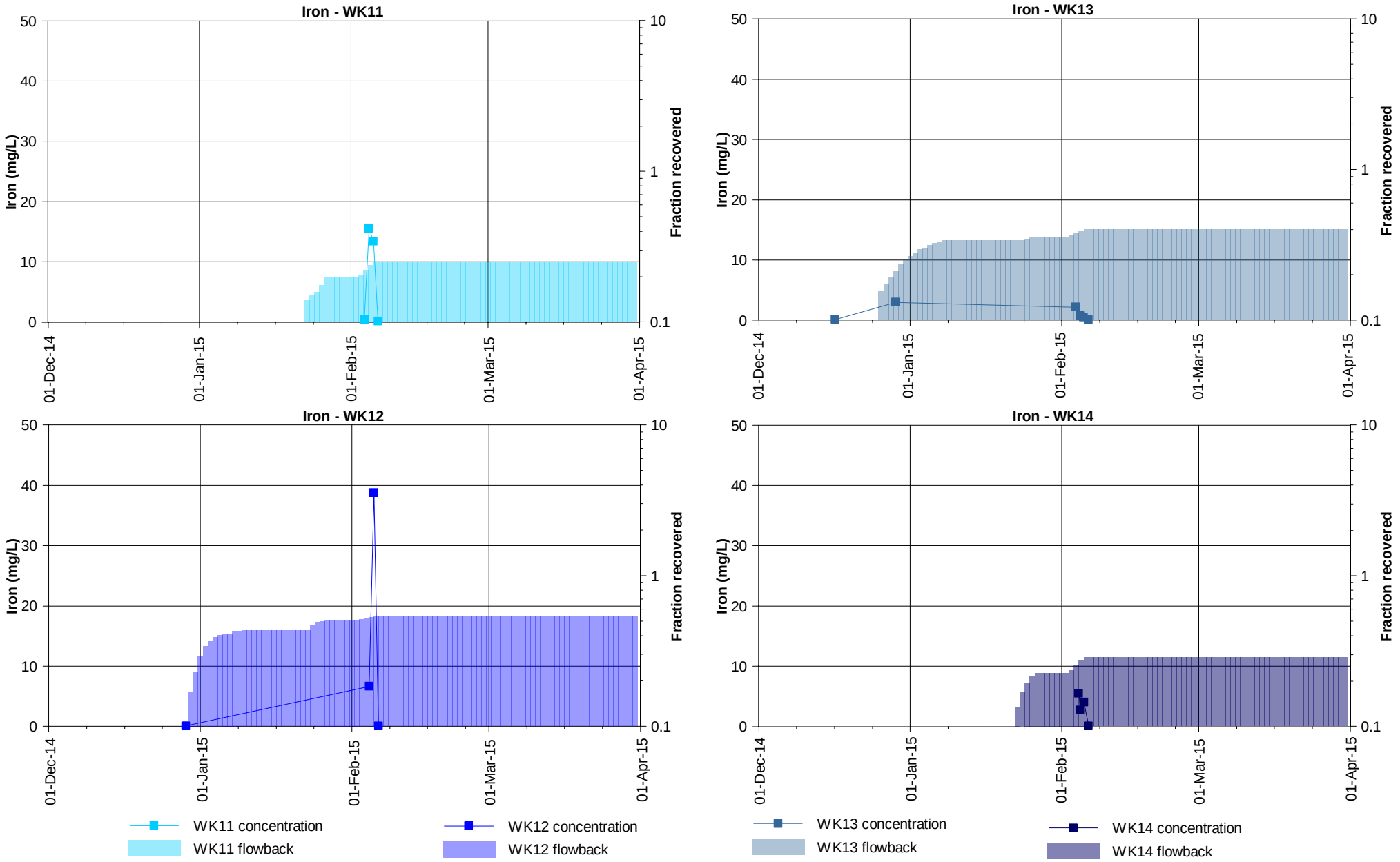

Figure E3.10: Iron concentrations and flowback volumes at the Waukivory pilot wells

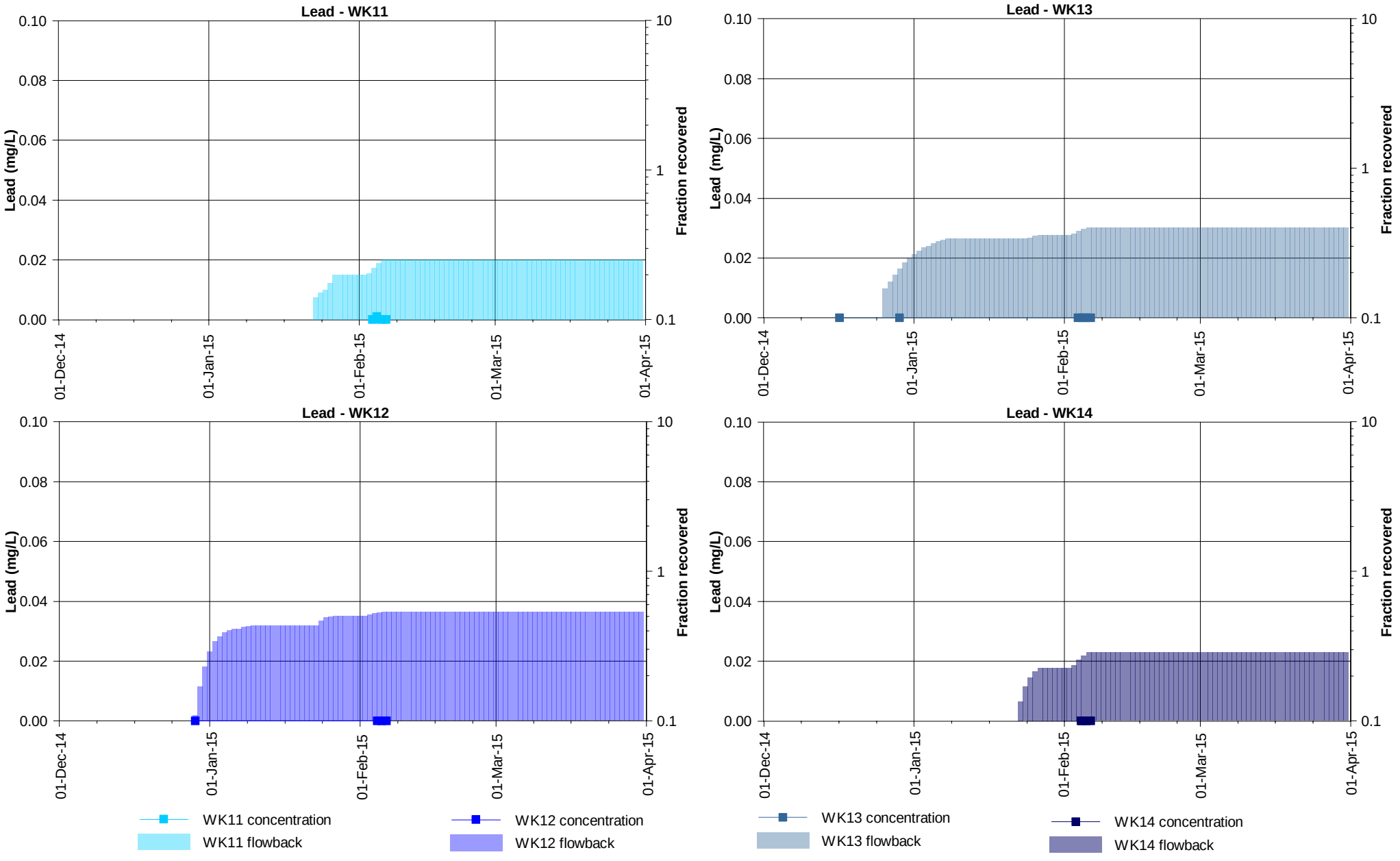

Figure E3.11: Lead concentrations and flowback volumes at the Waukivory pilot wells

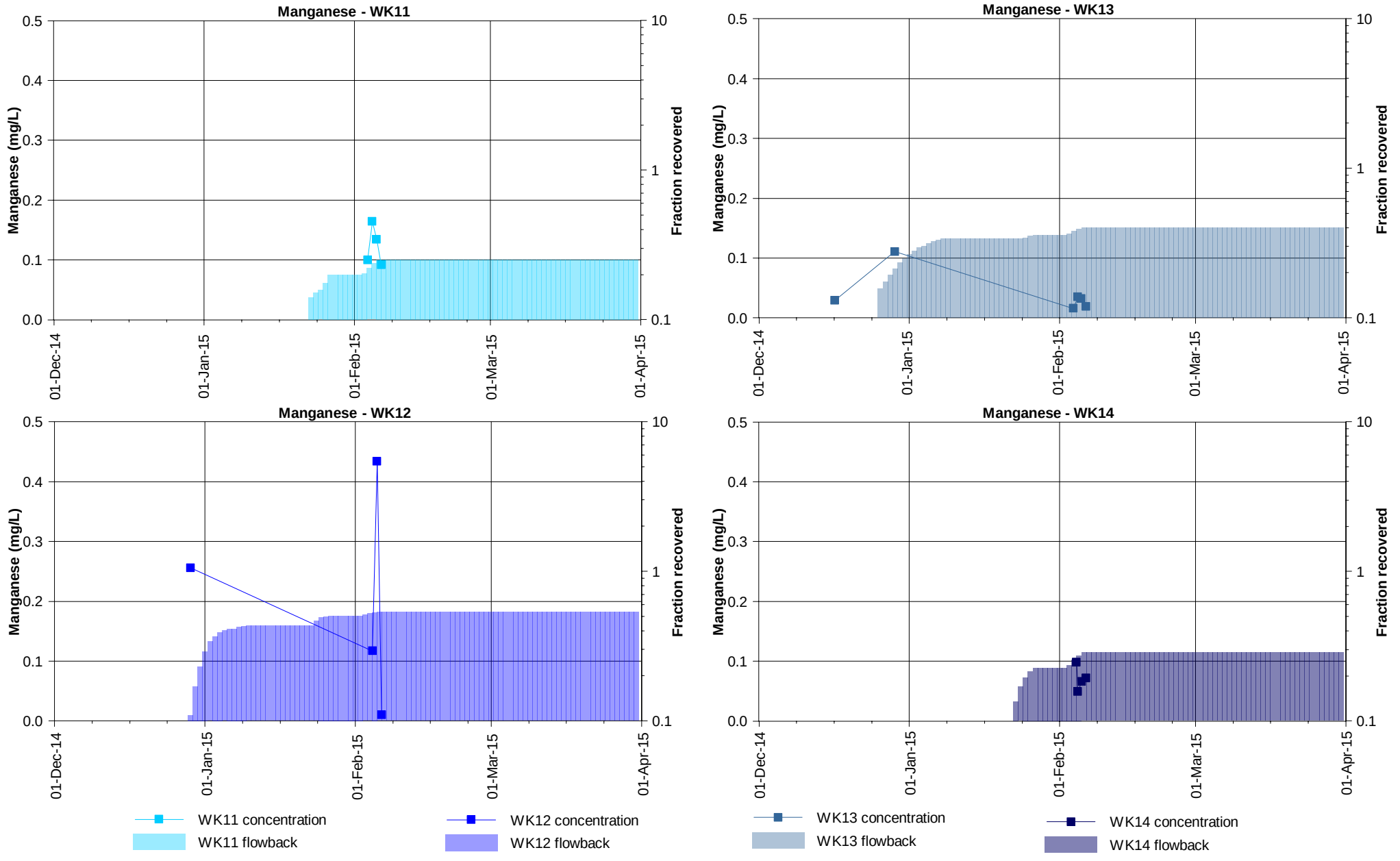

Figure E3.12: Manganese concentrations and flowback volumes at the Waukivory pilot wells

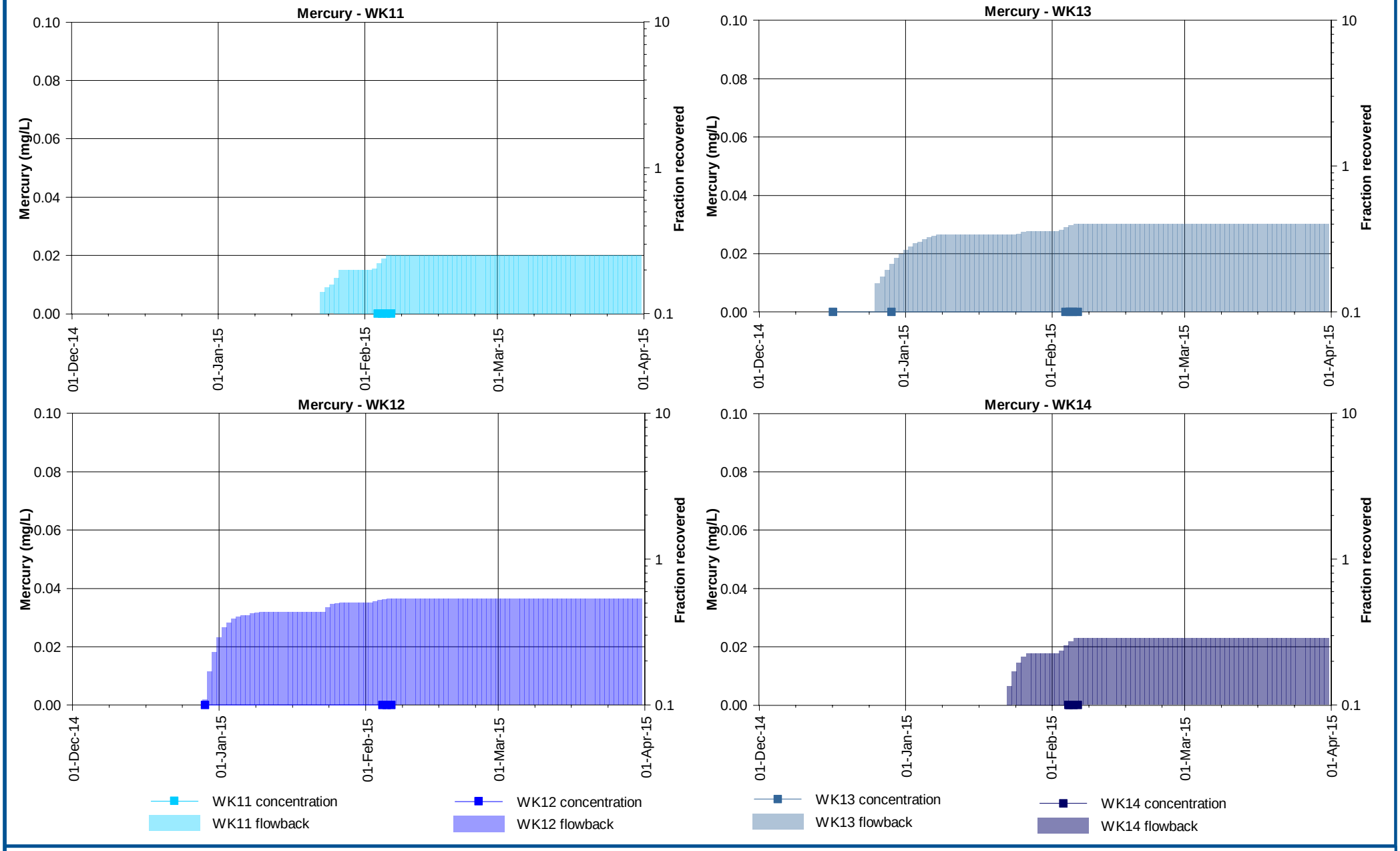

Figure E3.13: Mercury concentrations and flowback volumes at the Waukivory pilot wells

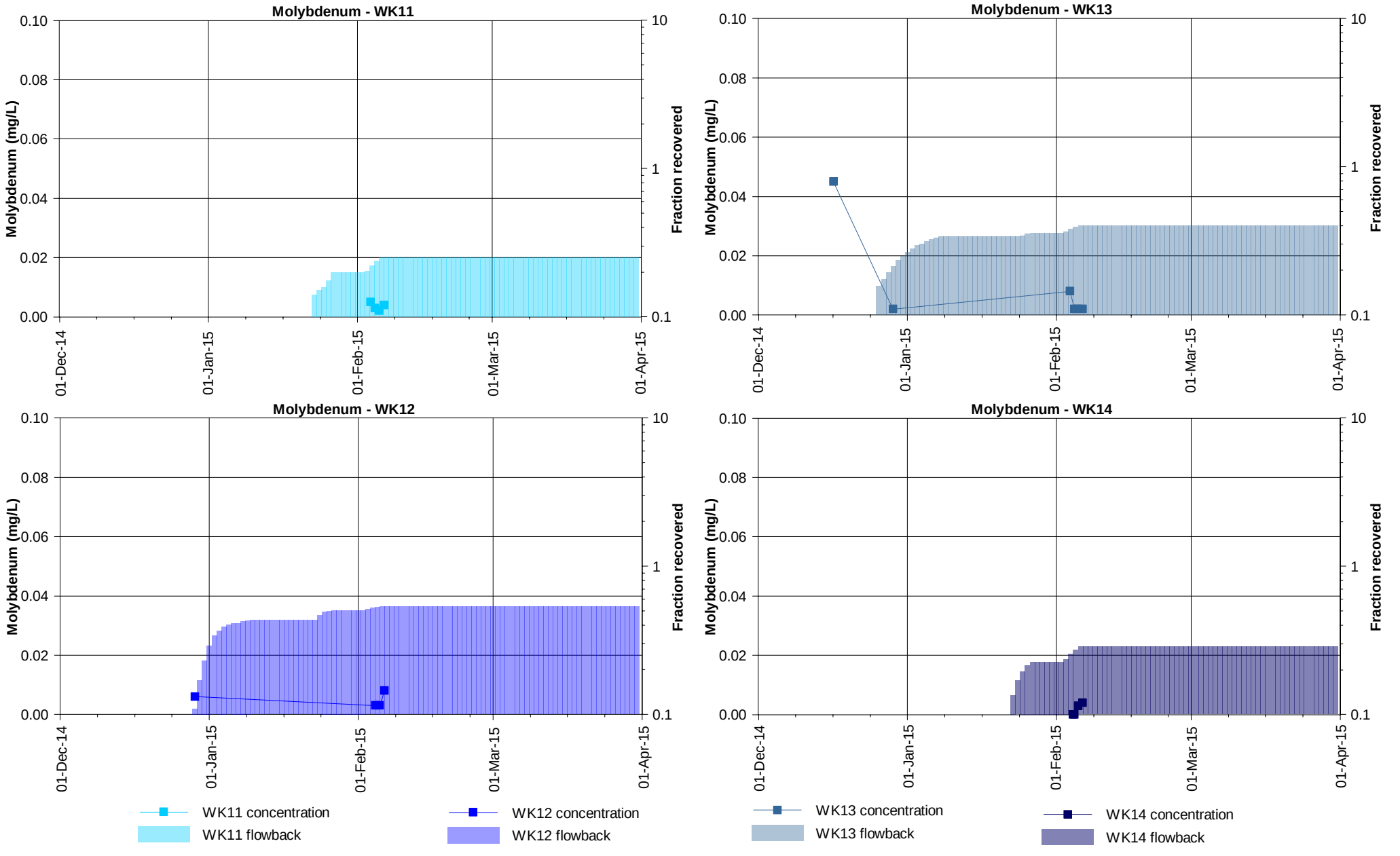

Figure E3.14: Molybdenum concentrations and flowback volumes at the Waukivory pilot wells

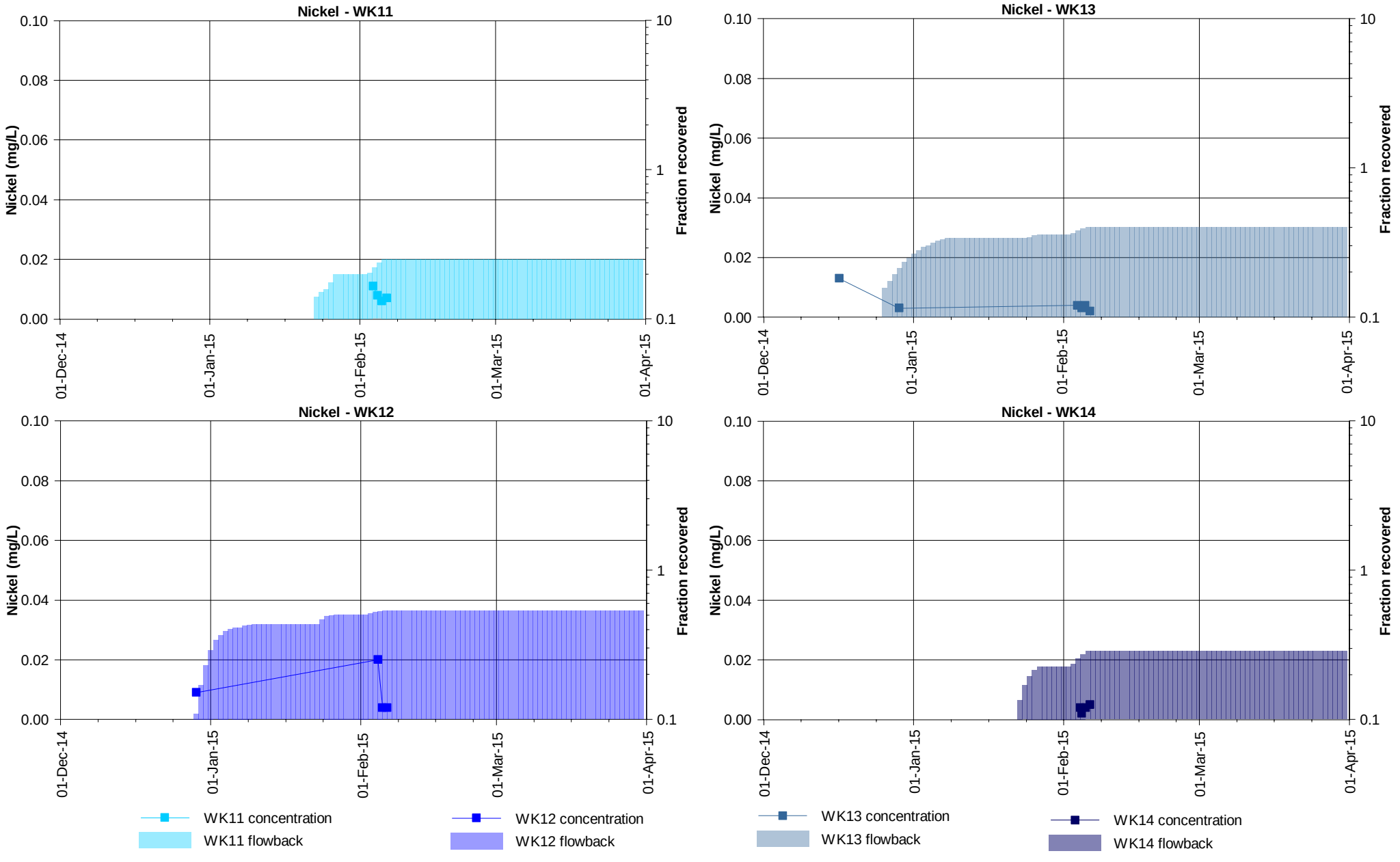

Figure E3.15: Nickel concentrations and flowback volumes at the Waukivory pilot wells

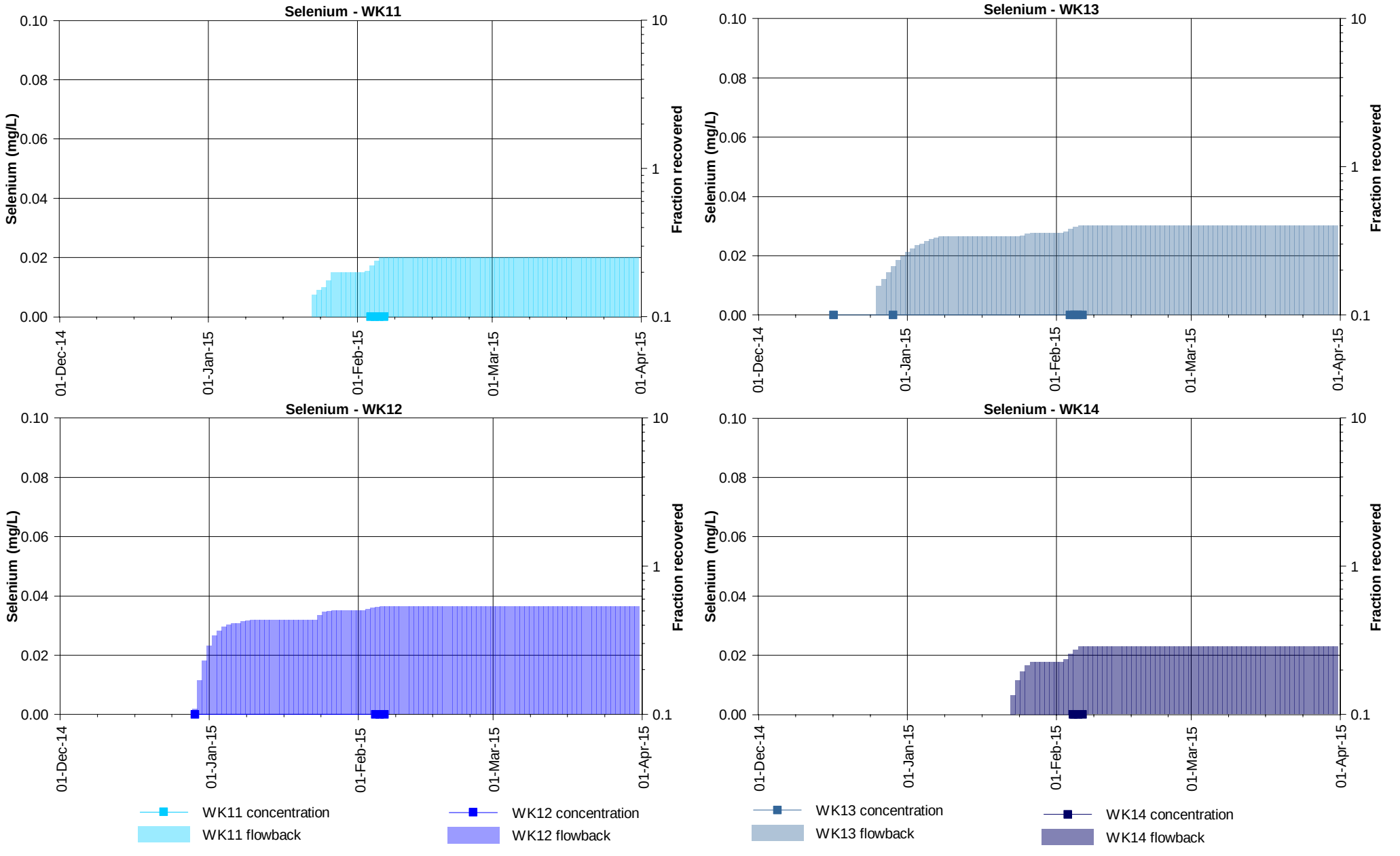

Figure E3.16: Selenium concentrations and flowback volumes at the Waukivory pilot wells

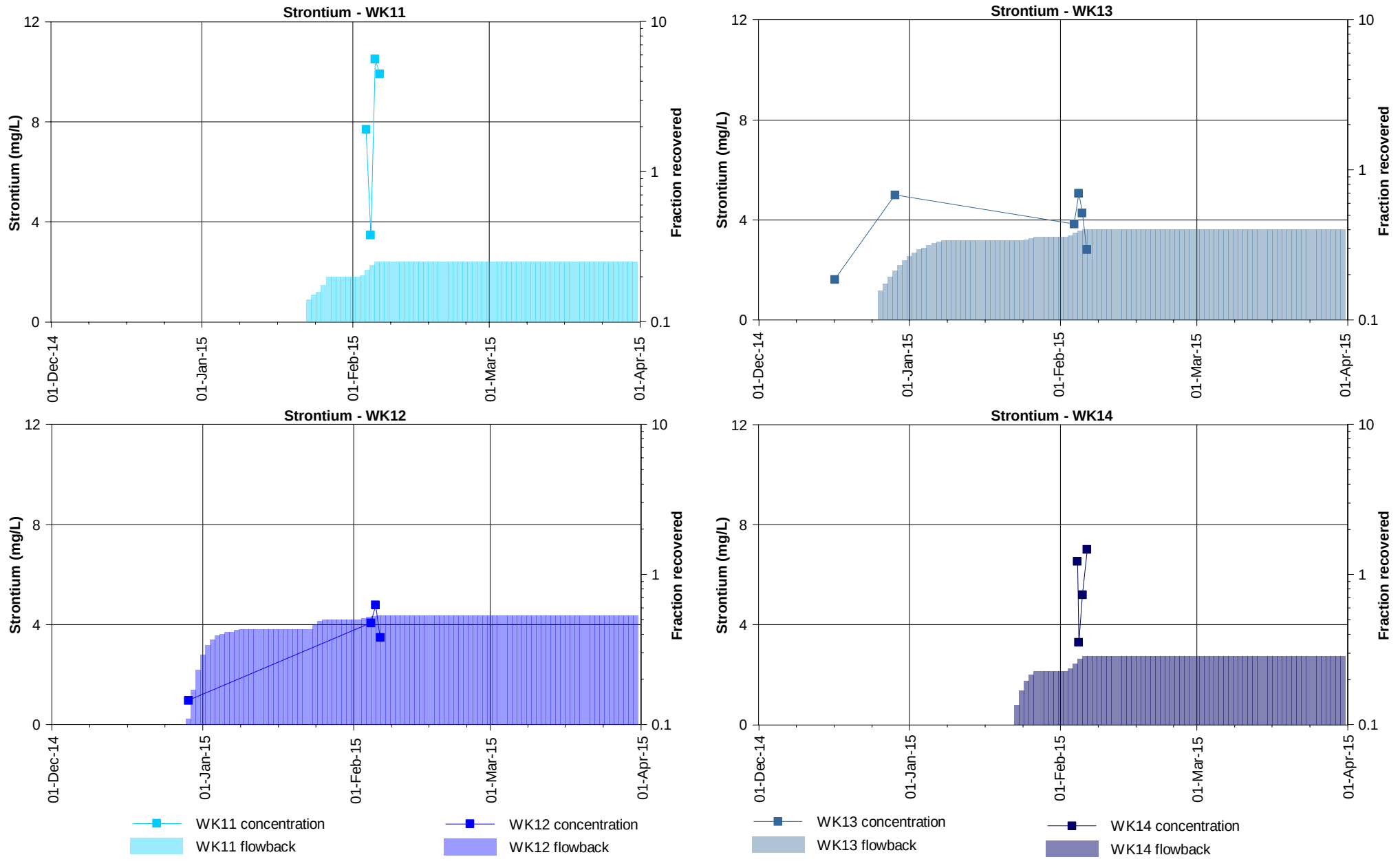

Figure E3.17: Strontium concentrations and flowback volumes at the Waukivory pilot wells

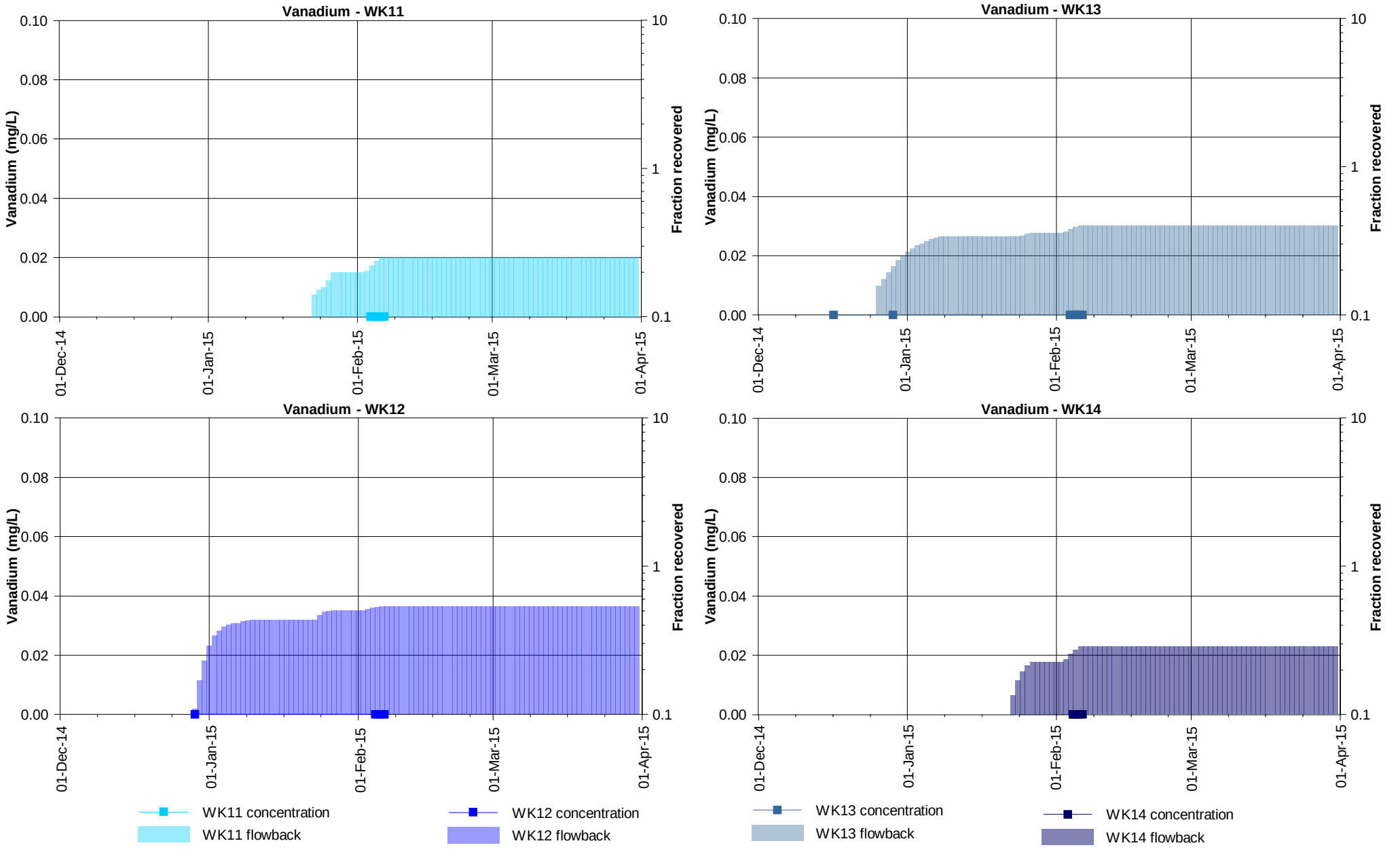

Figure E3.18: Vanadium concentrations and flowback volumes at the Waukivory pilot wells

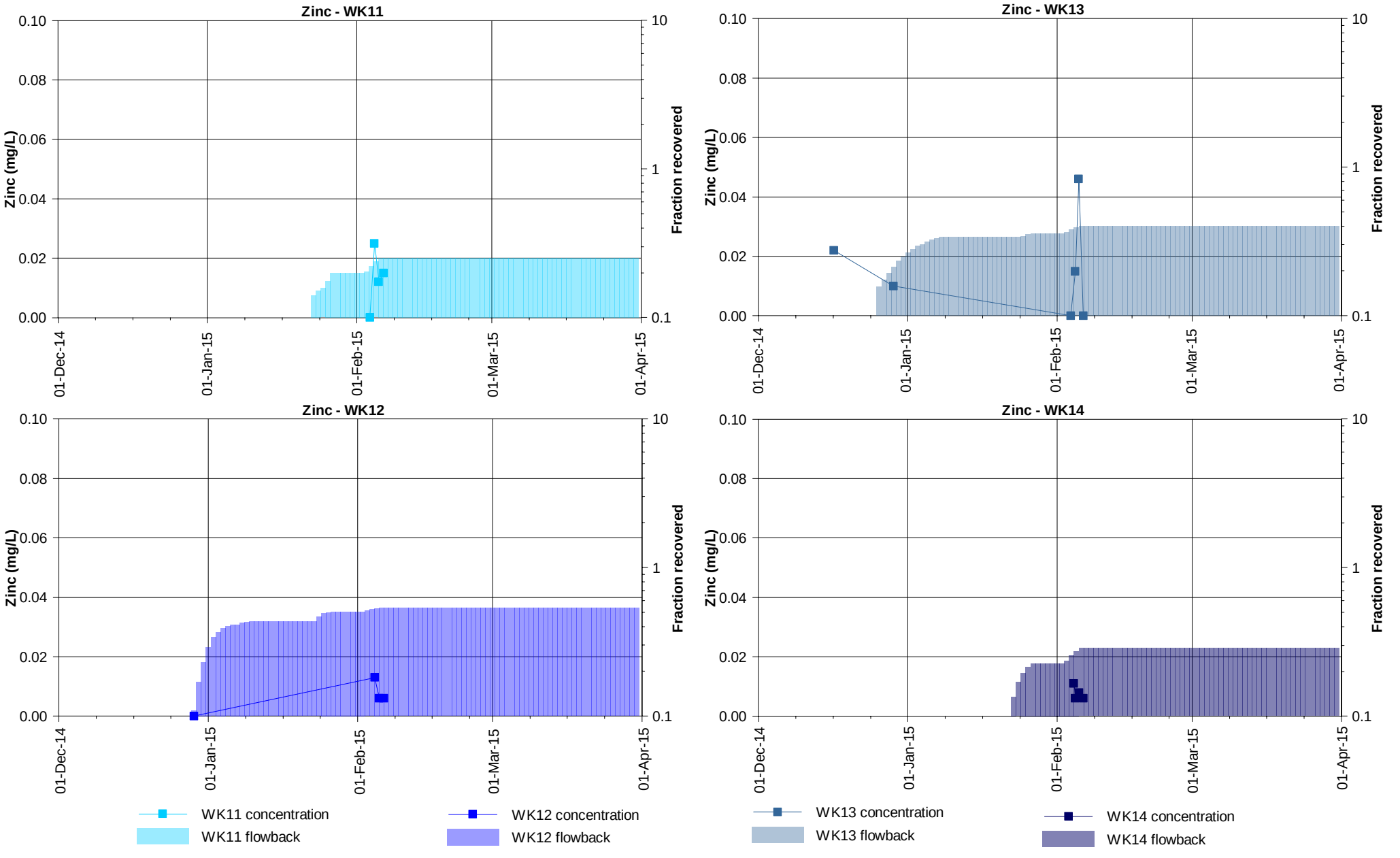

Figure E3.19: Zinc concentrations and flowback volumes at the Waukivory pilot wells

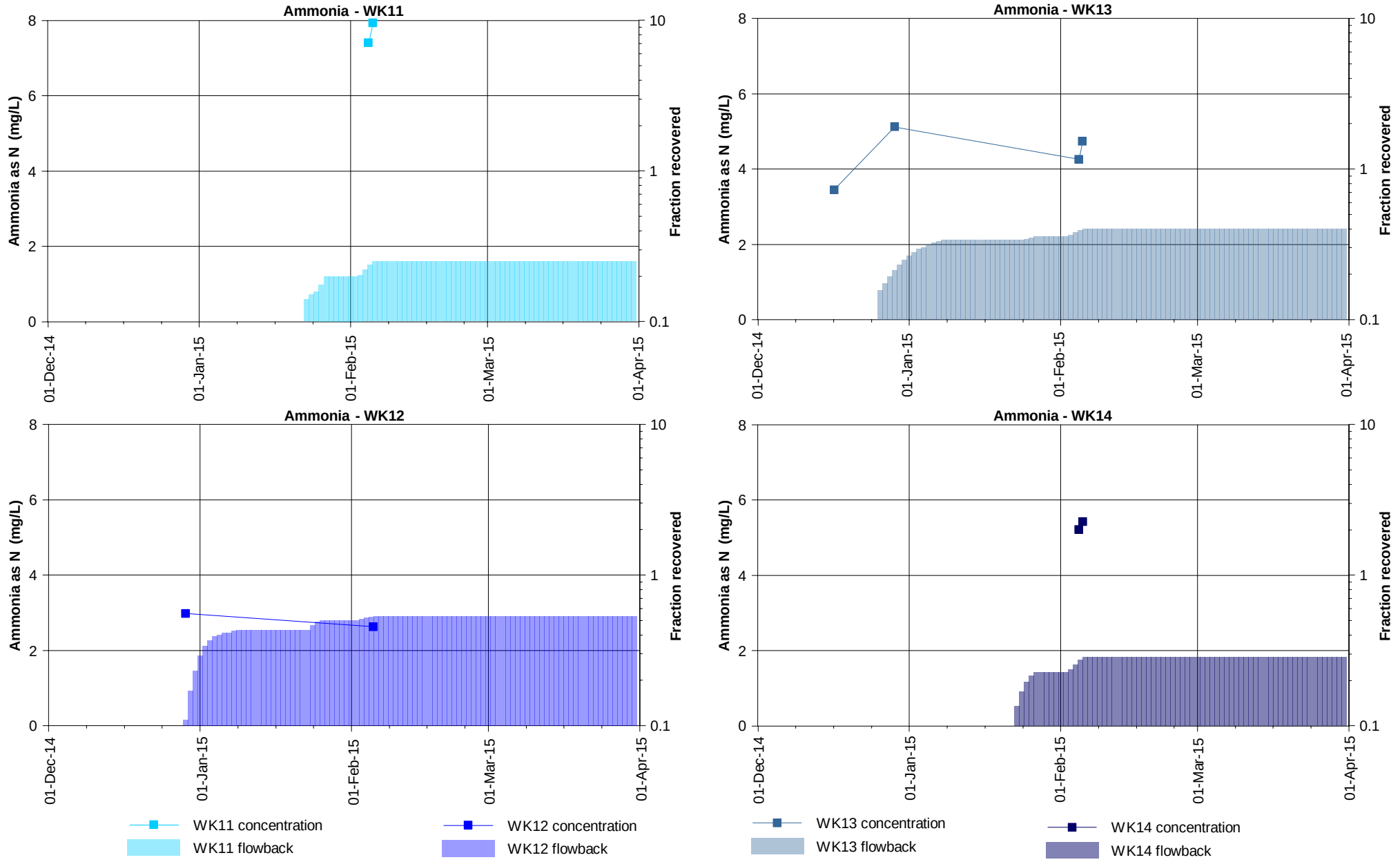

Figure E4.1: Ammonia concentrations and flowback volumes at the Waukivory pilot wells

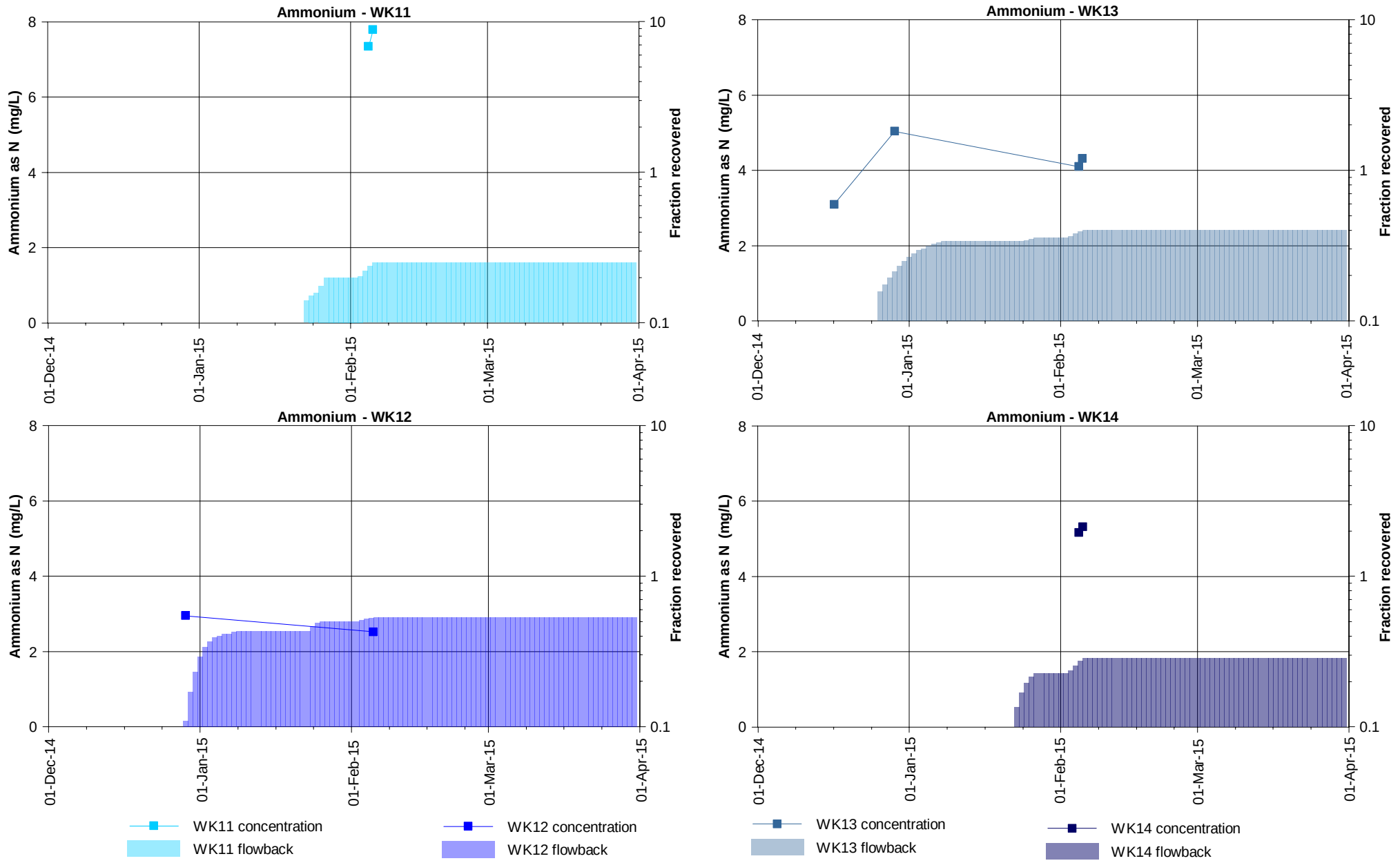

Figure E4.2: Ammonium concentrations and flowback volumes at the Waukivory pilot wells

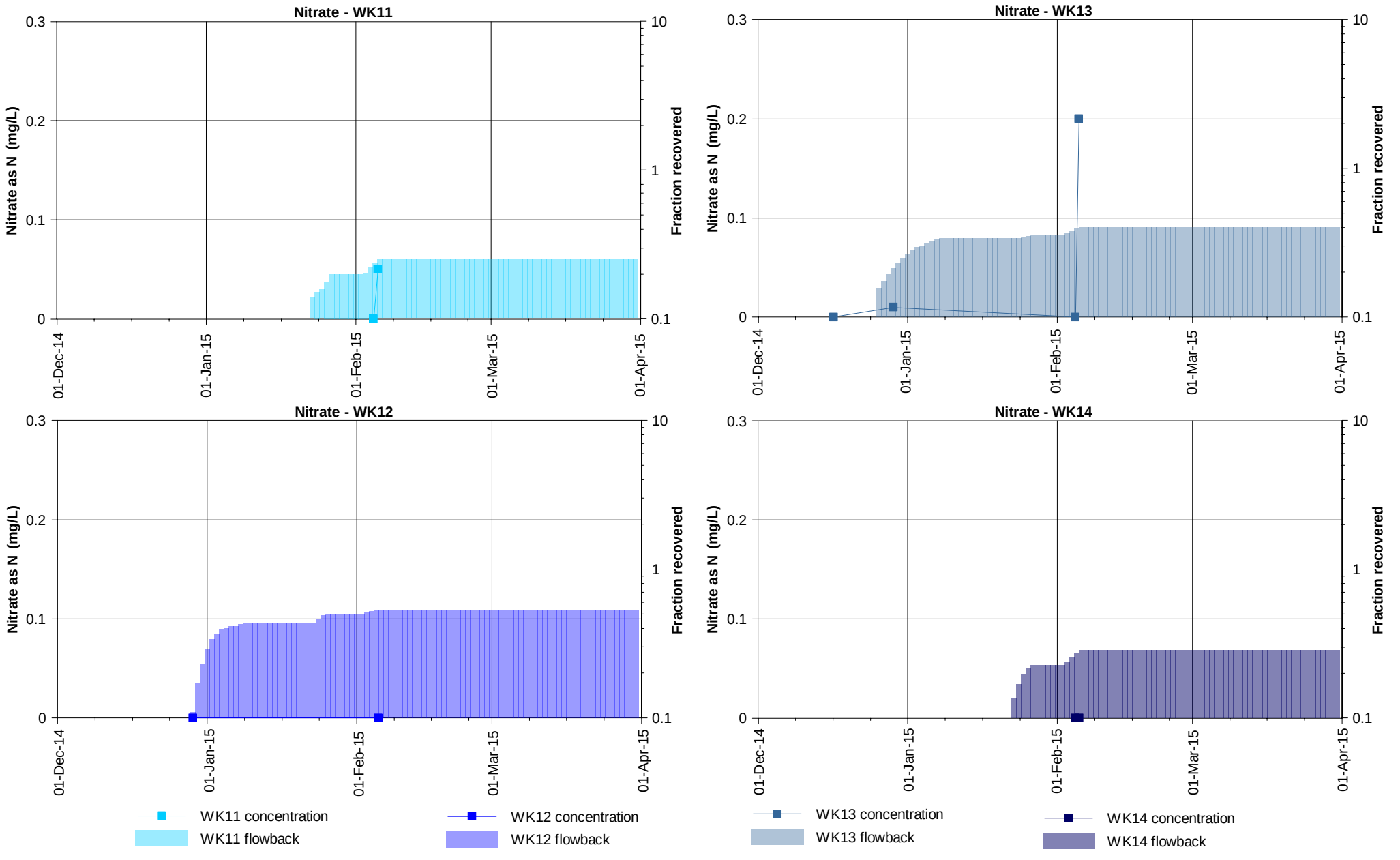

Figure E4.3: Nitrate concentrations and flowback volumes at the Waukivory pilot wells

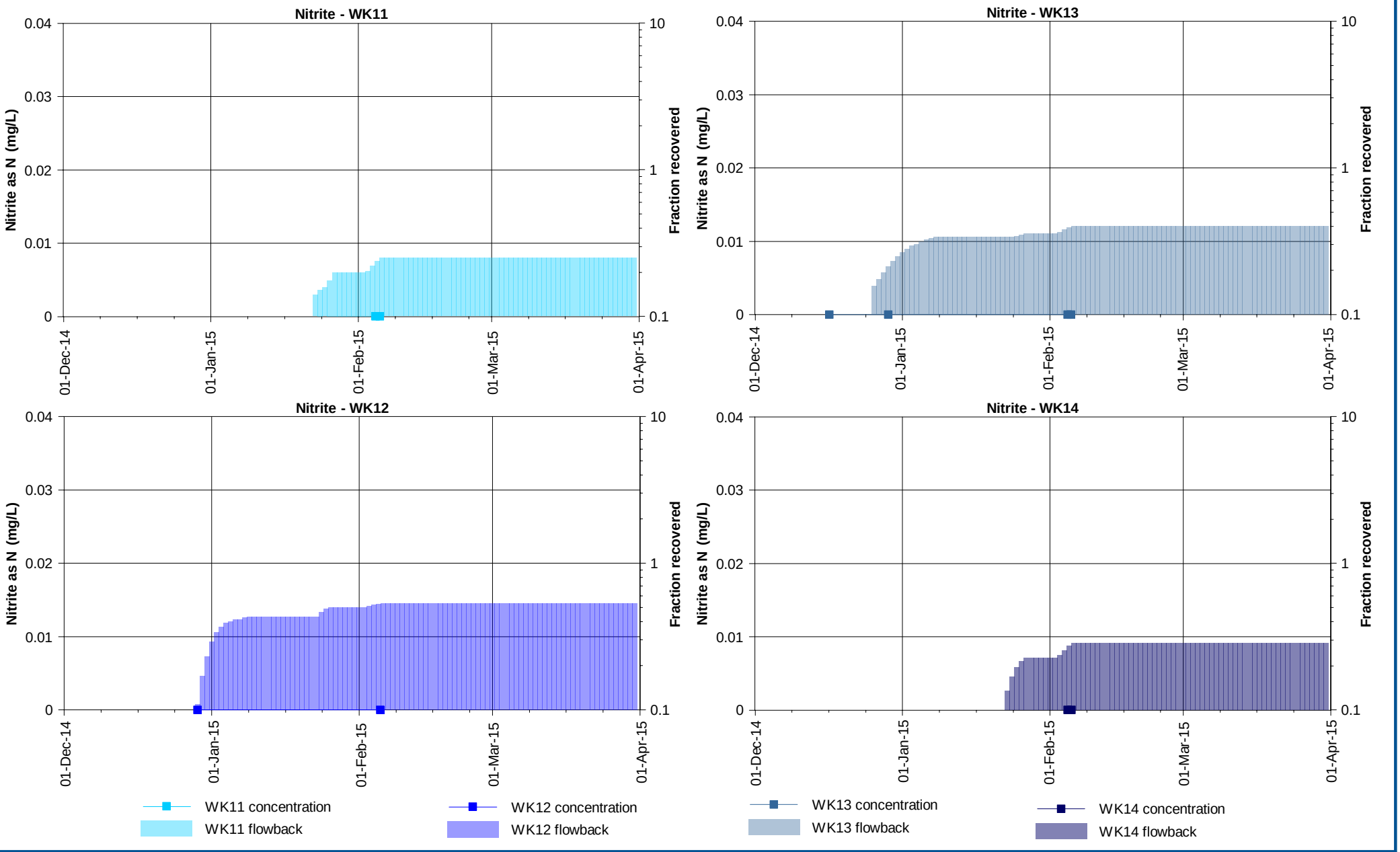

Figure E4.4: Nitrite concentrations and flowback volumes at the Waukivory pilot wells

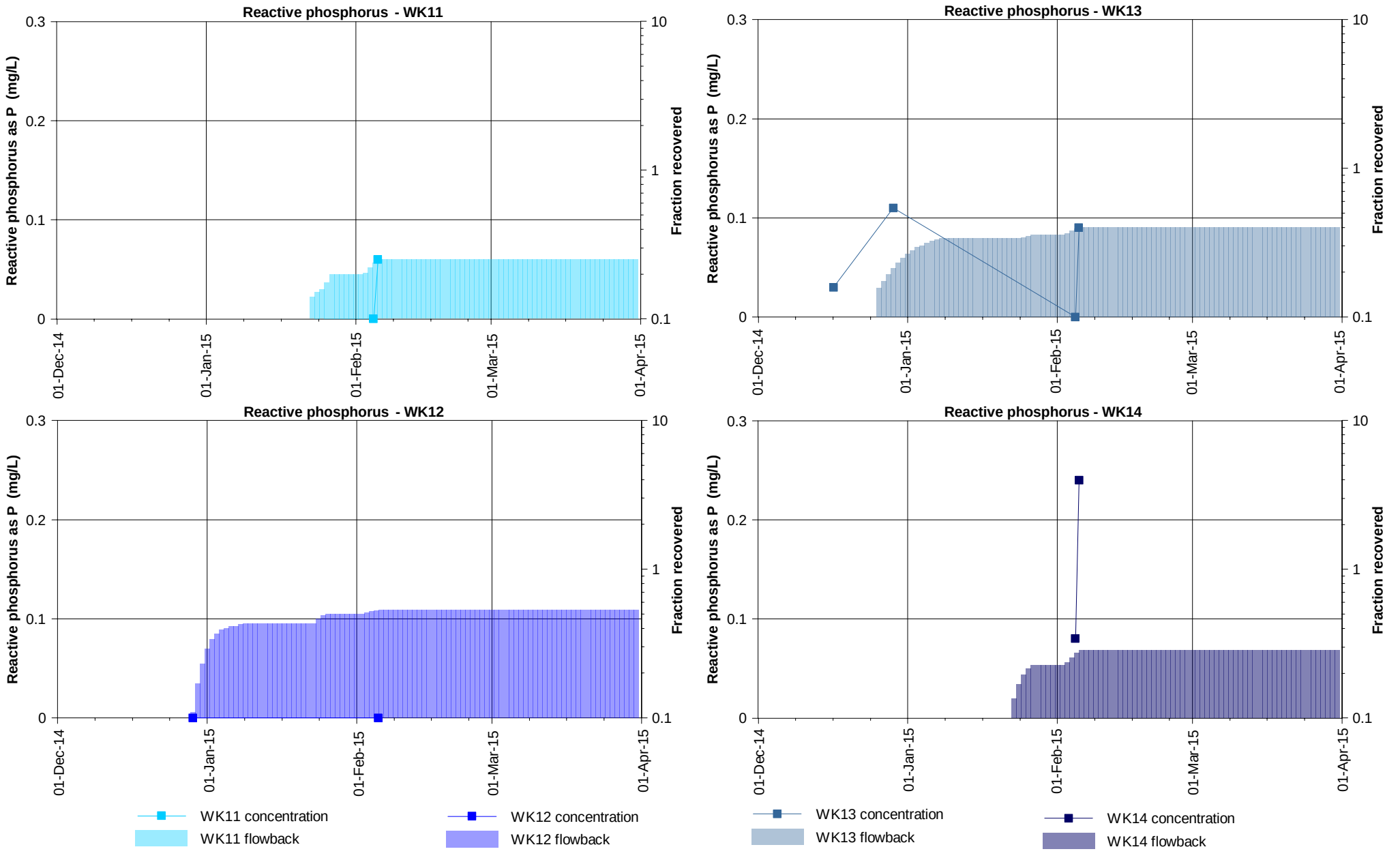

Figure E4.5: Reactive phosphorus concentrations and flowback volumes at the Waukivory pilot wells

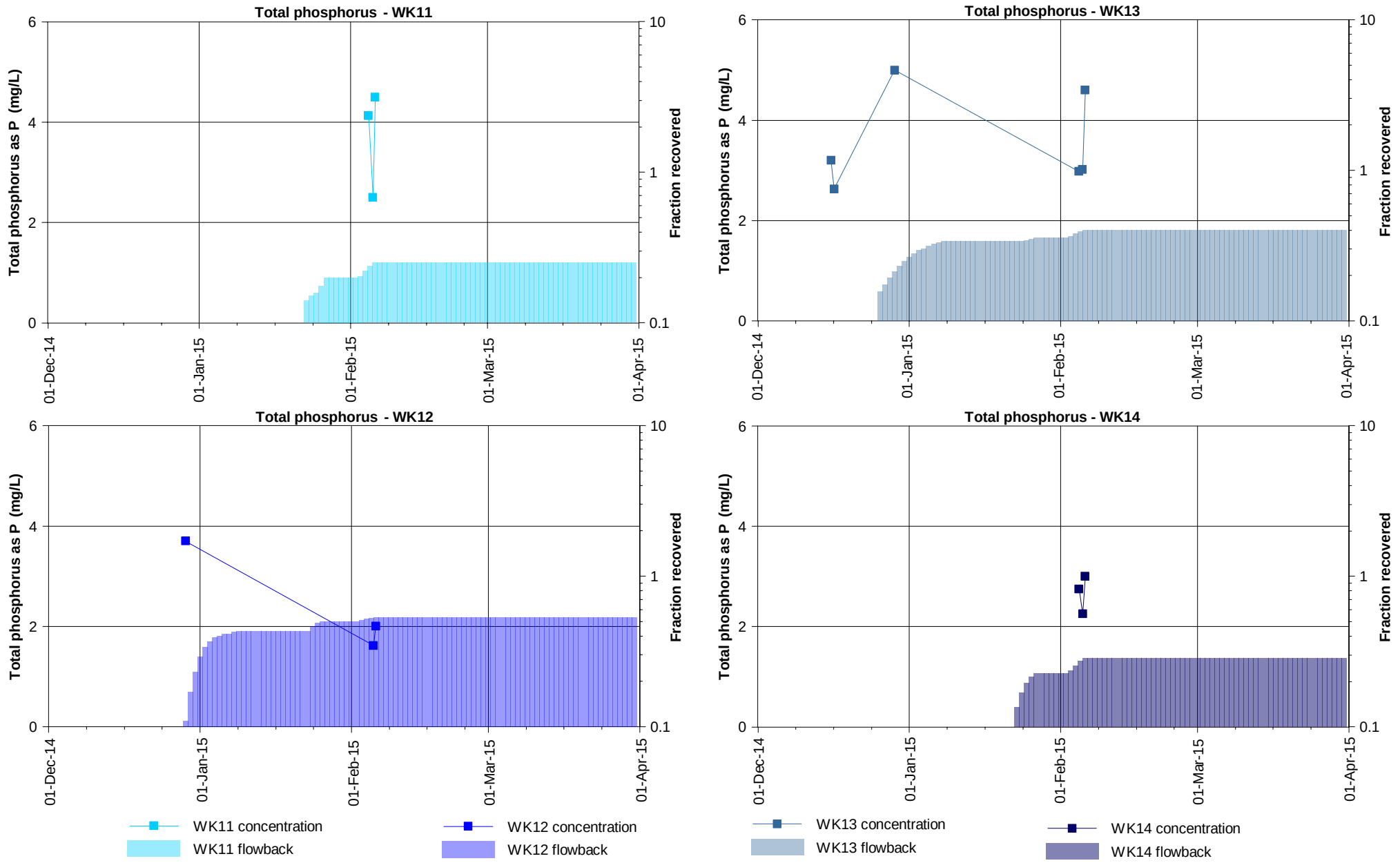

Figure E4.6: Total phosphorus concentrations and flowback volumes at the Waukivory pilot wells

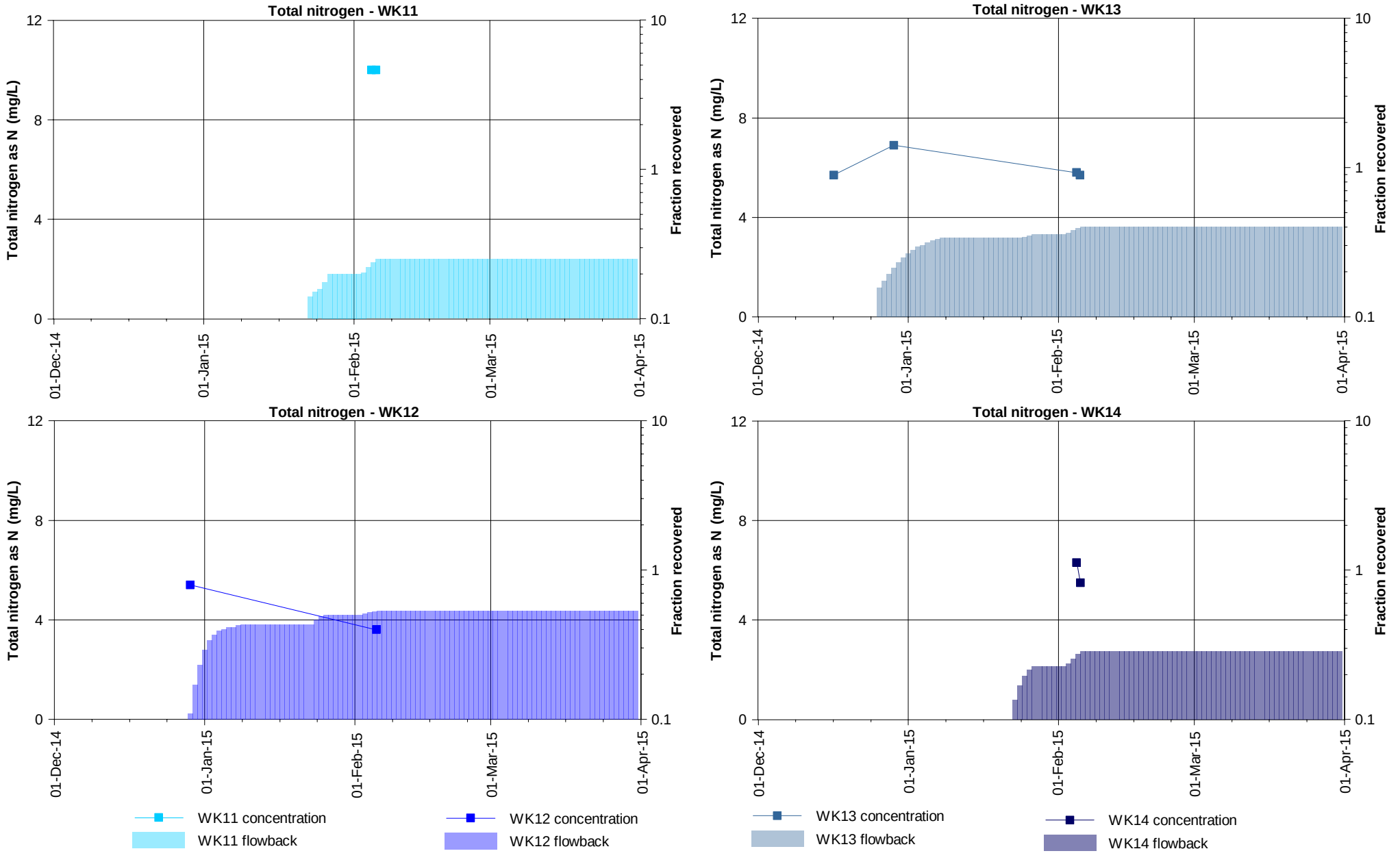

Figure E4.7: Total nitrogen concentrations and flowback volumes at the Waukivory pilot wells

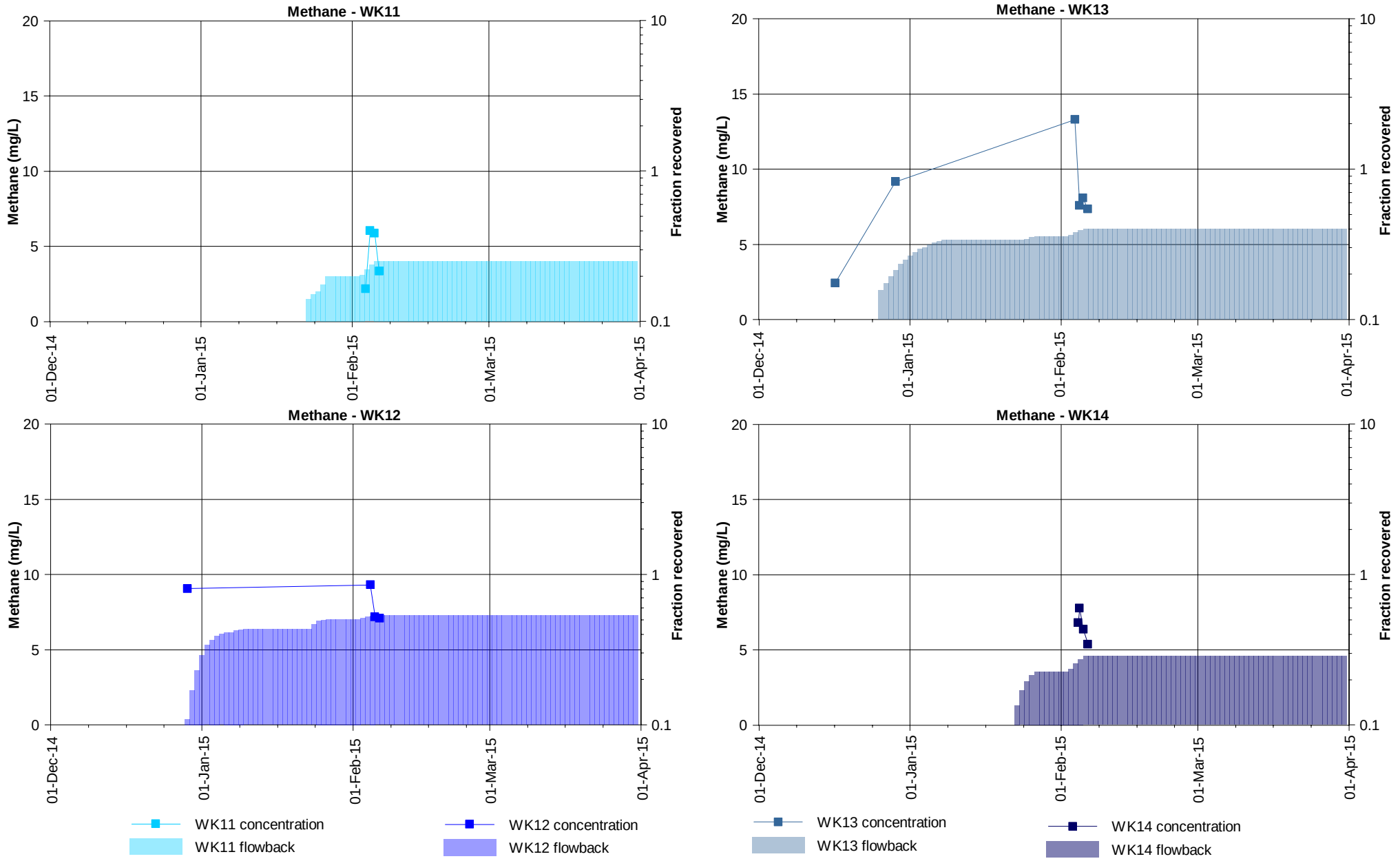

Figure E5.1: Methane concentrations and flowback volumes at the Waukivory pilot wells

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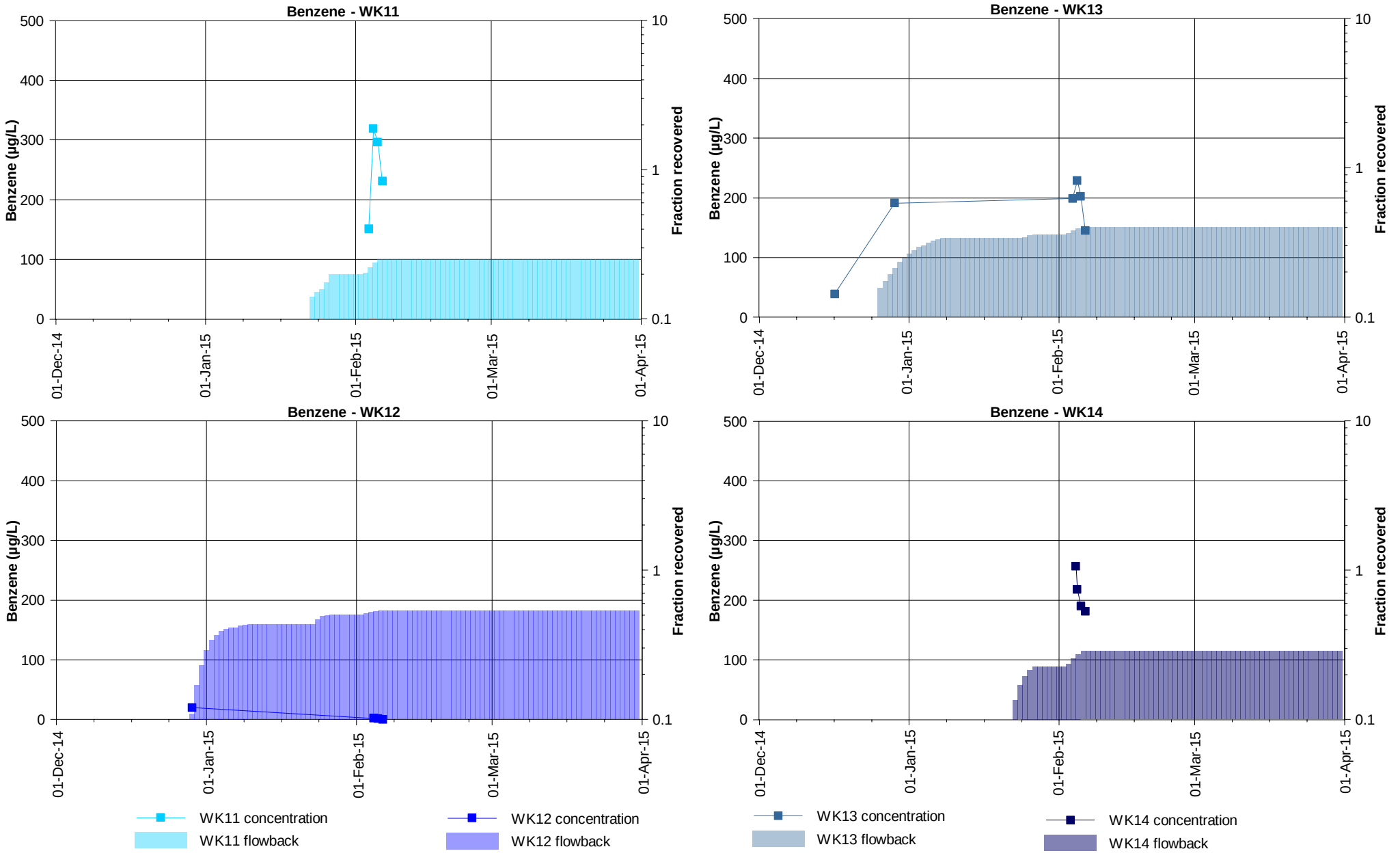

Figure E6.1: Benzene concentrations and flowback volumes at the Waukivory pilot wells

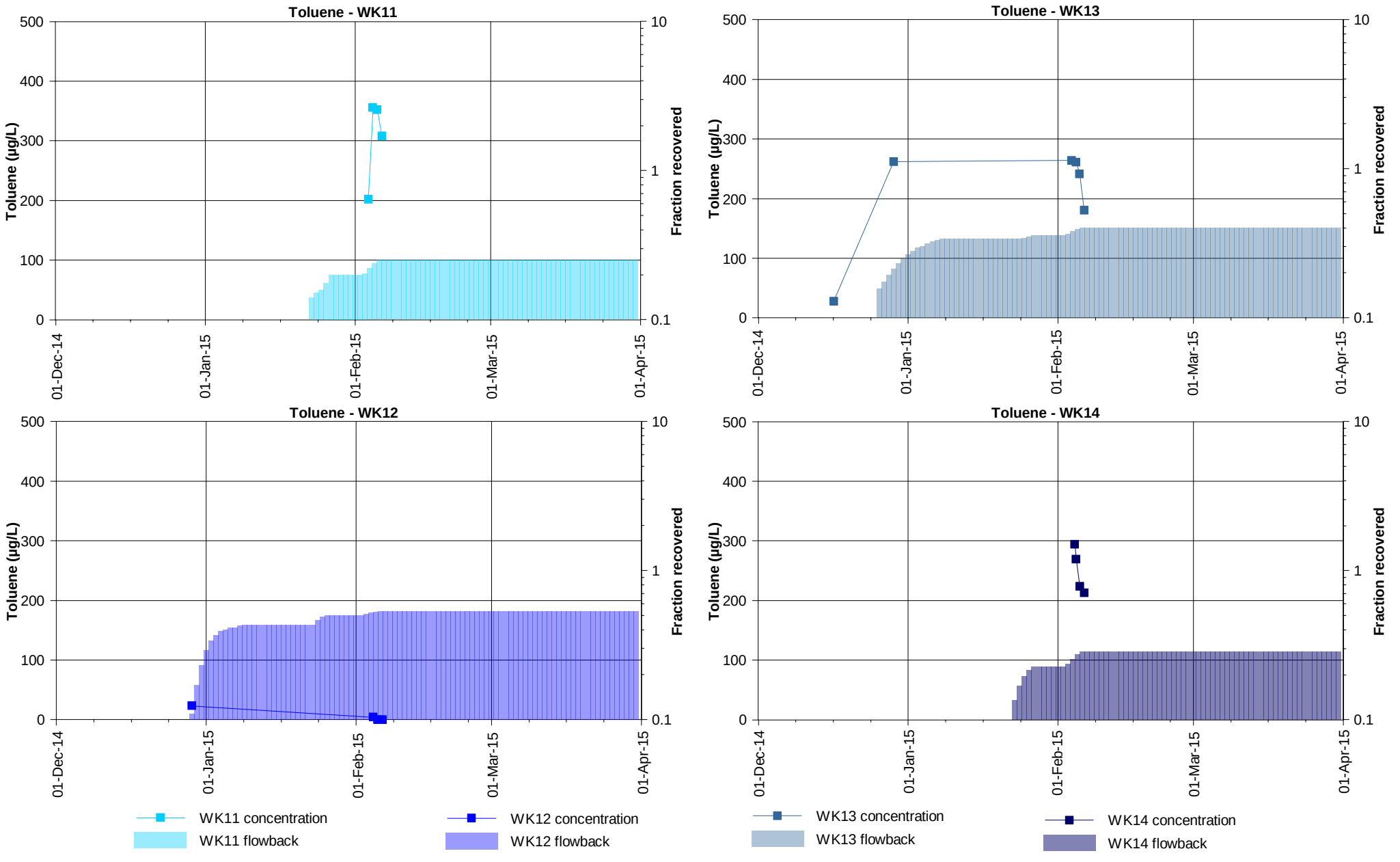

Figure E6.2: Toluene concentrations and flowback volumes at the Waukivory pilot wells

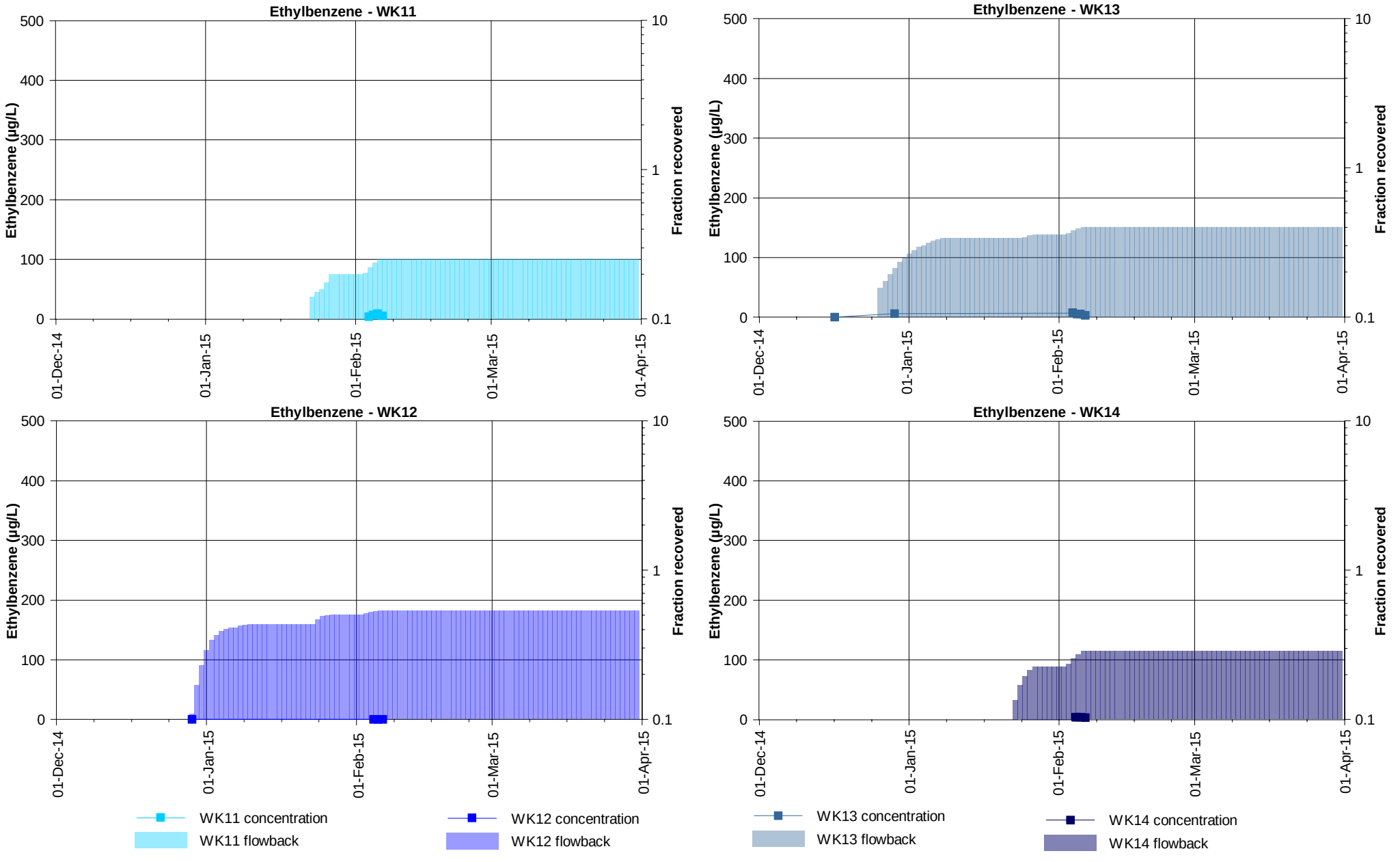

Figure E6.3: Ethylbenzene total concentrations and flowback volumes at the Waukivory pilot wells

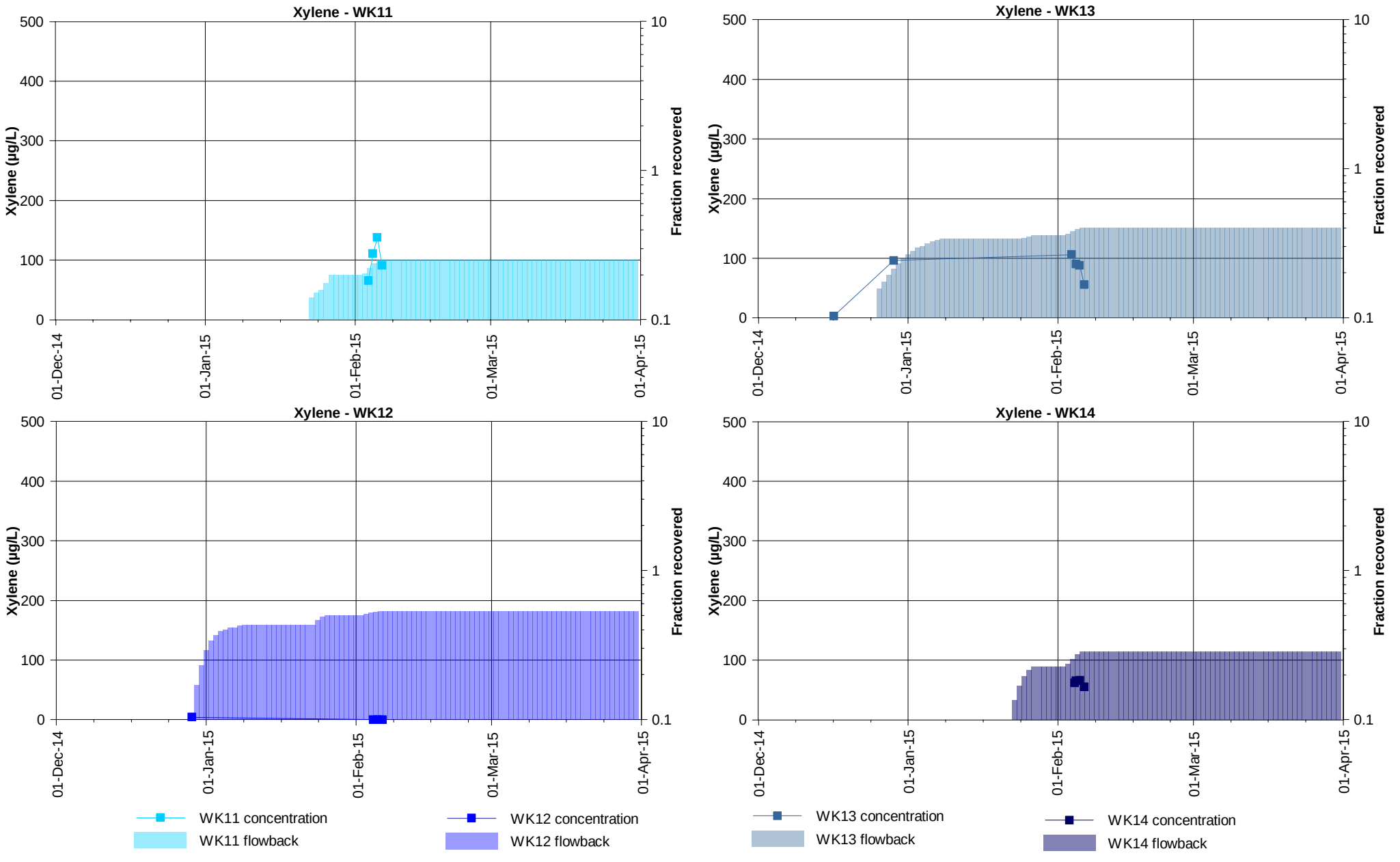

Figure E6.4: Xylene total concentrations and flowback volumes at the Waukivory pilot wells

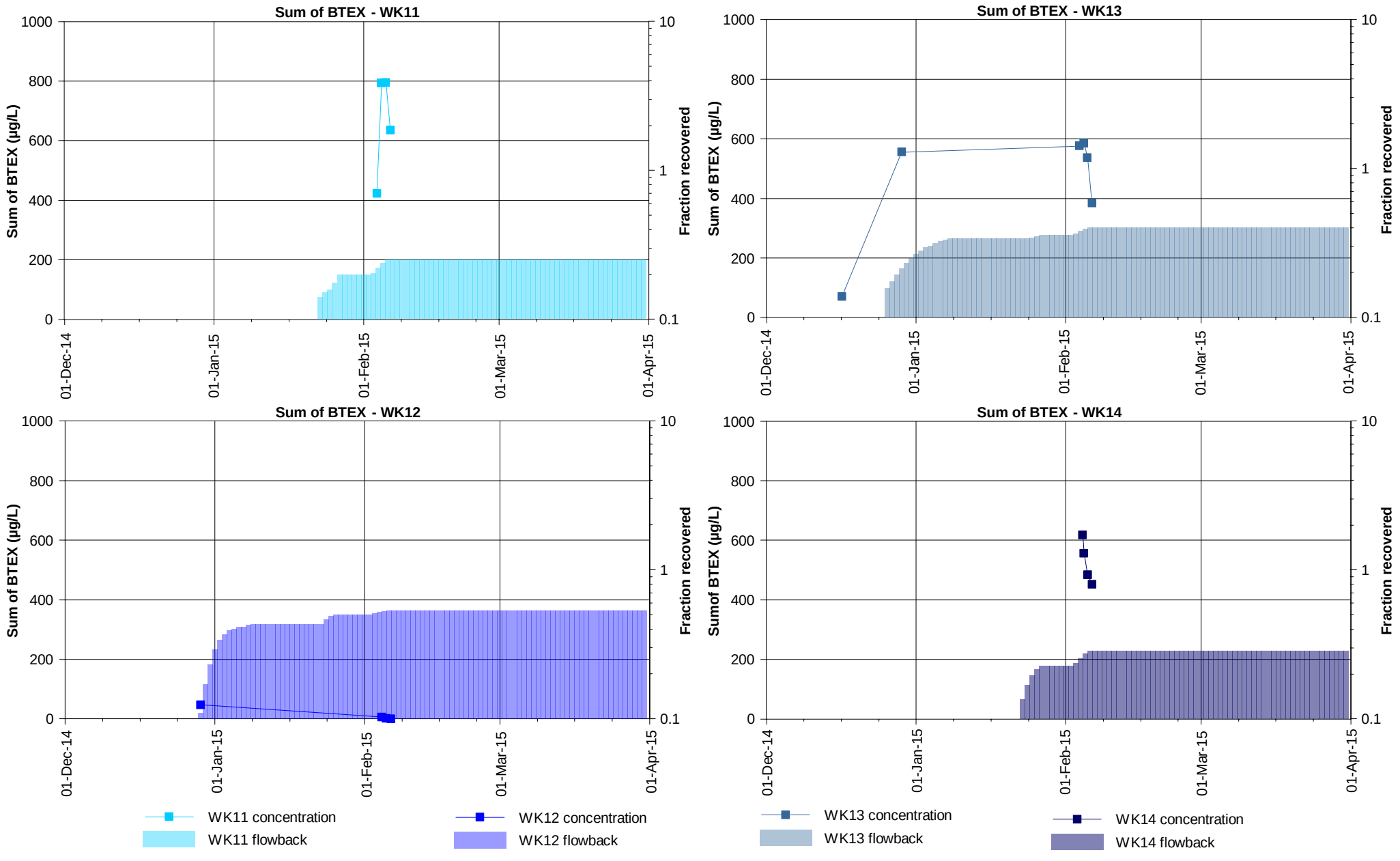

Figure E6.5: Sum of BTEX concentrations and flowback volumes at the Waukivory pilot wells

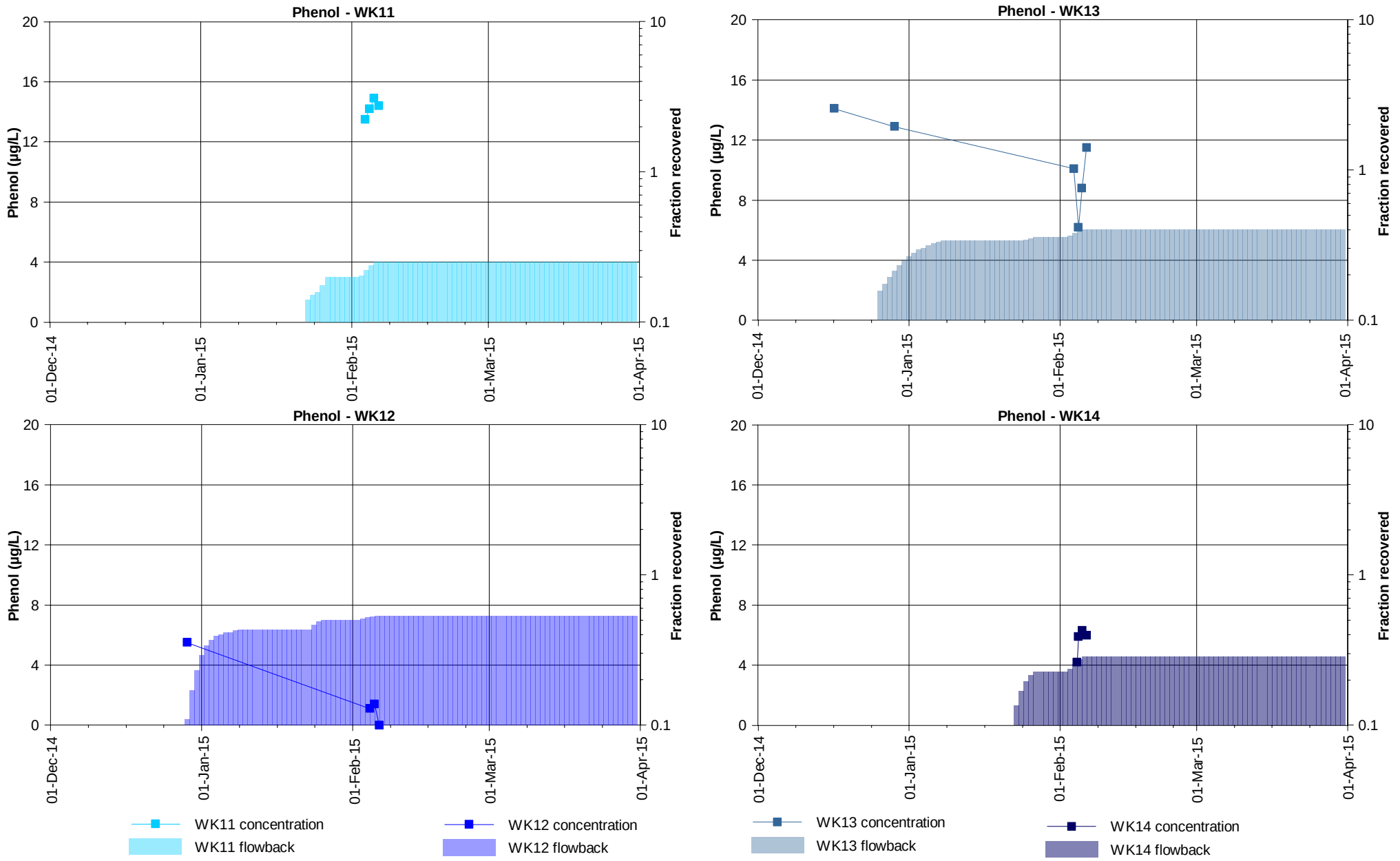

Figure E7.1: Phenol concentrations and flowback volumes at the Waukivory pilot wells

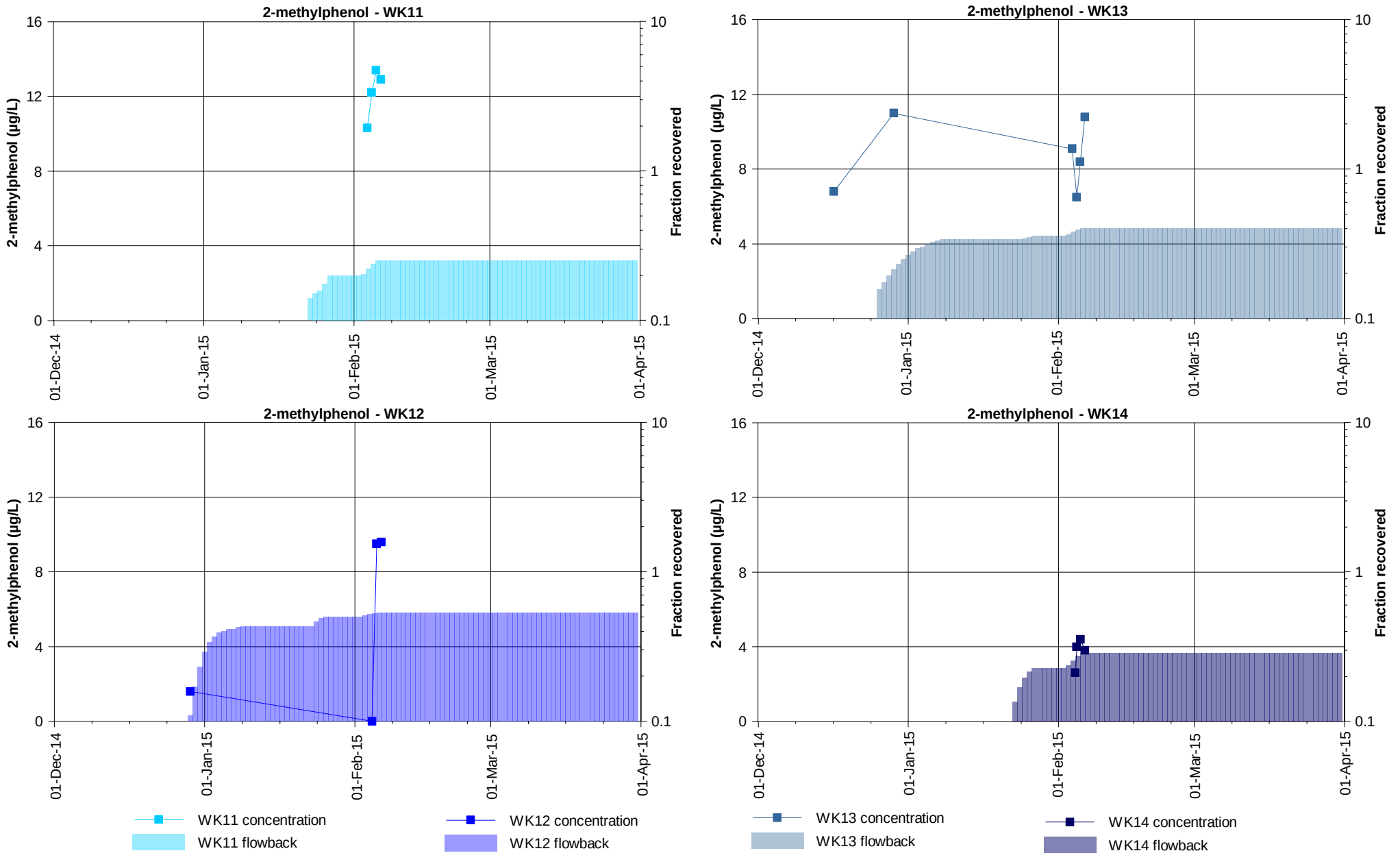

Figure E7.2: 2-methylphenol concentrations and flowback volumes at the Waukivory pilot wells

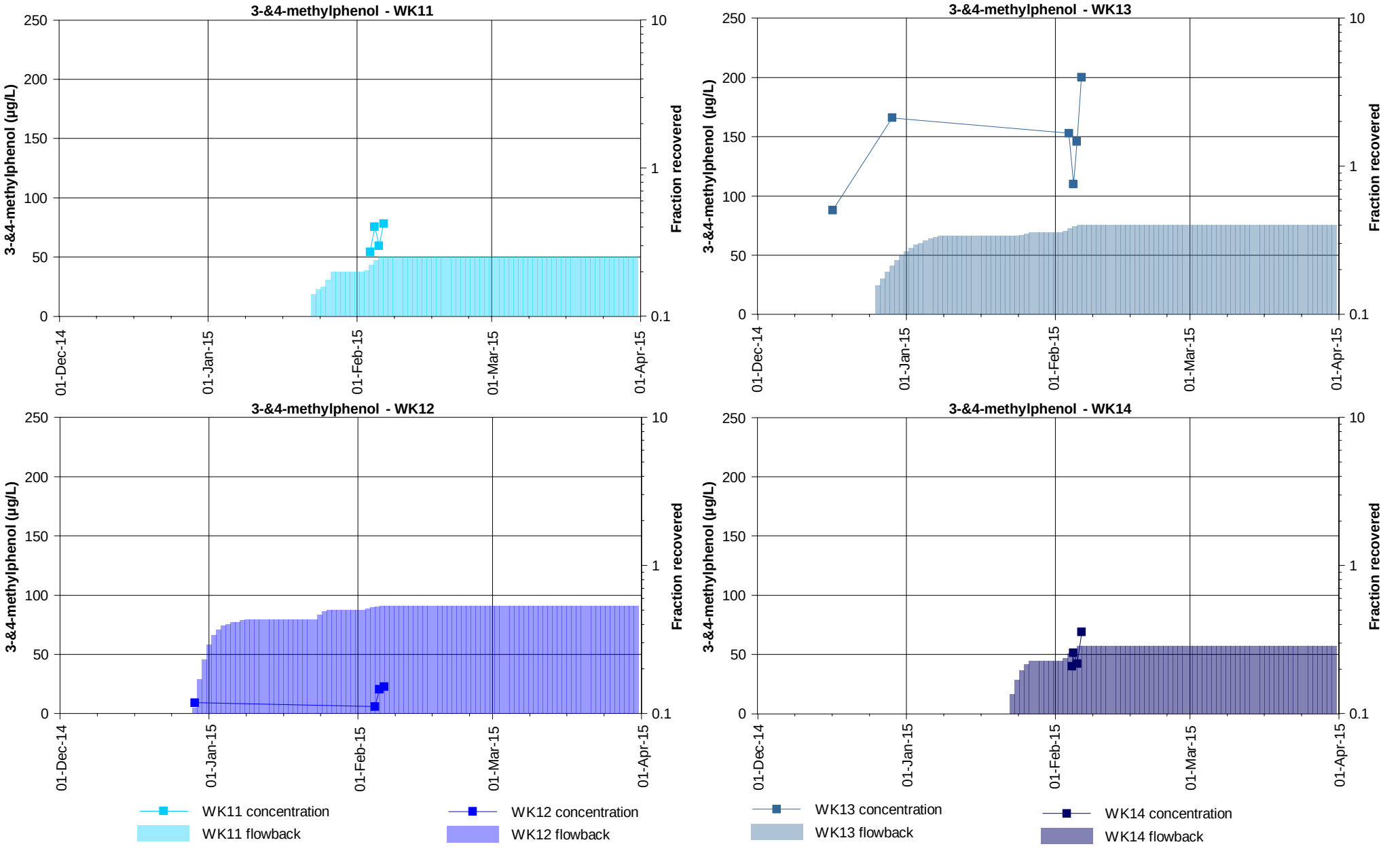

Figure E7.3: 3-&4-methylphenol concentrations and flowback volumes at the Waukivory pilot wells

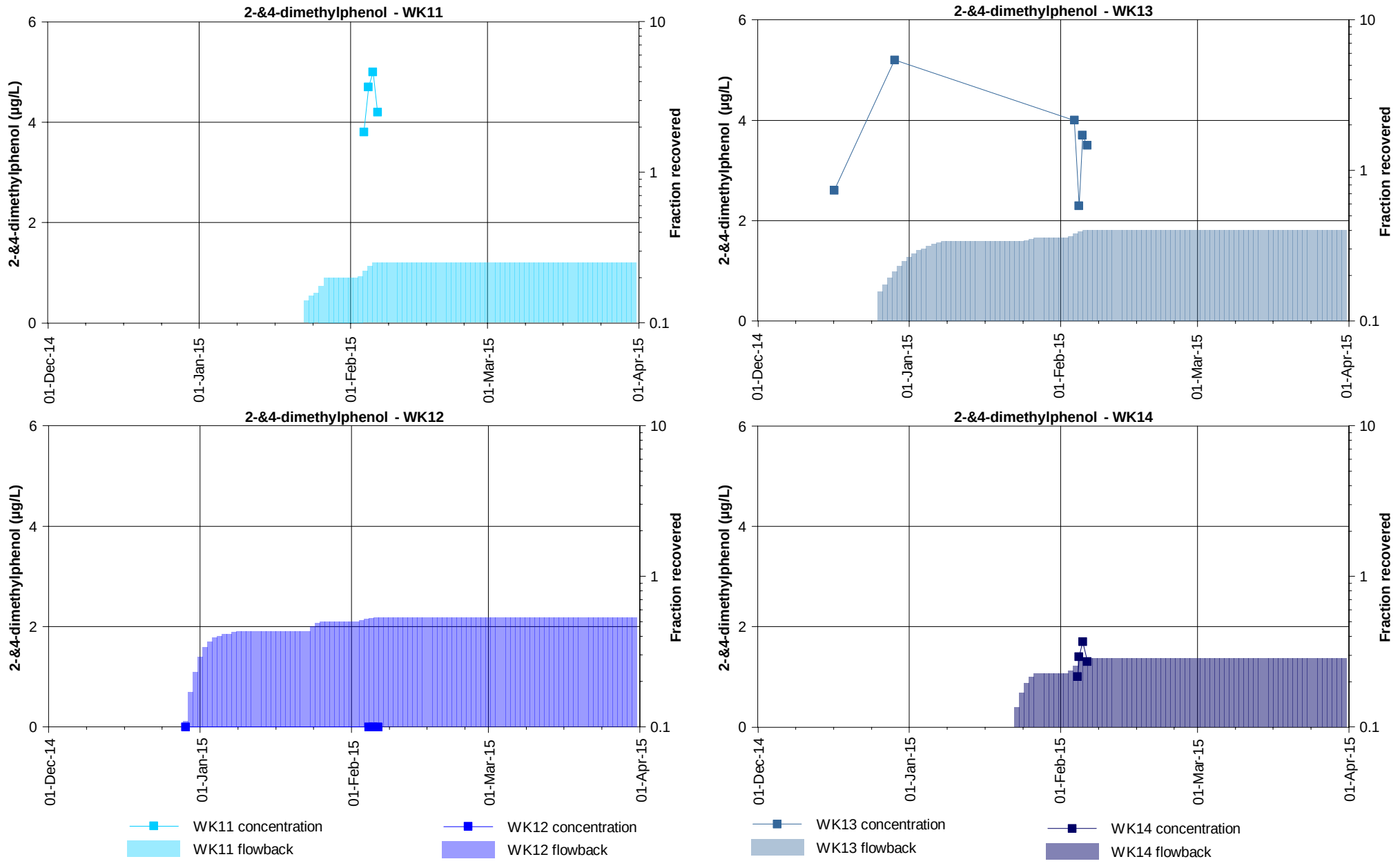

Figure E7.4: 2-&4-dimethylphenol concentrations and flowback volumes at the Waukivory pilot wells

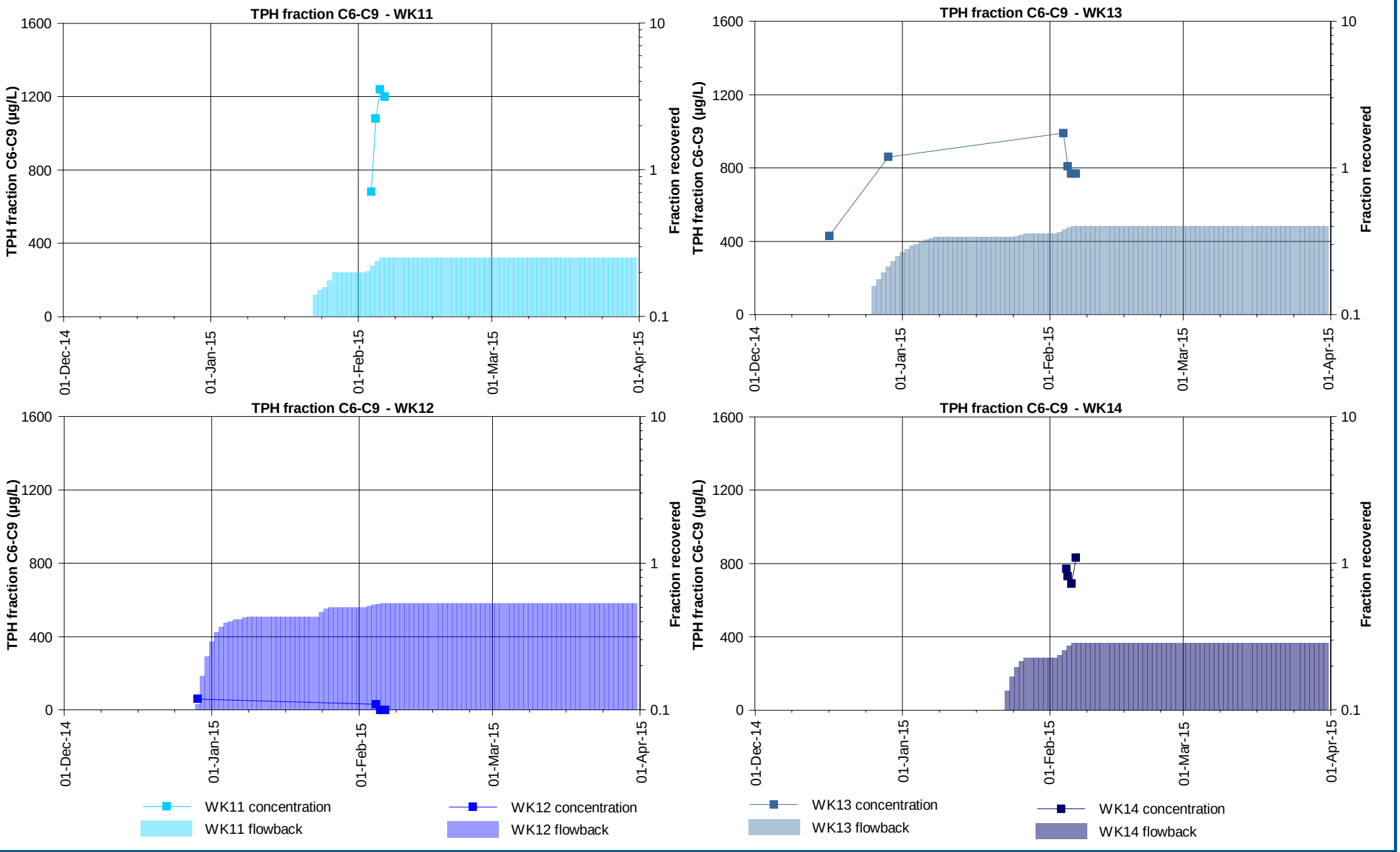

Figure E7.5: TPH fractions C6-C9 and flowback volumes at the Waukivory pilot wells

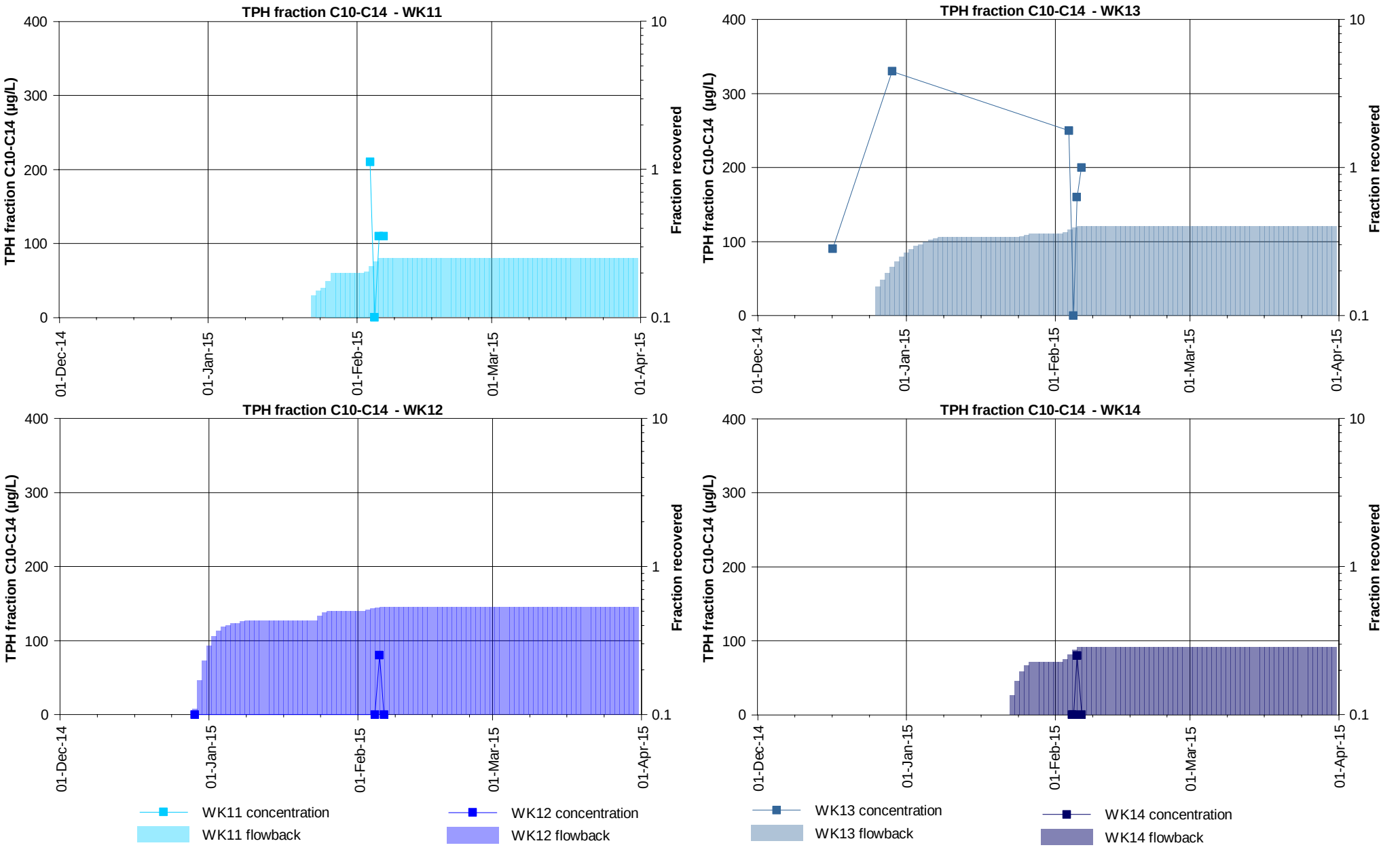

Figure E7.6: TPH fractions C10-C14 and flowback volumes at the Waukivory pilot wells

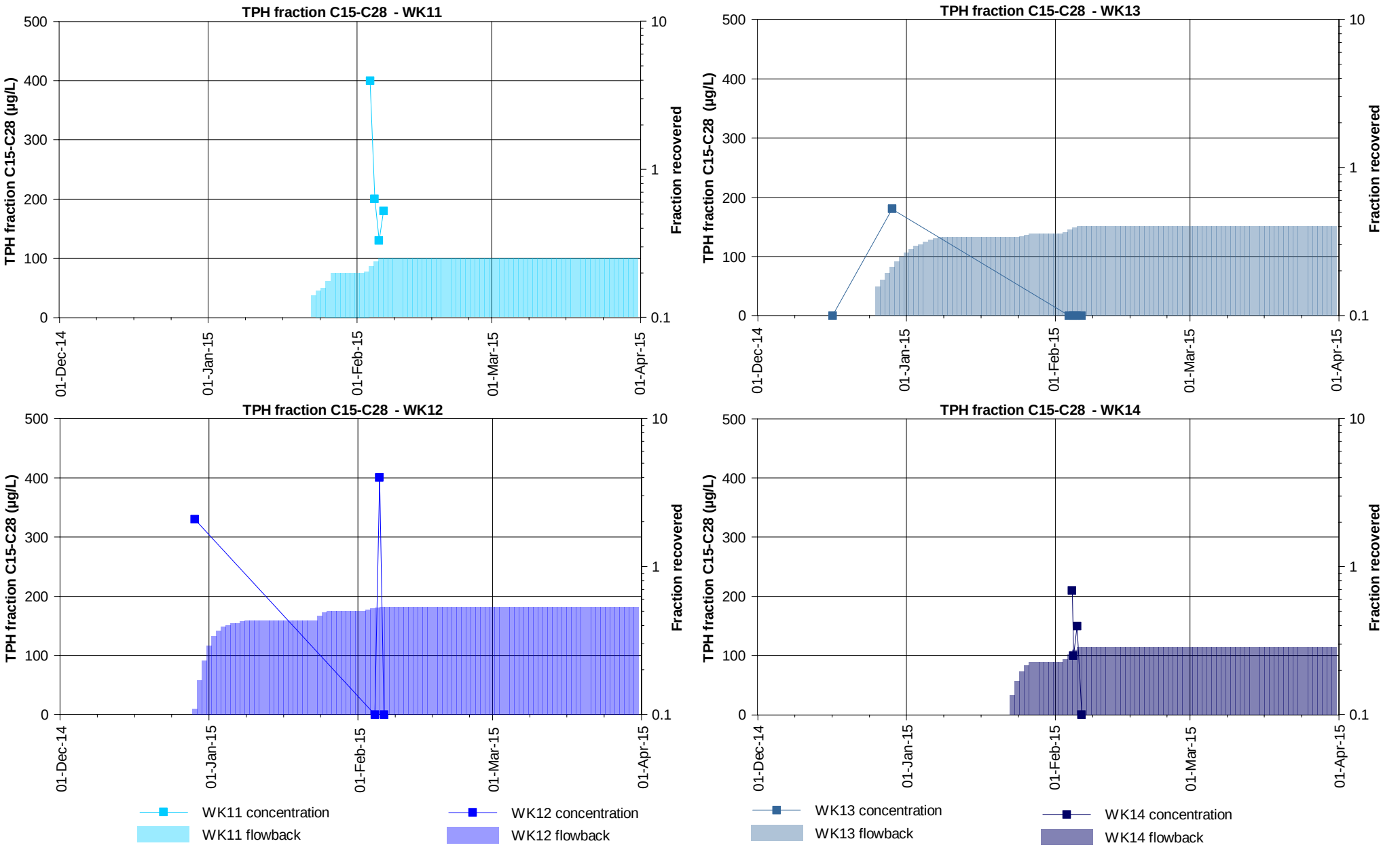

Figure E7.7: TPH fractions C15-C28 and flowback volumes at the Waukivory pilot wells

Appendix F

Groundwater and surface water analyte time-series hydrographs

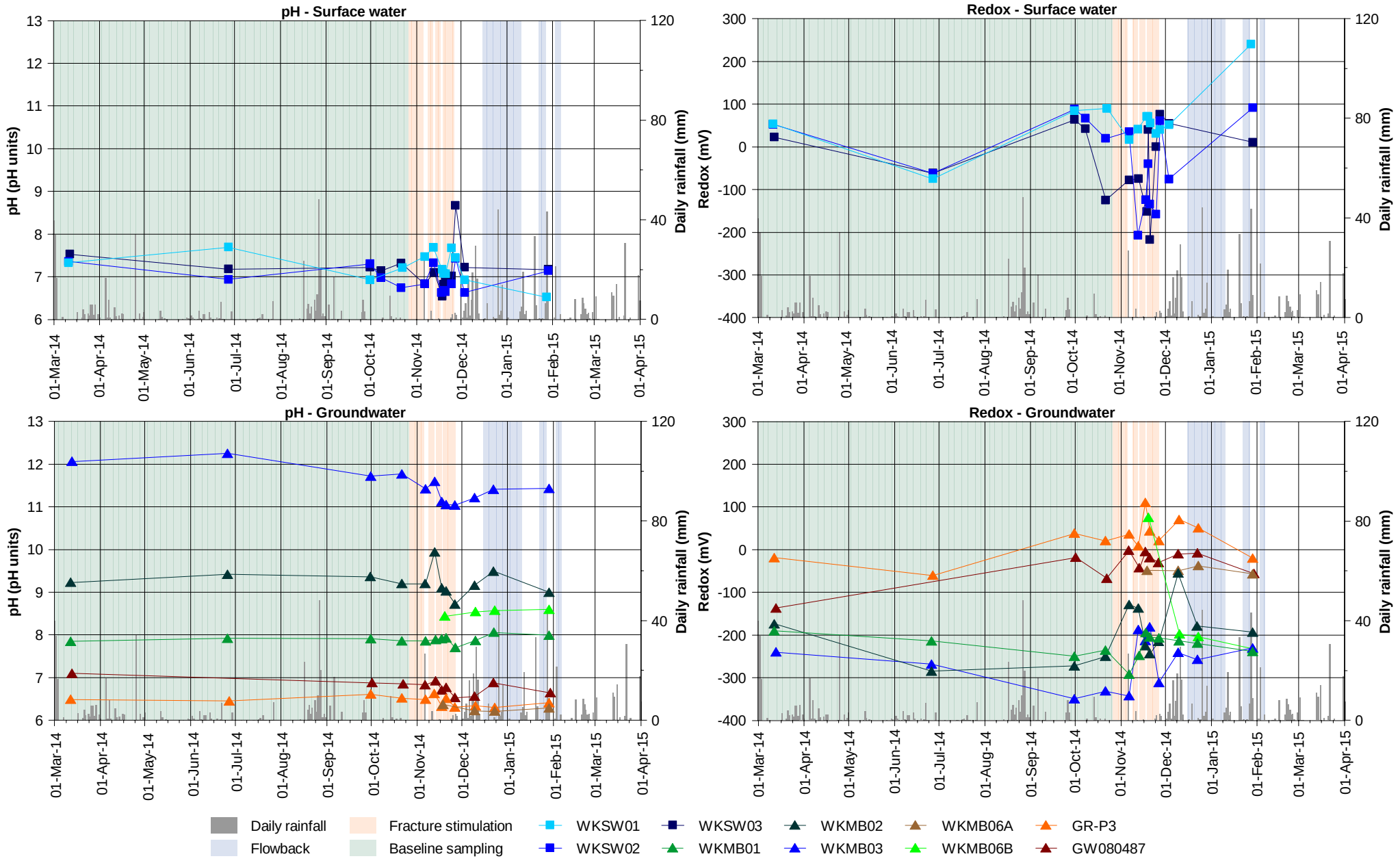

Figure F1.1: Field measurements of pH and redox at Waukivory surface water and groundwater monitoring locations.

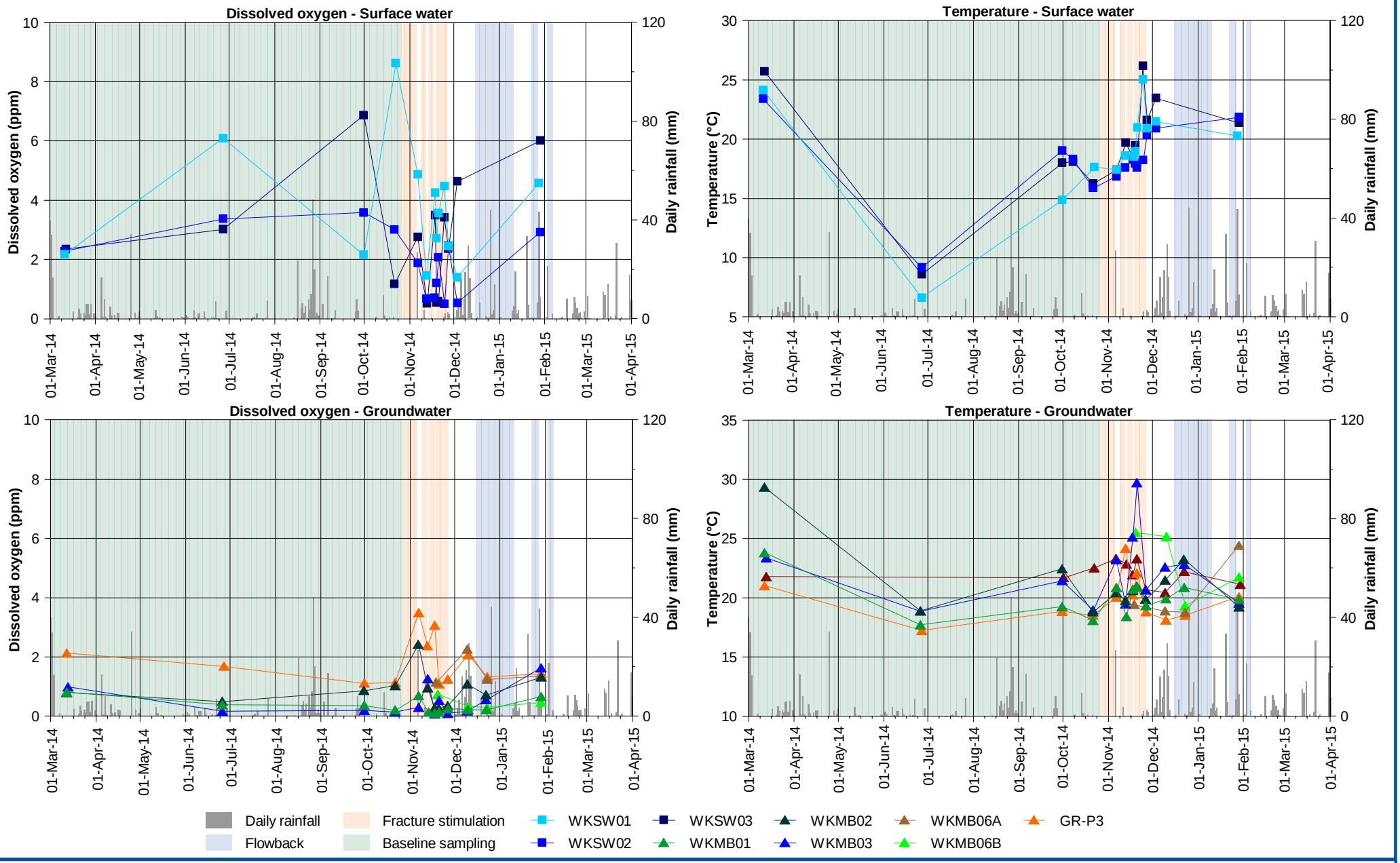

Figure F1.2: Field measurements of dissolved oxygen and temperature at Waukivory surface water and groundwater monitoring locations.

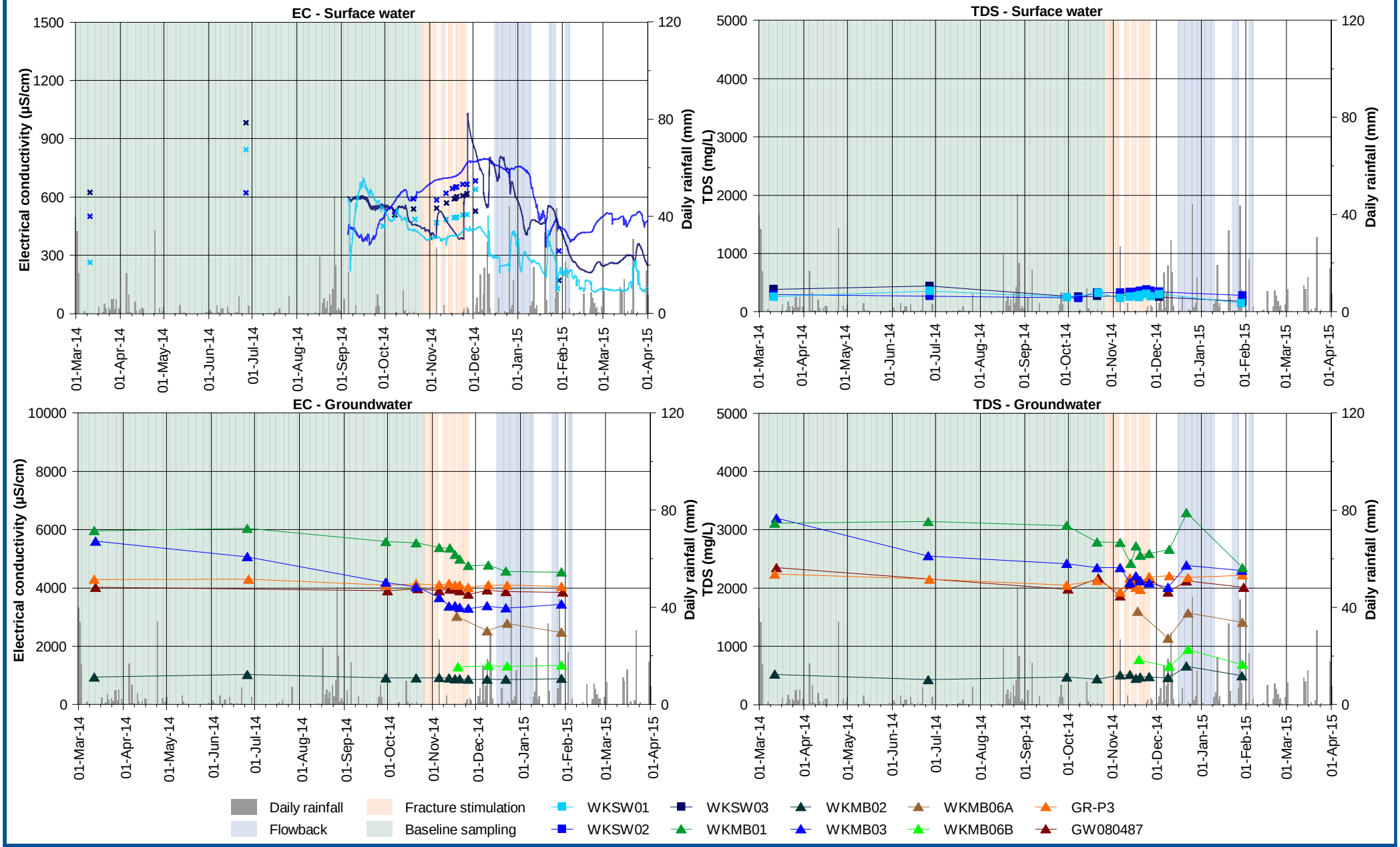

Figure F1.3: Laboratory measurements of EC and TDS at Waukivory surface water and groundwater monitoring locations.

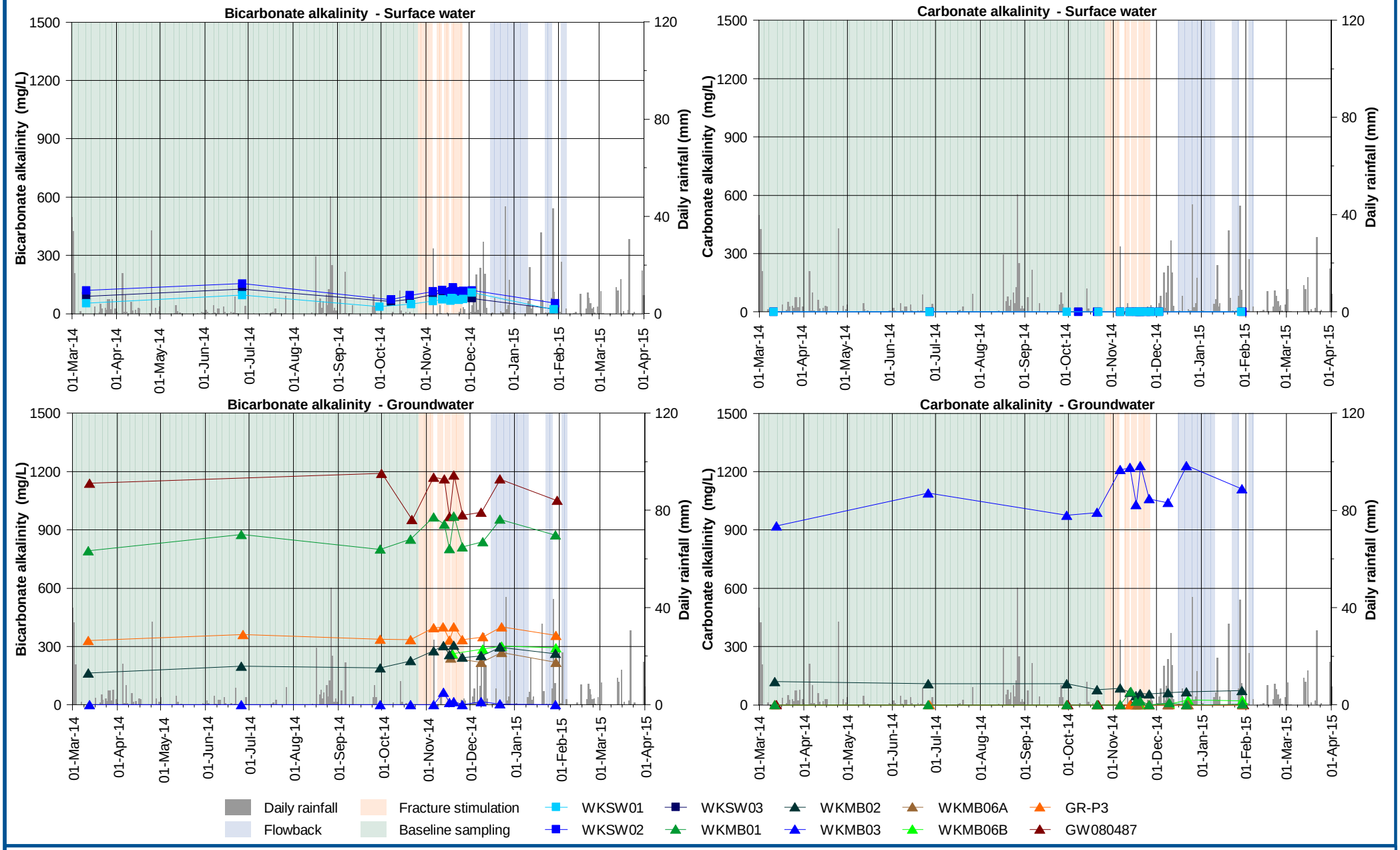

Figure F2.1: Bicarbonate alkalinity and carbonate alkalinity at Waukivory surface water and groundwater monitoring locations.

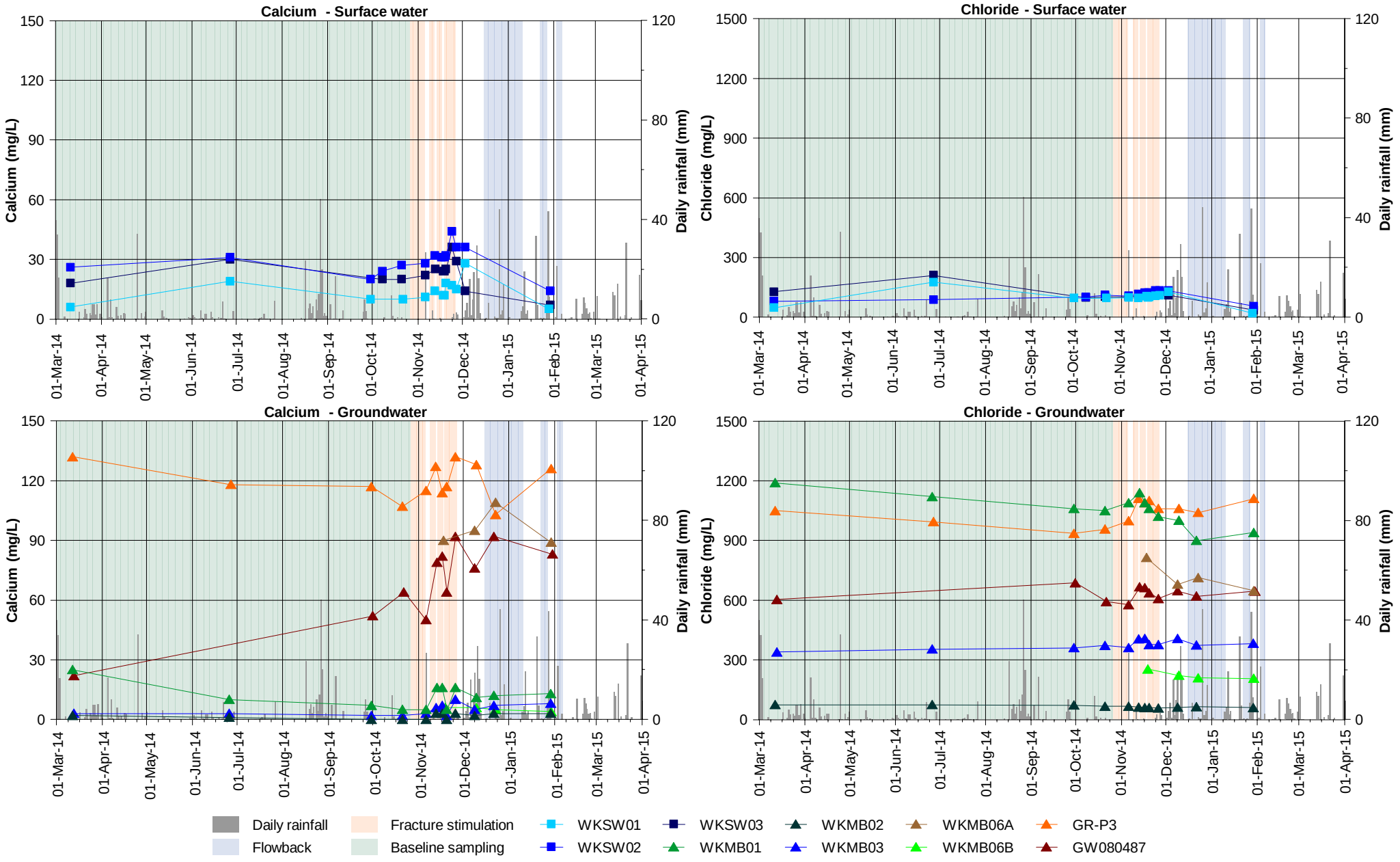

Figure F2.2: Calcium and chloride at Waukivory surface water and groundwater monitoring locations.

Note: Chloride method - APHA 4500-Cl ⁻

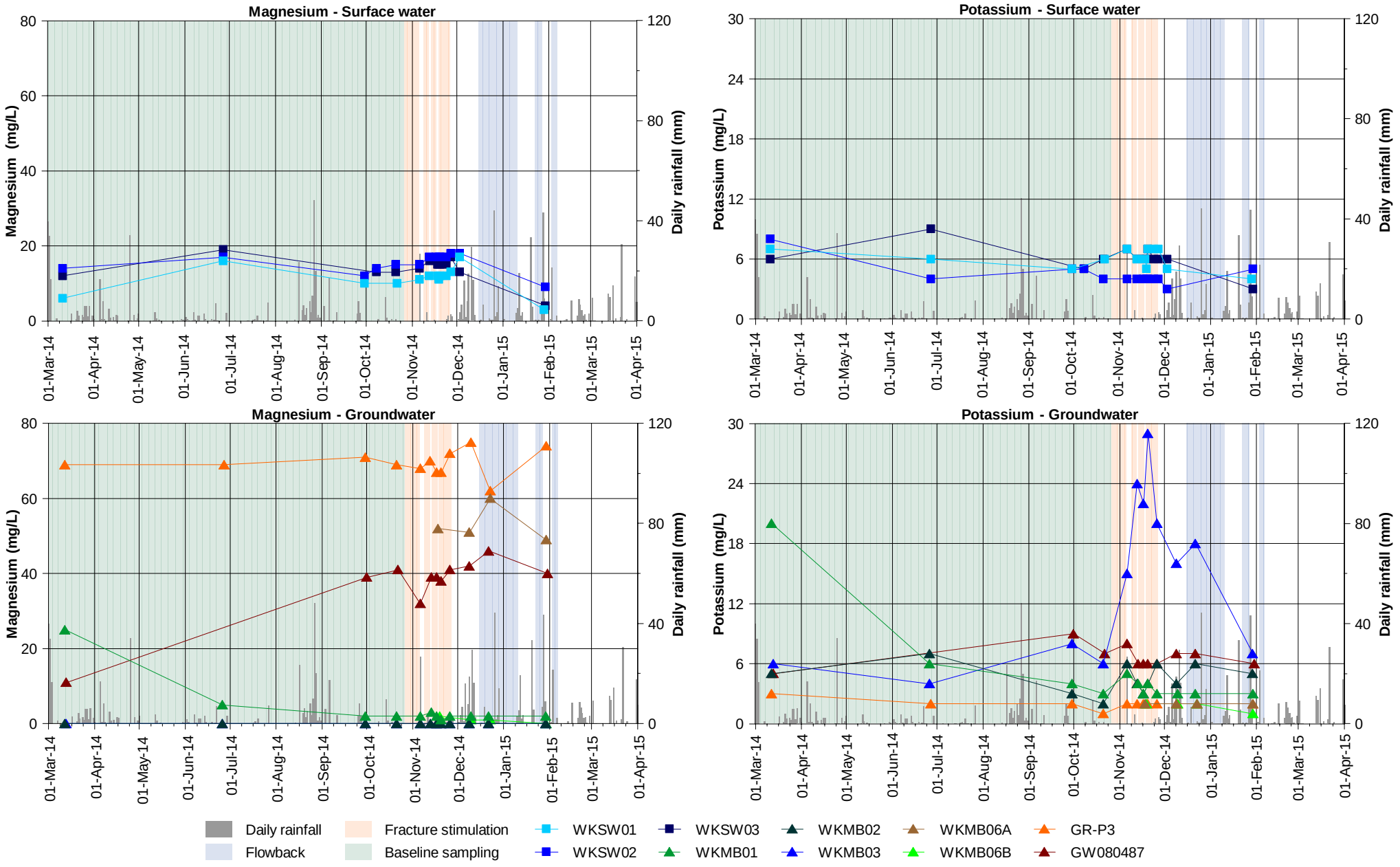

Figure F2.3: Magnesium and potassium at Waukivory surface water and groundwater monitoring locations.

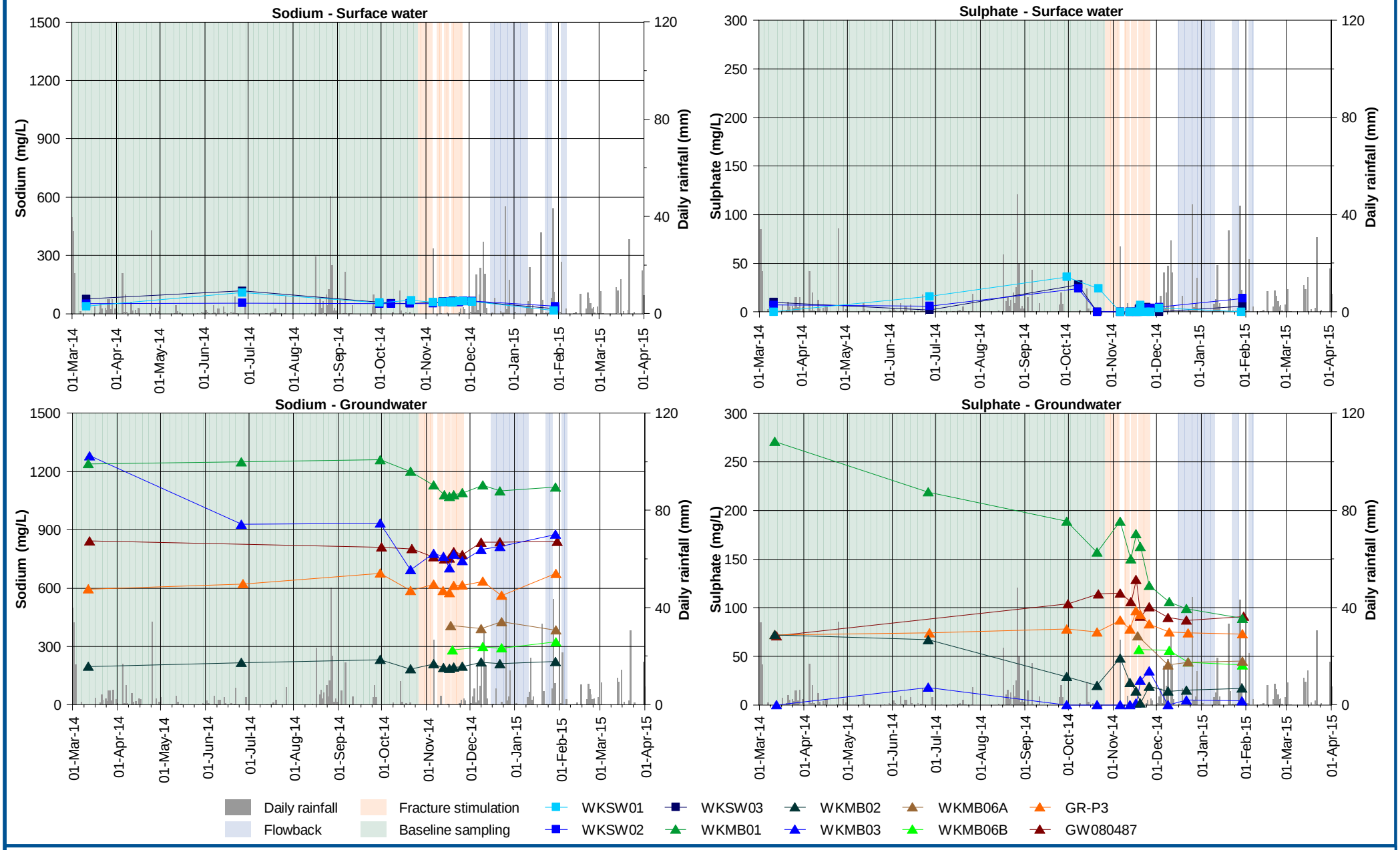

Figure F2.4: Sodium and sulphate at Waukivory surface water and groundwater monitoring locations.

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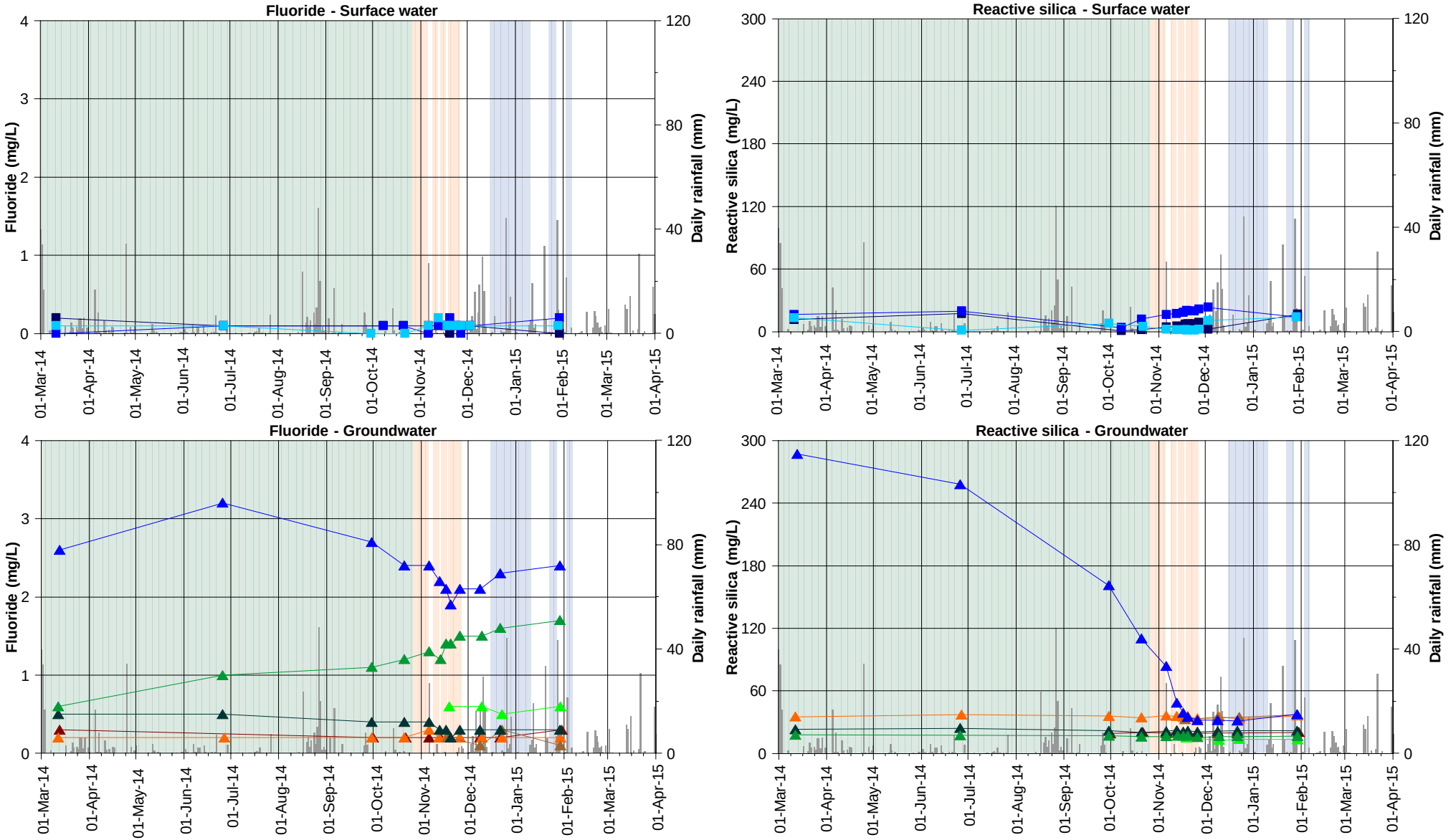

Note. Two groundwater sampling locations (WKMB01, WKMB03) contained dissolved fluoride concentrations greater than 1 mg/L. These concentrations were observed in baseline data and did not vary significantly during the fracture stimulation process. The localised and consistent nature of the fluoride concentrations in WKMB01 and WKMB03 suggest the most likely source is geological. As a result, the EPA intends to take no further action in relation to the issue of fluoride detections (EPA, 2015d).

Figure F2.5: Fluoride and reactive silica at Waukivory surface water and groundwater monitoring locations.

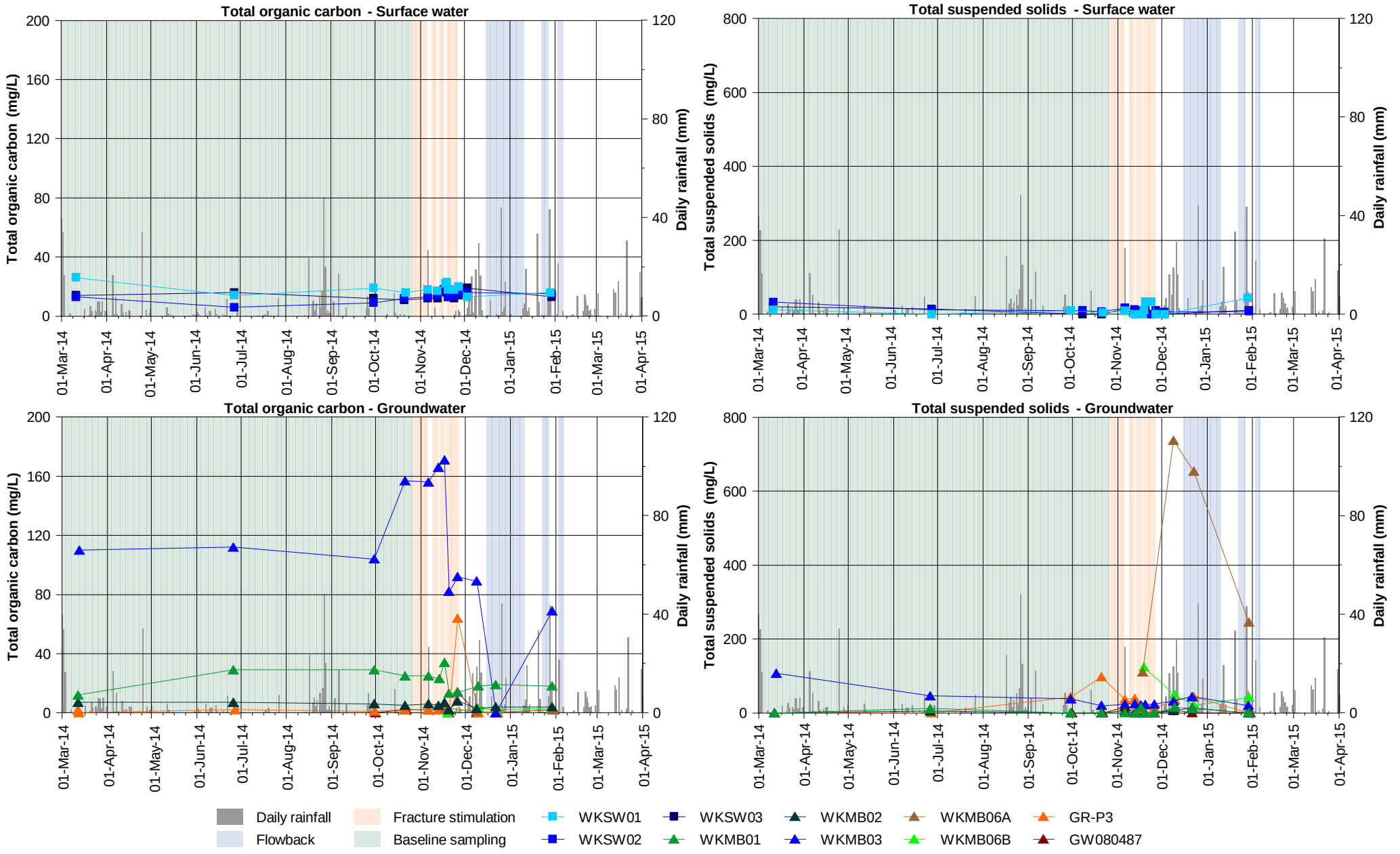

Figure F2.6: Total organic carbon (TOC) and total suspended solids (TSS) at Waukivory surface water and groundwater monitoring locations.

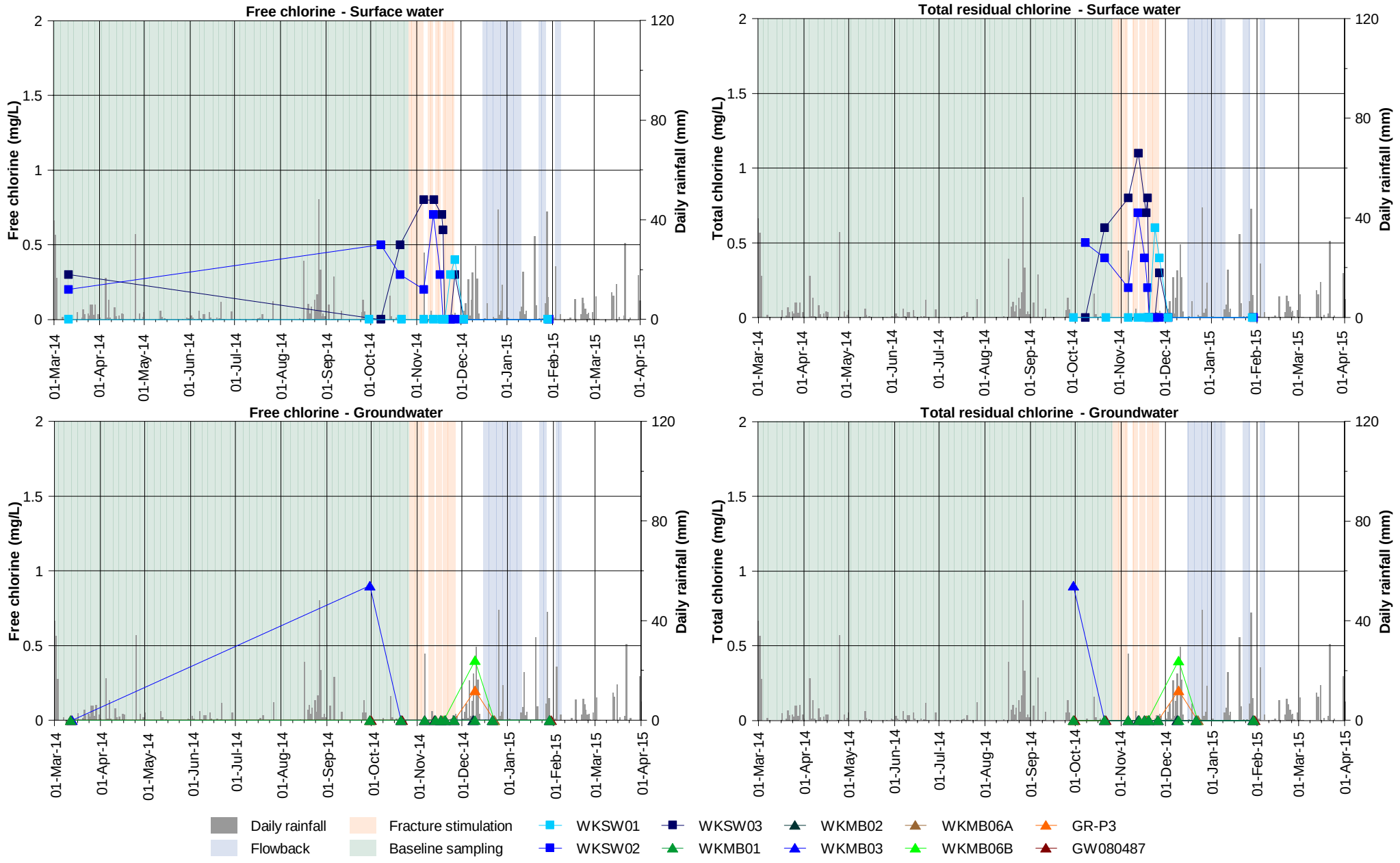

Figure F2.7: Laboratory measurements of free and total chlorine at Waukivory surface water and groundwater monitoring locations.

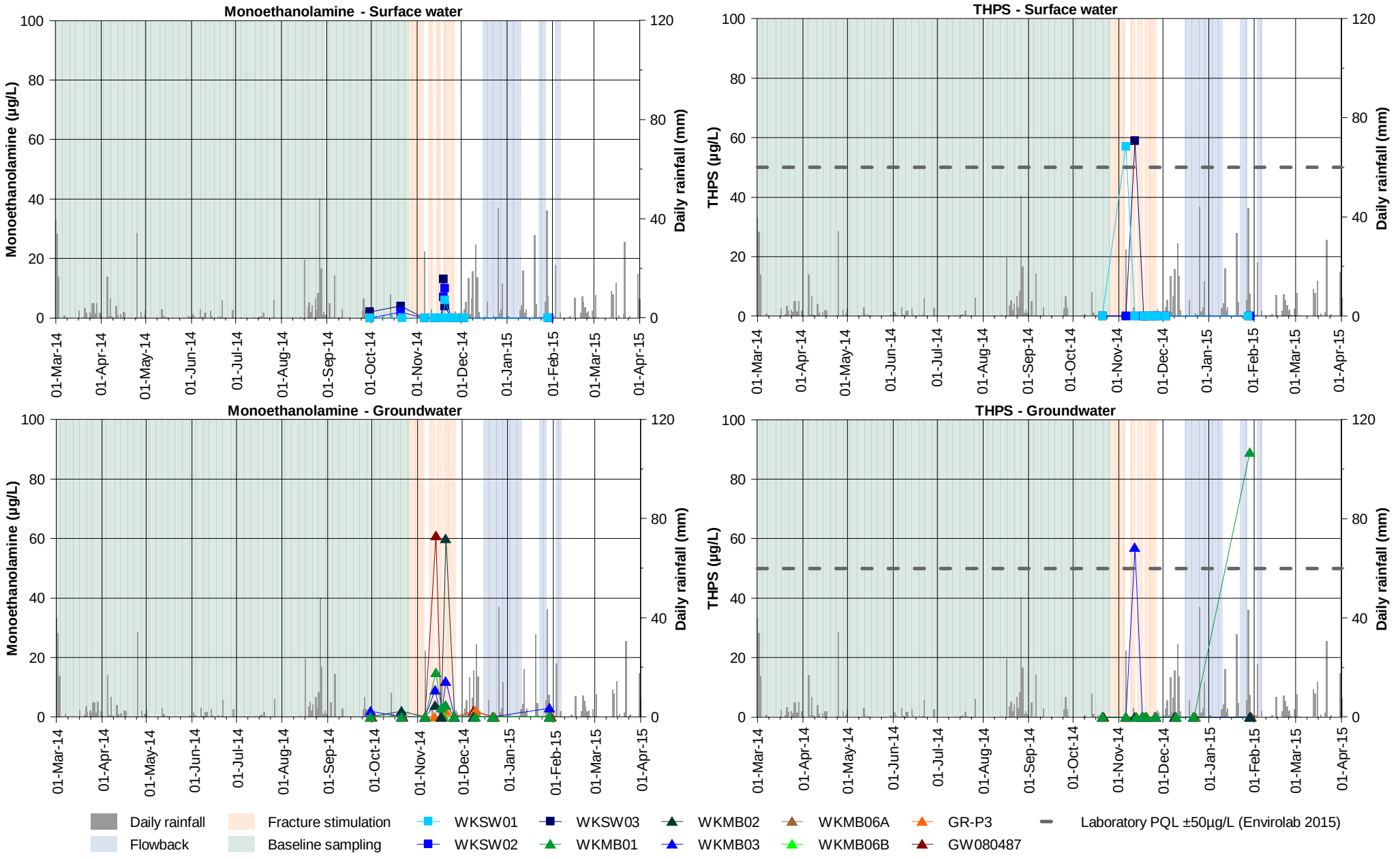

Figure F2.8: Ethanolamine and THPS at Waukivory surface water and groundwater monitoring locations.

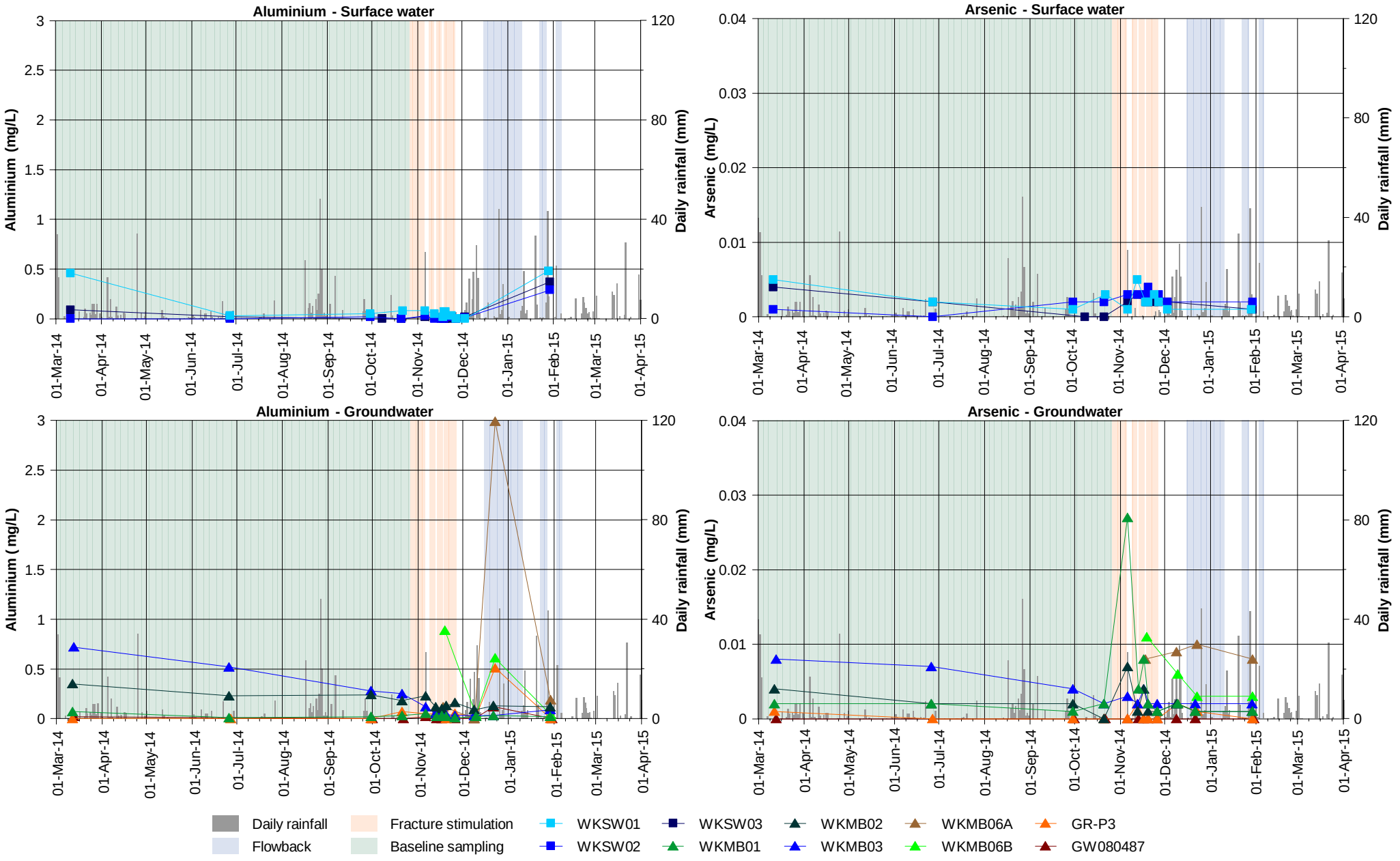

Figure F3.1: Aluminium and arsenic at Waukivory surface water and groundwater monitoring locations.

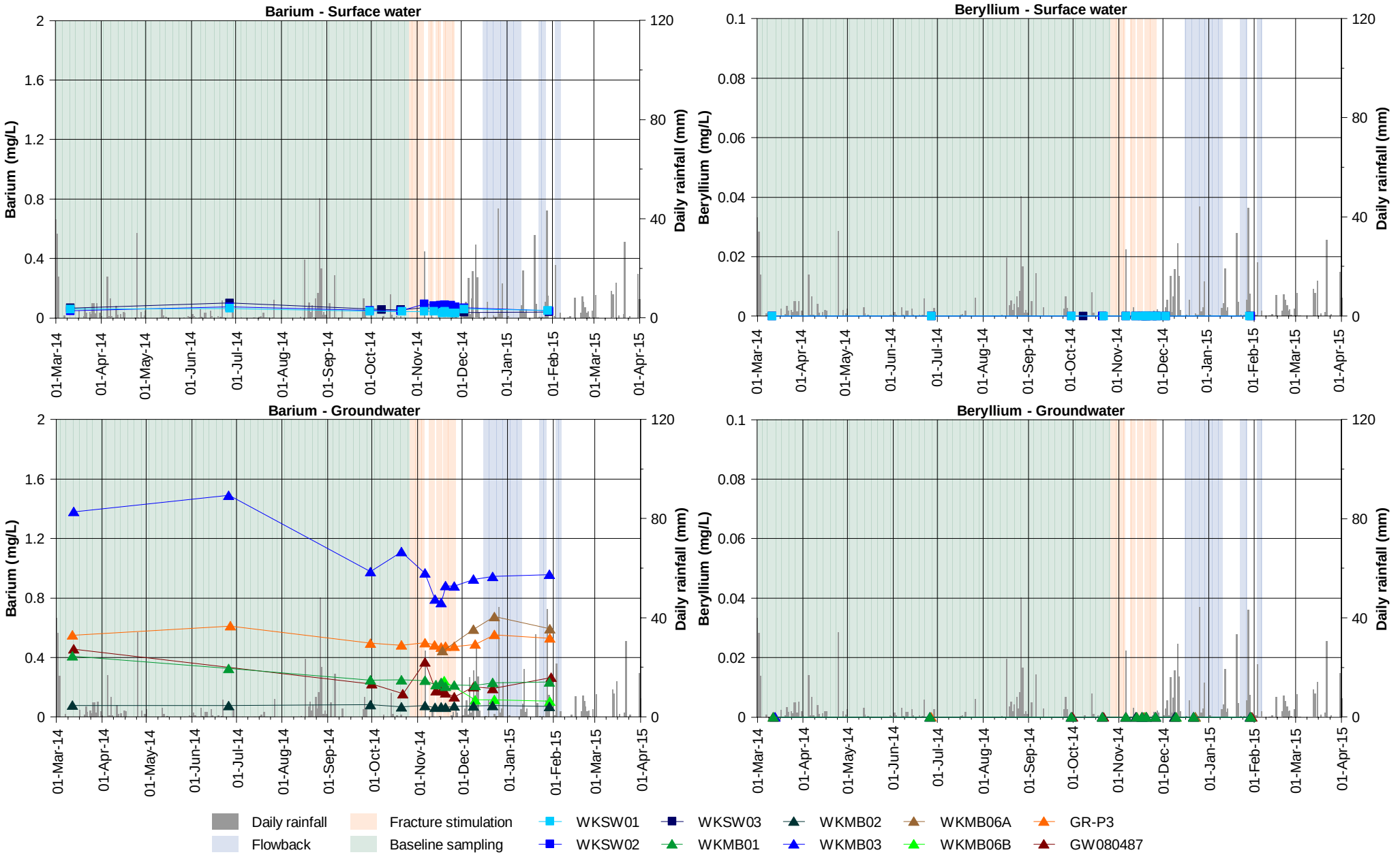

Figure F3.2: Barium and beryllium at Waukivory surface water and groundwater monitoring locations.

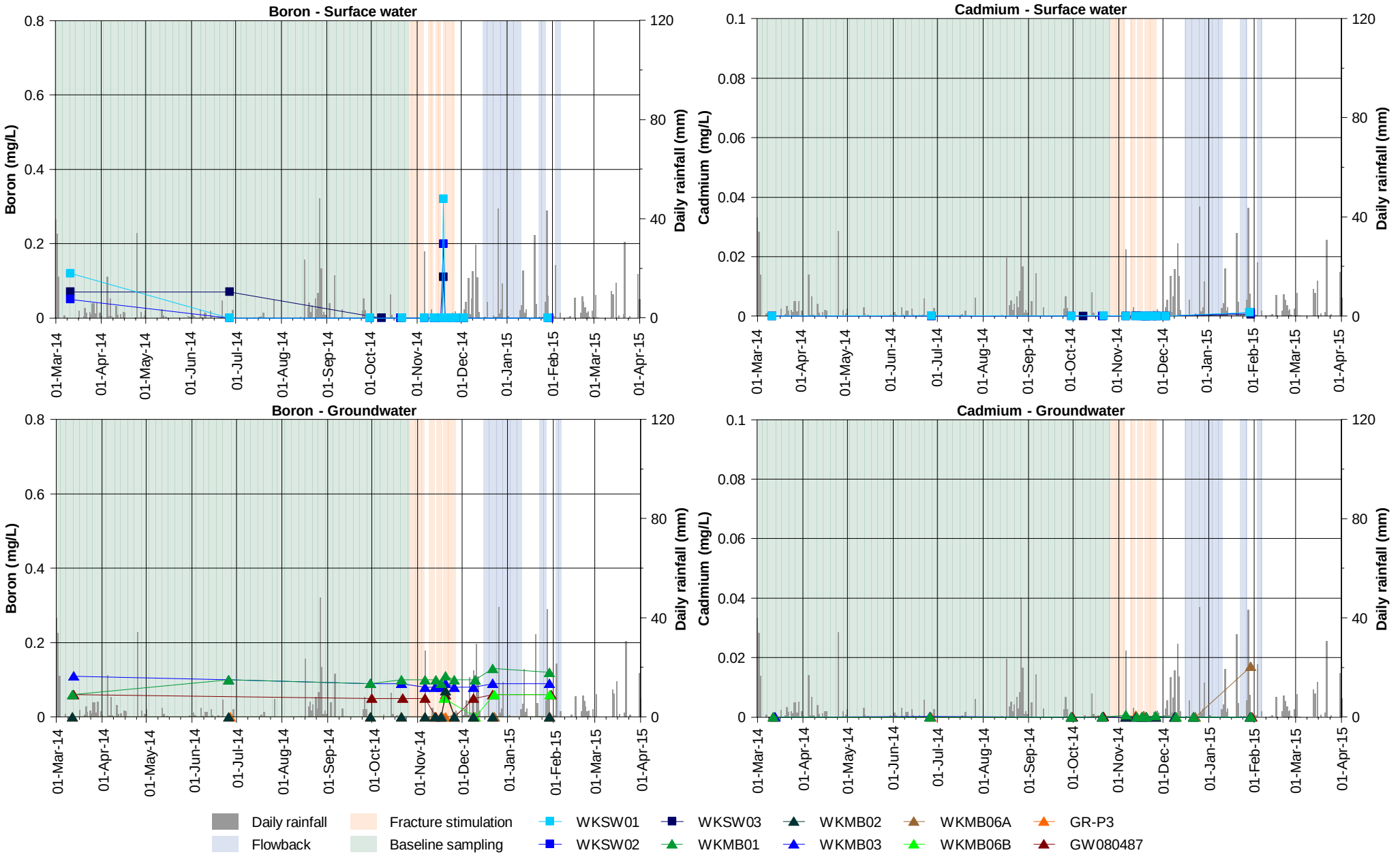

Figure F3.3: Boron and cadmium at Waukivory surface water and groundwater monitoring locations.

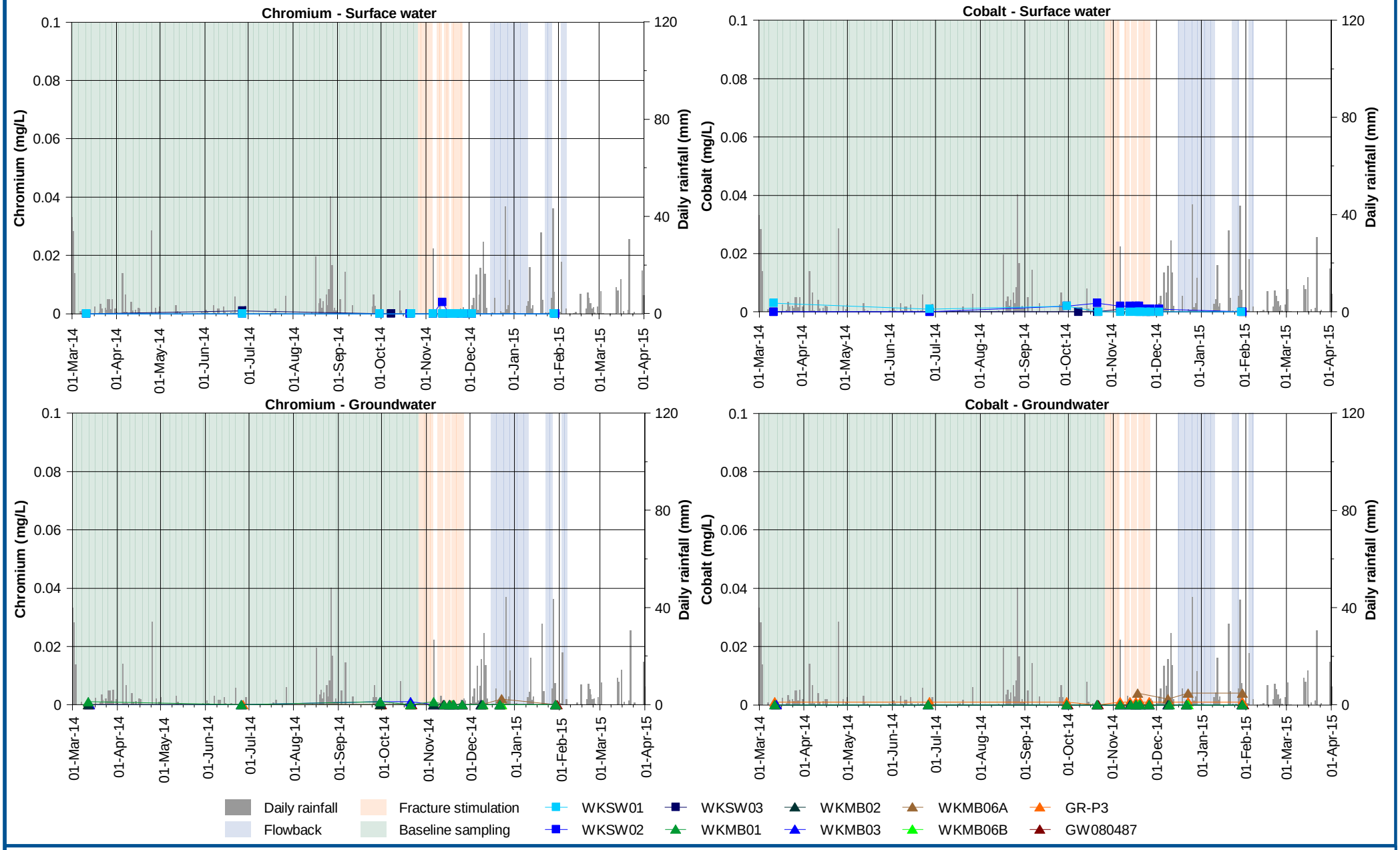

Figure F3.4: Chromium and cobalt at Waukivory surface water and groundwater monitoring locations.

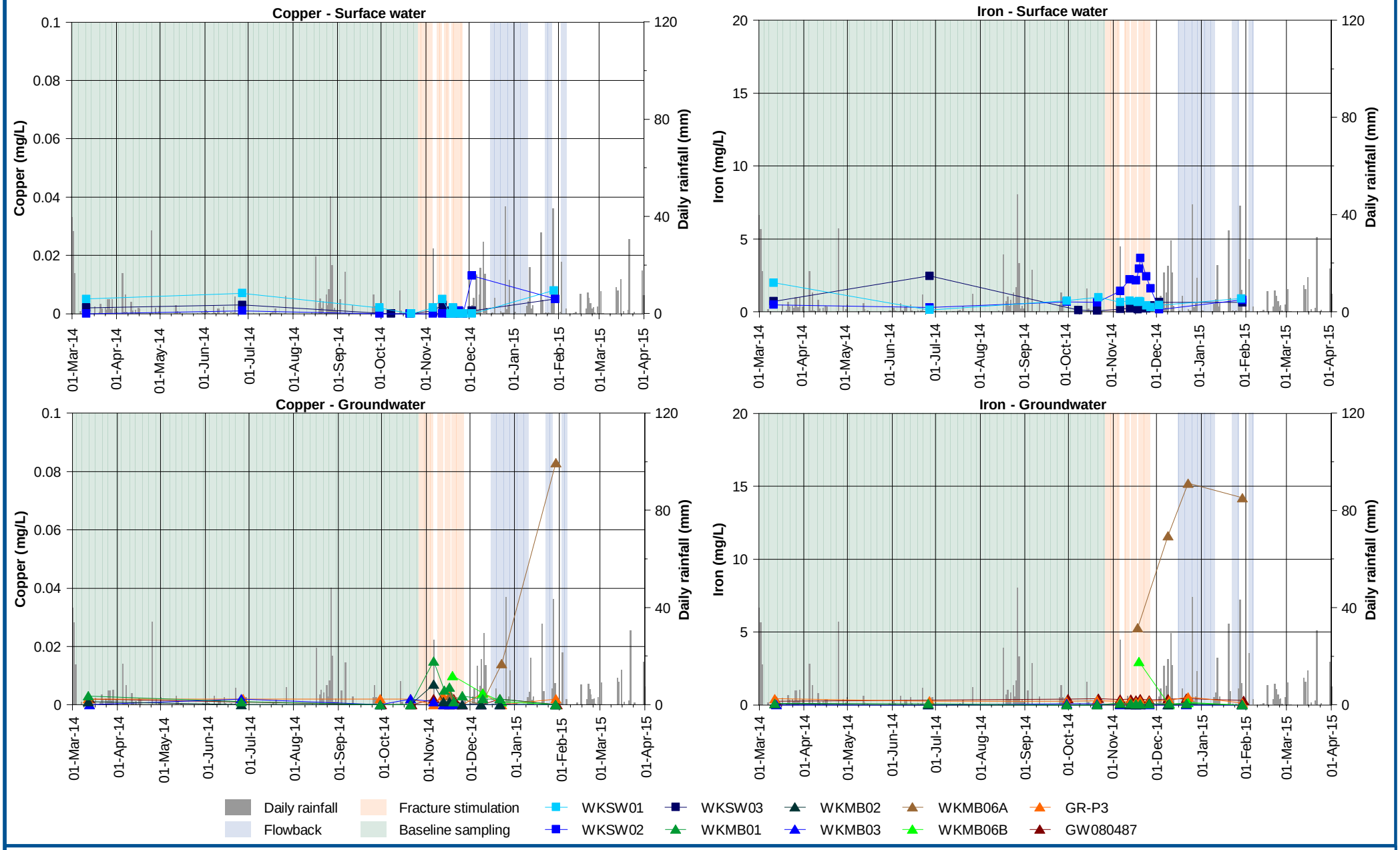

Figure F3.5: Copper and iron at Waukivory surface water and groundwater monitoring locations.

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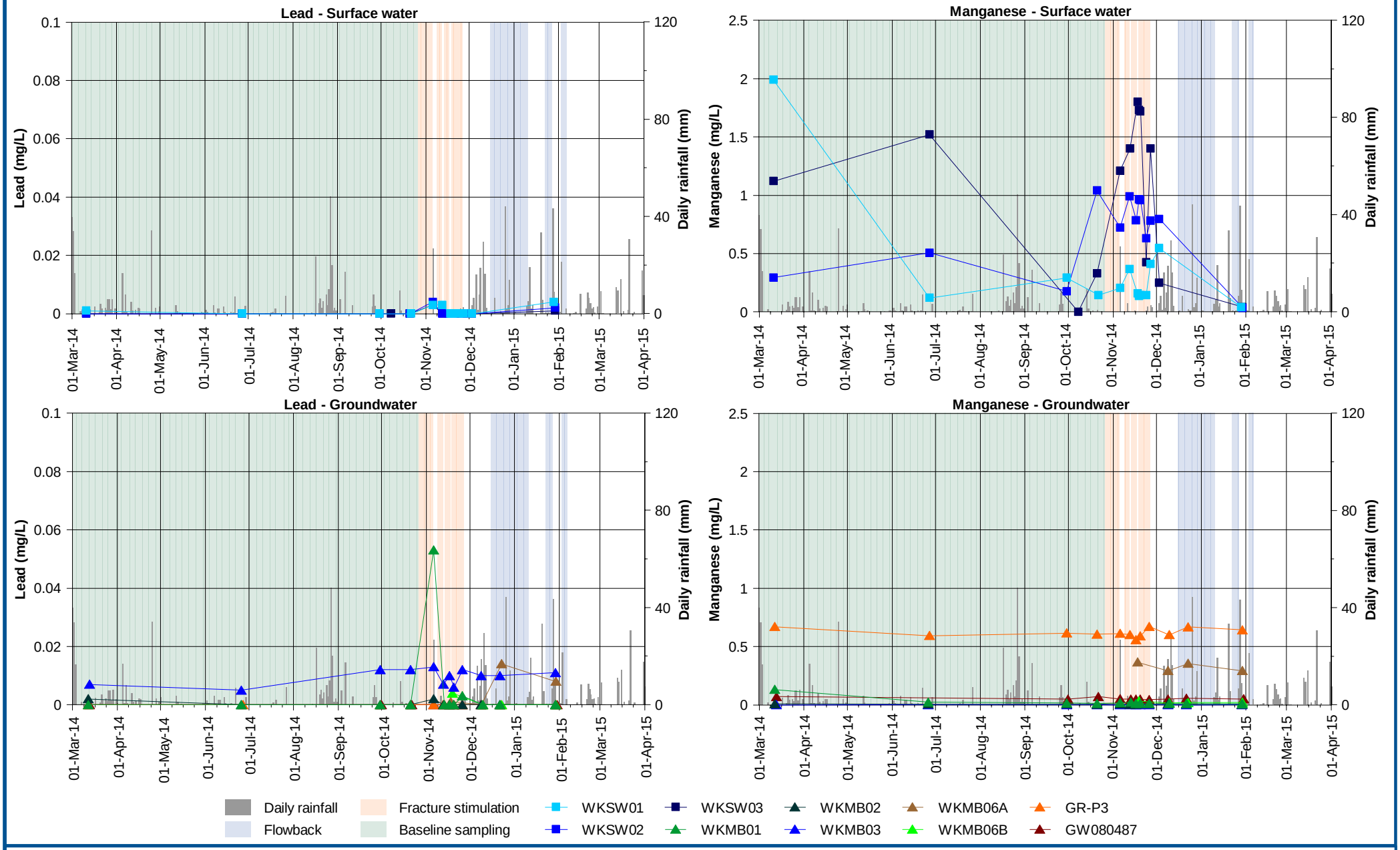


Figure F3.6: Lead and manganese at Waukivory surface water and groundwater monitoring locations.

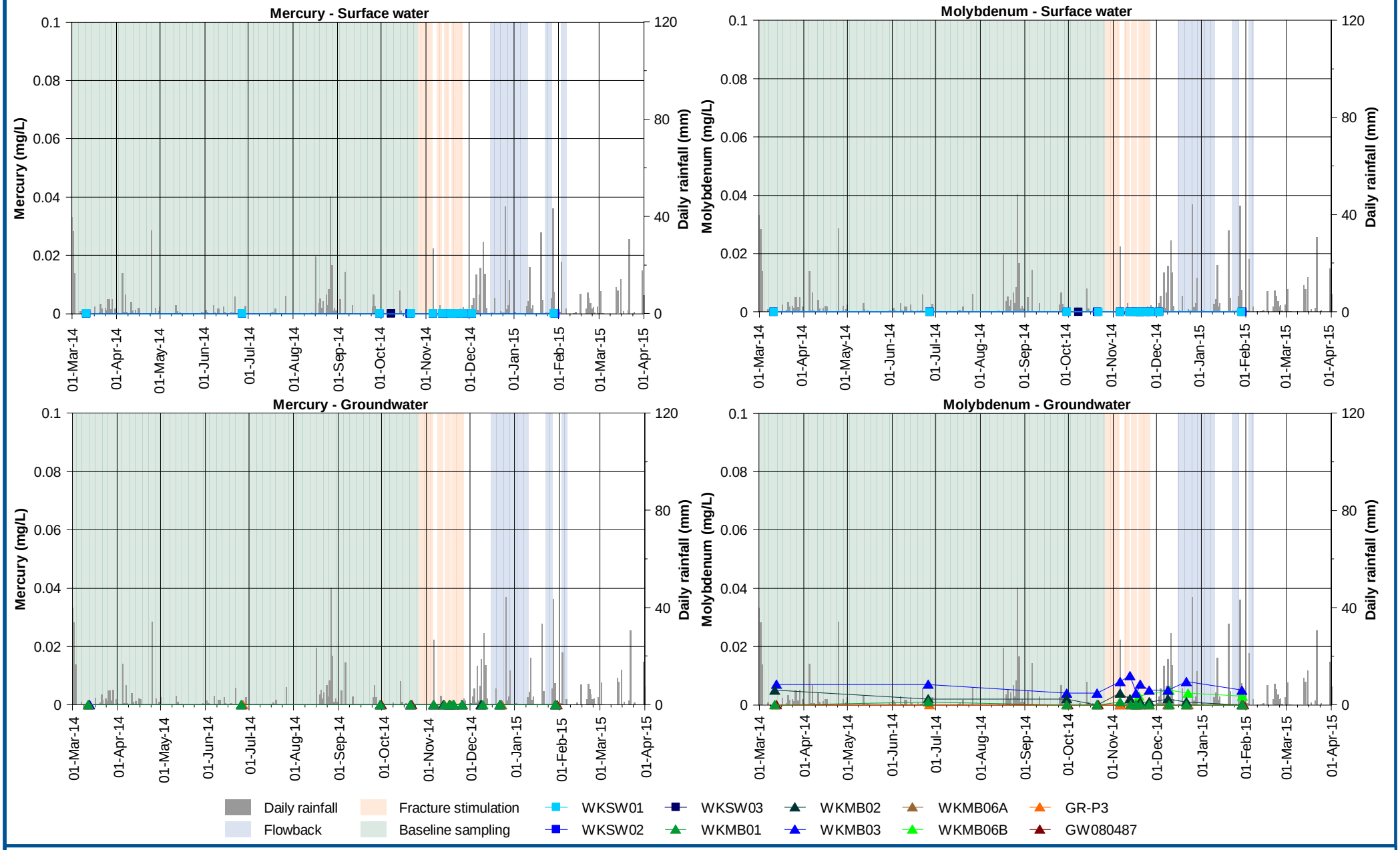


Figure F3.7: Mercury and molybdenum at Waukivory surface water and groundwater monitoring locations.

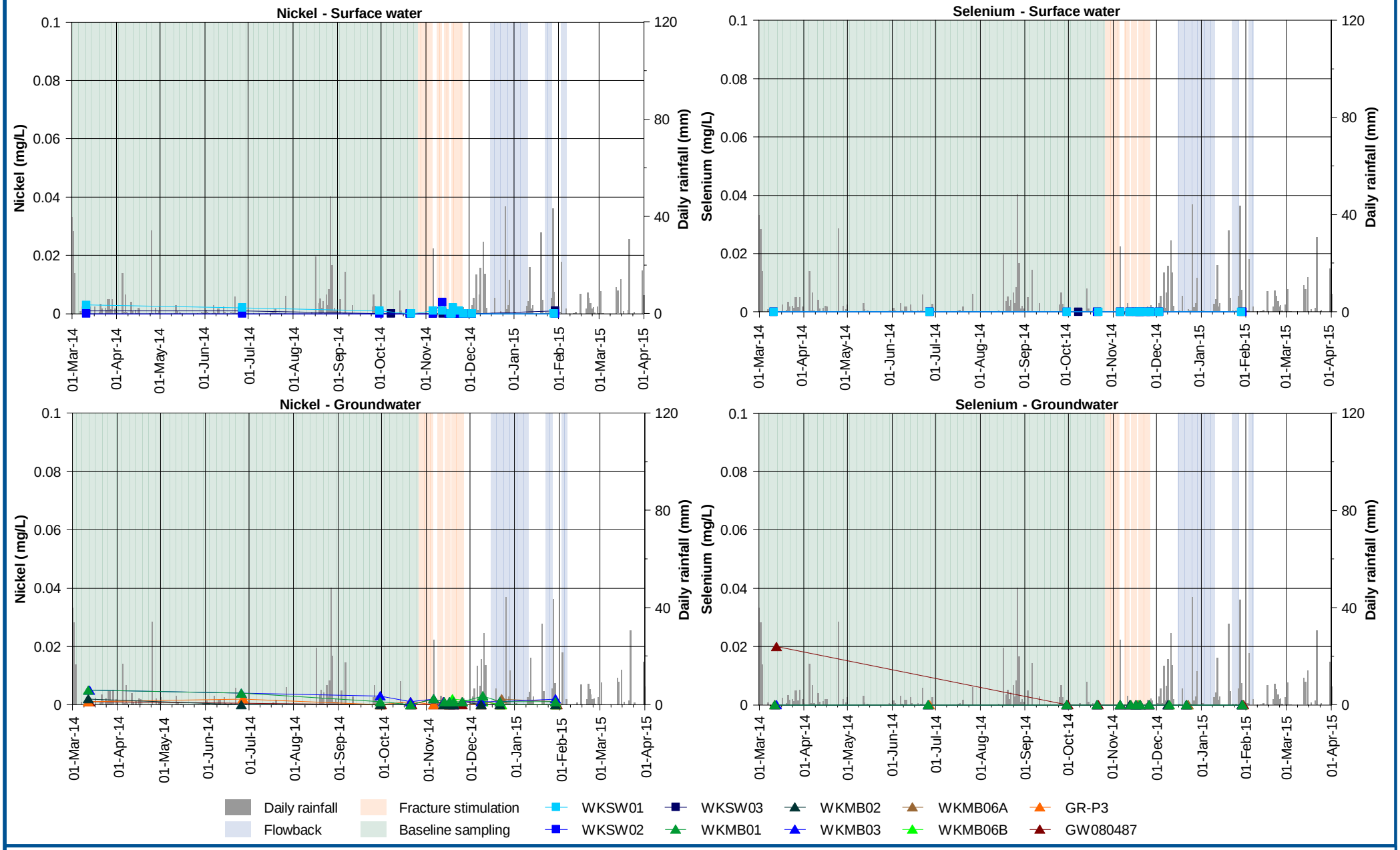


Figure F3.8: Nickel and selenium at Waukivory surface water and groundwater monitoring locations.

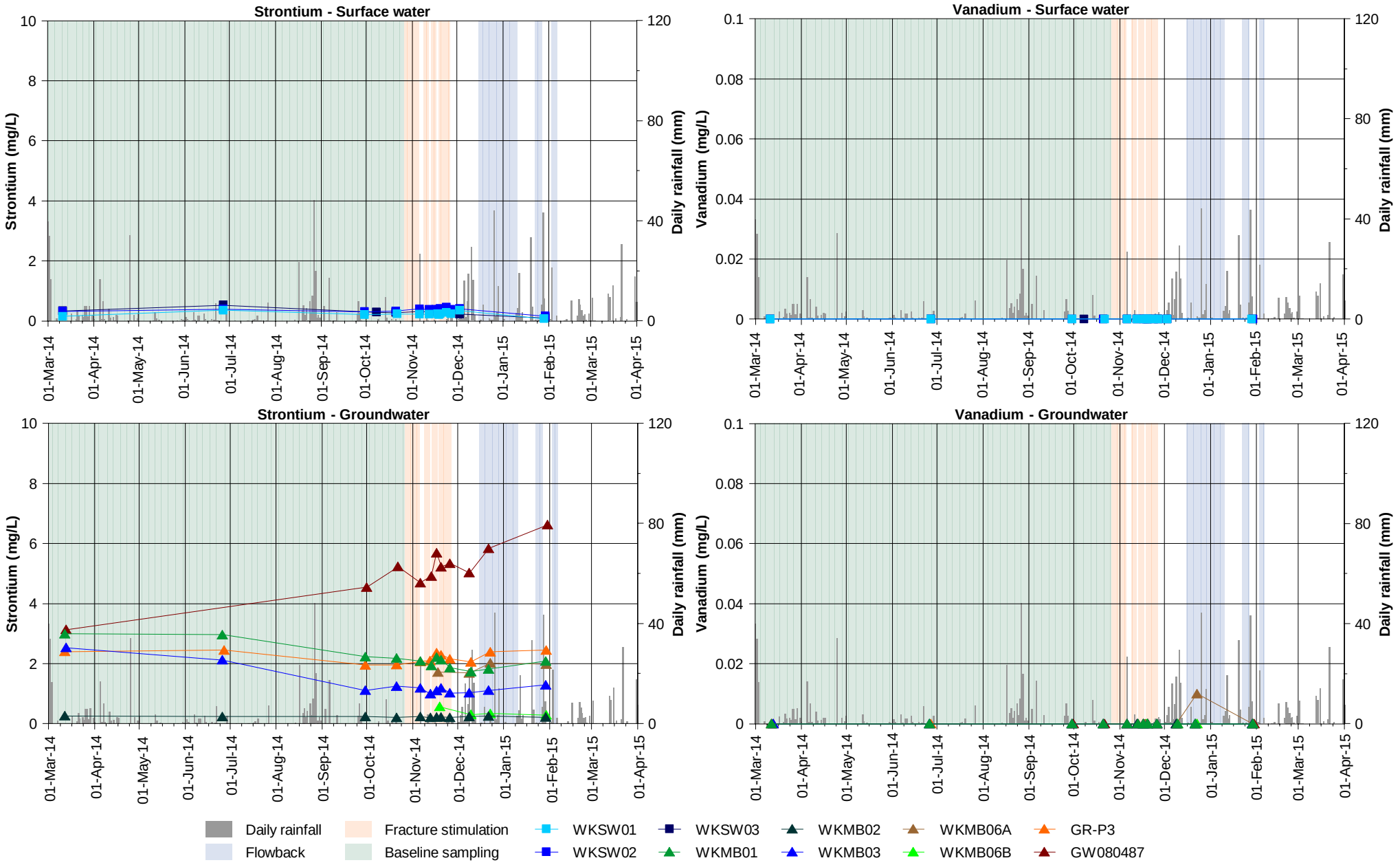


Figure F3.9: Strontium and vanadium at Waukivory surface water and groundwater monitoring locations.

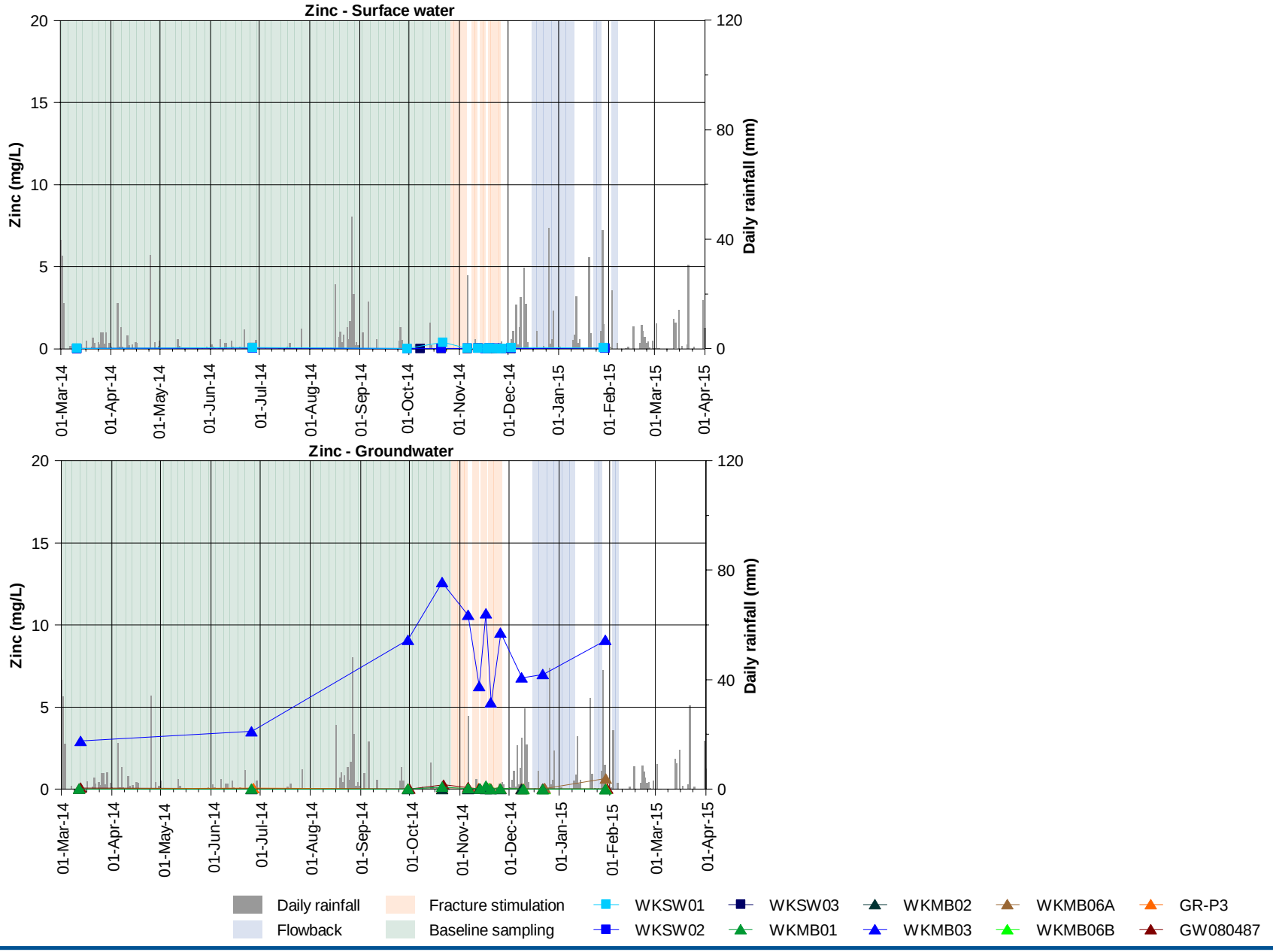


Figure F3.10: Zinc at Waukivory surface water and groundwater monitoring locations.

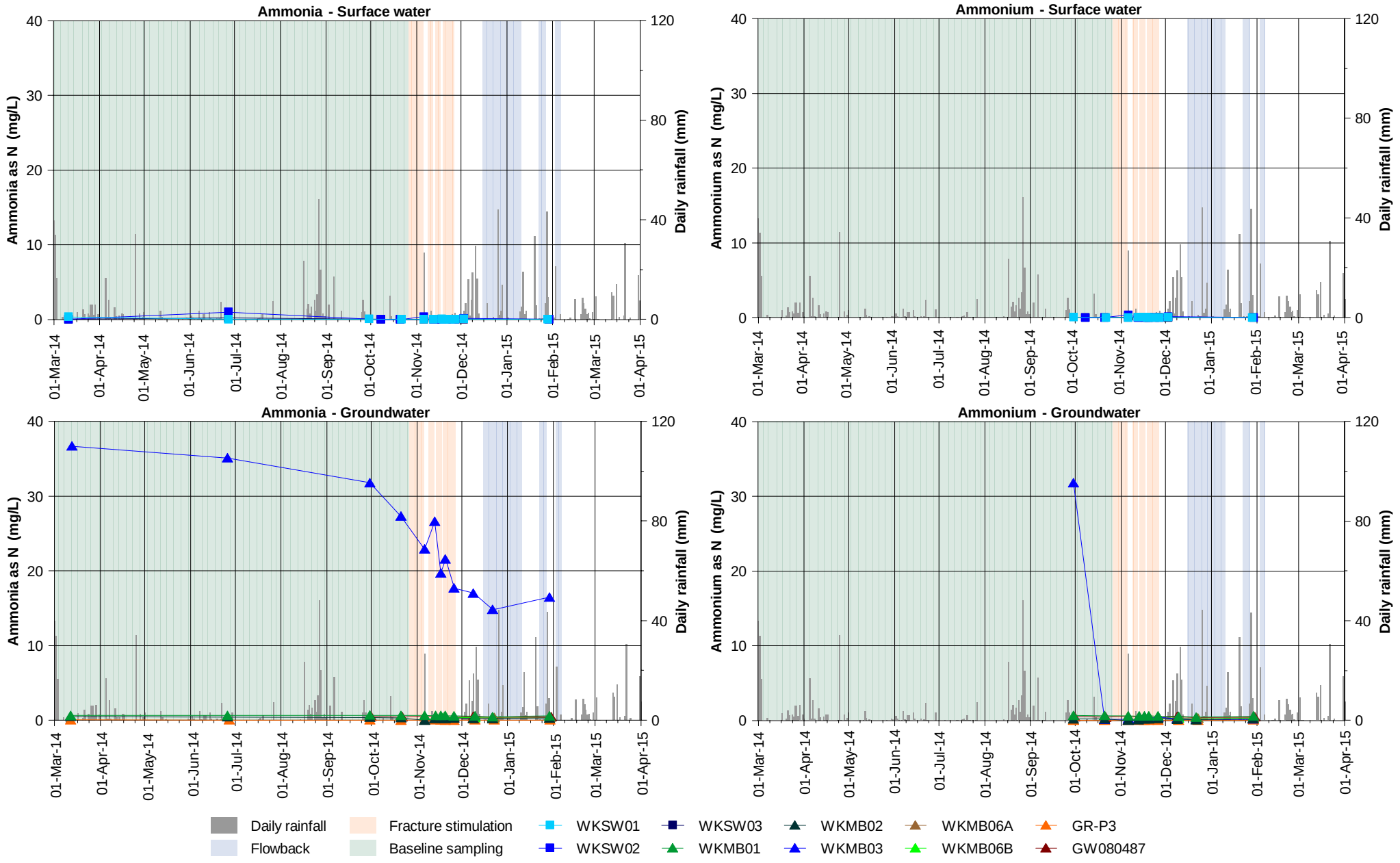


Figure F4.1: Ammonia and ammonium at Waukivory surface water and groundwater monitoring locations.

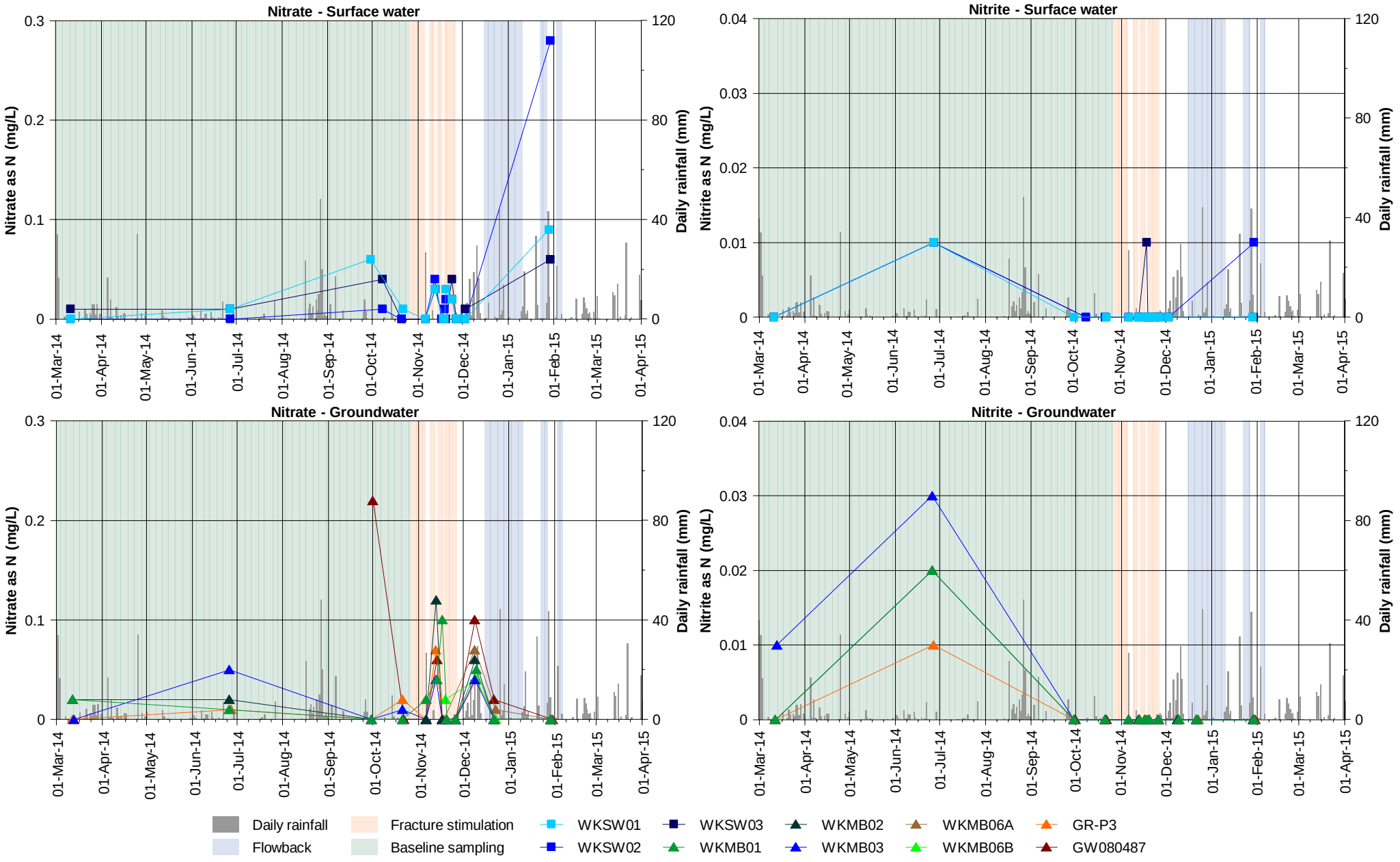


Figure F4.2: Nitrate and nitrite at Waukivory surface water and groundwater monitoring locations.

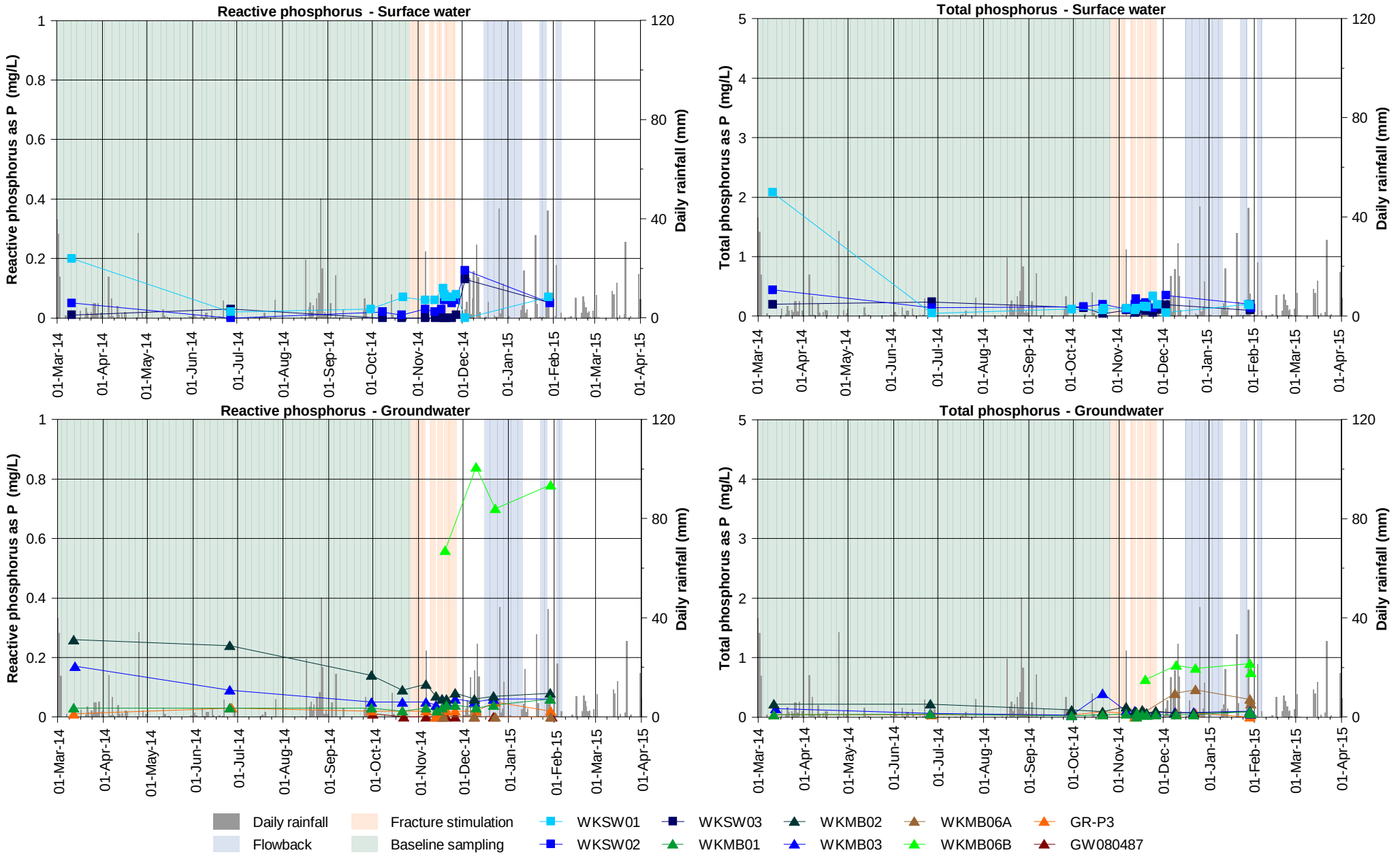


Figure F4.3: Reactive phosphorus and total phosphorus at Waukivory surface water and groundwater monitoring locations.

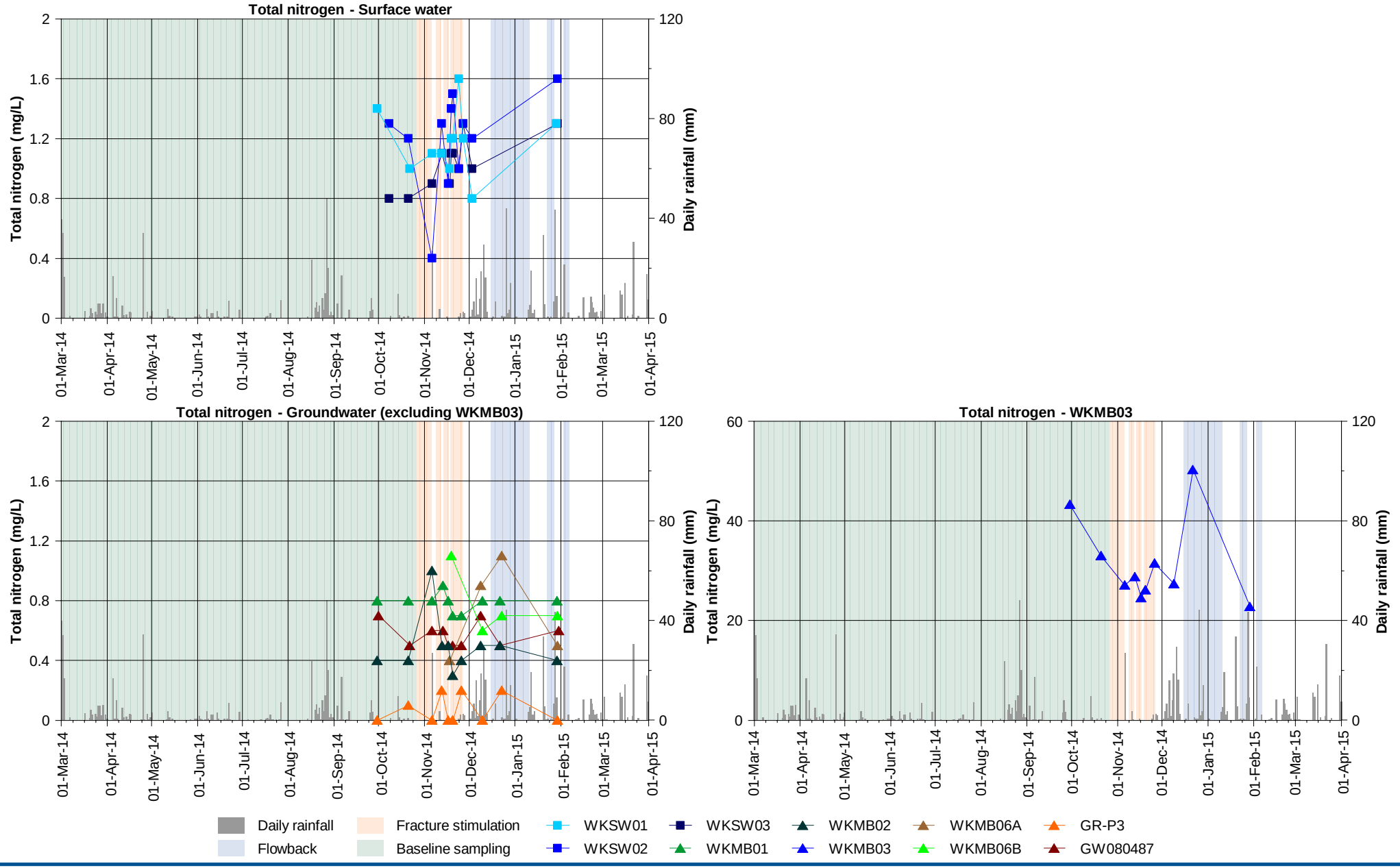


Figure F4.4: Total nitrogen at Waukivory surface water and groundwater monitoring locations.

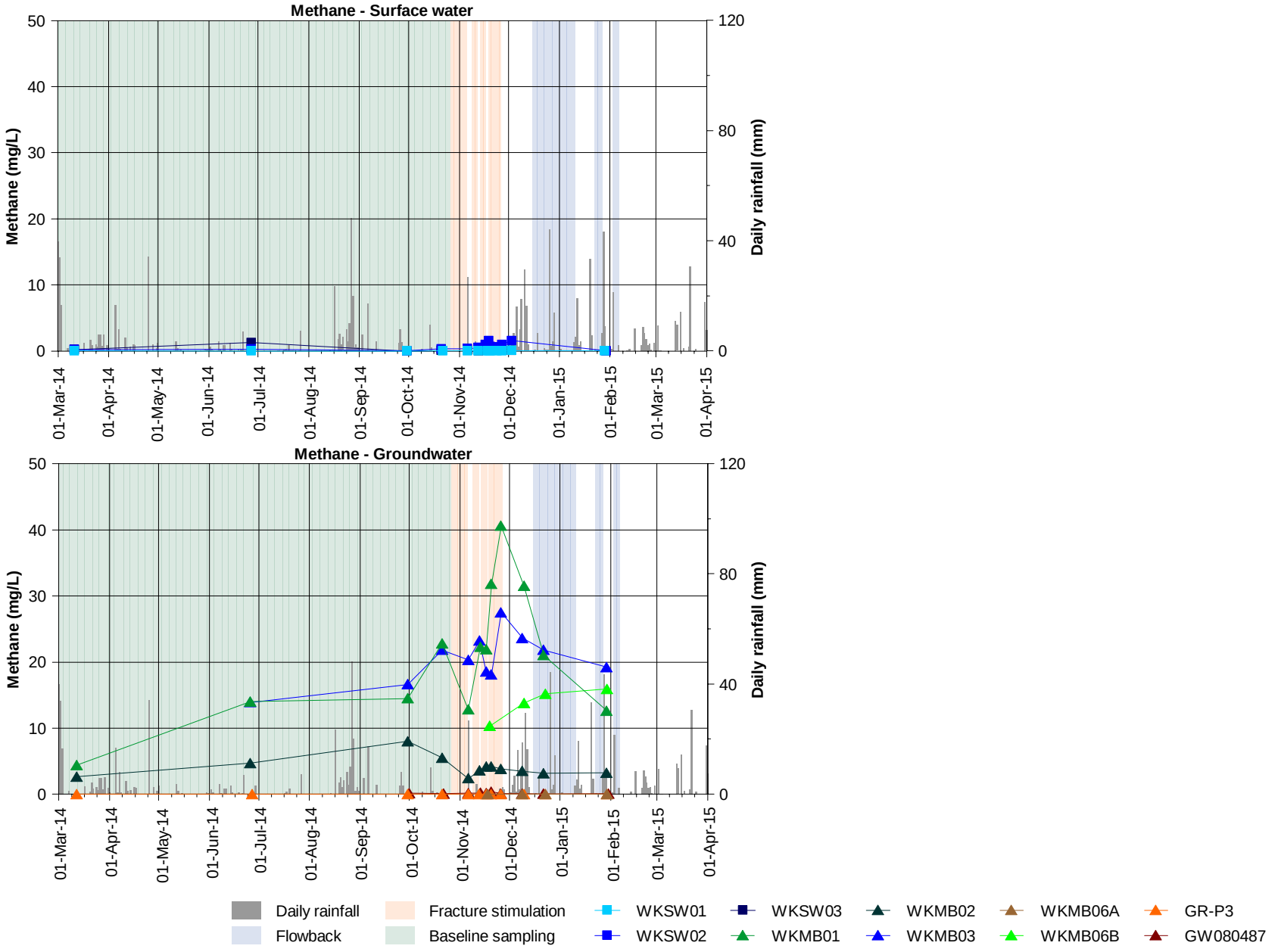


Figure F5.1: Methane at Waukivory surface water and groundwater monitoring locations.

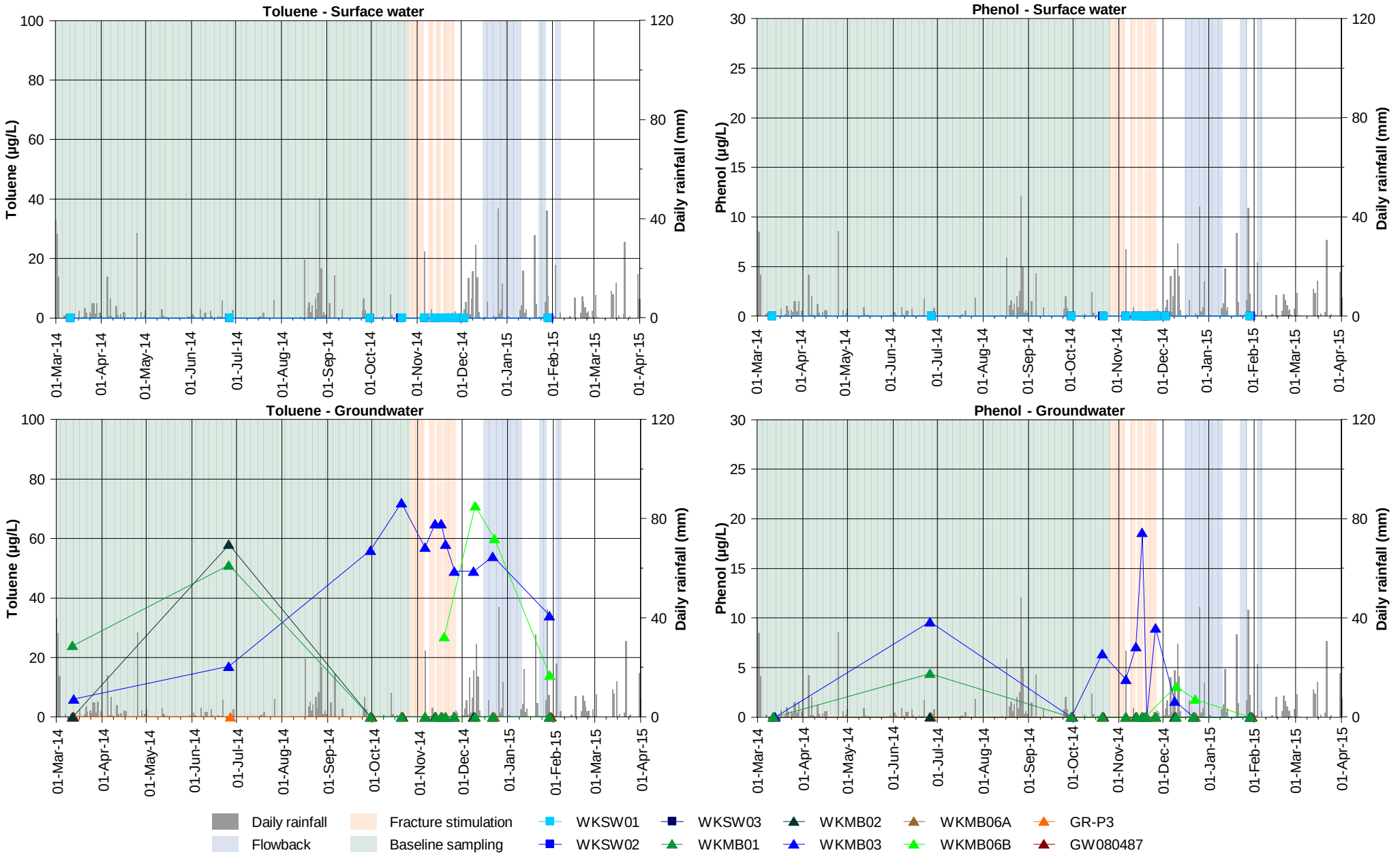


Figure F6.1: Toluene and phenol at Waukivory surface water and groundwater monitoring locations.

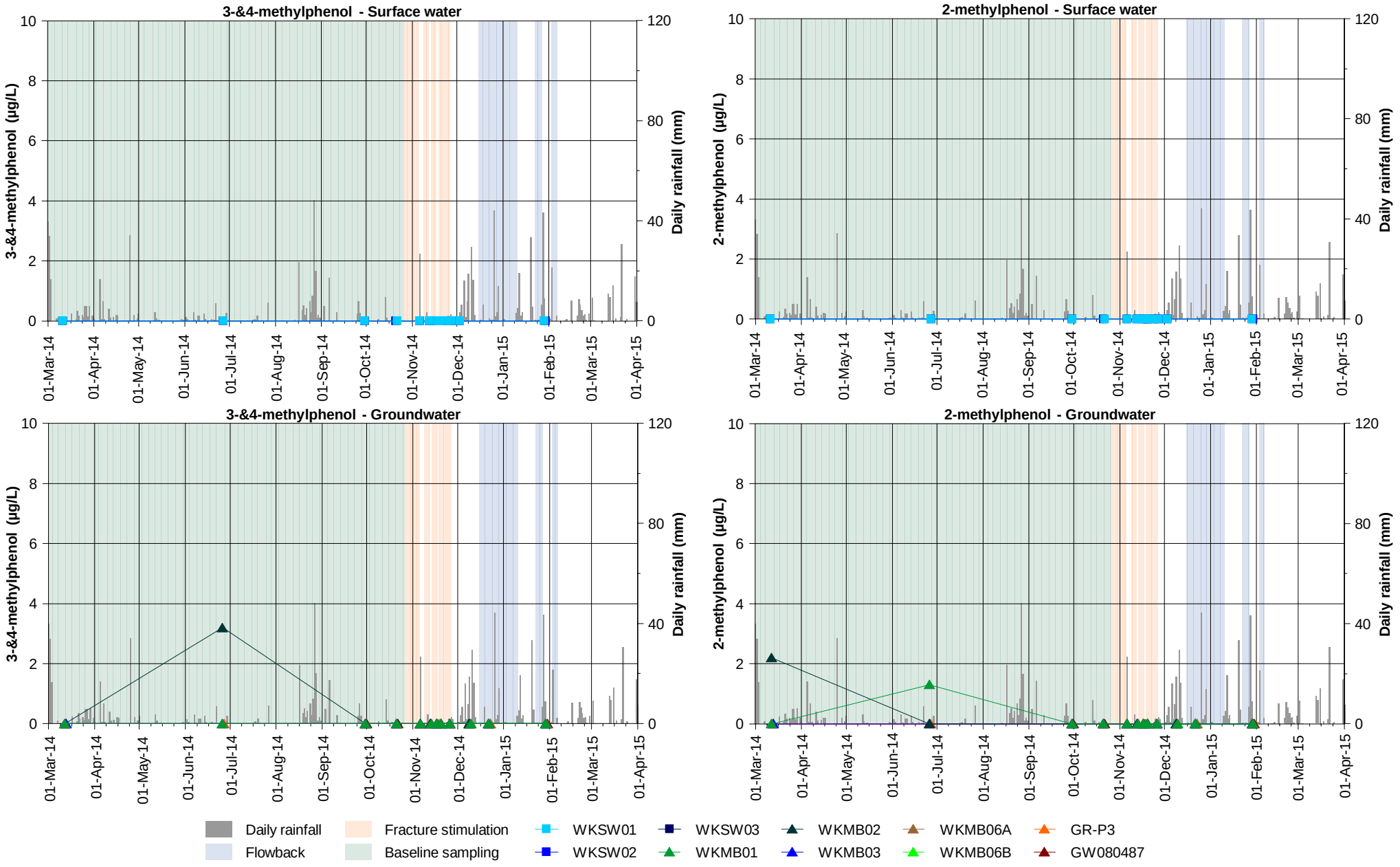


Figure F6.2: 3-&4-methylphenol and 2-methylphenol at Waukivory surface water and groundwater monitoring locations.

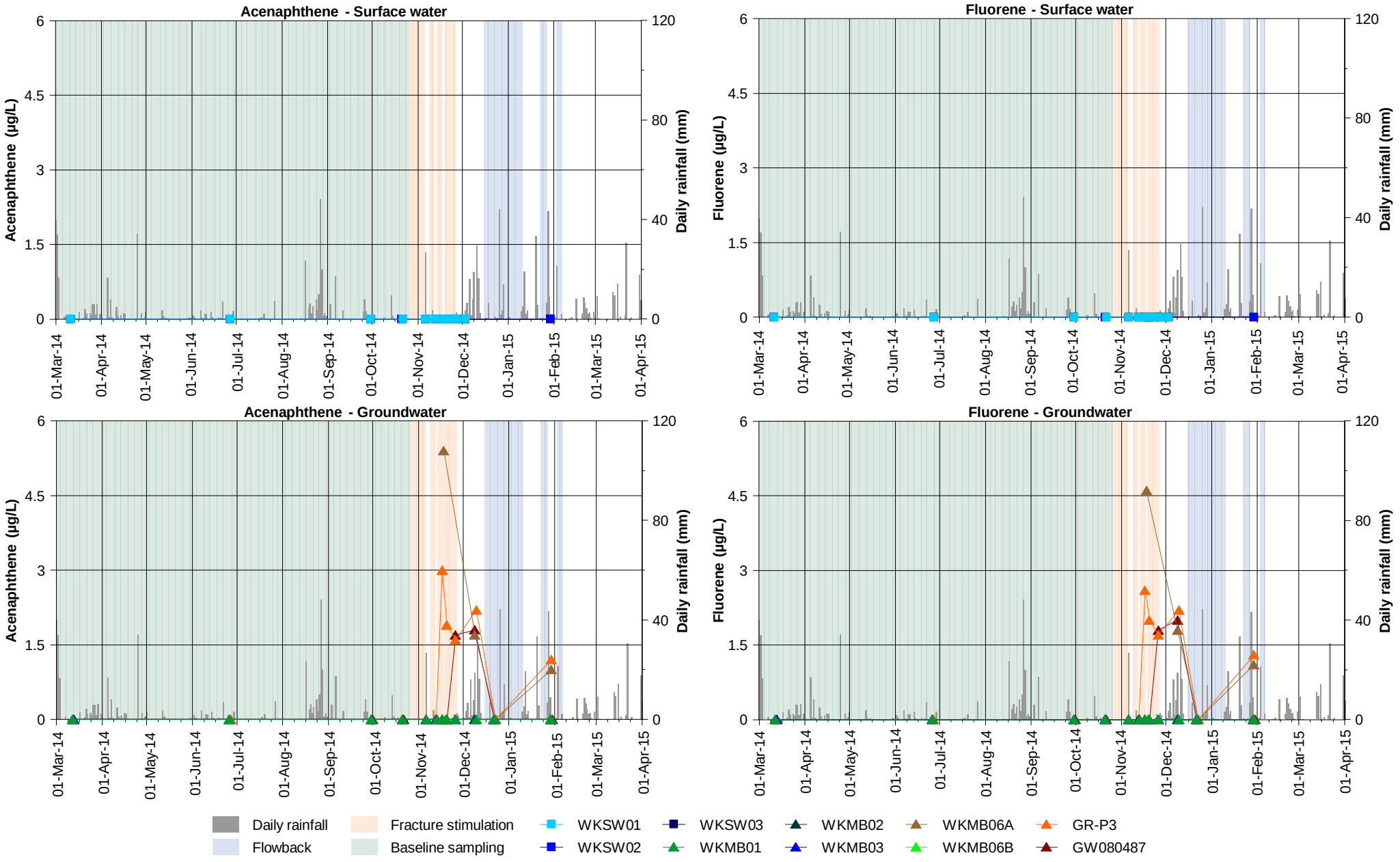


Figure F6.3: Acenaphthene and fluorene at Waukivory surface water and groundwater monitoring locations.

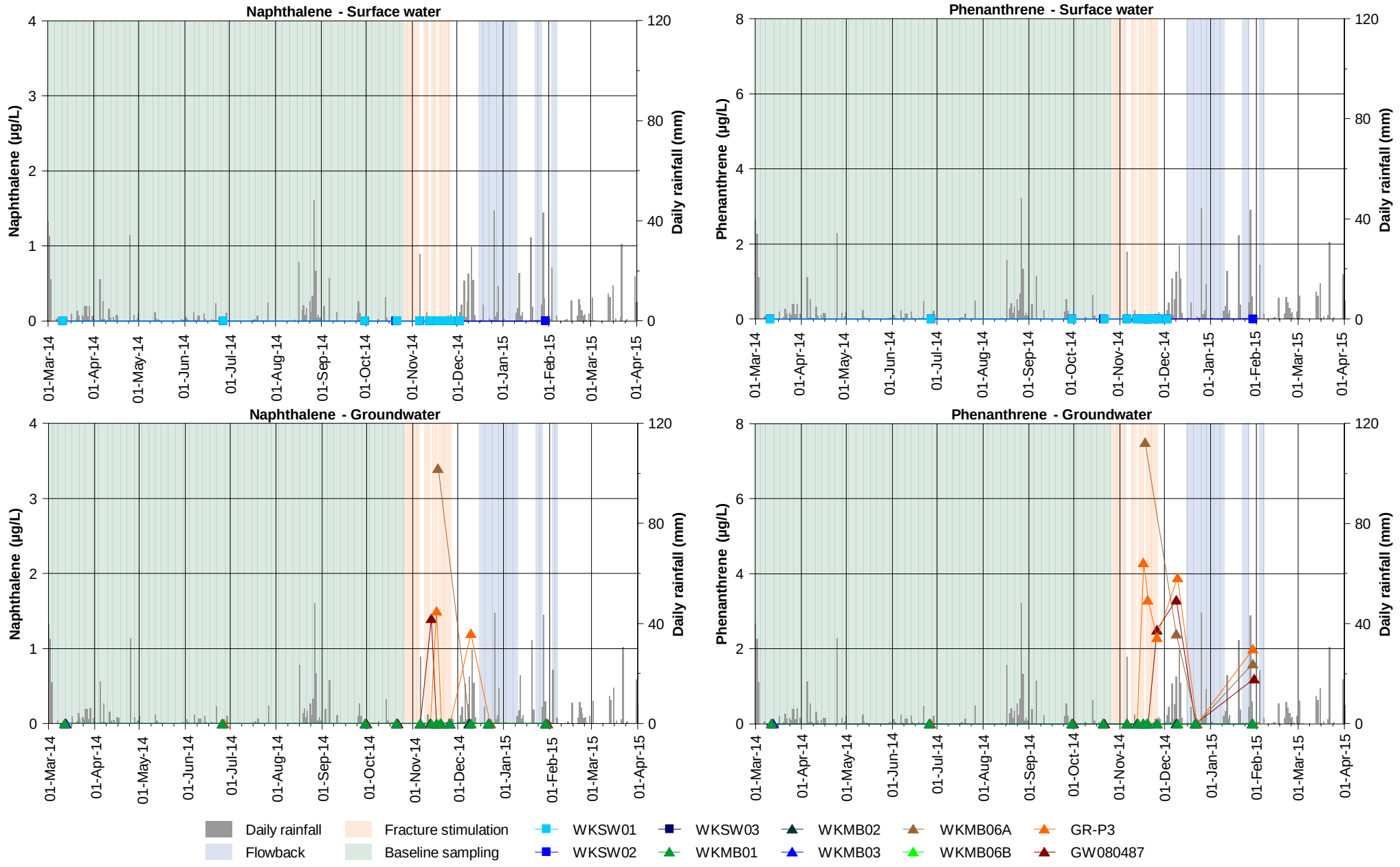


Figure F6.4: Naphthalene and phenanthrene at Waukivory surface water and groundwater monitoring locations.

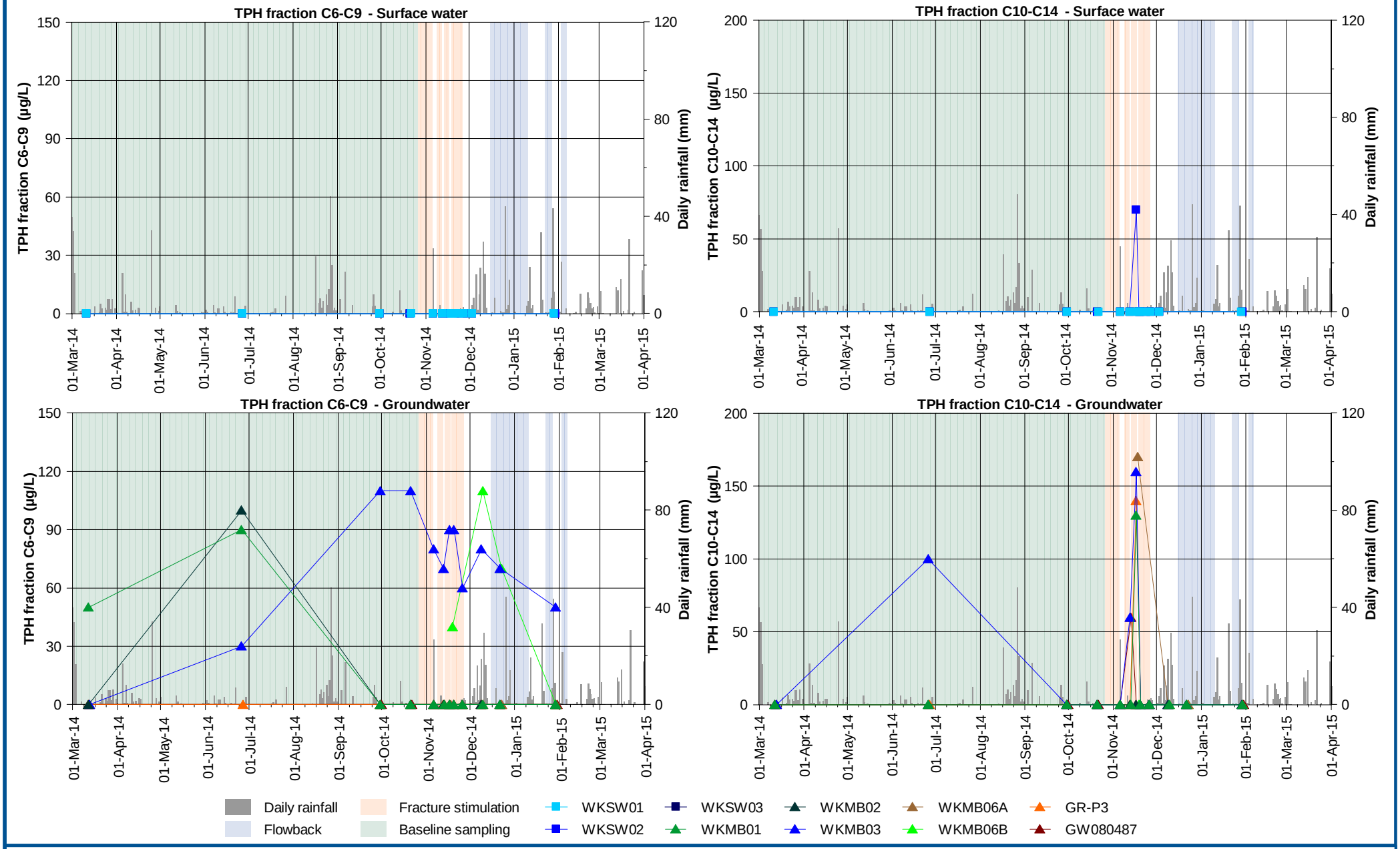


Figure F6.5: TPH fractions C6-C9 and C10-C14 at Waukivory surface water and groundwater monitoring locations.

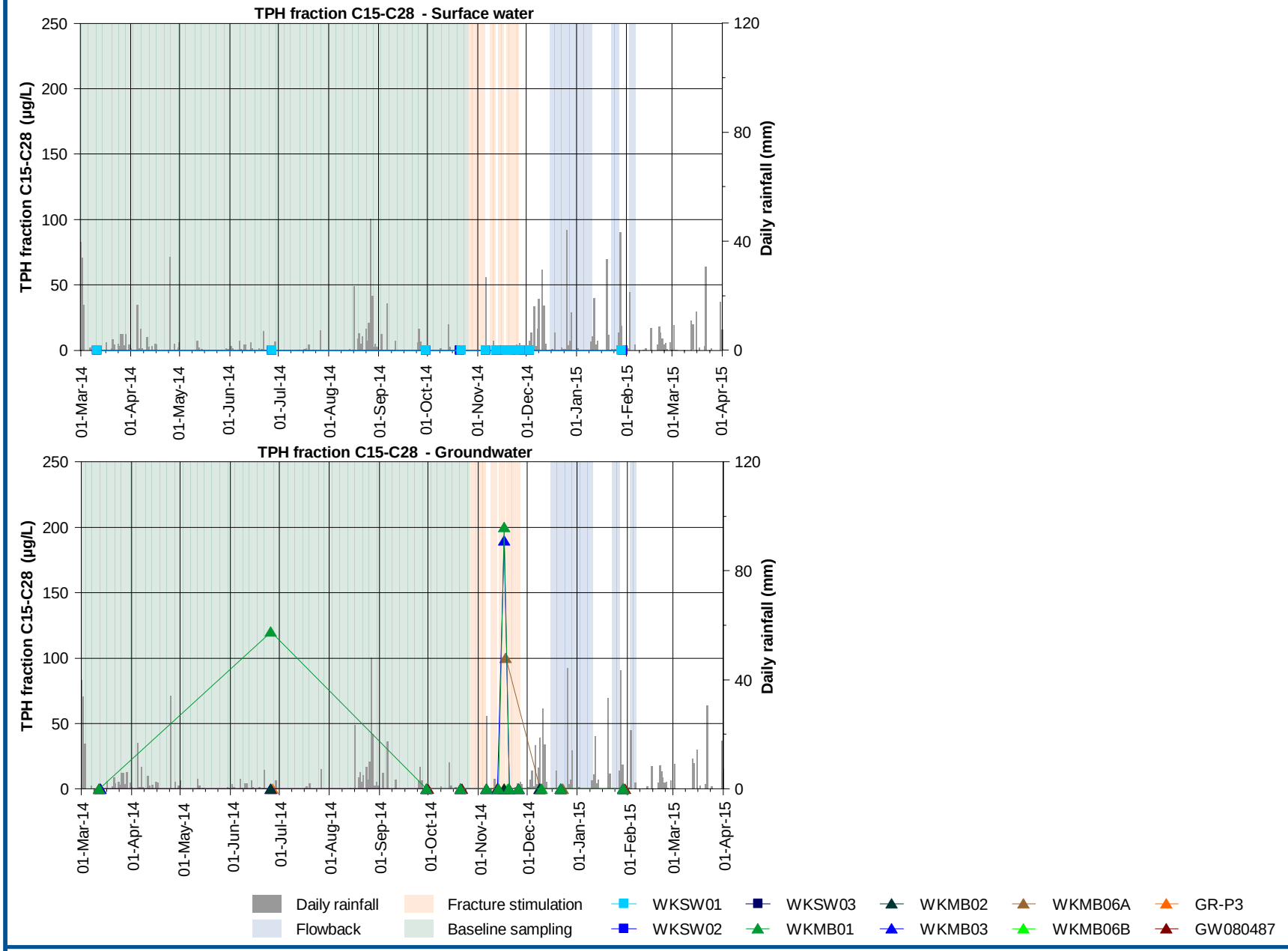
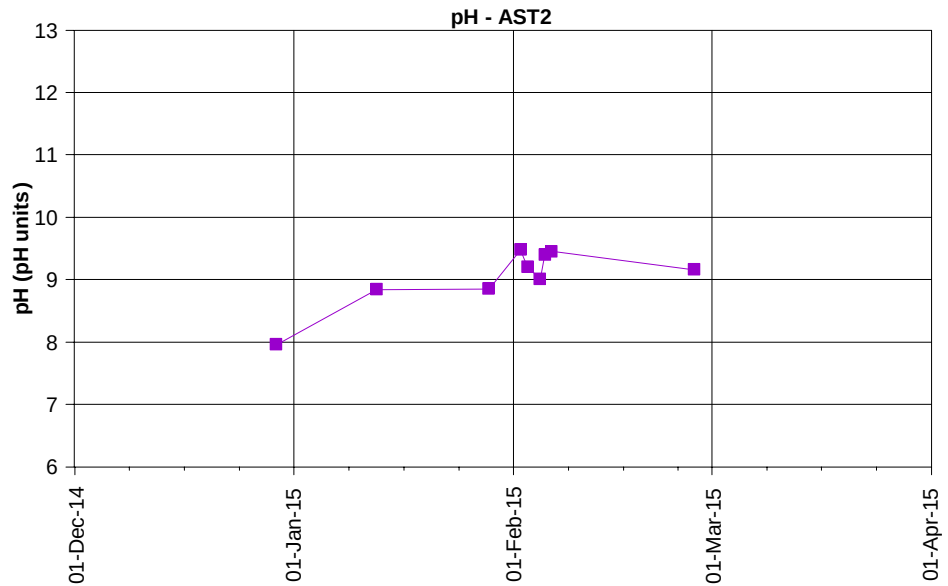
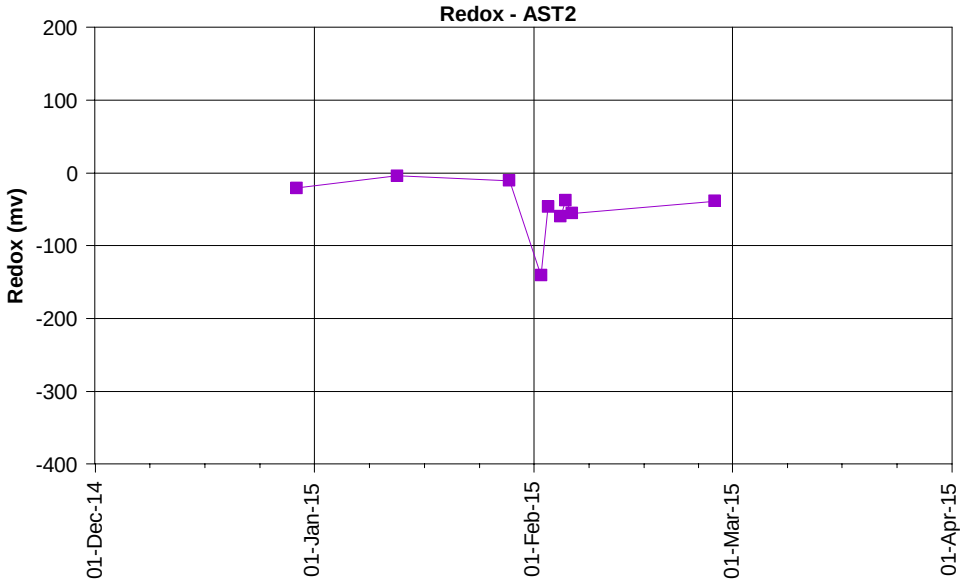


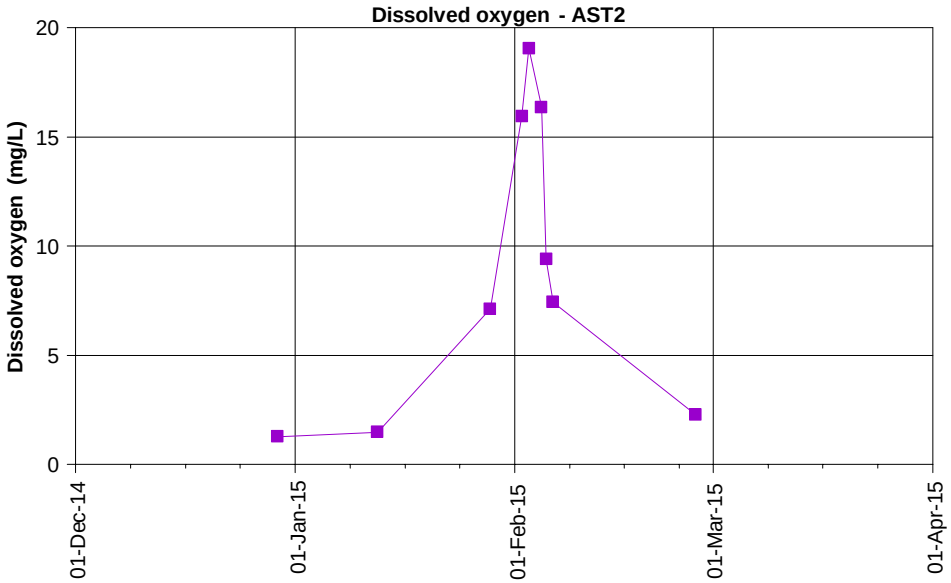
Figure F6.6: TPH fraction C15-C28 at Waukivory surface water and groundwater monitoring locations.

Appendix G

AST2 analyte time-series hydrographs







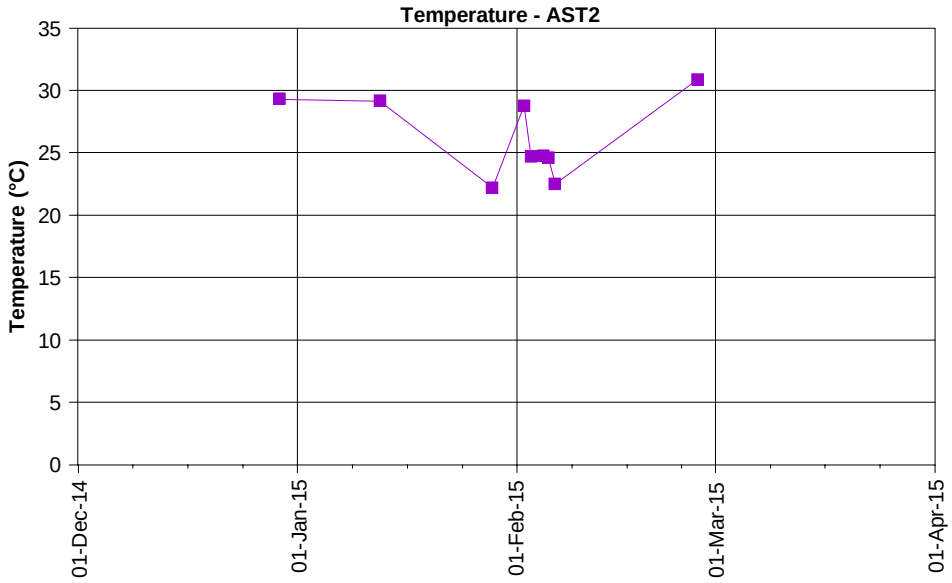
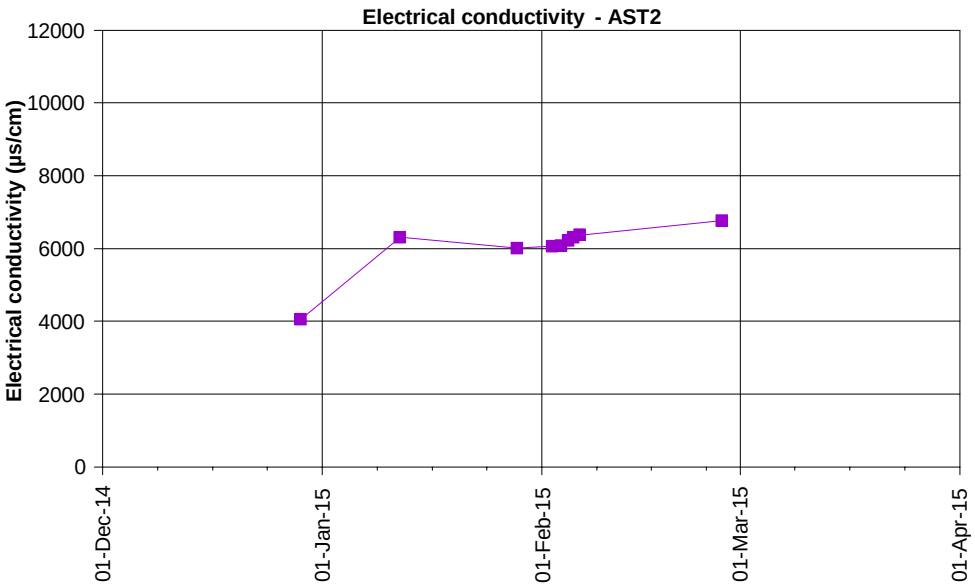


Figure G1.1: Field measurements of pH, redox, dissolved oxygen and temperature at AST2.



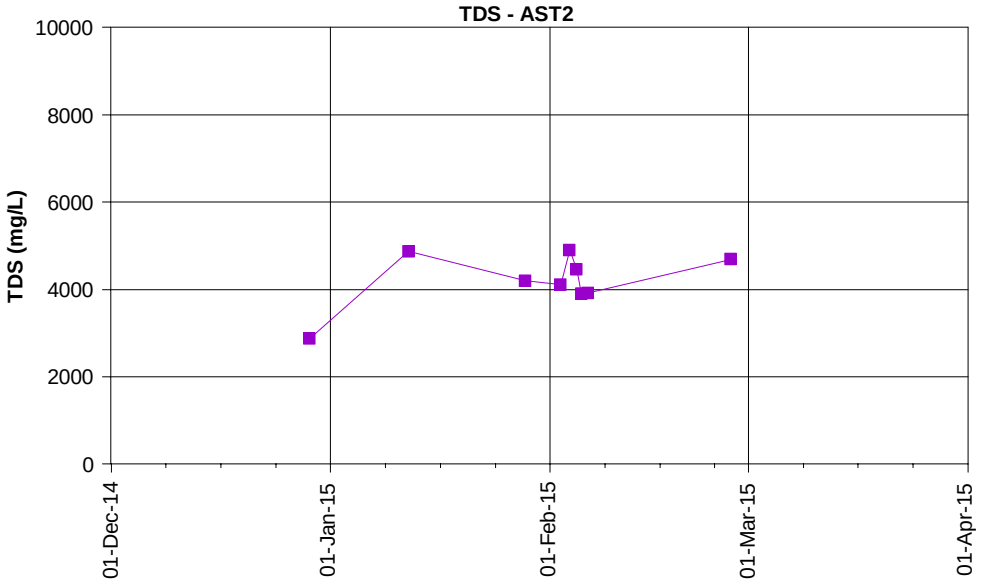
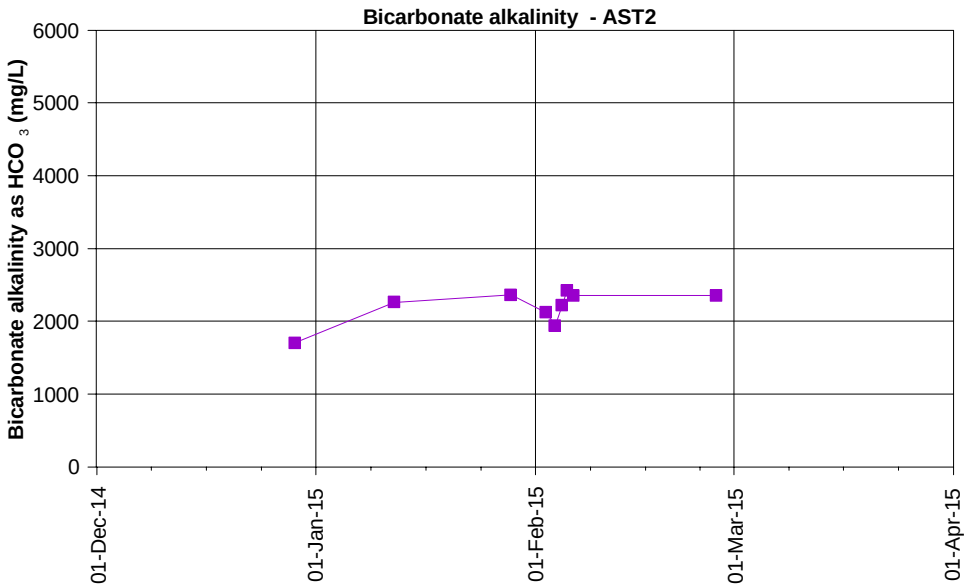
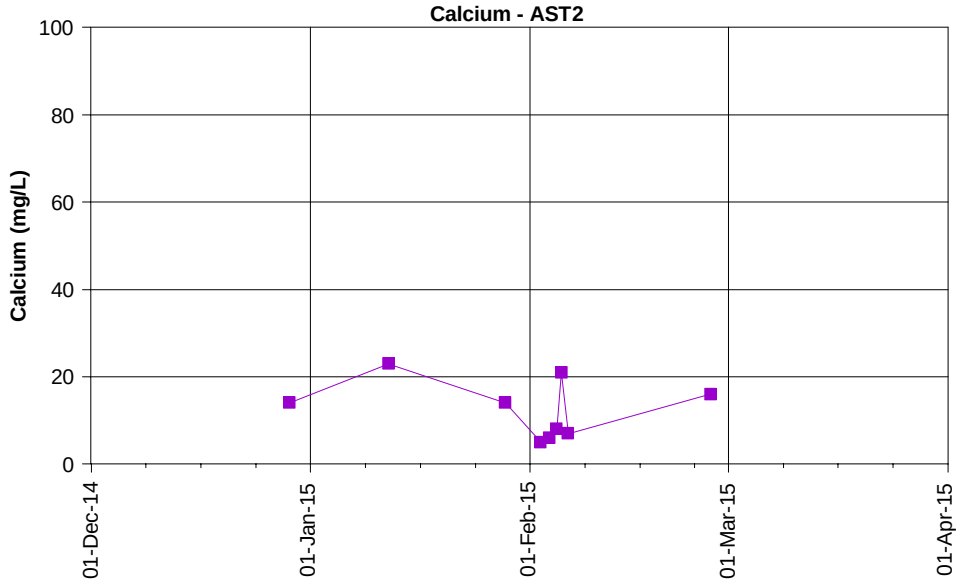
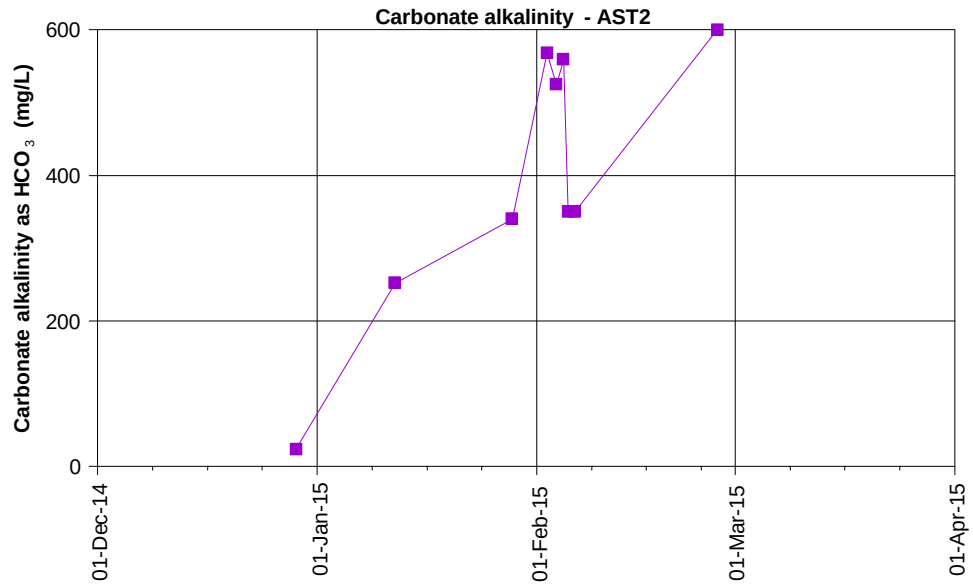


Figure G1.2: Laboratory measurements of electrical conductivity and Total Dissolved Solids (TDS) at AST2.







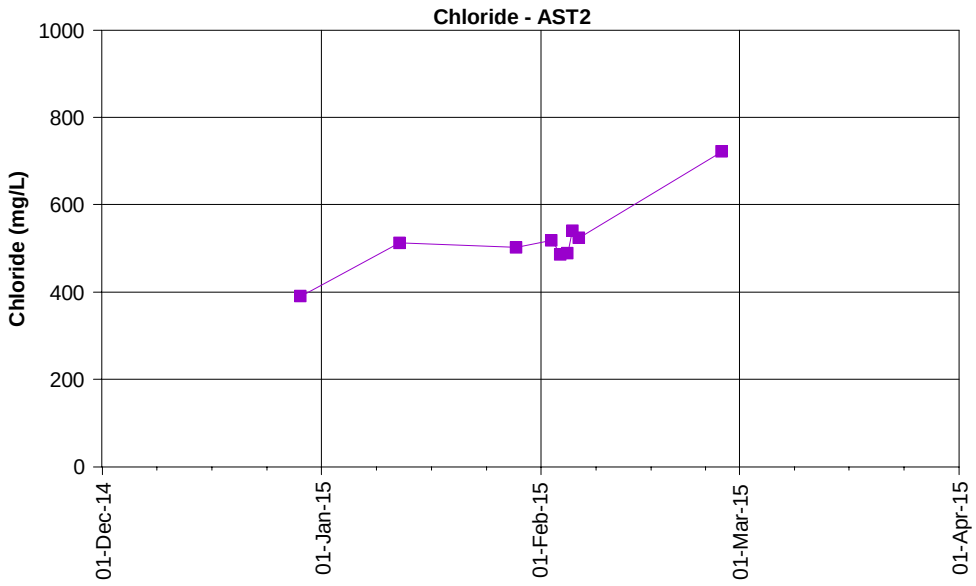
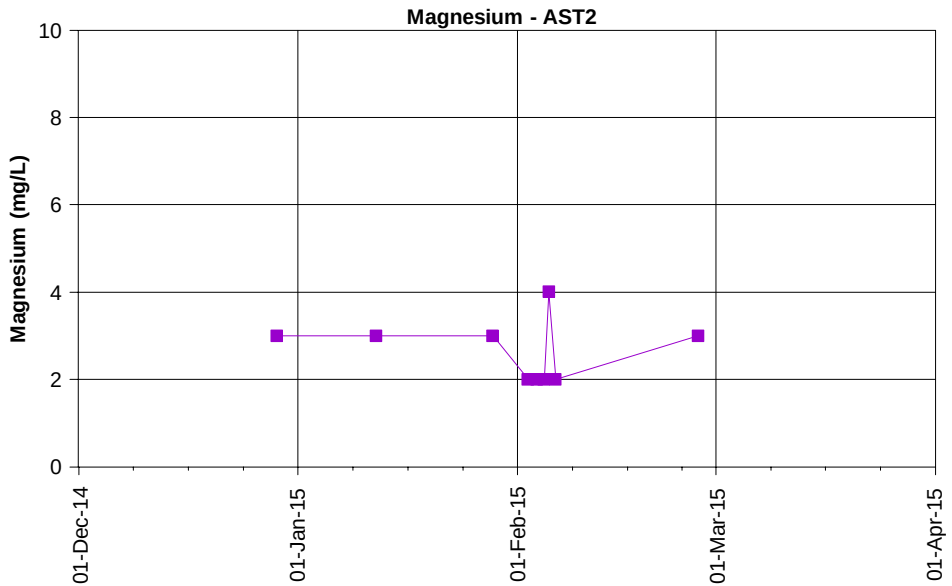
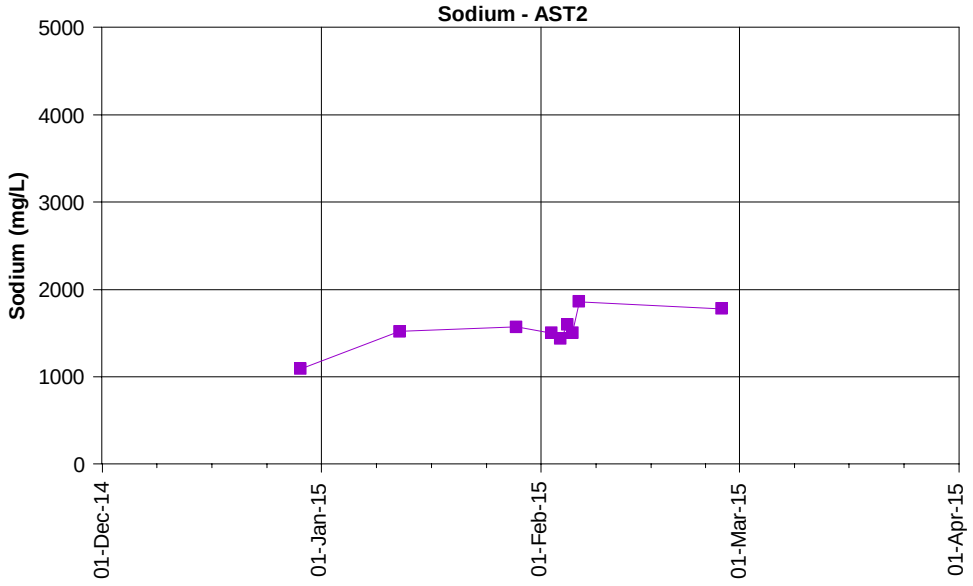
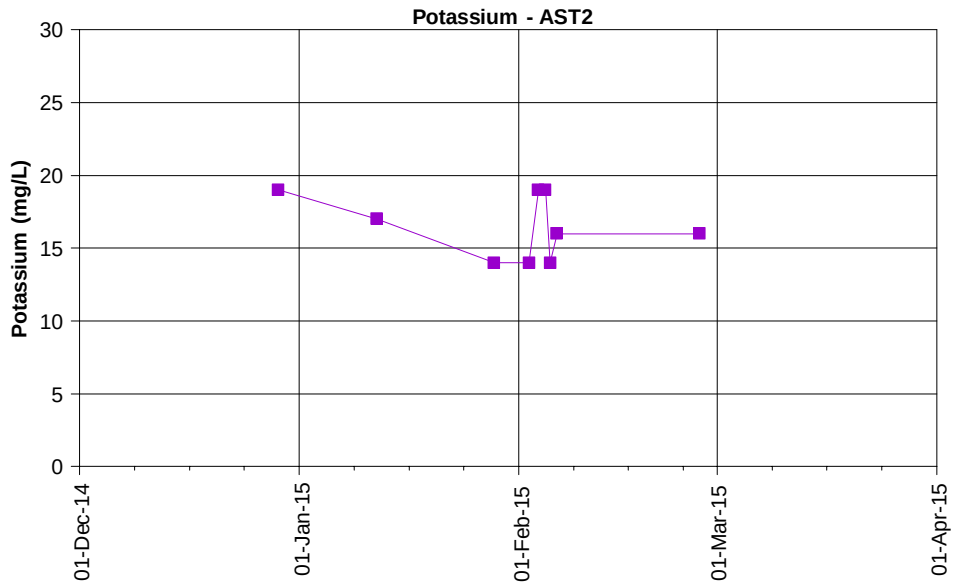


Figure G2.1: Bicarbonate alkalinity, carbonate alkalinity, calcium and chloride concentrations at AST2







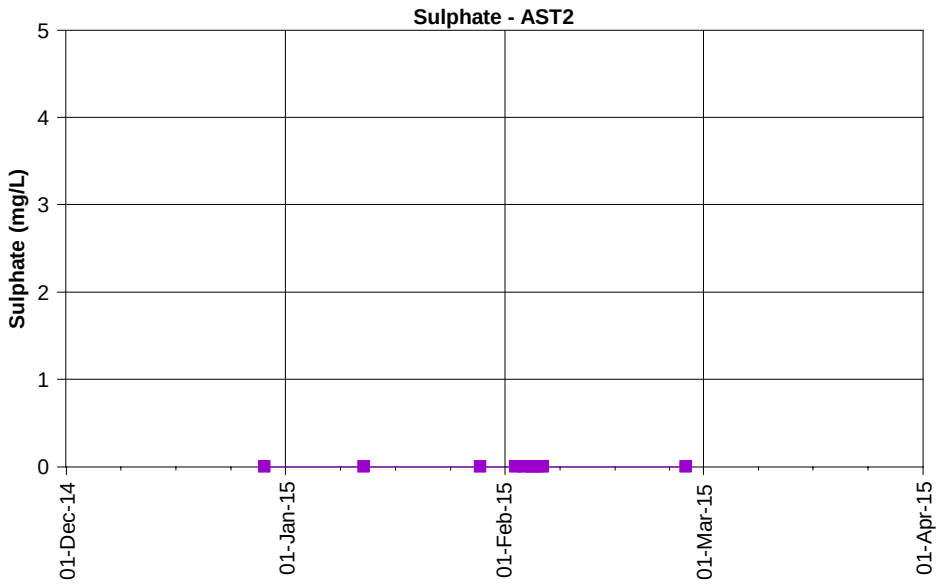
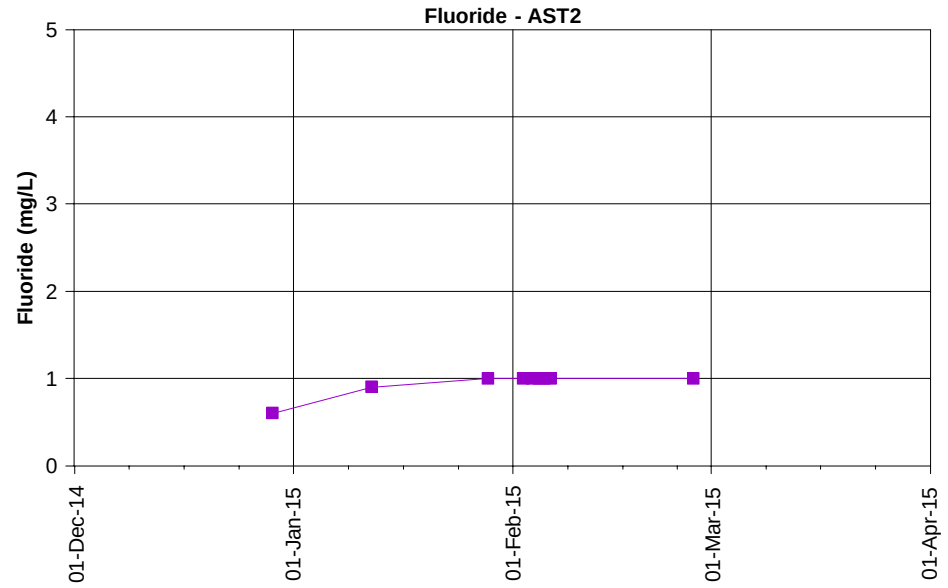
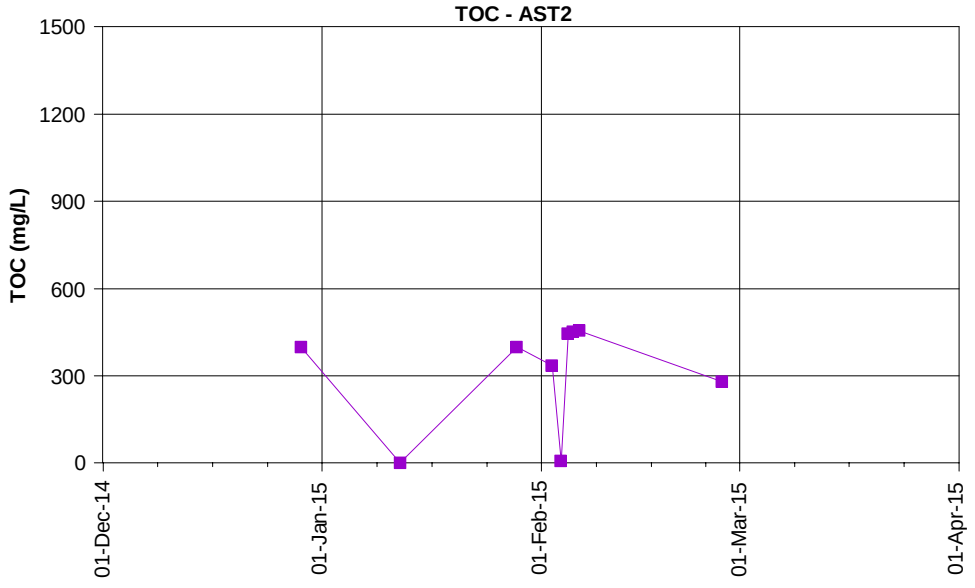
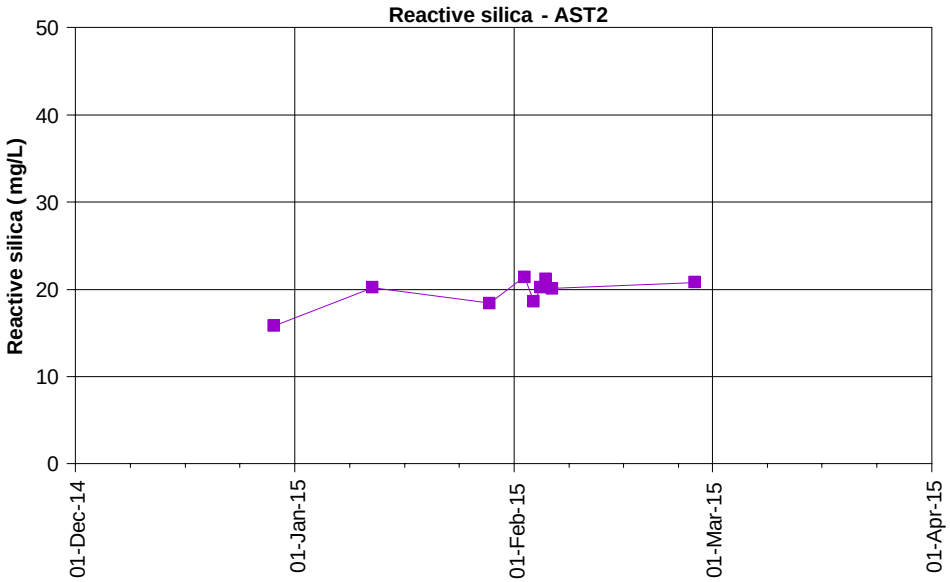


Figure G2.2: Magnesium, potassium, sodium and sulphate concentrations at AST2







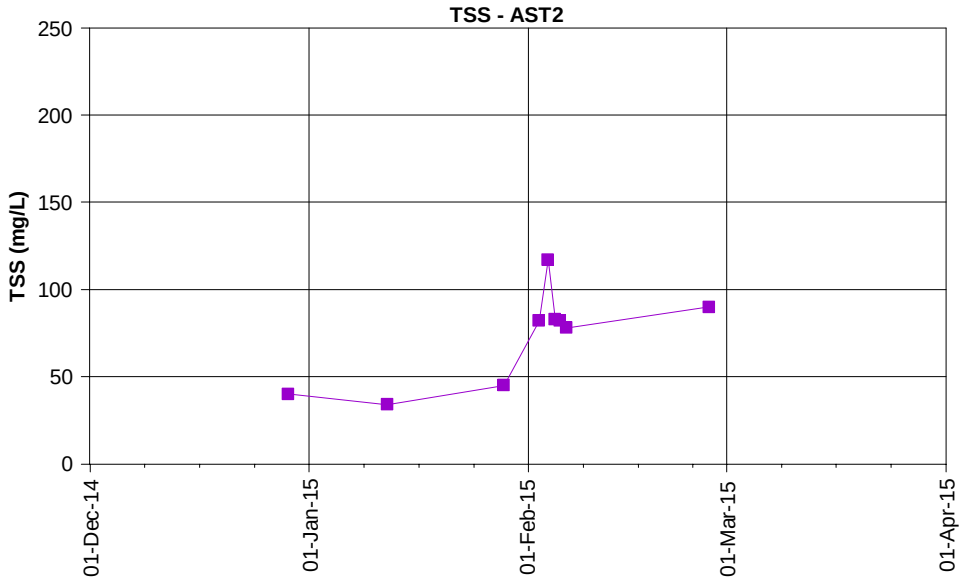
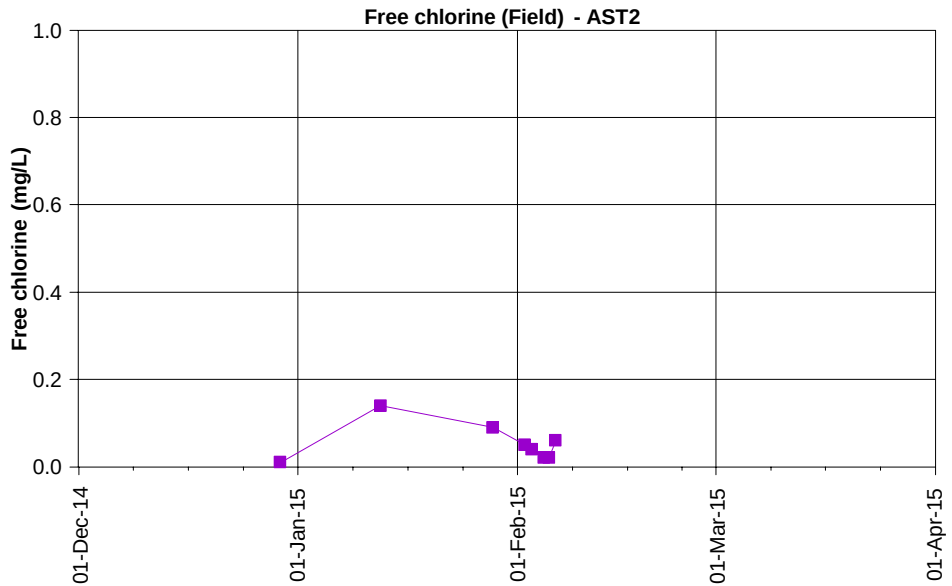
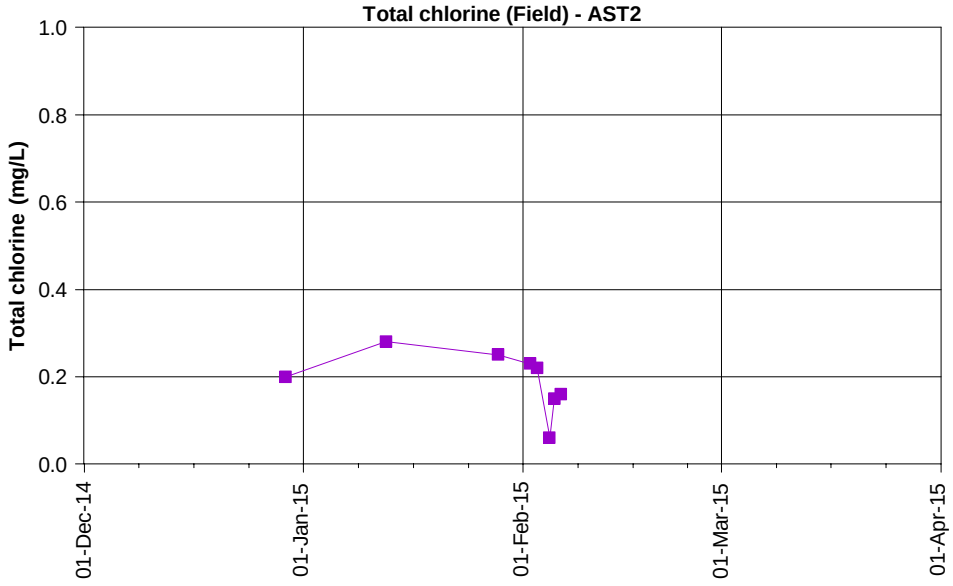
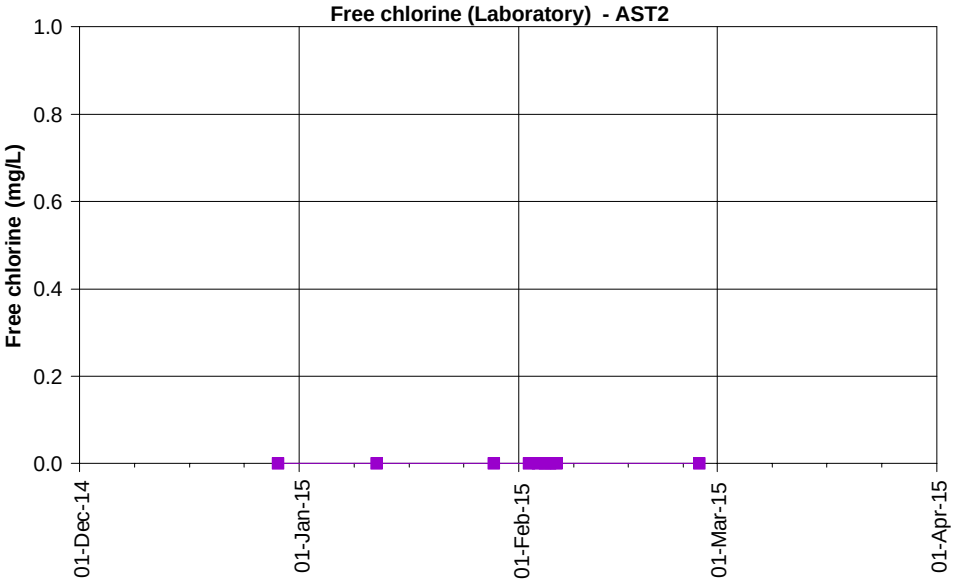


Figure G2.3: Fluoride, reactive silica, total organic carbon (TOC) and total suspended solids (TSS) concentrations at AST2







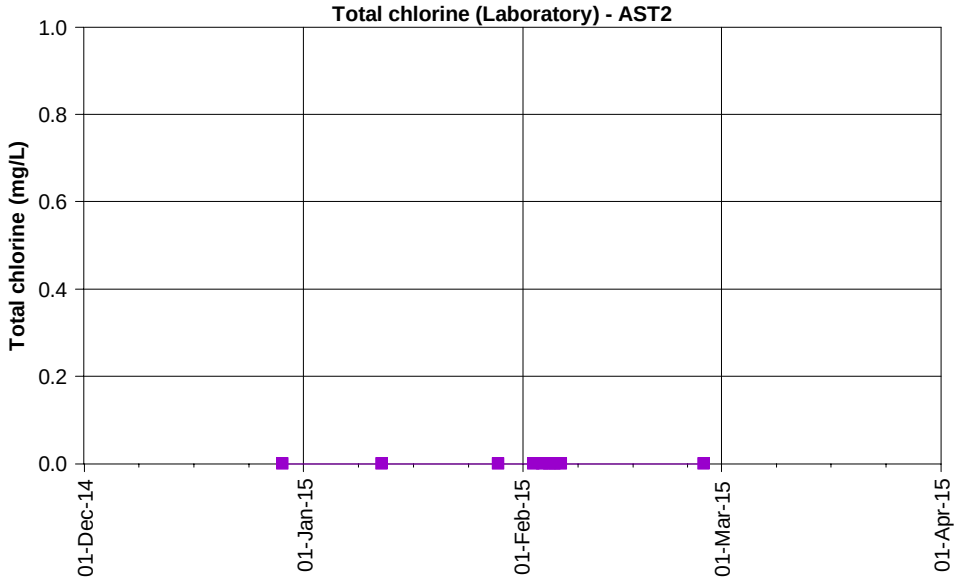
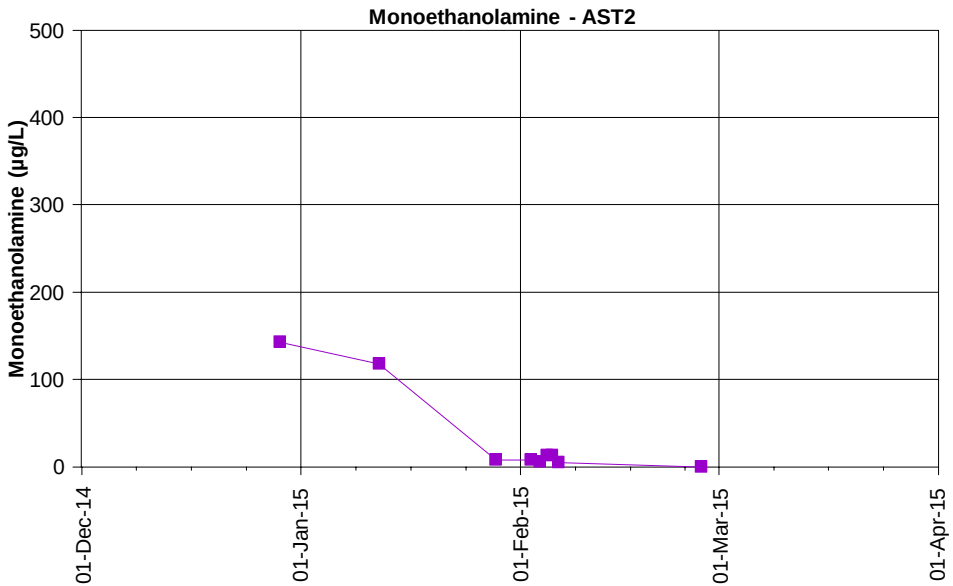


Figure G2.4: Field and laboratory measurements of free and total chlorine at AST2.



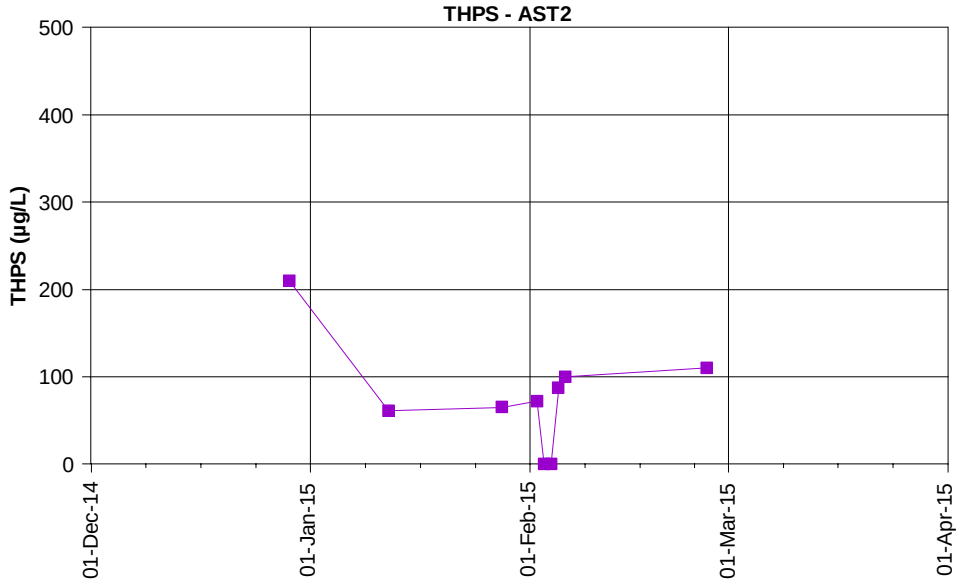
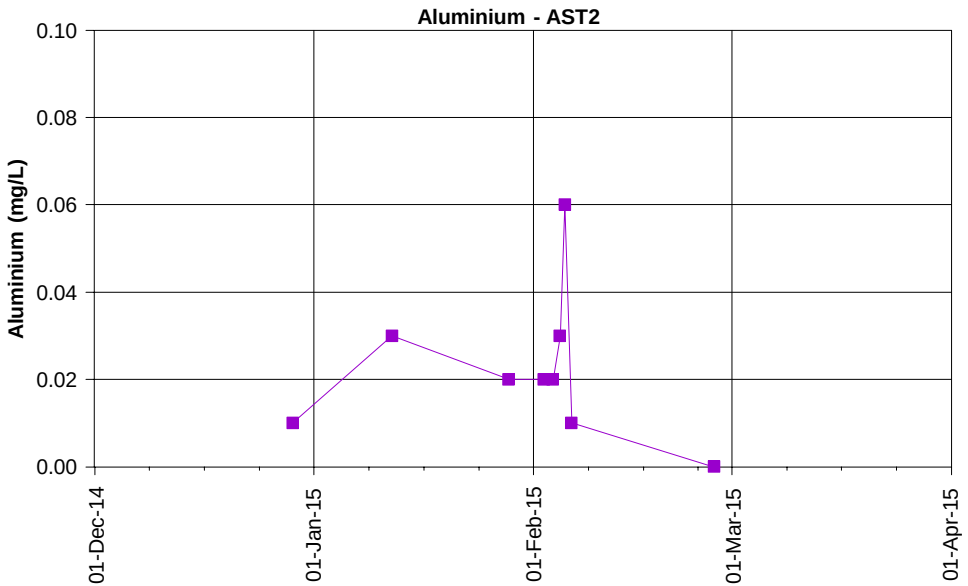
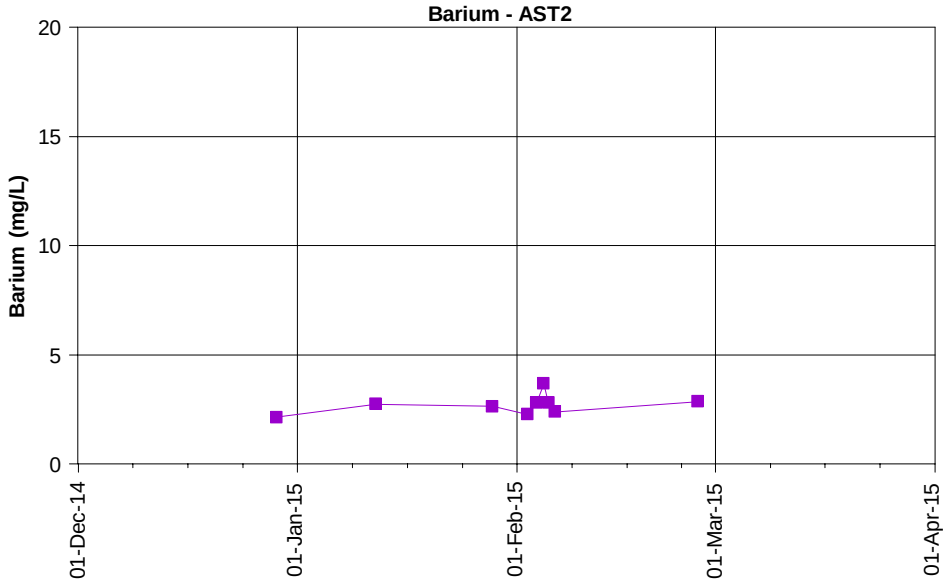
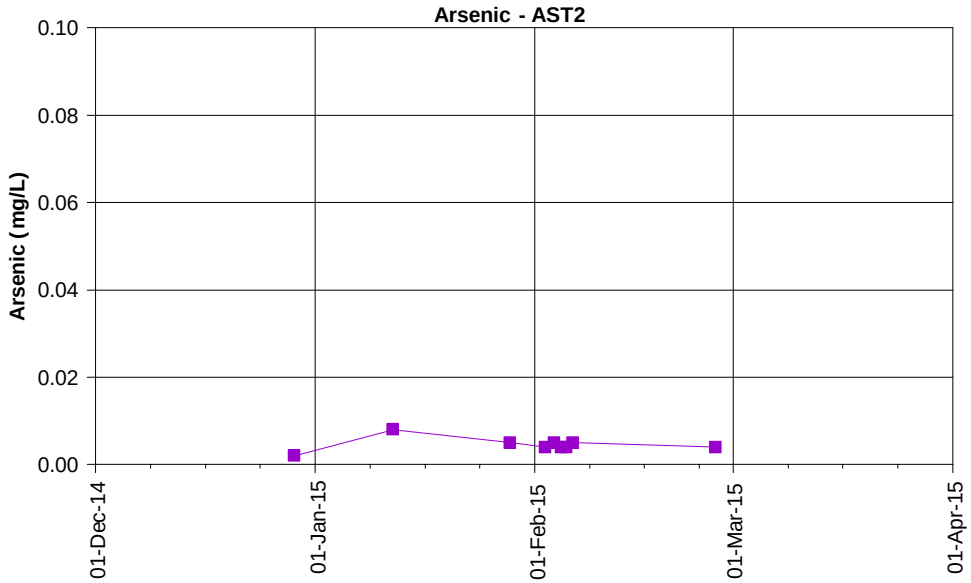


Figure G2.5: Monoethanolamine and THPS concentrations at AST2.







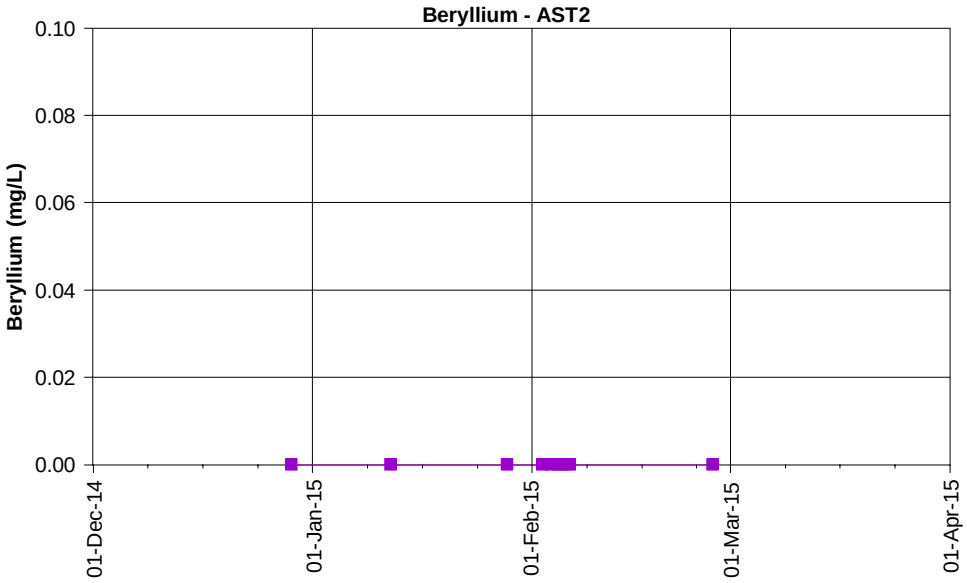


Figure G3.1: Aluminium, arsenic, barium and beryllium concentrations at AST2

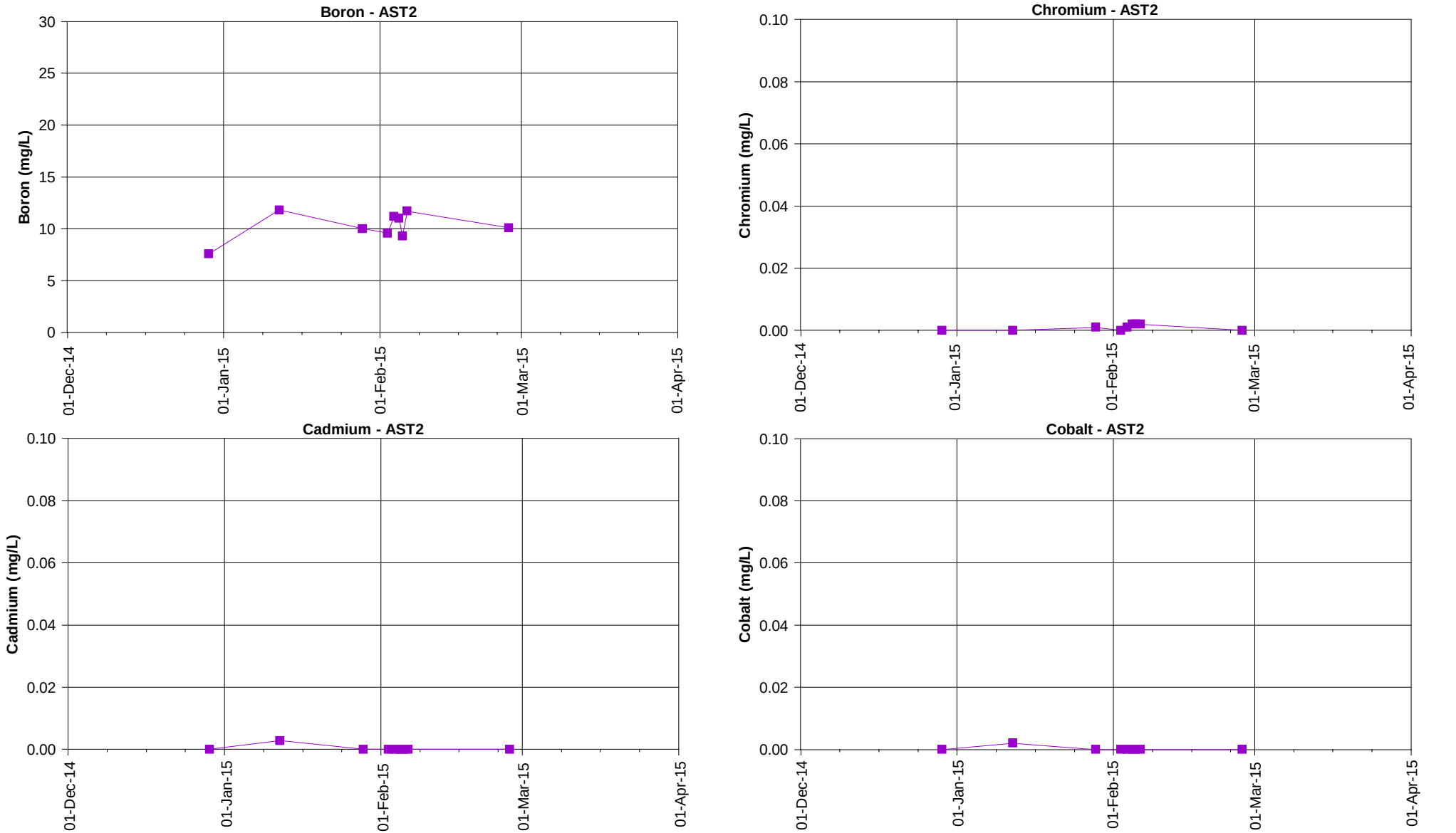
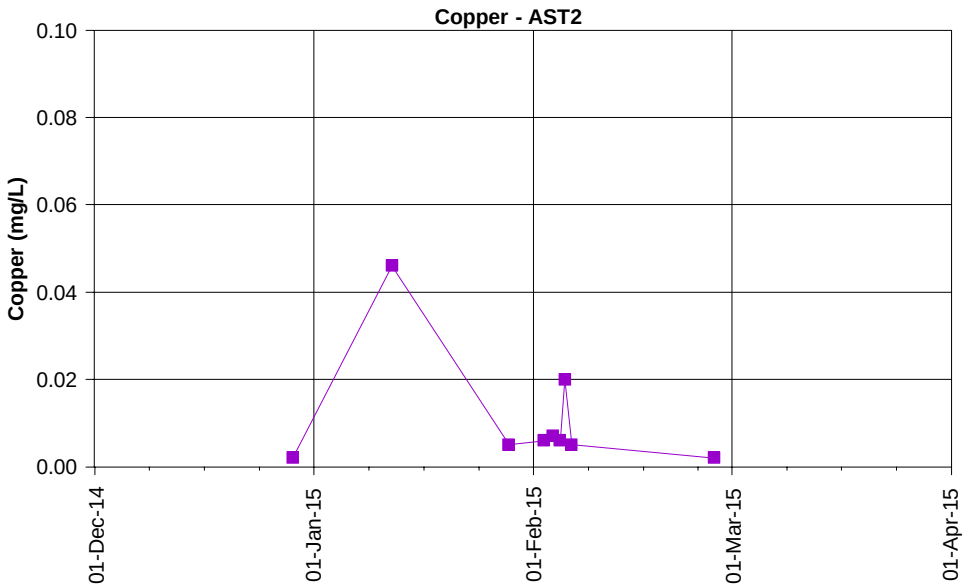
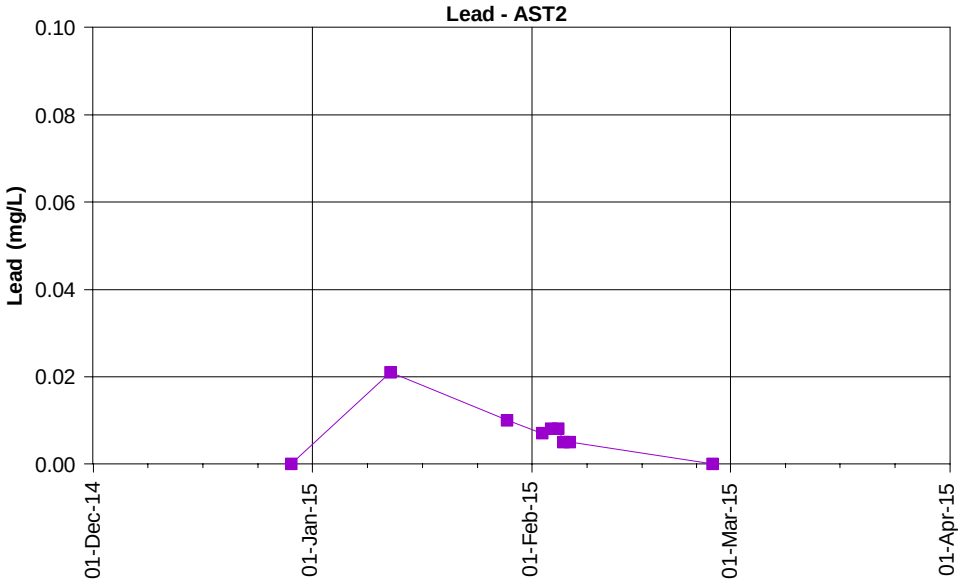
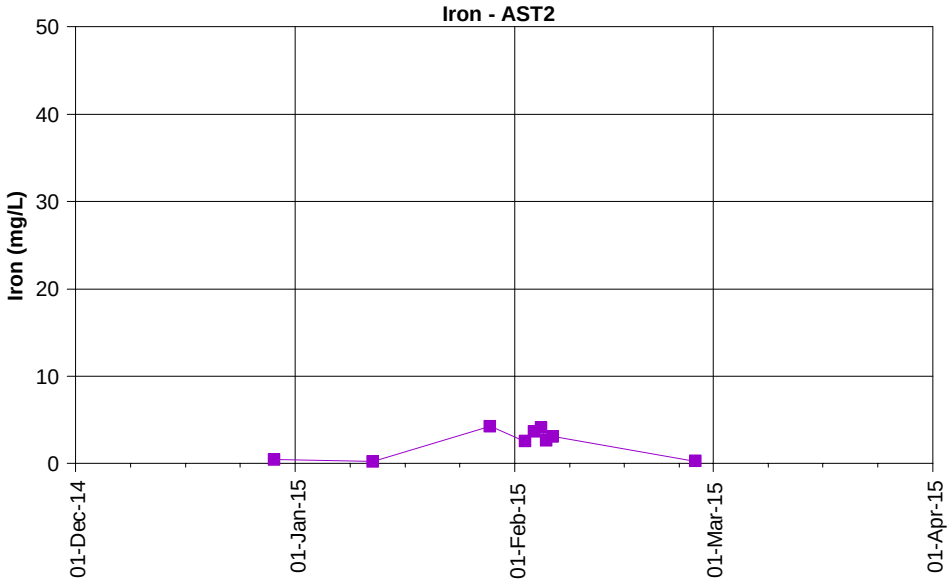


Figure G3.2: Boron, cadmium, chromium and cobalt concentrations at AST2







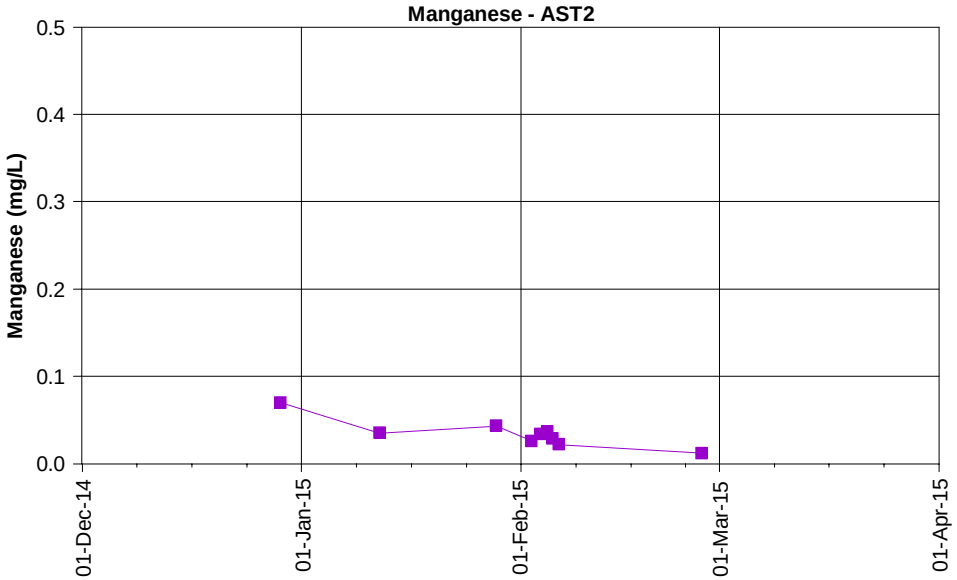
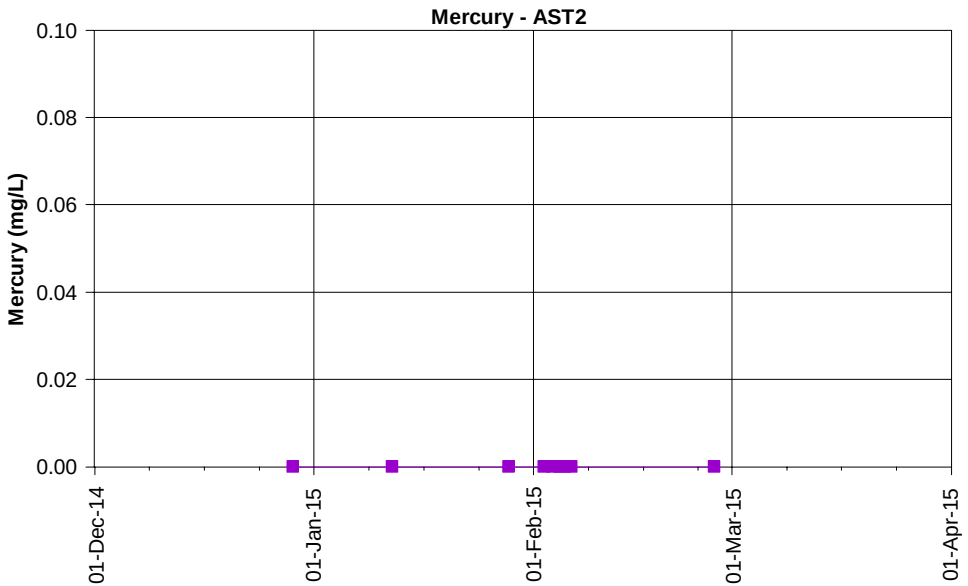
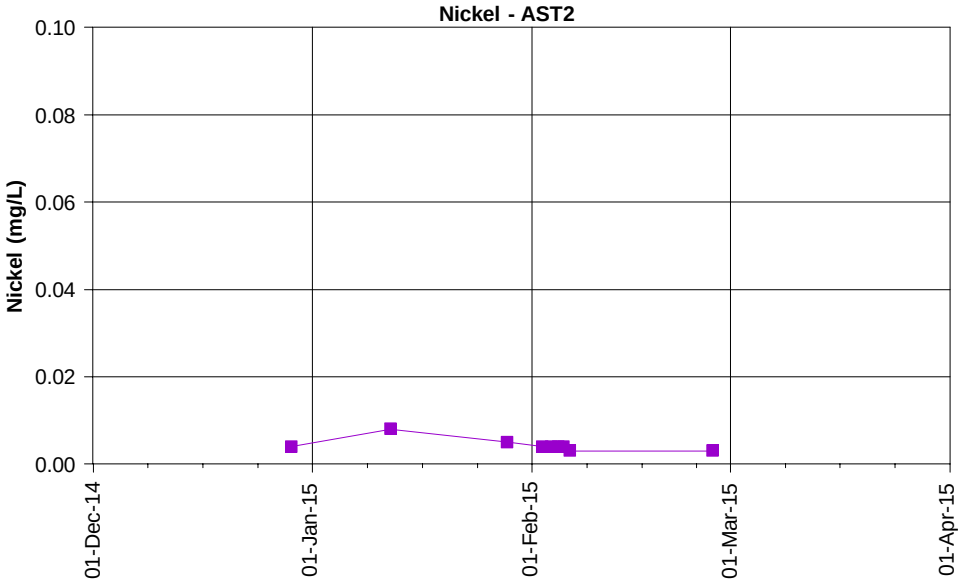
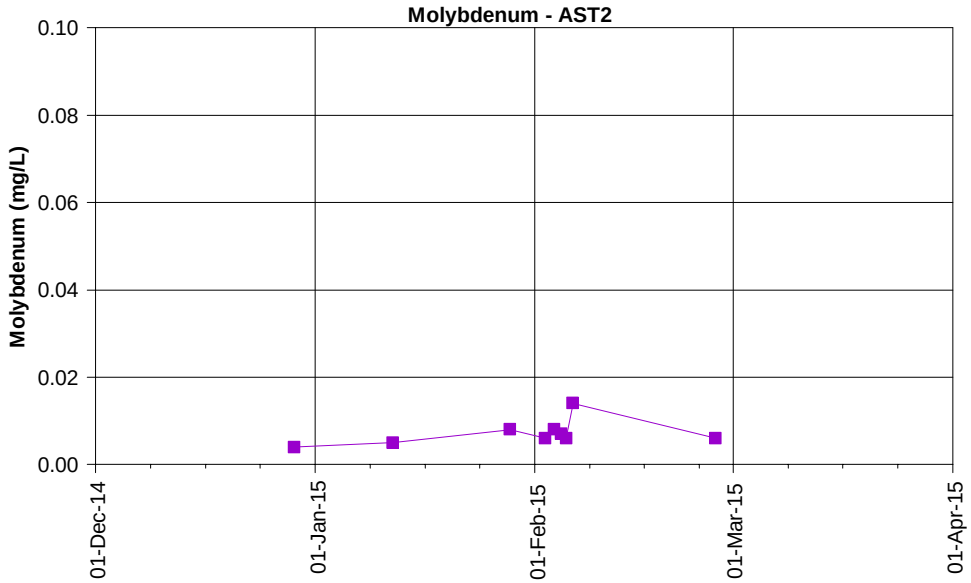


Figure G3.3: Copper, iron, lead and manganese concentrations at AST2







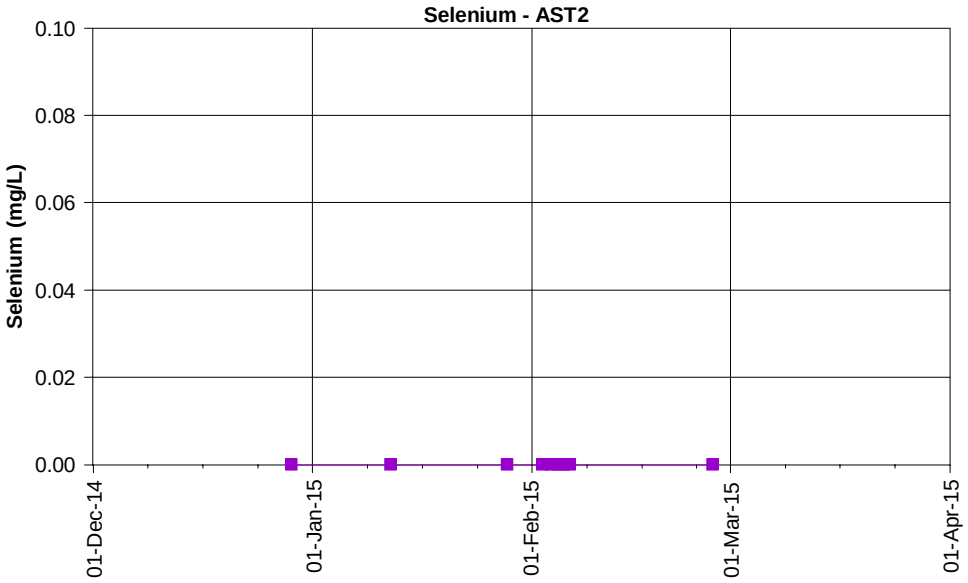
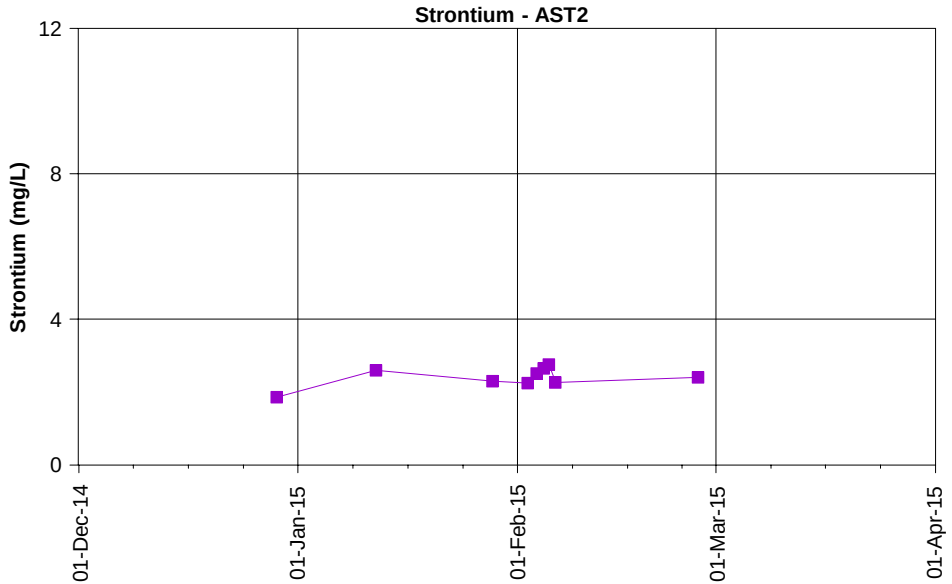
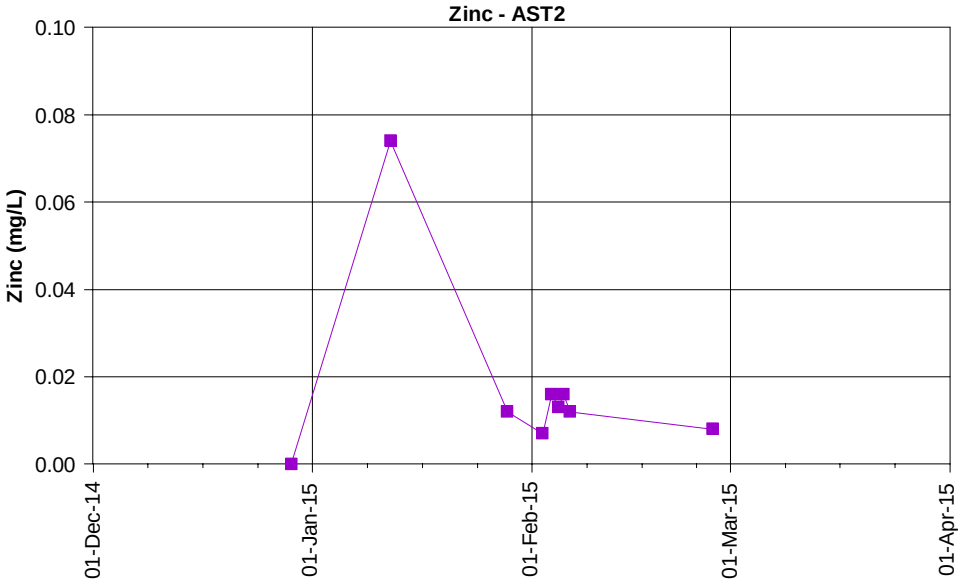


Figure G3.4: Mercury, molybdenum, nickel and selenium concentrations at AST2





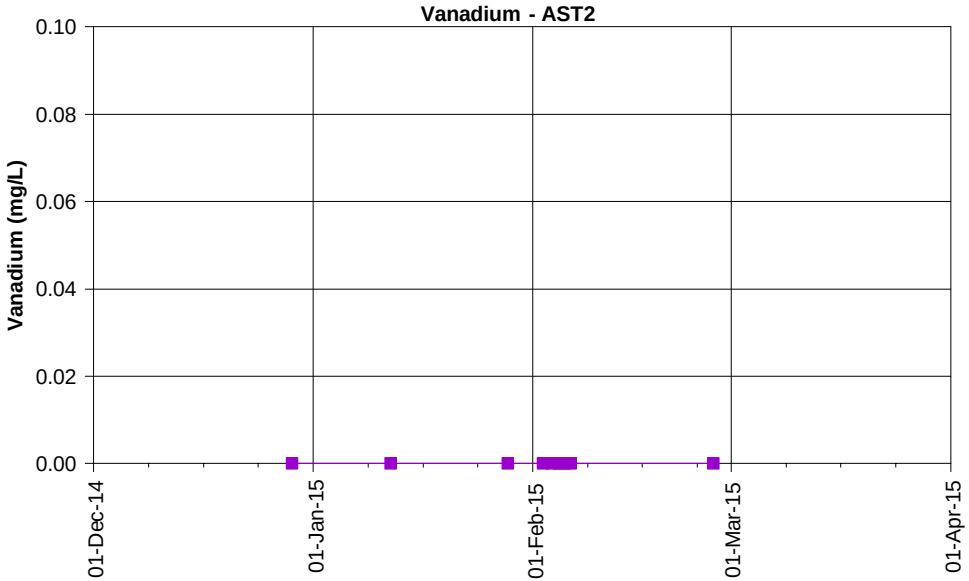
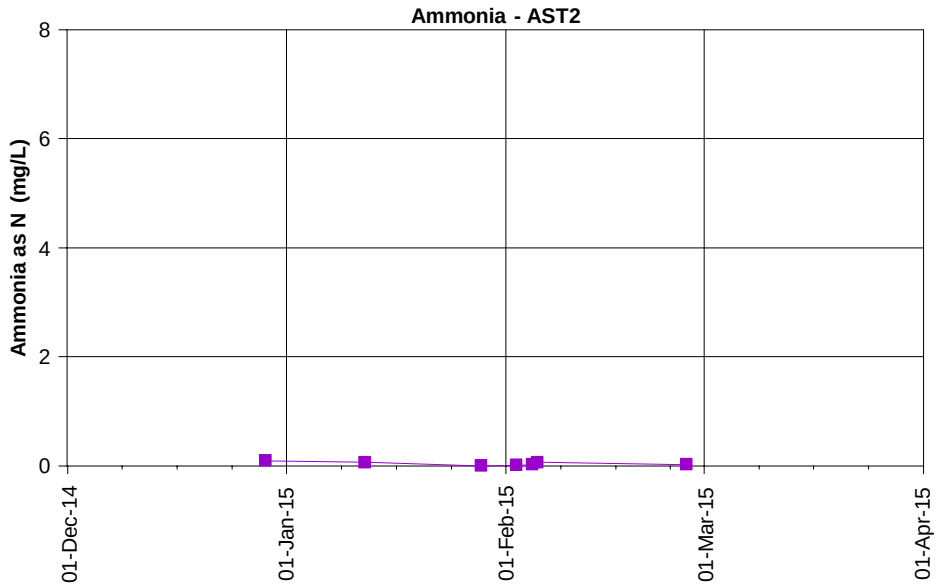
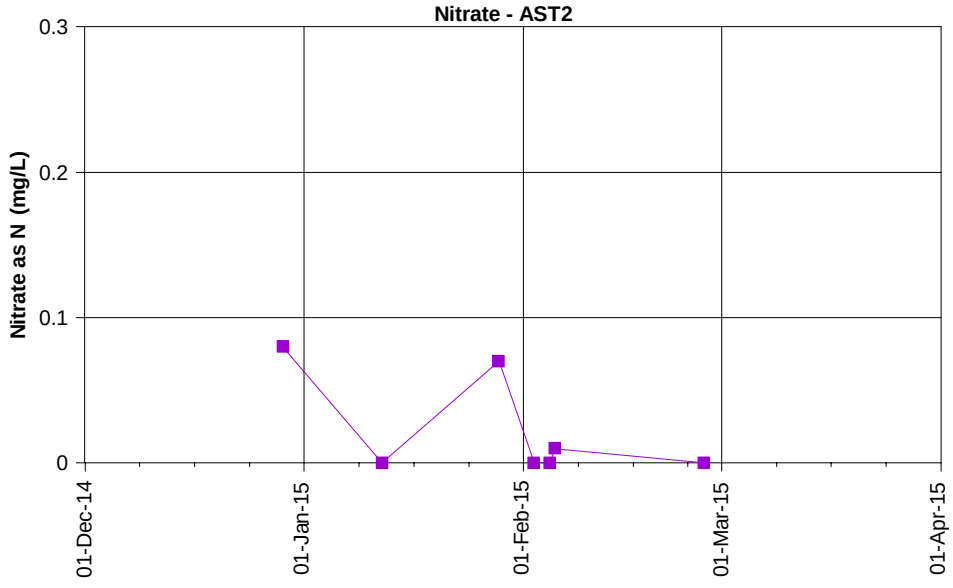
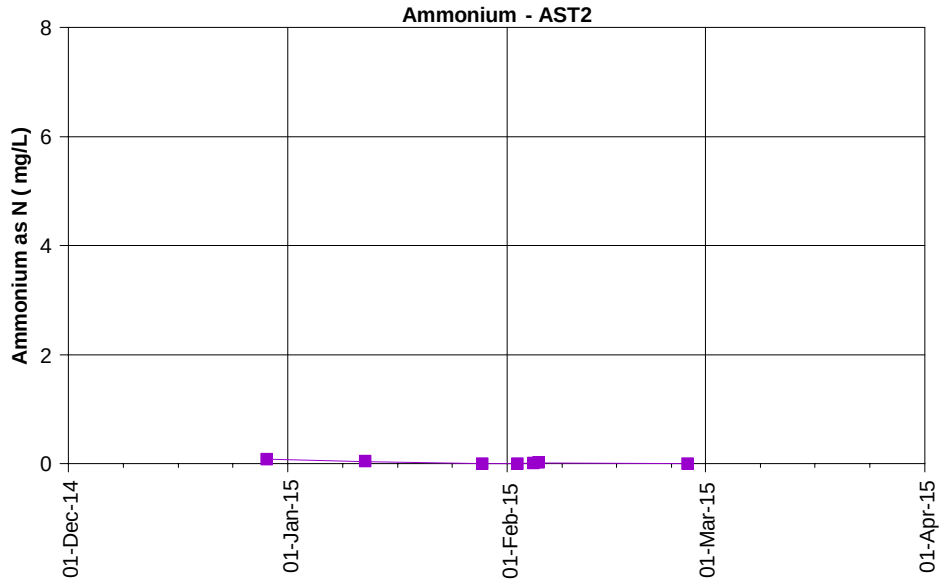


Figure G3.5: Strontium, vanadium and zinc concentrations at AST2







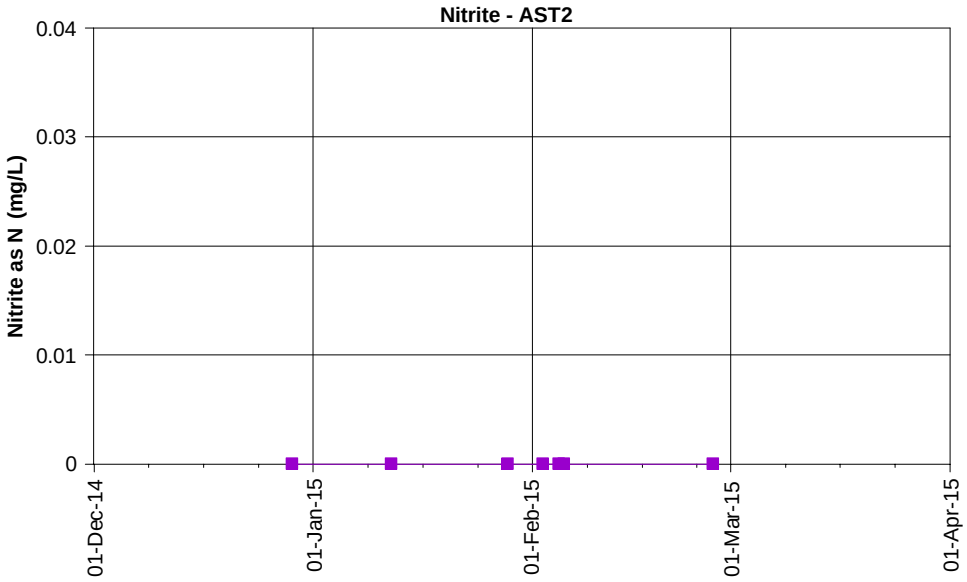
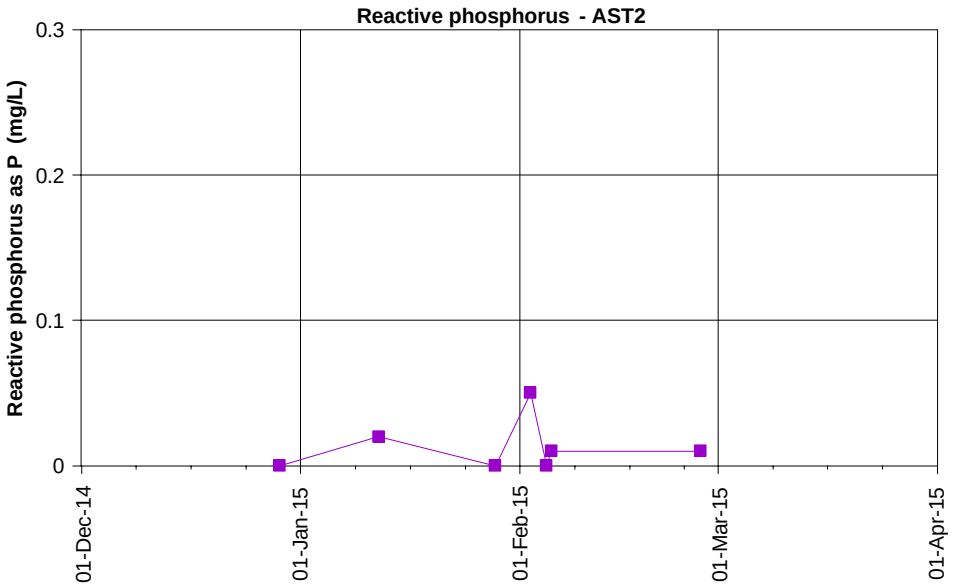
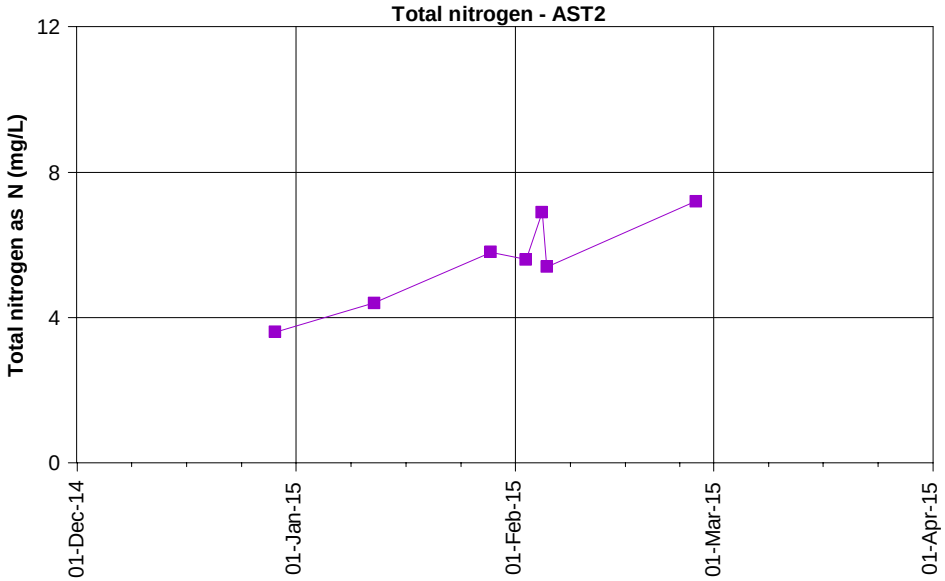


Figure G4.1: Ammonia, ammonium, nitrate and nitrite concentrations at AST2





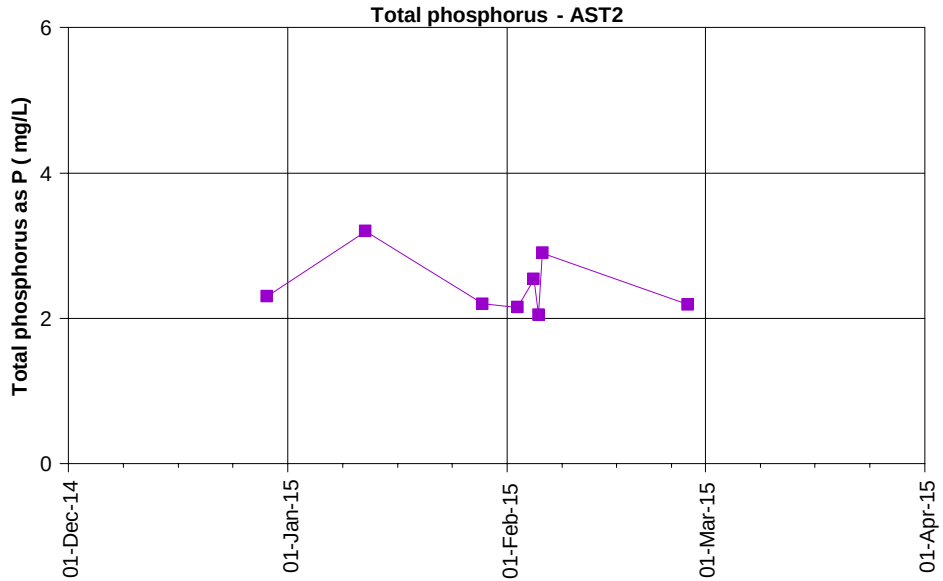


Figure G4.2: Reactive phosphorus, total phosphorus and total nitrogen concentrations at AST2

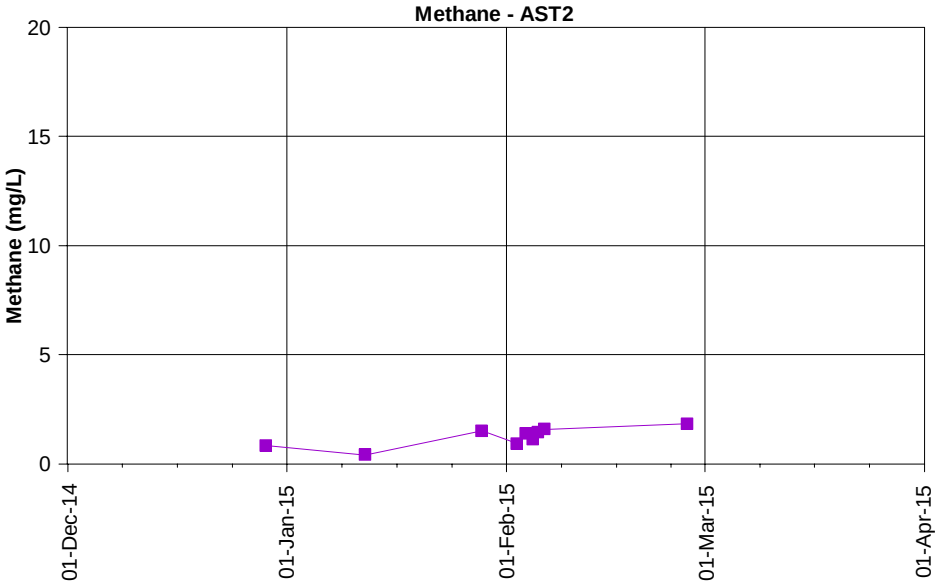
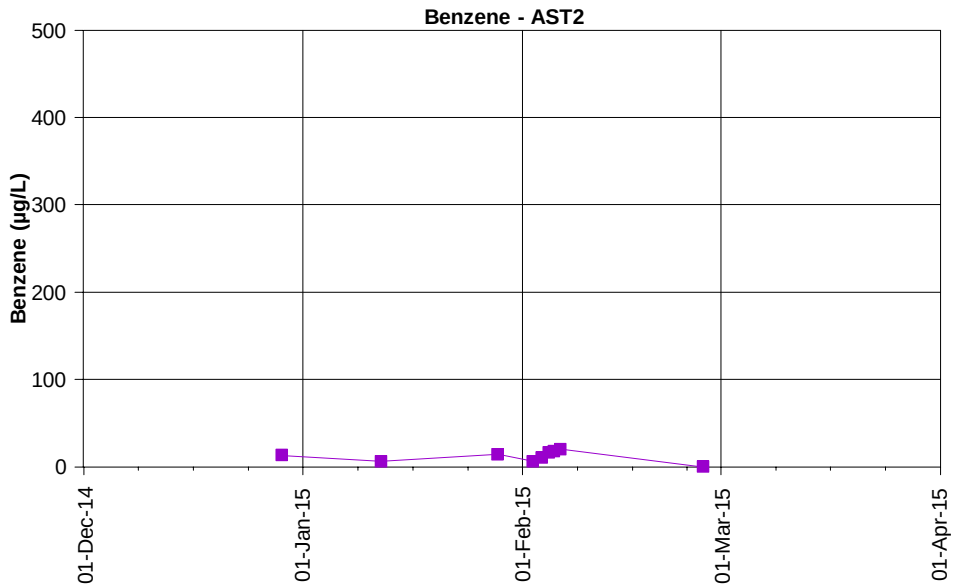
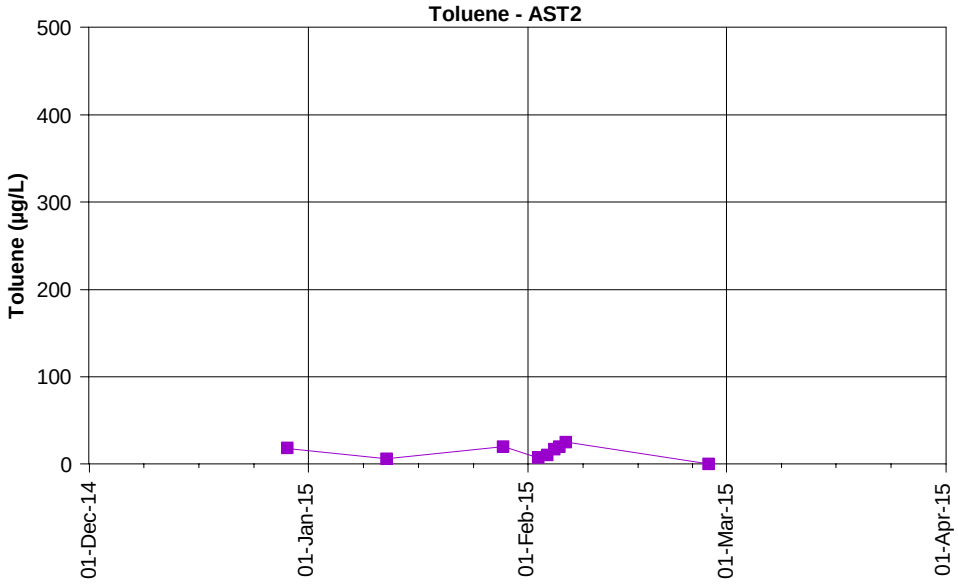
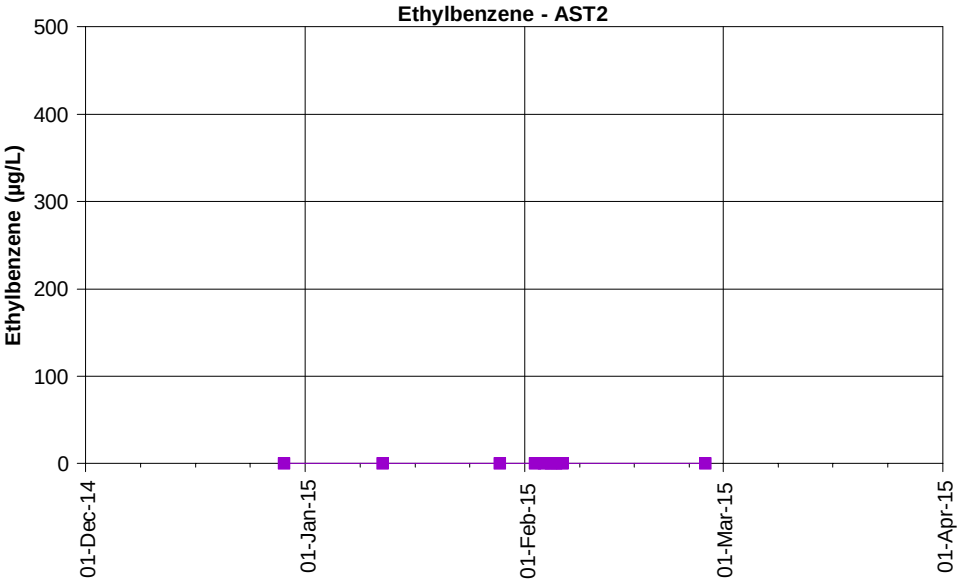


Figure G5.1: Concentration of methane at AST2.







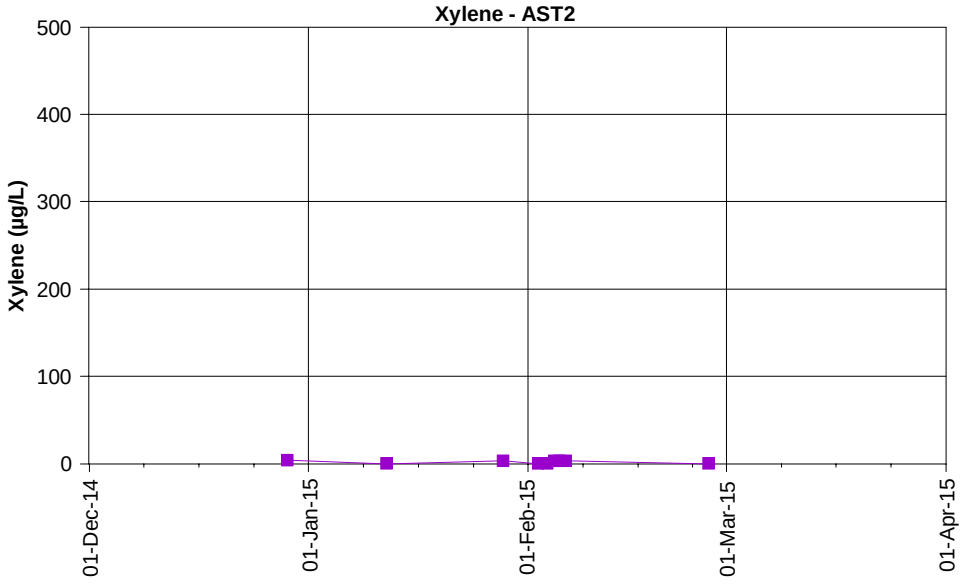


Figure G6.1: Benzene, Toulene Ethylbenzene and Xylene concentrations at AST2

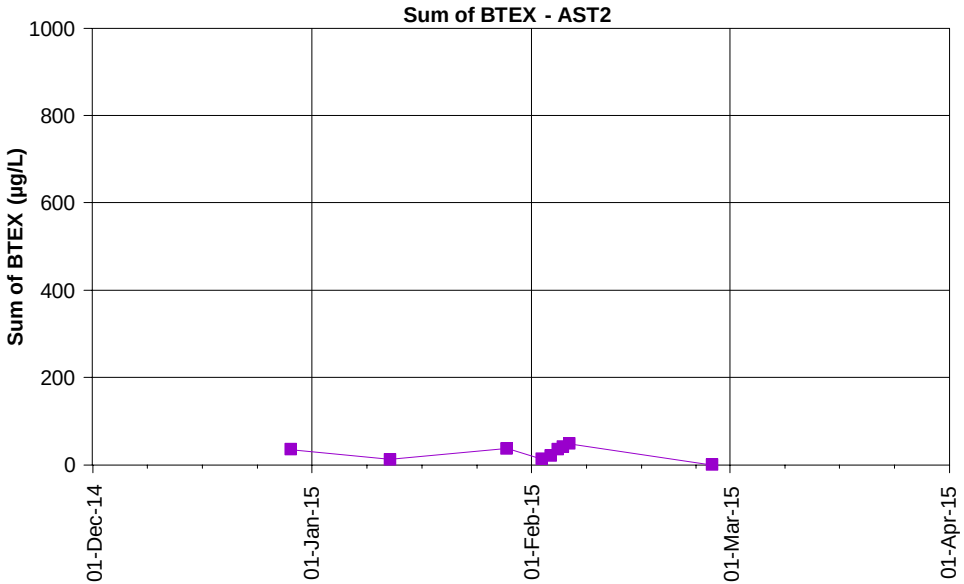
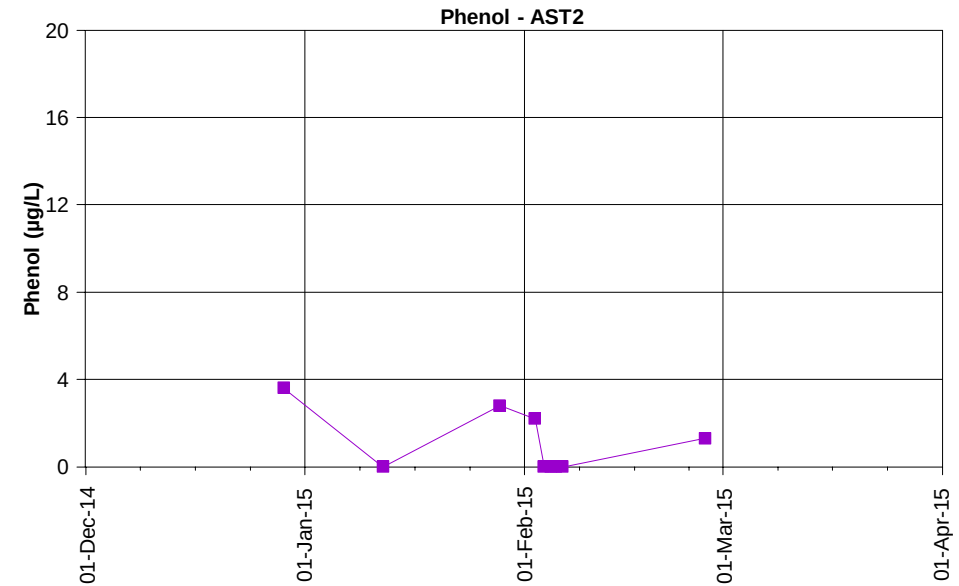
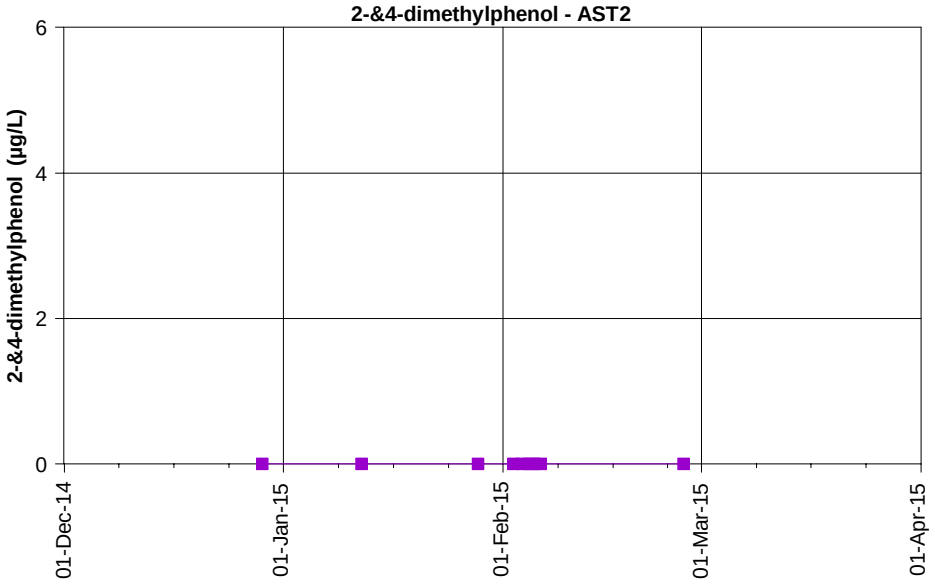
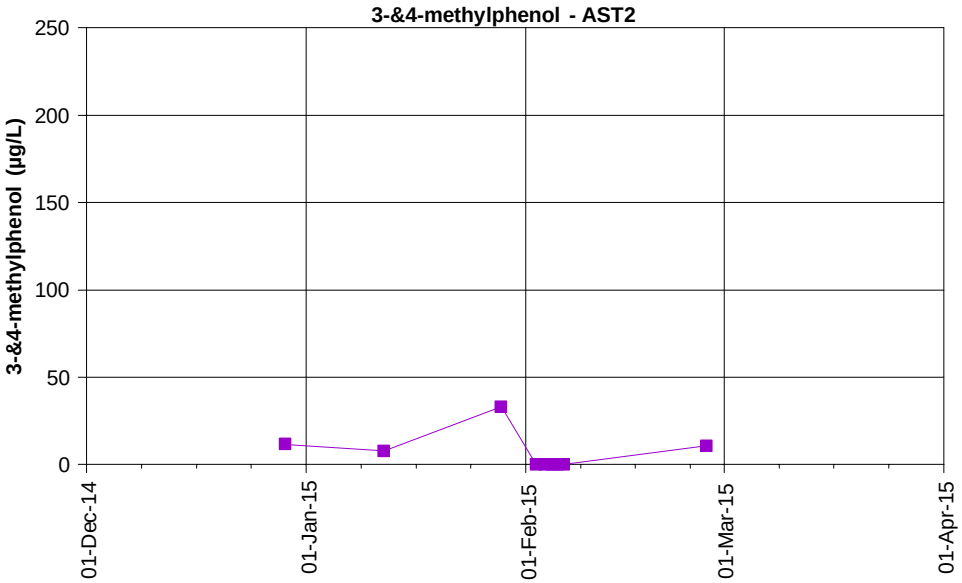


Figure G6.2: Sum of BTEX concentration at AST2.







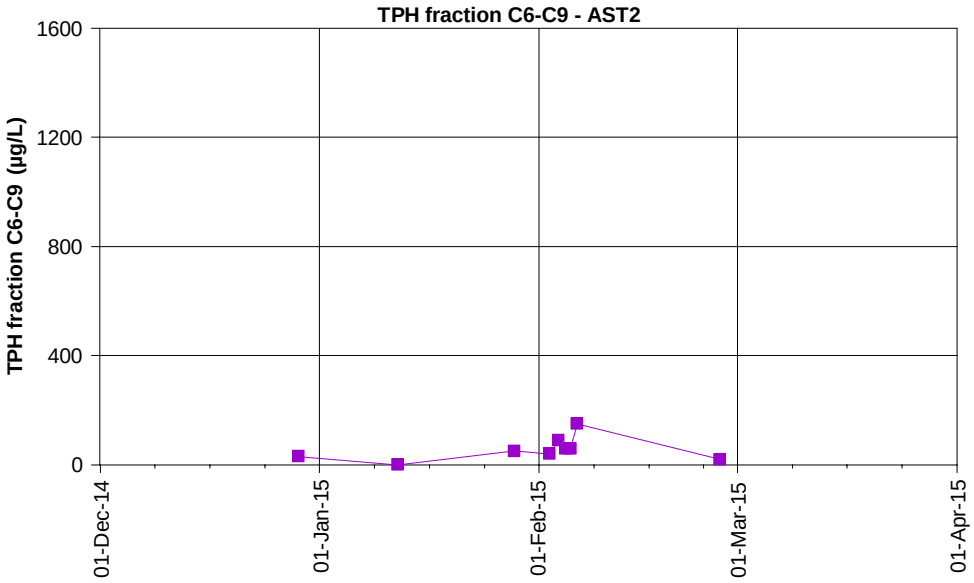


Figure G7.1: Phenol, 3-&4-methylphenol, 2-&4-dimethylphenol and TPH fraction C6-C9 concentrations at AST2.

Appendix H

ALS and Envirolab Services laboratory reports

Appendix H

Laboratory results summary table

Date samples received	Report number	Lab Name
13-January-2015	ES1500419	ALS
30-January-2015	ES1501844	ALS
29-January-2015	ES1501981	ALS
29-January-2015	ES1501982	ALS
02-February-2015	ES1502224	ALS
04-February-2015	ES1502485	ALS
04-February-2015	ES1502614	ALS
05-February-2015	ES1502642	ALS
05-February-2015	ES1502776	ALS
05-February-2015	ES1502783	ALS
06-February-2015	ES1502916	ALS
06-February-2015	ES1502917	ALS
26-February-2015	ES1504724	ALS
13-January-2015	121884	Envirolab
30-January-2015	122757	Envirolab
02-February-2015	122818	Envirolab
04-February-2015	122955	Envirolab
05-February-2015	123059	Envirolab
05-February-2015	123060	Envirolab
06-February-2015	123117	Envirolab
06-February-2015	123154	Envirolab
26-February-2015	124237	Envirolab

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1500419**	Page	: 1 of 10
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: SDaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 13-JAN-2015
Sampler	: BR/SD	Issue Date	: 12-MAY-2015
Site	: ----		
		No. of samples received	: 1
Quote number	: SY/933/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **ED041G:LOR raised for Sulfate analysis on sample ID(FB TANK) due to sample matrix.**
- **EG020: 'Bromine/Iodine' quantification may be unreliable due to its low solubility in acid, leading to variable volatility during measurement by ICPMS.**
- **This report has been amended as a result of a request to change sample identification numbers (IDs) received by ALS from Kelly-Jane Wallis on 5/5/15. All analysis results are as per the previous report.**

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Edwandy Fadjar	Organic Coordinator	Sydney Organics
Lana Nguyen	Senior LCMS Chemist	Sydney Organics
Merrin Avery	Supervisor - Inorganic	Newcastle - Inorganics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	AST2	----	----	----	----
				Client sampling date / time	12-JAN-2015 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1500419-001	----	----	----	----
EA005: pH									
pH Value	----	0.01	pH Unit	**8.79**	----	----	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	**6310**	----	----	----	----
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	----	10	mg/L	**4870**	----	----	----	----
EA025: Suspended Solids									
Suspended Solids (SS)	----	5	mg/L	**34**	----	----	----	----
ED009: Anions									
Chloride	16887-00-6	0.100	mg/L	**508**	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	**252**	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**2260**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**2510**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	----	----	----	----
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L	**512**	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	**23**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**3**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**1520**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**17**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	**0.03**	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	**0.008**	----	----	----	----
Boron	7440-42-8	0.05	mg/L	**11.8**	----	----	----	----
Strontium	7440-24-6	0.001	mg/L	**2.59**	----	----	----	----
Barium	7440-39-3	0.001	mg/L	**2.75**	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	**0.0028**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	**0.002**	----	----	----	----
Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	AST2	----	----	----	----
				Client sampling date / time	12-JAN-2015 15:00	----	----	----	----
					ES1500419-001	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.046**	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.035**	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		**0.005**	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		**0.008**	----	----	----	----
Lead	7439-92-1	0.001	mg/L		**0.021**	----	----	----	----
Antimony	7440-36-0	0.001	mg/L		**0.002**	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		**0.074**	----	----	----	----
Iron	7439-89-6	0.05	mg/L		**0.22**	----	----	----	----
Bromine	7726-95-6	0.1	mg/L		**0.8**	----	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L		**20.2**	----	----	----	----
EK010/011: Chlorine									
Chlorine - Free	----	0.2	mg/L		<0.2	----	----	----	----
Chlorine - Total Residual	----	0.2	mg/L		<0.2	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.9**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.06**	----	----	----	----
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	----	0.01	mg/L		**0.04**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----	0.01	mg/L		<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	AST2	----	----	----	----
				Client sampling date / time	12-JAN-2015 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1500419-001	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		4.4	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		4.4	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		2.57	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		0.02	----	----	----	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		64.6	----	----	----	----
Total Cations	----	0.01	meq/L		68.0	----	----	----	----
Ionic Balance	----	0.01	%		2.47	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		<1	----	----	----	----
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8	10	µg/L		403	----	----	----	----
Ethene	74-85-1	10	µg/L		<10	----	----	----	----
Ethane	74-84-0	10	µg/L		14	----	----	----	----
Propene	115-07-1	10	µg/L		<10	----	----	----	----
Propane	74-98-6	10	µg/L		<10	----	----	----	----
Butene	25167-67-3	10	µg/L		<10	----	----	----	----
Butane	106-97-8	10	µg/L		<10	----	----	----	----
EP074A: Monocyclic Aromatic Hydrocarbons									
Styrene	100-42-5	5	µg/L		<5	----	----	----	----
Isopropylbenzene	98-82-8	5	µg/L		<5	----	----	----	----
n-Propylbenzene	103-65-1	5	µg/L		<5	----	----	----	----
1.3.5-Trimethylbenzene	108-67-8	5	µg/L		<5	----	----	----	----
sec-Butylbenzene	135-98-8	5	µg/L		<5	----	----	----	----
1.2.4-Trimethylbenzene	95-63-6	5	µg/L		<5	----	----	----	----
tert-Butylbenzene	98-06-6	5	µg/L		<5	----	----	----	----
p-Isopropyltoluene	99-87-6	5	µg/L		<5	----	----	----	----
n-Butylbenzene	104-51-8	5	µg/L		<5	----	----	----	----
EP074B: Oxygenated Compounds									
Vinyl Acetate	108-05-4	50	µg/L		<50	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	AST2	----	----	----	----
				Client sampling date / time	12-JAN-2015 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1500419-001	----	----	----	----
EP074B: Oxygenated Compounds - Continued									
2-Butanone (MEK)	78-93-3	50	µg/L		<50	----	----	----	----
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L		<50	----	----	----	----
2-Hexanone (MBK)	591-78-6	50	µg/L		<50	----	----	----	----
EP074C: Sulfonated Compounds									
Carbon disulfide	75-15-0	5	µg/L		<5	----	----	----	----
EP074D: Fumigants									
2.2-Dichloropropane	594-20-7	5	µg/L		<5	----	----	----	----
1.2-Dichloropropane	78-87-5	5	µg/L		<5	----	----	----	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L		<5	----	----	----	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L		<5	----	----	----	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	----	----	----	----
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	----	----	----	----
Chloromethane	74-87-3	50	µg/L		<50	----	----	----	----
Vinyl chloride	75-01-4	50	µg/L		<50	----	----	----	----
Bromomethane	74-83-9	50	µg/L		<50	----	----	----	----
Chloroethane	75-00-3	50	µg/L		<50	----	----	----	----
Trichlorofluoromethane	75-69-4	50	µg/L		<50	----	----	----	----
1.1-Dichloroethene	75-35-4	5	µg/L		<5	----	----	----	----
Iodomethane	74-88-4	5	µg/L		<5	----	----	----	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L		<5	----	----	----	----
1.1-Dichloroethane	75-34-3	5	µg/L		<5	----	----	----	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L		<5	----	----	----	----
1.1.1-Trichloroethane	71-55-6	5	µg/L		<5	----	----	----	----
1.1-Dichloropropylene	563-58-6	5	µg/L		<5	----	----	----	----
Carbon Tetrachloride	56-23-5	5	µg/L		<5	----	----	----	----
1.2-Dichloroethane	107-06-2	5	µg/L		<5	----	----	----	----
Trichloroethene	79-01-6	5	µg/L		<5	----	----	----	----
Dibromomethane	74-95-3	5	µg/L		<5	----	----	----	----
1.1.2-Trichloroethane	79-00-5	5	µg/L		<5	----	----	----	----
1.3-Dichloropropane	142-28-9	5	µg/L		<5	----	----	----	----
Tetrachloroethene	127-18-4	5	µg/L		<5	----	----	----	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L		<5	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: AST2	----	----	----	----
				Client sampling date / time: 12-JAN-2015 15:00	----	----	----	----
				ES1500419-001	----	----	----	----
EP074E: Halogenated Aliphatic Compounds - Continued								
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	----	----	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	----	----	----	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	----	----	----	----
1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	----	----	----	----
Pentachloroethane	76-01-7	5	µg/L	<5	----	----	----	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	----	----	----	----
Hexachlorobutadiene	87-68-3	5	µg/L	<5	----	----	----	----
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	5	µg/L	<5	----	----	----	----
Bromobenzene	108-86-1	5	µg/L	<5	----	----	----	----
2-Chlorotoluene	95-49-8	5	µg/L	<5	----	----	----	----
4-Chlorotoluene	106-43-4	5	µg/L	<5	----	----	----	----
1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	----	----	----	----
1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	----	----	----	----
1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	----	----	----	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	----	----	----	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	----	----	----	----
EP074G: Trihalomethanes								
Chloroform	67-66-3	5	µg/L	<5	----	----	----	----
Bromodichloromethane	75-27-4	5	µg/L	<5	----	----	----	----
Dibromochloromethane	124-48-1	5	µg/L	<5	----	----	----	----
Bromoform	75-25-2	5	µg/L	<5	----	----	----	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	<1.0	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L	**1.1**	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	**7.7**	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	----	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	----	----	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	----	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: AST2	----	----	----	----
				Client sampling date / time: 12-JAN-2015 15:00	----	----	----	----
				ES1500419-001	----	----	----	----
EP075(SIM)A: Phenolic Compounds - Continued								
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	----	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L	<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L	<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L	<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: AST2	----	----	----	----
				Client sampling date / time: 12-JAN-2015 15:00	----	----	----	----
				ES1500419-001	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L	<100	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L	<100	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	**6**	----	----	----	----
Toluene	108-88-3	2	µg/L	**6**	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----
^ **Total Xylenes**	1330-20-7	2	µg/L	<2	----	----	----	----
^ **Sum of BTEX**	----	1	µg/L	**12**	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----
EP262: Ethanolamines								
Ethanolamine	141-43-5	1	µg/L	**118**	----	----	----	----
Diethanolamine	111-42-2	1	µg/L	<1	----	----	----	----
Methyl diethanolamine (MDEA)	105-59-9	1	µg/L	<1	----	----	----	----
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	**80.2**	----	----	----	----
Toluene-D8	2037-26-5	0.1	%	**90.8**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	**87.2**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	**25.4**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%	**44.5**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%	**40.5**	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**67.1**	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%	**68.4**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	**75.8**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	**81.0**	----	----	----	----
Toluene-D8	2037-26-5	0.1	%	**92.7**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	**86.1**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78.3	133.2
Toluene-D8	2037-26-5	79.1	128.9
4-Bromofluorobenzene	460-00-4	80.8	123.7
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27.4	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1501844**	Page	: 1 of 24
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: SDaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 30-JAN-2015
Sampler	: CR/KM	Issue Date	: 10-FEB-2015
Site	: ----		
		No. of samples received	: 11
Quote number	: SY/933/14	No. of samples analysed	: 11

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Merrin Avery	Supervisor - Inorganic	Newcastle - Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.**
- **EA015: TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.**
- **EG020: Bromine quantification may be unreliable due to its low solubility in acid, leading to variable volatility during measurement by ICPMS**
- **EG020: Zinc results for samples ES1501844-001, 009, 010, and 011 have been confirmed by re-analysis.**
- **EK071G: It has been noted that Reactive P is greater than Total P, however this difference is within the limits of experimental variation.**
- **EK071GILOR raised for Reactive P analysis on sample ID(WKMB06A) due to sample matrix.**

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WKSW02	WKSW03	WKMB01	WKMB02	WKMB03
				Client sampling date / time	29-JAN-2015 17:00	29-JAN-2015 16:15	29-JAN-2015 12:00	29-JAN-2015 09:30	29-JAN-2015 10:30
					ES1501844-001	ES1501844-002	ES1501844-003	ES1501844-004	ES1501844-005
EA005: pH									
pH Value	----	0.01	pH Unit		**7.39**	**7.18**	**8.23**	**9.15**	**11.0**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**322**	**169**	**4540**	**885**	**3440**
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	----	10	mg/L		**278**	**177**	**2350**	**494**	**2300**
EA025: Suspended Solids									
Suspended Solids (SS)	----	5	mg/L		**8**	**11**	<5	<5	**20**
ED009: Anions									
Chloride	16887-00-6	0.100	mg/L		**55.4**	**30.1**	**940**	**60.5**	**375**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	**62**
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	**4**	**73**	**1110**
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**53**	**23**	**872**	**263**	<1
Total Alkalinity as CaCO3	----	1	mg/L		**53**	**23**	**875**	**336**	**1180**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**14**	**6**	**89**	**17**	**4**
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		**54**	**36**	**848**	**60**	**382**
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**14**	**7**	**13**	**3**	**8**
Magnesium	7439-95-4	1	mg/L		**9**	**4**	**2**	<1	<1
Sodium	7440-23-5	1	mg/L		**38**	**25**	**1120**	**222**	**877**
Potassium	7440-09-7	1	mg/L		**5**	**3**	**3**	**5**	**7**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.29**	**0.37**	**0.02**	**0.12**	**0.09**
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		**0.002**	**0.001**	**0.001**	**0.001**	**0.002**
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L		**0.048**	**0.040**	**0.235**	**0.071**	**0.958**
Cadmium	7440-43-9	0.0001	mg/L		**0.0011**	**0.0006**	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		**0.005**	**0.005**	<0.001	<0.001	<0.001
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WKSW02	WKSW03	WKMB01	WKMB02	WKMB03
				Client sampling date / time	29-JAN-2015 17:00	29-JAN-2015 16:15	29-JAN-2015 12:00	29-JAN-2015 09:30	29-JAN-2015 10:30
					ES1501844-001	ES1501844-002	ES1501844-003	ES1501844-004	ES1501844-005
EG020F: Dissolved Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.001	mg/L		<0.001	**0.001**	**0.001**	<0.001	**0.002**
Lead	7439-92-1	0.001	mg/L		**0.002**	**0.001**	<0.001	<0.001	**0.011**
Zinc	7440-66-6	0.005	mg/L		**0.038**	**0.022**	<0.005	<0.005	**9.08**
Manganese	7439-96-5	0.001	mg/L		**0.033**	**0.040**	**0.008**	**0.005**	**0.001**
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.005**
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Strontium	7440-24-6	0.001	mg/L		**0.162**	**0.099**	**2.08**	**0.216**	**1.29**
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	**0.12**	<0.05	**0.09**
Iron	7439-89-6	0.05	mg/L		**0.82**	**0.65**	<0.05	<0.05	<0.05
Bromine	7726-95-6	0.1	mg/L		**0.1**	<0.1	**2.2**	**0.2**	**0.7**
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L		**14.1**	**16.6**	**16.4**	**21.9**	**37.6**
EK010/011: Chlorine									
Chlorine - Free	----	0.2	mg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Chlorine - Total Residual	----	0.2	mg/L		<0.2	<0.2	<0.2	<0.2	<0.2
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.2**	<0.1	**1.7**	**0.3**	**2.4**
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.01**	**0.01**	**0.59**	**0.30**	**16.5**
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	----	0.01	mg/L		<0.01	<0.01	**0.57**	**0.22**	**0.17**
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----	0.01	mg/L		**0.01**	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.28**	**0.06**	<0.01	<0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.29**	**0.06**	<0.01	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WKSW02	WKSW03	WKMB01	WKMB02	WKMB03
				Client sampling date / time	29-JAN-2015 17:00	29-JAN-2015 16:15	29-JAN-2015 12:00	29-JAN-2015 09:30	29-JAN-2015 10:30
					ES1501844-001	ES1501844-002	ES1501844-003	ES1501844-004	ES1501844-005
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**1.3**	**1.2**	**0.8**	**0.4**	**22.8**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ **Total Nitrogen as N**	----	0.1	mg/L		**1.6**	**1.3**	**0.8**	**0.4**	**22.8**
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.14**	**0.13**	**0.06**	**0.08**	**0.05**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		**0.05**	**0.05**	**0.06**	**0.08**	**0.06**
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**3.24**	**2.03**	**46.4**	**9.36**	**37.1**
Total Cations	----	0.01	meq/L		**3.22**	**1.84**	**49.6**	**9.93**	**38.7**
Ionic Balance	----	0.01	%		**0.33**	----	**3.39**	**2.95**	**2.19**
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**15**	**13**	**18**	**4**	**69**
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8	10	µg/L		**29**	**14**	**12600**	**3210**	**19200**
Ethene	74-85-1	10	µg/L		<10	<10	<10	<10	<10
Ethane	74-84-0	10	µg/L		<10	<10	<10	<10	<10
Propene	115-07-1	10	µg/L		<10	<10	<10	<10	<10
Propane	74-98-6	10	µg/L		<10	<10	<10	<10	<10
Butene	25167-67-3	10	µg/L		<10	<10	<10	<10	<10
Butane	106-97-8	10	µg/L		<10	<10	<10	<10	<10
EP074A: Monocyclic Aromatic Hydrocarbons									
Styrene	100-42-5	5	µg/L		<5	<5	<5	<5	<5
Isopropylbenzene	98-82-8	5	µg/L		<5	<5	<5	<5	<5
n-Propylbenzene	103-65-1	5	µg/L		<5	<5	<5	<5	<5
1.3.5-Trimethylbenzene	108-67-8	5	µg/L		<5	<5	<5	<5	<5
sec-Butylbenzene	135-98-8	5	µg/L		<5	<5	<5	<5	<5
1.2.4-Trimethylbenzene	95-63-6	5	µg/L		<5	<5	<5	<5	<5
tert-Butylbenzene	98-06-6	5	µg/L		<5	<5	<5	<5	<5
p-Isopropyltoluene	99-87-6	5	µg/L		<5	<5	<5	<5	<5
n-Butylbenzene	104-51-8	5	µg/L		<5	<5	<5	<5	<5
EP074B: Oxygenated Compounds									
Vinyl Acetate	108-05-4	50	µg/L		<50	<50	<50	<50	<50

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WKSW02	WKSW03	WKMB01	WKMB02	WKMB03
				Client sampling date / time	29-JAN-2015 17:00	29-JAN-2015 16:15	29-JAN-2015 12:00	29-JAN-2015 09:30	29-JAN-2015 10:30
					ES1501844-001	ES1501844-002	ES1501844-003	ES1501844-004	ES1501844-005
EP074B: Oxygenated Compounds - Continued									
2-Butanone (MEK)	78-93-3	50	µg/L		<50	<50	<50	<50	<50
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L		<50	<50	<50	<50	<50
2-Hexanone (MBK)	591-78-6	50	µg/L		<50	<50	<50	<50	<50
EP074C: Sulfonated Compounds									
Carbon disulfide	75-15-0	5	µg/L		<5	<5	<5	<5	<5
EP074D: Fumigants									
2.2-Dichloropropane	594-20-7	5	µg/L		<5	<5	<5	<5	<5
1.2-Dichloropropane	78-87-5	5	µg/L		<5	<5	<5	<5	<5
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L		<5	<5	<5	<5	<5
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L		<5	<5	<5	<5	<5
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	<5	<5	<5	<5
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	<50	<50	<50	<50
Chloromethane	74-87-3	50	µg/L		<50	<50	<50	<50	<50
Vinyl chloride	75-01-4	50	µg/L		<50	<50	<50	<50	<50
Bromomethane	74-83-9	50	µg/L		<50	<50	<50	<50	<50
Chloroethane	75-00-3	50	µg/L		<50	<50	<50	<50	<50
Trichlorofluoromethane	75-69-4	50	µg/L		<50	<50	<50	<50	<50
1.1-Dichloroethene	75-35-4	5	µg/L		<5	<5	<5	<5	<5
Iodomethane	74-88-4	5	µg/L		<5	<5	<5	<5	<5
trans-1.2-Dichloroethene	156-60-5	5	µg/L		<5	<5	<5	<5	<5
1.1-Dichloroethane	75-34-3	5	µg/L		<5	<5	<5	<5	<5
cis-1.2-Dichloroethene	156-59-2	5	µg/L		<5	<5	<5	<5	<5
1.1.1-Trichloroethane	71-55-6	5	µg/L		<5	<5	<5	<5	<5
1.1-Dichloropropylene	563-58-6	5	µg/L		<5	<5	<5	<5	<5
Carbon Tetrachloride	56-23-5	5	µg/L		<5	<5	<5	<5	<5
1.2-Dichloroethane	107-06-2	5	µg/L		<5	<5	<5	<5	<5
Trichloroethene	79-01-6	5	µg/L		<5	<5	<5	<5	<5
Dibromomethane	74-95-3	5	µg/L		<5	<5	<5	<5	<5
1.1.2-Trichloroethane	79-00-5	5	µg/L		<5	<5	<5	<5	<5
1.3-Dichloropropane	142-28-9	5	µg/L		<5	<5	<5	<5	<5
Tetrachloroethene	127-18-4	5	µg/L		<5	<5	<5	<5	<5
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L		<5	<5	<5	<5	<5

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WKSW02	WKSW03	WKMB01	WKMB02	WKMB03
				Client sampling date / time	29-JAN-2015 17:00	29-JAN-2015 16:15	29-JAN-2015 12:00	29-JAN-2015 09:30	29-JAN-2015 10:30
					ES1501844-001	ES1501844-002	ES1501844-003	ES1501844-004	ES1501844-005
EP074E: Halogenated Aliphatic Compounds - Continued									
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L		<5	<5	<5	<5	<5
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	<5	<5	<5	<5
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L		<5	<5	<5	<5	<5
1.2.3-Trichloropropane	96-18-4	5	µg/L		<5	<5	<5	<5	<5
Pentachloroethane	76-01-7	5	µg/L		<5	<5	<5	<5	<5
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L		<5	<5	<5	<5	<5
Hexachlorobutadiene	87-68-3	5	µg/L		<5	<5	<5	<5	<5
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		<5	<5	<5	<5	<5
Bromobenzene	108-86-1	5	µg/L		<5	<5	<5	<5	<5
2-Chlorotoluene	95-49-8	5	µg/L		<5	<5	<5	<5	<5
4-Chlorotoluene	106-43-4	5	µg/L		<5	<5	<5	<5	<5
1.3-Dichlorobenzene	541-73-1	5	µg/L		<5	<5	<5	<5	<5
1.4-Dichlorobenzene	106-46-7	5	µg/L		<5	<5	<5	<5	<5
1.2-Dichlorobenzene	95-50-1	5	µg/L		<5	<5	<5	<5	<5
1.2.4-Trichlorobenzene	120-82-1	5	µg/L		<5	<5	<5	<5	<5
1.2.3-Trichlorobenzene	87-61-6	5	µg/L		<5	<5	<5	<5	<5
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		<5	<5	<5	<5	<5
Bromodichloromethane	75-27-4	5	µg/L		<5	<5	<5	<5	<5
Dibromochloromethane	124-48-1	5	µg/L		<5	<5	<5	<5	<5
Bromoform	75-25-2	5	µg/L		<5	<5	<5	<5	<5
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WKSW02	WKSW03	WKMB01	WKMB02	WKMB03
				Client sampling date / time	29-JAN-2015 17:00	29-JAN-2015 16:15	29-JAN-2015 12:00	29-JAN-2015 09:30	29-JAN-2015 10:30
					ES1501844-001	ES1501844-002	ES1501844-003	ES1501844-004	ES1501844-005
EP075(SIM)A: Phenolic Compounds - Continued									
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	**50**
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	**50**
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	>C10_C16	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WKSW02	WKSW03	WKMB01	WKMB02	WKMB03
				Client sampling date / time	29-JAN-2015 17:00	29-JAN-2015 16:15	29-JAN-2015 12:00	29-JAN-2015 09:30	29-JAN-2015 10:30
					ES1501844-001	ES1501844-002	ES1501844-003	ES1501844-004	ES1501844-005
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	<100	<100	<100	<100
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	**34**
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	<2	<2	<2	<2
^ **Sum of BTEX**	----	1	µg/L		<1	<1	<1	<1	**34**
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP262: Ethanolamines									
Ethanolamine	141-43-5	1	µg/L		<1	<1	<1	<1	**3**
Diethanolamine	111-42-2	1	µg/L		<1	<1	<1	<1	**7**
Methyl diethanolamine (MDEA)	105-59-9	1	µg/L		<1	<1	<1	<1	**8**
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**121**	**119**	**118**	**106**	**116**
Toluene-D8	2037-26-5	0.1	%		**123**	**119**	**124**	**105**	**118**
4-Bromofluorobenzene	460-00-4	0.1	%		**112**	**108**	**117**	**96.8**	**113**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		**66.8**	**37.7**	**35.1**	**35.3**	**41.3**
2-Chlorophenol-D4	93951-73-6	0.1	%		**107**	**61.1**	**59.8**	**49.8**	**40.8**
2.4.6-Tribromophenol	118-79-6	0.1	%		**110**	**57.0**	**57.1**	**35.1**	**30.9**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		**108**	**65.3**	**53.0**	**56.4**	**76.2**
Anthracene-d10	1719-06-8	0.1	%		**120**	**70.6**	**73.0**	**68.9**	**101**
4-Terphenyl-d14	1718-51-0	0.1	%		**126**	**72.7**	**75.0**	**69.6**	**95.3**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**120**	**117**	**124**	**105**	**121**
Toluene-D8	2037-26-5	0.1	%		**122**	**117**	**118**	**103**	**113**
4-Bromofluorobenzene	460-00-4	0.1	%		**122**	**116**	**123**	**105**	**119**

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	GR-P3	WKMB06A	WKMB06B	GW080487	QA1
				Client sampling date / time	29-JAN-2015 15:40	29-JAN-2015 14:20	29-JAN-2015 14:40	30-JAN-2015 10:30	[30-JAN-2015]
					ES1501844-006	ES1501844-007	ES1501844-008	ES1501844-009	ES1501844-010
EA005: pH									
pH Value	----	0.01	pH Unit		**7.03**	**6.90**	**8.70**	**7.30**	**7.39**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**4050**	**2470**	**1340**	**3850**	**326**
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	----	10	mg/L		**2220**	**1410**	**687**	**2010**	**306**
EA025: Suspended Solids									
Suspended Solids (SS)	----	5	mg/L		<5	**245**	**42**	<5	<5
ED009: Anions									
Chloride	16887-00-6	0.100	mg/L		**1110**	**647**	**195**	**645**	**55.0**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	**22**	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**357**	**218**	**293**	**1050**	**56**
Total Alkalinity as CaCO3	----	1	mg/L		**357**	**218**	**314**	**1050**	**56**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**73**	**45**	**41**	**91**	**14**
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		**998**	**619**	**206**	**608**	**58**
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**126**	**89**	**4**	**83**	**14**
Magnesium	7439-95-4	1	mg/L		**74**	**49**	<1	**40**	**9**
Sodium	7440-23-5	1	mg/L		**675**	**384**	**323**	**840**	**39**
Potassium	7440-09-7	1	mg/L		**2**	**2**	**1**	**6**	**6**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	**0.19**	**0.04**	<0.01	**0.29**
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		<0.001	**0.008**	**0.003**	<0.001	**0.002**
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L		**0.530**	**0.592**	**0.105**	**0.265**	**0.046**
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	**0.0170**	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		**0.002**	**0.083**	<0.001	<0.001	**0.002**
Cobalt	7440-48-4	0.001	mg/L		**0.001**	**0.004**	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	GR-P3	WKMB06A	WKMB06B	GW080487	QA1
				Client sampling date / time	29-JAN-2015 15:40	29-JAN-2015 14:20	29-JAN-2015 14:40	30-JAN-2015 10:30	[30-JAN-2015]
					ES1501844-006	ES1501844-007	ES1501844-008	ES1501844-009	ES1501844-010
EG020F: Dissolved Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.001	mg/L		<0.001	**0.001**	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	**0.008**	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		**0.018**	**0.645**	**0.006**	**0.012**	**0.009**
Manganese	7439-96-5	0.001	mg/L		**0.643**	**0.293**	**0.021**	**0.050**	**0.046**
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	**0.003**	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Strontium	7440-24-6	0.001	mg/L		**2.45**	**1.98**	**0.284**	**6.62**	**0.168**
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		**0.002**	<0.001	**0.001**	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	**0.06**	**0.06**	<0.05
Iron	7439-89-6	0.05	mg/L		**0.13**	**14.2**	<0.05	**0.31**	**0.80**
Bromine	7726-95-6	0.1	mg/L		**1.9**	**1.5**	**0.5**	**1.8**	**0.2**
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L		**36.0**	**37.2**	**13.4**	**20.3**	**14.1**
EK010/011: Chlorine									
Chlorine - Free	----	0.2	mg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Chlorine - Total Residual	----	0.2	mg/L		<0.2	<0.2	<0.2	<0.2	<0.2
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.2**	**0.1**	**0.6**	**0.3**	**0.1**
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.04**	**0.38**	**0.37**	**0.46**	**0.01**
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	----	0.01	mg/L		**0.04**	**0.38**	**0.31**	**0.46**	<0.01
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	**0.01**
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	**0.28**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	**0.29**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	GR-P3	WKMB06A	WKMB06B	GW080487	QA1
				Client sampling date / time	29-JAN-2015 15:40	29-JAN-2015 14:20	29-JAN-2015 14:40	30-JAN-2015 10:30	[30-JAN-2015]
					ES1501844-006	ES1501844-007	ES1501844-008	ES1501844-009	ES1501844-010
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		<0.1	**0.5**	**0.7**	**0.6**	**1.3**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ **Total Nitrogen as N**	----	0.1	mg/L		<0.1	**0.5**	**0.7**	**0.6**	**1.6**
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.04**	**0.22**	**0.75**	<0.01	**0.13**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		**0.02**	<0.05	**0.78**	<0.01	**0.07**
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		----	----	**12.9**	**40.0**	----
Total Anions	----	0.01	meq/L		**37.8**	**23.8**	----	----	**3.41**
Total Cations	----	0.01	meq/L		**41.8**	**25.2**	**14.3**	**44.1**	**3.29**
Ionic Balance	----	0.01	%		----	----	**4.86**	**4.84**	----
Ionic Balance	----	0.01	%		**5.08**	**2.99**	----	----	**1.87**
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**2**	**2**	**3**	**2**	**15**
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8	10	µg/L		<10	**19**	**15900**	**66**	**33**
Ethene	74-85-1	10	µg/L		<10	<10	<10	<10	<10
Ethane	74-84-0	10	µg/L		<10	<10	<10	<10	<10
Propene	115-07-1	10	µg/L		<10	<10	<10	<10	<10
Propane	74-98-6	10	µg/L		<10	<10	<10	<10	<10
Butene	25167-67-3	10	µg/L		<10	<10	<10	<10	<10
Butane	106-97-8	10	µg/L		<10	<10	<10	<10	<10
EP074A: Monocyclic Aromatic Hydrocarbons									
Styrene	100-42-5	5	µg/L		<5	<5	<5	<5	<5
Isopropylbenzene	98-82-8	5	µg/L		<5	<5	<5	<5	<5
n-Propylbenzene	103-65-1	5	µg/L		<5	<5	<5	<5	<5
1.3.5-Trimethylbenzene	108-67-8	5	µg/L		<5	<5	<5	<5	<5
sec-Butylbenzene	135-98-8	5	µg/L		<5	<5	<5	<5	<5
1.2.4-Trimethylbenzene	95-63-6	5	µg/L		<5	<5	<5	<5	<5
tert-Butylbenzene	98-06-6	5	µg/L		<5	<5	<5	<5	<5
p-Isopropyltoluene	99-87-6	5	µg/L		<5	<5	<5	<5	<5
n-Butylbenzene	104-51-8	5	µg/L		<5	<5	<5	<5	<5

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	GR-P3	WKMB06A	WKMB06B	GW080487	QA1
				Client sampling date / time	29-JAN-2015 15:40	29-JAN-2015 14:20	29-JAN-2015 14:40	30-JAN-2015 10:30	[30-JAN-2015]
					ES1501844-006	ES1501844-007	ES1501844-008	ES1501844-009	ES1501844-010
EP074B: Oxygenated Compounds									
Vinyl Acetate	108-05-4	50	µg/L		<50	<50	<50	<50	<50
2-Butanone (MEK)	78-93-3	50	µg/L		<50	<50	<50	<50	<50
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L		<50	<50	<50	<50	<50
2-Hexanone (MBK)	591-78-6	50	µg/L		<50	<50	<50	<50	<50
EP074C: Sulfonated Compounds									
Carbon disulfide	75-15-0	5	µg/L		<5	<5	<5	<5	<5
EP074D: Fumigants									
2.2-Dichloropropane	594-20-7	5	µg/L		<5	<5	<5	<5	<5
1.2-Dichloropropane	78-87-5	5	µg/L		<5	<5	<5	<5	<5
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L		<5	<5	<5	<5	<5
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L		<5	<5	<5	<5	<5
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	<5	<5	<5	<5
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	<50	<50	<50	<50
Chloromethane	74-87-3	50	µg/L		<50	<50	<50	<50	<50
Vinyl chloride	75-01-4	50	µg/L		<50	<50	<50	<50	<50
Bromomethane	74-83-9	50	µg/L		<50	<50	<50	<50	<50
Chloroethane	75-00-3	50	µg/L		<50	<50	<50	<50	<50
Trichlorofluoromethane	75-69-4	50	µg/L		<50	<50	<50	<50	<50
1.1-Dichloroethene	75-35-4	5	µg/L		<5	<5	<5	<5	<5
Iodomethane	74-88-4	5	µg/L		<5	<5	<5	<5	<5
trans-1.2-Dichloroethene	156-60-5	5	µg/L		<5	<5	<5	<5	<5
1.1-Dichloroethane	75-34-3	5	µg/L		<5	<5	<5	<5	<5
cis-1.2-Dichloroethene	156-59-2	5	µg/L		<5	<5	<5	<5	<5
1.1.1-Trichloroethane	71-55-6	5	µg/L		<5	<5	<5	<5	<5
1.1-Dichloropropylene	563-58-6	5	µg/L		<5	<5	<5	<5	<5
Carbon Tetrachloride	56-23-5	5	µg/L		<5	<5	<5	<5	<5
1.2-Dichloroethane	107-06-2	5	µg/L		<5	<5	<5	<5	<5
Trichloroethene	79-01-6	5	µg/L		<5	<5	<5	<5	<5
Dibromomethane	74-95-3	5	µg/L		<5	<5	<5	<5	<5
1.1.2-Trichloroethane	79-00-5	5	µg/L		<5	<5	<5	<5	<5
1.3-Dichloropropane	142-28-9	5	µg/L		<5	<5	<5	<5	<5
Tetrachloroethene	127-18-4	5	µg/L		<5	<5	<5	<5	<5

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	GR-P3	WKMB06A	WKMB06B	GW080487	QA1
				Client sampling date / time	29-JAN-2015 15:40	29-JAN-2015 14:20	29-JAN-2015 14:40	30-JAN-2015 10:30	[30-JAN-2015]
					ES1501844-006	ES1501844-007	ES1501844-008	ES1501844-009	ES1501844-010
EP074E: Halogenated Aliphatic Compounds - Continued									
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L		<5	<5	<5	<5	<5
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L		<5	<5	<5	<5	<5
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	<5	<5	<5	<5
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L		<5	<5	<5	<5	<5
1.2.3-Trichloropropane	96-18-4	5	µg/L		<5	<5	<5	<5	<5
Pentachloroethane	76-01-7	5	µg/L		<5	<5	<5	<5	<5
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L		<5	<5	<5	<5	<5
Hexachlorobutadiene	87-68-3	5	µg/L		<5	<5	<5	<5	<5
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		<5	<5	<5	<5	<5
Bromobenzene	108-86-1	5	µg/L		<5	<5	<5	<5	<5
2-Chlorotoluene	95-49-8	5	µg/L		<5	<5	<5	<5	<5
4-Chlorotoluene	106-43-4	5	µg/L		<5	<5	<5	<5	<5
1.3-Dichlorobenzene	541-73-1	5	µg/L		<5	<5	<5	<5	<5
1.4-Dichlorobenzene	106-46-7	5	µg/L		<5	<5	<5	<5	<5
1.2-Dichlorobenzene	95-50-1	5	µg/L		<5	<5	<5	<5	<5
1.2.4-Trichlorobenzene	120-82-1	5	µg/L		<5	<5	<5	<5	<5
1.2.3-Trichlorobenzene	87-61-6	5	µg/L		<5	<5	<5	<5	<5
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		<5	<5	<5	<5	<5
Bromodichloromethane	75-27-4	5	µg/L		<5	<5	<5	<5	<5
Dibromochloromethane	124-48-1	5	µg/L		<5	<5	<5	<5	<5
Bromoform	75-25-2	5	µg/L		<5	<5	<5	<5	<5
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	GR-P3	WKMB06A	WKMB06B	GW080487	QA1
				Client sampling date / time	29-JAN-2015 15:40	29-JAN-2015 14:20	29-JAN-2015 14:40	30-JAN-2015 10:30	[30-JAN-2015]
					ES1501844-006	ES1501844-007	ES1501844-008	ES1501844-009	ES1501844-010
EP075(SIM)A: Phenolic Compounds - Continued									
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1.0	µg/L		**1.2**	**1.0**	<1.0	<1.0	<1.0
Fluorene	86-73-7	1.0	µg/L		**1.3**	**1.1**	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1.0	µg/L		**2.0**	**1.6**	<1.0	**1.2**	<1.0
Anthracene	120-12-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L		**4.5**	**3.7**	<0.5	**1.2**	<0.5
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	>C10_C16	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	GR-P3	WKMB06A	WKMB06B	GW080487	QA1
				Client sampling date / time	29-JAN-2015 15:40	29-JAN-2015 14:20	29-JAN-2015 14:40	30-JAN-2015 10:30	[30-JAN-2015]
					ES1501844-006	ES1501844-007	ES1501844-008	ES1501844-009	ES1501844-010
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	<100	<100	<100	<100
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	**14**	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	<2	<2	<2	<2
^ **Sum of BTEX**	----	1	µg/L		<1	<1	**14**	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP262: Ethanolamines									
Ethanolamine	141-43-5	1	µg/L		<1	<1	<1	<1	<1
Diethanolamine	111-42-2	1	µg/L		<1	<1	<1	<1	<1
Methyl diethanolamine (MDEA)	105-59-9	1	µg/L		<1	<1	<1	<1	<1
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**124**	**129**	**112**	**128**	**131**
Toluene-D8	2037-26-5	0.1	%		**126**	**127**	**126**	**125**	**122**
4-Bromofluorobenzene	460-00-4	0.1	%		**112**	**112**	**114**	**110**	**109**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		**36.9**	**32.4**	**31.4**	**28.3**	**32.8**
2-Chlorophenol-D4	93951-73-6	0.1	%		**67.3**	**60.0**	**58.0**	**54.2**	**61.7**
2.4.6-Tribromophenol	118-79-6	0.1	%		**62.8**	**57.3**	**42.4**	**43.4**	**64.1**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		**45.5**	**48.5**	**61.5**	**39.3**	**56.1**
Anthracene-d10	1719-06-8	0.1	%		**74.7**	**68.0**	**74.1**	**58.3**	**74.1**
4-Terphenyl-d14	1718-51-0	0.1	%		**77.1**	**77.4**	**82.0**	**59.6**	**77.5**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**123**	**129**	**116**	**126**	**130**
Toluene-D8	2037-26-5	0.1	%		**124**	**125**	**127**	**123**	**120**
4-Bromofluorobenzene	460-00-4	0.1	%		**121**	**121**	**120**	**117**	**115**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	QA2	----	----	----	----
				Client sampling date / time	[30-JAN-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1501844-011	----	----	----	----
EA005: pH									
pH Value	----	0.01	pH Unit		**7.34**	----	----	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**3850**	----	----	----	----
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	----	10	mg/L		**1990**	----	----	----	----
EA025: Suspended Solids									
Suspended Solids (SS)	----	5	mg/L		<5	----	----	----	----
ED009: Anions									
Chloride	16887-00-6	0.100	mg/L		**643**	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**1050**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L		**1050**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**92**	----	----	----	----
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		**598**	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**84**	----	----	----	----
Magnesium	7439-95-4	1	mg/L		**41**	----	----	----	----
Sodium	7440-23-5	1	mg/L		**866**	----	----	----	----
Potassium	7440-09-7	1	mg/L		**6**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	----	----	----	----
Antimony	7440-36-0	0.001	mg/L		<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	----	----	----	----
Barium	7440-39-3	0.001	mg/L		**0.243**	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	QA2	----	----	----	----
				Client sampling date / time	[30-JAN-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1501844-011	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.001	mg/L	<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.011**	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	**0.051**	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	<0.001	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
Strontium	7440-24-6	0.001	mg/L	**6.17**	----	----	----	----
Tin	7440-31-5	0.001	mg/L	<0.001	----	----	----	----
Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	----	----	----	----
Boron	7440-42-8	0.05	mg/L	**0.06**	----	----	----	----
Iron	7439-89-6	0.05	mg/L	**0.31**	----	----	----	----
Bromine	7726-95-6	0.1	mg/L	**1.7**	----	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	**20.1**	----	----	----	----
EK010/011: Chlorine									
Chlorine - Free	----	0.2	mg/L	<0.2	----	----	----	----
Chlorine - Total Residual	----	0.2	mg/L	<0.2	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	**0.2**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	**0.46**	----	----	----	----
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	----	0.01	mg/L	**0.46**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----	0.01	mg/L	<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	QA2	----	----	----	----
				Client sampling date / time	[30-JAN-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1501844-011	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.6**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**0.6**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		<0.01	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	----	----	----	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**41.6**	----	----	----	----
Total Cations	----	0.01	meq/L		**45.4**	----	----	----	----
Ionic Balance	----	0.01	%		**4.33**	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**2**	----	----	----	----
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8	10	µg/L		**72**	----	----	----	----
Ethene	74-85-1	10	µg/L		<10	----	----	----	----
Ethane	74-84-0	10	µg/L		<10	----	----	----	----
Propene	115-07-1	10	µg/L		<10	----	----	----	----
Propane	74-98-6	10	µg/L		<10	----	----	----	----
Butene	25167-67-3	10	µg/L		<10	----	----	----	----
Butane	106-97-8	10	µg/L		<10	----	----	----	----
EP074A: Monocyclic Aromatic Hydrocarbons									
Styrene	100-42-5	5	µg/L		<5	----	----	----	----
Isopropylbenzene	98-82-8	5	µg/L		<5	----	----	----	----
n-Propylbenzene	103-65-1	5	µg/L		<5	----	----	----	----
1.3.5-Trimethylbenzene	108-67-8	5	µg/L		<5	----	----	----	----
sec-Butylbenzene	135-98-8	5	µg/L		<5	----	----	----	----
1.2.4-Trimethylbenzene	95-63-6	5	µg/L		<5	----	----	----	----
tert-Butylbenzene	98-06-6	5	µg/L		<5	----	----	----	----
p-Isopropyltoluene	99-87-6	5	µg/L		<5	----	----	----	----
n-Butylbenzene	104-51-8	5	µg/L		<5	----	----	----	----
EP074B: Oxygenated Compounds									
Vinyl Acetate	108-05-4	50	µg/L		<50	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	QA2	----	----	----	----
				Client sampling date / time	[30-JAN-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1501844-011	----	----	----	----
EP074B: Oxygenated Compounds - Continued									
2-Butanone (MEK)	78-93-3	50	µg/L		<50	----	----	----	----
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L		<50	----	----	----	----
2-Hexanone (MBK)	591-78-6	50	µg/L		<50	----	----	----	----
EP074C: Sulfonated Compounds									
Carbon disulfide	75-15-0	5	µg/L		<5	----	----	----	----
EP074D: Fumigants									
2.2-Dichloropropane	594-20-7	5	µg/L		<5	----	----	----	----
1.2-Dichloropropane	78-87-5	5	µg/L		<5	----	----	----	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L		<5	----	----	----	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L		<5	----	----	----	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	----	----	----	----
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	----	----	----	----
Chloromethane	74-87-3	50	µg/L		<50	----	----	----	----
Vinyl chloride	75-01-4	50	µg/L		<50	----	----	----	----
Bromomethane	74-83-9	50	µg/L		<50	----	----	----	----
Chloroethane	75-00-3	50	µg/L		<50	----	----	----	----
Trichlorofluoromethane	75-69-4	50	µg/L		<50	----	----	----	----
1.1-Dichloroethene	75-35-4	5	µg/L		<5	----	----	----	----
Iodomethane	74-88-4	5	µg/L		<5	----	----	----	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L		<5	----	----	----	----
1.1-Dichloroethane	75-34-3	5	µg/L		<5	----	----	----	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L		<5	----	----	----	----
1.1.1-Trichloroethane	71-55-6	5	µg/L		<5	----	----	----	----
1.1-Dichloropropylene	563-58-6	5	µg/L		<5	----	----	----	----
Carbon Tetrachloride	56-23-5	5	µg/L		<5	----	----	----	----
1.2-Dichloroethane	107-06-2	5	µg/L		<5	----	----	----	----
Trichloroethene	79-01-6	5	µg/L		<5	----	----	----	----
Dibromomethane	74-95-3	5	µg/L		<5	----	----	----	----
1.1.2-Trichloroethane	79-00-5	5	µg/L		<5	----	----	----	----
1.3-Dichloropropane	142-28-9	5	µg/L		<5	----	----	----	----
Tetrachloroethene	127-18-4	5	µg/L		<5	----	----	----	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L		<5	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	QA2	----	----	----	----
				Client sampling date / time	[30-JAN-2015]	----	----	----	----
					ES1501844-011	----	----	----	----
EP074E: Halogenated Aliphatic Compounds - Continued									
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L		<5	----	----	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	----	----	----	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L		<5	----	----	----	----
1.2.3-Trichloropropane	96-18-4	5	µg/L		<5	----	----	----	----
Pentachloroethane	76-01-7	5	µg/L		<5	----	----	----	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L		<5	----	----	----	----
Hexachlorobutadiene	87-68-3	5	µg/L		<5	----	----	----	----
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		<5	----	----	----	----
Bromobenzene	108-86-1	5	µg/L		<5	----	----	----	----
2-Chlorotoluene	95-49-8	5	µg/L		<5	----	----	----	----
4-Chlorotoluene	106-43-4	5	µg/L		<5	----	----	----	----
1.3-Dichlorobenzene	541-73-1	5	µg/L		<5	----	----	----	----
1.4-Dichlorobenzene	106-46-7	5	µg/L		<5	----	----	----	----
1.2-Dichlorobenzene	95-50-1	5	µg/L		<5	----	----	----	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L		<5	----	----	----	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L		<5	----	----	----	----
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		<5	----	----	----	----
Bromodichloromethane	75-27-4	5	µg/L		<5	----	----	----	----
Dibromochloromethane	124-48-1	5	µg/L		<5	----	----	----	----
Bromoform	75-25-2	5	µg/L		<5	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	----	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	----	----	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	----	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: QA2	----	----	----	----
				Client sampling date / time: [30-JAN-2015]	----	----	----	----
				ES1501844-011	**----**	**----**	**----**	**----**
EP075(SIM)A: Phenolic Compounds - Continued								
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	----	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L	**1.0**	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L	**1.6**	----	----	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L	**2.6**	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L	<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	QA2	----	----	----	----
				Client sampling date / time	[30-JAN-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1501844-011	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ Total Xylenes	1330-20-7	2	µg/L		<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP262: Ethanolamines									
Ethanolamine	141-43-5	1	µg/L		<1	----	----	----	----
Diethanolamine	111-42-2	1	µg/L		<1	----	----	----	----
Methyl diethanolamine (MDEA)	105-59-9	1	µg/L		<1	----	----	----	----
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**126**	----	----	----	----
Toluene-D8	2037-26-5	0.1	%		**120**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		**104**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		**27.1**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%		**55.6**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%		**53.2**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		**41.4**	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%		**65.8**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%		**66.6**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**125**	----	----	----	----
Toluene-D8	2037-26-5	0.1	%		**118**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		**109**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78.3	133.2
Toluene-D8	2037-26-5	79.1	128.9
4-Bromofluorobenzene	460-00-4	80.8	123.7
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27.4	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1501981**	Page	: 1 of 10
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: S DAYKIN	Contact	: Loren Schiavon
Address	: PO Box 5394 SYDNEY NSW 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: sdaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: ----	Telephone	: +61 2 8784 8503
Facsimile	: ----	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 29-JAN-2015
Sampler	: CS	Issue Date	: 12-MAY-2015
Site	: ----		
		No. of samples received	: 1
Quote number	: SY/933/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.**
- **EG020: 'Bromine/Iodine' quantification may be unreliable due to its low solubility in acid, leading to variable volatility during measurement by ICPMS.**
- **EP005 is conducted by ALS Melbourne, NATA accreditation no. 825, site no 13778.**
- **This report has been amended as a result of a request to change sample identification numbers (IDs) received by ALS from Kelly-Jane Wallis on 5/5/15. All analysis results are as per the previous report.**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	AST2	----	----	----	----
				Client sampling date / time	28-JAN-2015 12:15	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1501981-001	----	----	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	**8.77**	----	----	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	**6010**	----	----	----	----
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	----	10	mg/L	**4200**	----	----	----	----
EA025: Suspended Solids									
Suspended Solids (SS)	----	5	mg/L	**45**	----	----	----	----
ED009: Anions									
Chloride	16887-00-6	0.100	mg/L	**454**	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	**340**	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**2360**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**2700**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	----	----	----	----
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L	**502**	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	**14**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**3**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**1570**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**14**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	**0.02**	----	----	----	----
Antimony	7440-36-0	0.001	mg/L	**0.001**	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	**0.005**	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	----	----	----	----
Barium	7440-39-3	0.001	mg/L	**2.64**	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	**0.001**	----	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.005**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: AST2	----	----	----	----
				Client sampling date / time: 28-JAN-2015 12:15	----	----	----	----
				ES1501981-001	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued								
Nickel	7440-02-0	0.001	mg/L	**0.005**	----	----	----	----
Lead	7439-92-1	0.001	mg/L	**0.010**	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.012**	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	**0.043**	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	**0.008**	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
Strontium	7440-24-6	0.001	mg/L	**2.29**	----	----	----	----
Tin	7440-31-5	0.001	mg/L	<0.001	----	----	----	----
Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	----	----	----	----
Boron	7440-42-8	0.05	mg/L	**10.0**	----	----	----	----
Iron	7439-89-6	0.05	mg/L	**4.26**	----	----	----	----
Bromine	7726-95-6	0.1	mg/L	**0.7**	----	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	**18.4**	----	----	----	----
EK010/011: Chlorine								
Chlorine - Free	----	0.2	mg/L	<0.2	----	----	----	----
Chlorine - Total Residual	----	0.2	mg/L	<0.2	----	----	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	**1.0**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	----	----	----	----
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	----	0.01	mg/L	<0.01	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	----	0.01	mg/L	<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.07**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.07**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	AST2	----	----	----	----
			Client sampling date / time	28-JAN-2015 12:15	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1501981-001	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**5.7**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**5.8**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**2.20**	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	----	----	----	----
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	**68.1**	----	----	----	----
Total Cations	----	0.01	meq/L	**69.6**	----	----	----	----
Ionic Balance	----	0.01	%	**1.02**	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**399**	----	----	----	----
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	----	----	----	----
EP033: C1 - C4 Hydrocarbon Gases								
Methane	74-82-8	10	µg/L	**1500**	----	----	----	----
Ethene	74-85-1	10	µg/L	<10	----	----	----	----
Ethane	74-84-0	10	µg/L	**89**	----	----	----	----
Propene	115-07-1	10	µg/L	<10	----	----	----	----
Propane	74-98-6	10	µg/L	**12**	----	----	----	----
Butene	25167-67-3	10	µg/L	<10	----	----	----	----
Butane	106-97-8	10	µg/L	<10	----	----	----	----
EP074A: Monocyclic Aromatic Hydrocarbons								
Styrene	100-42-5	5	µg/L	<5	----	----	----	----
Isopropylbenzene	98-82-8	5	µg/L	<5	----	----	----	----
n-Propylbenzene	103-65-1	5	µg/L	<5	----	----	----	----
1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	----	----	----	----
sec-Butylbenzene	135-98-8	5	µg/L	<5	----	----	----	----
1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	----	----	----	----
tert-Butylbenzene	98-06-6	5	µg/L	<5	----	----	----	----
p-Isopropyltoluene	99-87-6	5	µg/L	<5	----	----	----	----
n-Butylbenzene	104-51-8	5	µg/L	<5	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: AST2	----	----	----	----
				Client sampling date / time: 28-JAN-2015 12:15	----	----	----	----
				ES1501981-001	----	----	----	----
EP074B: Oxygenated Compounds								
Vinyl Acetate	108-05-4	50	µg/L	<50	----	----	----	----
2-Butanone (MEK)	78-93-3	50	µg/L	<50	----	----	----	----
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	----	----	----	----
2-Hexanone (MBK)	591-78-6	50	µg/L	<50	----	----	----	----
EP074C: Sulfonated Compounds								
Carbon disulfide	75-15-0	5	µg/L	<5	----	----	----	----
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	5	µg/L	<5	----	----	----	----
1.2-Dichloropropane	78-87-5	5	µg/L	<5	----	----	----	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	----	----	----	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	----	----	----	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	----	----	----	----
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	50	µg/L	<50	----	----	----	----
Chloromethane	74-87-3	50	µg/L	<50	----	----	----	----
Vinyl chloride	75-01-4	50	µg/L	<50	----	----	----	----
Bromomethane	74-83-9	50	µg/L	<50	----	----	----	----
Chloroethane	75-00-3	50	µg/L	<50	----	----	----	----
Trichlorofluoromethane	75-69-4	50	µg/L	<50	----	----	----	----
1.1-Dichloroethene	75-35-4	5	µg/L	<5	----	----	----	----
Iodomethane	74-88-4	5	µg/L	<5	----	----	----	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	----	----	----	----
1.1-Dichloroethane	75-34-3	5	µg/L	<5	----	----	----	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	----	----	----	----
1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	----	----	----	----
1.1-Dichloropropylene	563-58-6	5	µg/L	<5	----	----	----	----
Carbon Tetrachloride	56-23-5	5	µg/L	<5	----	----	----	----
1.2-Dichloroethane	107-06-2	5	µg/L	<5	----	----	----	----
Trichloroethene	79-01-6	5	µg/L	<5	----	----	----	----
Dibromomethane	74-95-3	5	µg/L	<5	----	----	----	----
1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	----	----	----	----
1.3-Dichloropropane	142-28-9	5	µg/L	<5	----	----	----	----
Tetrachloroethene	127-18-4	5	µg/L	<5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	AST2	----	----	----	----
				Client sampling date / time	28-JAN-2015 12:15	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1501981-001	----	----	----	----
EP074E: Halogenated Aliphatic Compounds - Continued									
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L		<5	----	----	----	----
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L		<5	----	----	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	----	----	----	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L		<5	----	----	----	----
1.2.3-Trichloropropane	96-18-4	5	µg/L		<5	----	----	----	----
Pentachloroethane	76-01-7	5	µg/L		<5	----	----	----	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L		<5	----	----	----	----
Hexachlorobutadiene	87-68-3	5	µg/L		<5	----	----	----	----
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		<5	----	----	----	----
Bromobenzene	108-86-1	5	µg/L		<5	----	----	----	----
2-Chlorotoluene	95-49-8	5	µg/L		<5	----	----	----	----
4-Chlorotoluene	106-43-4	5	µg/L		<5	----	----	----	----
1.3-Dichlorobenzene	541-73-1	5	µg/L		<5	----	----	----	----
1.4-Dichlorobenzene	106-46-7	5	µg/L		<5	----	----	----	----
1.2-Dichlorobenzene	95-50-1	5	µg/L		<5	----	----	----	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L		<5	----	----	----	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L		<5	----	----	----	----
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		<5	----	----	----	----
Bromodichloromethane	75-27-4	5	µg/L		<5	----	----	----	----
Dibromochloromethane	124-48-1	5	µg/L		<5	----	----	----	----
Bromoform	75-25-2	5	µg/L		<5	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		**2.8**	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		**33.0**	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	----	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	----	----	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	----	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: AST2	----	----	----	----
				Client sampling date / time: 28-JAN-2015 12:15	----	----	----	----
				ES1501981-001	----	----	----	----
EP075(SIM)A: Phenolic Compounds - Continued								
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	----	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L	<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L	<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L	<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	**50**	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	**50**	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	AST2	----	----	----	----
				Client sampling date / time	28-JAN-2015 12:15	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1501981-001	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		**14**	----	----	----	----
Toluene	108-88-3	2	µg/L		**20**	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		**3**	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ Total Xylenes	1330-20-7	2	µg/L		**3**	----	----	----	----
^ Sum of BTEX	----	1	µg/L		**37**	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP262: Ethanolamines									
Ethanolamine	141-43-5	1	µg/L		**8**	----	----	----	----
Diethanolamine	111-42-2	1	µg/L		<1	----	----	----	----
Methyl diethanolamine (MDEA)	105-59-9	1	µg/L		<1	----	----	----	----
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**89.5**	----	----	----	----
Toluene-D8	2037-26-5	0.1	%		**100**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		**94.9**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		**20.7**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%		**33.4**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%		**28.6**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		**40.5**	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%		**53.8**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%		**60.2**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**85.0**	----	----	----	----
Toluene-D8	2037-26-5	0.1	%		**115**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		**91.7**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78.3	133.2
Toluene-D8	2037-26-5	79.1	128.9
4-Bromofluorobenzene	460-00-4	80.8	123.7
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27.4	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1501982**	Page	: 1 of 10
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: S DAYKIN	Contact	: Loren Schiavon
Address	: PO Box 5394 SYDNEY NSW 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: sdaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: ----	Telephone	: +61 2 8784 8503
Facsimile	: ----	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 29-JAN-2015
Sampler	: CS	Issue Date	: 06-FEB-2015
Site	: ----		
		No. of samples received	: 1
Quote number	: SY/933/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.**
- **EA015: TDS by method EA-015 may bias high for sample WKSW01 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.**
- **EG020: Bromine quantification may be unreliable due to its low solubility in acid, leading to variable volatility during measurement by ICPMS.**
- **TOC by EP005 is conducted by ALS Melbourne, NATA accreditation no. 825, site no 13778.**

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	WKSW01	----	----	----	----
			Client sampling date / time	28-JAN-2015 17:45	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1501982-001	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.94**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**128**	----	----	----	----
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	----	10	mg/L	**149**	----	----	----	----
EA025: Suspended Solids								
Suspended Solids (SS)	----	5	mg/L	**44**	----	----	----	----
ED009: Anions								
Chloride	16887-00-6	0.100	mg/L	**20.2**	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**22**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**22**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	----	----	----	----
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	**17**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**5**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**3**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**16**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**4**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.48**	----	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	**0.001**	----	----	----	----
Boron	7440-42-8	0.05	mg/L	<0.05	----	----	----	----
Barium	7440-39-3	0.001	mg/L	**0.051**	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	**0.0013**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WKSW01	----	----	----	----
				Client sampling date / time	28-JAN-2015 17:45	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1501982-001	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Copper	7440-50-8	0.001	mg/L		**0.008**	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.040**	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		**0.004**	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		**0.051**	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		<0.001	----	----	----	----
Strontium	7440-24-6	0.001	mg/L		**0.071**	----	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	----	----	----	----
Uranium	7440-61-1	0.001	mg/L		<0.001	----	----	----	----
Iron	7439-89-6	0.05	mg/L		**0.92**	----	----	----	----
Bromine	7726-95-6	0.1	mg/L		<0.1	----	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L		**14.0**	----	----	----	----
EK010/011: Chlorine									
Chlorine - Free	----	0.2	mg/L		<0.2	----	----	----	----
Chlorine - Total Residual	----	0.2	mg/L		<0.2	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.1**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.02**	----	----	----	----
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	----	0.01	mg/L		**0.02**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----	0.01	mg/L		<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.09**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.09**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	WKSW01	----	----	----	----
			Client sampling date / time	28-JAN-2015 17:45	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1501982-001	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**1.2**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**1.3**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.18**	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.07**	----	----	----	----
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	**1.28**	----	----	----	----
Total Cations	----	0.01	meq/L	**1.29**	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**16**	----	----	----	----
EP033: C1 - C4 Hydrocarbon Gases								
Methane	74-82-8	10	µg/L	**18**	----	----	----	----
Ethene	74-85-1	10	µg/L	<10	----	----	----	----
Ethane	74-84-0	10	µg/L	<10	----	----	----	----
Propene	115-07-1	10	µg/L	<10	----	----	----	----
Propane	74-98-6	10	µg/L	<10	----	----	----	----
Butene	25167-67-3	10	µg/L	<10	----	----	----	----
Butane	106-97-8	10	µg/L	<10	----	----	----	----
EP074A: Monocyclic Aromatic Hydrocarbons								
Styrene	100-42-5	5	µg/L	<5	----	----	----	----
Isopropylbenzene	98-82-8	5	µg/L	<5	----	----	----	----
n-Propylbenzene	103-65-1	5	µg/L	<5	----	----	----	----
1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	----	----	----	----
sec-Butylbenzene	135-98-8	5	µg/L	<5	----	----	----	----
1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	----	----	----	----
tert-Butylbenzene	98-06-6	5	µg/L	<5	----	----	----	----
p-Isopropyltoluene	99-87-6	5	µg/L	<5	----	----	----	----
n-Butylbenzene	104-51-8	5	µg/L	<5	----	----	----	----
EP074B: Oxygenated Compounds								
Vinyl Acetate	108-05-4	50	µg/L	<50	----	----	----	----
2-Butanone (MEK)	78-93-3	50	µg/L	<50	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: WKSW01	----	----	----	----
				Client sampling date / time: 28-JAN-2015 17:45	----	----	----	----
				ES1501982-001	----	----	----	----
EP074B: Oxygenated Compounds - Continued								
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	----	----	----	----
2-Hexanone (MBK)	591-78-6	50	µg/L	<50	----	----	----	----
EP074C: Sulfonated Compounds								
Carbon disulfide	75-15-0	5	µg/L	<5	----	----	----	----
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	5	µg/L	<5	----	----	----	----
1.2-Dichloropropane	78-87-5	5	µg/L	<5	----	----	----	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	----	----	----	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	----	----	----	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	----	----	----	----
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	50	µg/L	<50	----	----	----	----
Chloromethane	74-87-3	50	µg/L	<50	----	----	----	----
Vinyl chloride	75-01-4	50	µg/L	<50	----	----	----	----
Bromomethane	74-83-9	50	µg/L	<50	----	----	----	----
Chloroethane	75-00-3	50	µg/L	<50	----	----	----	----
Trichlorofluoromethane	75-69-4	50	µg/L	<50	----	----	----	----
1.1-Dichloroethene	75-35-4	5	µg/L	<5	----	----	----	----
Iodomethane	74-88-4	5	µg/L	<5	----	----	----	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	----	----	----	----
1.1-Dichloroethane	75-34-3	5	µg/L	<5	----	----	----	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	----	----	----	----
1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	----	----	----	----
1.1-Dichloropropylene	563-58-6	5	µg/L	<5	----	----	----	----
Carbon Tetrachloride	56-23-5	5	µg/L	<5	----	----	----	----
1.2-Dichloroethane	107-06-2	5	µg/L	<5	----	----	----	----
Trichloroethene	79-01-6	5	µg/L	<5	----	----	----	----
Dibromomethane	74-95-3	5	µg/L	<5	----	----	----	----
1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	----	----	----	----
1.3-Dichloropropane	142-28-9	5	µg/L	<5	----	----	----	----
Tetrachloroethene	127-18-4	5	µg/L	<5	----	----	----	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	----	----	----	----
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WKSW01	----	----	----	----
				Client sampling date / time	28-JAN-2015 17:45	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1501982-001	----	----	----	----
EP074E: Halogenated Aliphatic Compounds - Continued									
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	----	----	----	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L		<5	----	----	----	----
1.2.3-Trichloropropane	96-18-4	5	µg/L		<5	----	----	----	----
Pentachloroethane	76-01-7	5	µg/L		<5	----	----	----	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L		<5	----	----	----	----
Hexachlorobutadiene	87-68-3	5	µg/L		<5	----	----	----	----
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		<5	----	----	----	----
Bromobenzene	108-86-1	5	µg/L		<5	----	----	----	----
2-Chlorotoluene	95-49-8	5	µg/L		<5	----	----	----	----
4-Chlorotoluene	106-43-4	5	µg/L		<5	----	----	----	----
1.3-Dichlorobenzene	541-73-1	5	µg/L		<5	----	----	----	----
1.4-Dichlorobenzene	106-46-7	5	µg/L		<5	----	----	----	----
1.2-Dichlorobenzene	95-50-1	5	µg/L		<5	----	----	----	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L		<5	----	----	----	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L		<5	----	----	----	----
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		<5	----	----	----	----
Bromodichloromethane	75-27-4	5	µg/L		<5	----	----	----	----
Dibromochloromethane	124-48-1	5	µg/L		<5	----	----	----	----
Bromoform	75-25-2	5	µg/L		<5	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	----	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	----	----	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	----	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	WKSW01	----	----	----	----
			Client sampling date / time	28-JAN-2015 17:45	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1501982-001	----	----	----	----
EP075(SIM)A: Phenolic Compounds - Continued								
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L	<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WKSW01	----	----	----	----
				Client sampling date / time	28-JAN-2015 17:45	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1501982-001	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ Total Xylenes	1330-20-7	2	µg/L		<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP262: Ethanolamines									
Ethanolamine	141-43-5	1	µg/L		<1	----	----	----	----
Diethanolamine	111-42-2	1	µg/L		<1	----	----	----	----
Methyl diethanolamine (MDEA)	105-59-9	1	µg/L		<1	----	----	----	----
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**95.6**	----	----	----	----
Toluene-D8	2037-26-5	0.1	%		**109**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		**104**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		**22.1**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%		**51.4**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%		**51.8**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		**58.9**	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%		**69.2**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%		**75.3**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**114**	----	----	----	----
Toluene-D8	2037-26-5	0.1	%		**109**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		**106**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78.3	133.2
Toluene-D8	2037-26-5	79.1	128.9
4-Bromofluorobenzene	460-00-4	80.8	123.7
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27.4	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1502224**	Page	: 1 of 10
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: SDaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 02-FEB-2015
Sampler	: SD,CS	Issue Date	: 12-MAY-2015
Site	: ----		
		No. of samples received	: 2
Quote number	: SY/933/14	No. of samples analysed	: 2

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Merrin Avery	Supervisor - Inorganic	Newcastle - Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **This report has been amended as a result of a request to change sample identification numbers (IDs) received by ALS from Kelly-Jane Wallis on 5/5/15. All analysis results are as per the previous report.**

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: AST2	QA	----	----	----
				Client sampling date / time: 02-FEB-2015 11:30	02-FEB-2015 12:15	----	----	----
				ES1502224-001	ES1502224-002	----	----	----
EA005: pH								
pH Value	----	0.01	pH Unit	**9.19**	**9.21**	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**6060**	**6070**	----	----	----
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	----	10	mg/L	**4110**	**4070**	----	----	----
EA025: Suspended Solids								
Suspended Solids (SS)	----	5	mg/L	**82**	**84**	----	----	----
ED009: Anions								
Chloride	16887-00-6	0.100	mg/L	**484**	**495**	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	**568**	**582**	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**2120**	**2150**	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**2680**	**2730**	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	----	----	----
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	**518**	**518**	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**5**	**5**	----	----	----
Magnesium	7439-95-4	1	mg/L	**2**	**2**	----	----	----
Sodium	7440-23-5	1	mg/L	**1500**	**1500**	----	----	----
Potassium	7440-09-7	1	mg/L	**14**	**14**	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.02**	**0.02**	----	----	----
Antimony	7440-36-0	0.001	mg/L	**0.001**	**0.002**	----	----	----
Arsenic	7440-38-2	0.001	mg/L	**0.004**	**0.004**	----	----	----
Boron	7440-42-8	0.05	mg/L	**9.55**	**9.27**	----	----	----
Barium	7440-39-3	0.001	mg/L	**2.28**	**2.40**	----	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	**0.001**	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	AST2	QA	----	----	----
				Client sampling date / time	02-FEB-2015 11:30	02-FEB-2015 12:15	----	----	----
					ES1502224-001	ES1502224-002	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Copper	7440-50-8	0.001	mg/L		**0.006**	**0.008**	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.026**	**0.030**	----	----	----
Nickel	7440-02-0	0.001	mg/L		**0.004**	**0.005**	----	----	----
Lead	7439-92-1	0.001	mg/L		**0.007**	**0.007**	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	----	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	----	----	----
Zinc	7440-66-6	0.005	mg/L		**0.007**	**0.014**	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		**0.006**	**0.007**	----	----	----
Strontium	7440-24-6	0.001	mg/L		**2.24**	**2.23**	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	----	----	----
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	----	----	----
Iron	7439-89-6	0.05	mg/L		**2.53**	**3.14**	----	----	----
Bromine	7726-95-6	0.1	mg/L		**0.8**	**0.6**	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	----	----	----
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L		**21.4**	**19.9**	----	----	----
EK010/011: Chlorine									
Chlorine - Free	----	0.2	mg/L		<0.2	<0.2	----	----	----
Chlorine - Total Residual	----	0.2	mg/L		<0.2	<0.2	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**1.0**	**1.0**	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.01**	**0.01**	----	----	----
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	----	0.01	mg/L		<0.01	<0.01	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----	0.01	mg/L		<0.01	<0.01	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	<0.01	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	<0.01	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	AST2	QA	----	----	----
				Client sampling date / time	02-FEB-2015 11:30	02-FEB-2015 12:15	----	----	----
					ES1502224-001	ES1502224-002	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**5.6**	**5.3**	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ **Total Nitrogen as N**	----	0.1	mg/L		**5.6**	**5.3**	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**2.15**	**2.08**	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		**0.05**	<0.01	----	----	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**68.2**	**69.2**	----	----	----
Total Cations	----	0.01	meq/L		**66.0**	**66.0**	----	----	----
Ionic Balance	----	0.01	%		**1.66**	**2.38**	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**335**	**349**	----	----	----
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L		**8**	**7**	----	----	----
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8	10	µg/L		**925**	**961**	----	----	----
Ethene	74-85-1	10	µg/L		<10	<10	----	----	----
Ethane	74-84-0	10	µg/L		**29**	**30**	----	----	----
Propene	115-07-1	10	µg/L		<10	<10	----	----	----
Propane	74-98-6	10	µg/L		<10	<10	----	----	----
Butene	25167-67-3	10	µg/L		<10	<10	----	----	----
Butane	106-97-8	10	µg/L		<10	<10	----	----	----
EP074A: Monocyclic Aromatic Hydrocarbons									
Styrene	100-42-5	5	µg/L		<5	<5	----	----	----
Isopropylbenzene	98-82-8	5	µg/L		<5	<5	----	----	----
n-Propylbenzene	103-65-1	5	µg/L		<5	<5	----	----	----
1.3.5-Trimethylbenzene	108-67-8	5	µg/L		<5	<5	----	----	----
sec-Butylbenzene	135-98-8	5	µg/L		<5	<5	----	----	----
1.2.4-Trimethylbenzene	95-63-6	5	µg/L		<5	<5	----	----	----
tert-Butylbenzene	98-06-6	5	µg/L		<5	<5	----	----	----
p-Isopropyltoluene	99-87-6	5	µg/L		<5	<5	----	----	----
n-Butylbenzene	104-51-8	5	µg/L		<5	<5	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	AST2	QA	----	----	----
				Client sampling date / time	02-FEB-2015 11:30	02-FEB-2015 12:15	----	----	----
					ES1502224-001	ES1502224-002	----	----	----
EP074B: Oxygenated Compounds									
Vinyl Acetate	108-05-4	50	µg/L		<50	<50	----	----	----
2-Butanone (MEK)	78-93-3	50	µg/L		<50	<50	----	----	----
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L		<50	<50	----	----	----
2-Hexanone (MBK)	591-78-6	50	µg/L		<50	<50	----	----	----
EP074C: Sulfonated Compounds									
Carbon disulfide	75-15-0	5	µg/L		<5	<5	----	----	----
EP074D: Fumigants									
2.2-Dichloropropane	594-20-7	5	µg/L		<5	<5	----	----	----
1.2-Dichloropropane	78-87-5	5	µg/L		<5	<5	----	----	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L		<5	<5	----	----	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L		<5	<5	----	----	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	<5	----	----	----
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	<50	----	----	----
Chloromethane	74-87-3	50	µg/L		<50	<50	----	----	----
Vinyl chloride	75-01-4	50	µg/L		<50	<50	----	----	----
Bromomethane	74-83-9	50	µg/L		<50	<50	----	----	----
Chloroethane	75-00-3	50	µg/L		<50	<50	----	----	----
Trichlorofluoromethane	75-69-4	50	µg/L		<50	<50	----	----	----
1.1-Dichloroethene	75-35-4	5	µg/L		<5	<5	----	----	----
Iodomethane	74-88-4	5	µg/L		<5	<5	----	----	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L		<5	<5	----	----	----
1.1-Dichloroethane	75-34-3	5	µg/L		<5	<5	----	----	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L		<5	<5	----	----	----
1.1.1-Trichloroethane	71-55-6	5	µg/L		<5	<5	----	----	----
1.1-Dichloropropylene	563-58-6	5	µg/L		<5	<5	----	----	----
Carbon Tetrachloride	56-23-5	5	µg/L		<5	<5	----	----	----
1.2-Dichloroethane	107-06-2	5	µg/L		<5	<5	----	----	----
Trichloroethene	79-01-6	5	µg/L		<5	<5	----	----	----
Dibromomethane	74-95-3	5	µg/L		<5	<5	----	----	----
1.1.2-Trichloroethane	79-00-5	5	µg/L		<5	<5	----	----	----
1.3-Dichloropropane	142-28-9	5	µg/L		<5	<5	----	----	----
Tetrachloroethene	127-18-4	5	µg/L		<5	<5	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: AST2	QA	----	----	----
				Client sampling date / time: 02-FEB-2015 11:30	02-FEB-2015 12:15	----	----	----
				ES1502224-001	ES1502224-002	----	----	----
EP074E: Halogenated Aliphatic Compounds - Continued								
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	----	----	----
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	----	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	----	----	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	----	----	----
1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	----	----	----
Pentachloroethane	76-01-7	5	µg/L	<5	<5	----	----	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	----	----	----
Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	----	----	----
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	5	µg/L	<5	<5	----	----	----
Bromobenzene	108-86-1	5	µg/L	<5	<5	----	----	----
2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	----	----	----
4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	----	----	----
1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	----	----	----
1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	----	----	----
1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	----	----	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	----	----	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	----	----	----
EP074G: Trihalomethanes								
Chloroform	67-66-3	5	µg/L	<5	<5	----	----	----
Bromodichloromethane	75-27-4	5	µg/L	<5	<5	----	----	----
Dibromochloromethane	124-48-1	5	µg/L	<5	<5	----	----	----
Bromoform	75-25-2	5	µg/L	<5	<5	----	----	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	**2.2**	**2.0**	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L	<1.0	<1.0	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	<2.0	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	<1.0	----	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	AST2	QA	----	----	----
				Client sampling date / time	02-FEB-2015 11:30	02-FEB-2015 12:15	----	----	----
					ES1502224-001	ES1502224-002	----	----	----
EP075(SIM)A: Phenolic Compounds - Continued									
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	<1.0	----	----	----
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	<1.0	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	<2.0	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	<1.0	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	<1.0	----	----	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	<1.0	----	----	----
Fluorene	86-73-7	1.0	µg/L		<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1.0	µg/L		<1.0	<1.0	----	----	----
Anthracene	120-12-7	1.0	µg/L		<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1.0	µg/L		<1.0	<1.0	----	----	----
Pyrene	129-00-0	1.0	µg/L		<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	<1.0	----	----	----
Chrysene	218-01-9	1.0	µg/L		<1.0	<1.0	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	<1.0	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	<1.0	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	<1.0	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L		<0.5	<0.5	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L		<0.5	<0.5	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		**40**	**50**	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		**40**	**50**	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		**30**	**40**	----	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L		<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	AST2	QA	----	----	----
				Client sampling date / time	02-FEB-2015 11:30	02-FEB-2015 12:15	----	----	----
					ES1502224-001	ES1502224-002	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C34 - C40 Fraction	----	100	µg/L		<100	<100	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	<100	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	<100	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		**6**	**6**	----	----	----
Toluene	108-88-3	2	µg/L		**7**	**7**	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	----	----	----
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	<2	----	----	----
^ **Sum of BTEX**	----	1	µg/L		**13**	**13**	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	<5	----	----	----
EP262: Ethanolamines									
Ethanolamine	141-43-5	1	µg/L		**8**	**8**	----	----	----
Diethanolamine	111-42-2	1	µg/L		<1	<1	----	----	----
Methyl diethanolamine (MDEA)	105-59-9	1	µg/L		**8**	**6**	----	----	----
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**84.9**	**84.4**	----	----	----
Toluene-D8	2037-26-5	0.1	%		**104**	**104**	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		**92.5**	**91.0**	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		**20.1**	**18.9**	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%		**30.1**	**28.3**	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%		**24.8**	**38.1**	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		**59.5**	**51.5**	----	----	----
Anthracene-d10	1719-06-8	0.1	%		**61.4**	**52.7**	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%		**67.1**	**64.4**	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**85.0**	**84.8**	----	----	----
Toluene-D8	2037-26-5	0.1	%		**113**	**112**	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		**115**	**112**	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78.3	133.2
Toluene-D8	2037-26-5	79.1	128.9
4-Bromofluorobenzene	460-00-4	80.8	123.7
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27.4	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1502485**	Page	: 1 of 10
Amendment	: **3**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: SDaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 04-FEB-2015
Sampler	: CS/AM	Issue Date	: 22-MAY-2015
Site	: ----		
		No. of samples received	: 12
Quote number	: SY/933/14	No. of samples analysed	: 3

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.**
- **Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.**
- **EG020: Poor matrix spike recovery was obtained for Lead and Vanadium for sample ES1502485 #002 due to matrix inteference. Confirmed by re-analysis.**
- **EK059G-EK058G-EK057G:LOR raised for NOx- Nitrate- Nitrite on sample ID (WK13 U/S) due to sample matrix.**
- **EK067G: Spike failed for Total P due to matrix interferences**
- **EK071G:LOR raised for Reactive P analysis on sample ID(WK11U/S) due to sample matrix.**
- **This report has been amended following the removal of some samples from the COA and a sample ID change as requested by Kelly-Jane Wallis on 5/5/15.**
- **This report has been amended following the request to remove samples from the report**

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WK11	WK13	AST2	----	----
				Client sampling date / time	03-FEB-2015 17:30	03-FEB-2015 19:05	03-FEB-2015 18:30	----	----
					ES1502485-001	ES1502485-003	ES1502485-005	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**7.57**	**8.08**	**9.17**	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**10500**	**6950**	**6070**	----	----
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	----	10	mg/L		**7450**	**5410**	**4900**	----	----
EA025: Suspended Solids									
Suspended Solids (SS)	----	5	mg/L		**66**	**16**	**117**	----	----
ED009: Anions									
Chloride	16887-00-6	0.100	mg/L		**677**	**558**	**468**	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	**525**	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**4620**	**2900**	**1940**	----	----
Total Alkalinity as CaCO3	----	1	mg/L		**4620**	**2900**	**2470**	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<1	<1	<1	----	----
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		**700**	**576**	**485**	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**15**	**18**	**6**	----	----
Magnesium	7439-95-4	1	mg/L		**5**	**2**	**2**	----	----
Sodium	7440-23-5	1	mg/L		**2560**	**1670**	**1440**	----	----
Potassium	7440-09-7	1	mg/L		**23**	**19**	**19**	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	<0.01	**0.02**	----	----
Arsenic	7440-38-2	0.001	mg/L		**0.002**	**0.007**	**0.005**	----	----
Boron	7440-42-8	0.05	mg/L		**22.4**	**6.48**	**11.2**	----	----
Strontium	7440-24-6	0.001	mg/L		**7.69**	**3.84**	**2.50**	----	----
Barium	7440-39-3	0.001	mg/L		**9.06**	**5.17**	**2.82**	----	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
Cobalt	7440-48-4	0.001	mg/L		**0.001**	<0.001	<0.001	----	----
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WK11	WK13	AST2	----	----
				Client sampling date / time	03-FEB-2015 17:30	03-FEB-2015 19:05	03-FEB-2015 18:30	----	----
					ES1502485-001	ES1502485-003	ES1502485-005	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Chromium	7440-47-3	0.001	mg/L		**0.002**	**0.003**	**0.001**	----	----
Copper	7440-50-8	0.001	mg/L		**0.002**	**0.004**	**0.007**	----	----
Manganese	7439-96-5	0.001	mg/L		**0.100**	**0.016**	**0.034**	----	----
Molybdenum	7439-98-7	0.001	mg/L		**0.005**	**0.008**	**0.008**	----	----
Nickel	7440-02-0	0.001	mg/L		**0.011**	**0.004**	**0.004**	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	**0.008**	----	----
Antimony	7440-36-0	0.001	mg/L		**0.001**	<0.001	**0.001**	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	**0.016**	----	----
Iron	7439-89-6	0.05	mg/L		**0.40**	**2.18**	**3.63**	----	----
Bromine	7726-95-6	0.1	mg/L		**1.4**	**1.0**	**0.7**	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L		**35.5**	**29.6**	**18.6**	----	----
EK010/011: Chlorine									
Chlorine - Free	----	0.2	mg/L		<0.2	<0.2	<0.2	----	----
Chlorine - Total Residual	----	0.2	mg/L		<0.2	<0.2	<0.2	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.9**	**1.8**	**1.0**	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**7.66**	**4.23**	**0.05**	----	----
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	----	0.01	mg/L		**7.46**	**4.13**	**0.03**	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----	0.01	mg/L		<0.01	<0.01	<0.01	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.02**	<0.01	<0.01	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.02**	<0.01	<0.01	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WK11	WK13	AST2	----	----
				Client sampling date / time	03-FEB-2015 17:30	03-FEB-2015 19:05	03-FEB-2015 18:30	----	----
					ES1502485-001	ES1502485-003	ES1502485-005	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**8.8**	**5.5**	**6.3**	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ **Total Nitrogen as N**	----	0.1	mg/L		**8.8**	**5.5**	**6.3**	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**3.71**	**2.83**	**2.24**	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	**0.12**	**0.03**	----	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**112**	**74.2**	**63.0**	----	----
Total Cations	----	0.01	meq/L		**113**	**74.2**	**63.6**	----	----
Ionic Balance	----	0.01	%		**0.40**	**0.06**	**0.38**	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**2**	**6**	**6**	----	----
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8	10	µg/L		**2170**	**13300**	**1370**	----	----
Ethene	74-85-1	10	µg/L		<10	<10	<10	----	----
Ethane	74-84-0	10	µg/L		**402**	**2000**	**50**	----	----
Propene	115-07-1	10	µg/L		<10	<10	<10	----	----
Propane	74-98-6	10	µg/L		**47**	**256**	<10	----	----
Butene	25167-67-3	10	µg/L		<10	<10	<10	----	----
Butane	106-97-8	10	µg/L		<10	**16**	<10	----	----
EP074A: Monocyclic Aromatic Hydrocarbons									
Styrene	100-42-5	5	µg/L		<5	<5	<5	----	----
Isopropylbenzene	98-82-8	5	µg/L		<5	<5	<5	----	----
n-Propylbenzene	103-65-1	5	µg/L		<5	<5	<5	----	----
1.3.5-Trimethylbenzene	108-67-8	5	µg/L		<5	<5	<5	----	----
sec-Butylbenzene	135-98-8	5	µg/L		<5	<5	<5	----	----
1.2.4-Trimethylbenzene	95-63-6	5	µg/L		<5	<5	<5	----	----
tert-Butylbenzene	98-06-6	5	µg/L		<5	<5	<5	----	----
p-Isopropyltoluene	99-87-6	5	µg/L		<5	<5	<5	----	----
n-Butylbenzene	104-51-8	5	µg/L		<5	<5	<5	----	----
EP074B: Oxygenated Compounds									
Vinyl Acetate	108-05-4	50	µg/L		<50	<50	<50	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WK11	WK13	AST2	----	----
				Client sampling date / time	03-FEB-2015 17:30	03-FEB-2015 19:05	03-FEB-2015 18:30	----	----
Compound	CAS Number	LOR	Unit		ES1502485-001	ES1502485-003	ES1502485-005	----	----
EP074B: Oxygenated Compounds - Continued									
2-Butanone (MEK)	78-93-3	50	µg/L		**160**	**100**	<50	----	----
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L		<50	<50	<50	----	----
2-Hexanone (MBK)	591-78-6	50	µg/L		<50	<50	<50	----	----
EP074C: Sulfonated Compounds									
Carbon disulfide	75-15-0	5	µg/L		<5	**10**	<5	----	----
EP074D: Fumigants									
2.2-Dichloropropane	594-20-7	5	µg/L		<5	<5	<5	----	----
1.2-Dichloropropane	78-87-5	5	µg/L		<5	<5	<5	----	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L		<5	<5	<5	----	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L		<5	<5	<5	----	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	<5	<5	----	----
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	<50	<50	----	----
Chloromethane	74-87-3	50	µg/L		<50	<50	<50	----	----
Vinyl chloride	75-01-4	50	µg/L		<50	<50	<50	----	----
Bromomethane	74-83-9	50	µg/L		<50	<50	<50	----	----
Chloroethane	75-00-3	50	µg/L		<50	<50	<50	----	----
Trichlorofluoromethane	75-69-4	50	µg/L		<50	<50	<50	----	----
1.1-Dichloroethene	75-35-4	5	µg/L		<5	<5	<5	----	----
Iodomethane	74-88-4	5	µg/L		<5	<5	<5	----	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L		<5	<5	<5	----	----
1.1-Dichloroethane	75-34-3	5	µg/L		<5	<5	<5	----	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L		<5	<5	<5	----	----
1.1.1-Trichloroethane	71-55-6	5	µg/L		<5	<5	<5	----	----
1.1-Dichloropropylene	563-58-6	5	µg/L		<5	<5	<5	----	----
Carbon Tetrachloride	56-23-5	5	µg/L		<5	<5	<5	----	----
1.2-Dichloroethane	107-06-2	5	µg/L		<5	<5	<5	----	----
Trichloroethene	79-01-6	5	µg/L		<5	<5	<5	----	----
Dibromomethane	74-95-3	5	µg/L		<5	<5	<5	----	----
1.1.2-Trichloroethane	79-00-5	5	µg/L		<5	<5	<5	----	----
1.3-Dichloropropane	142-28-9	5	µg/L		<5	<5	<5	----	----
Tetrachloroethene	127-18-4	5	µg/L		<5	<5	<5	----	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L		<5	<5	<5	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WK11	WK13	AST2	----	----
				Client sampling date / time	03-FEB-2015 17:30	03-FEB-2015 19:05	03-FEB-2015 18:30	----	----
					ES1502485-001	ES1502485-003	ES1502485-005	----	----
EP074E: Halogenated Aliphatic Compounds - Continued									
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L		<5	<5	<5	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	<5	<5	----	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L		<5	<5	<5	----	----
1.2.3-Trichloropropane	96-18-4	5	µg/L		<5	<5	<5	----	----
Pentachloroethane	76-01-7	5	µg/L		<5	<5	<5	----	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L		<5	<5	<5	----	----
Hexachlorobutadiene	87-68-3	5	µg/L		<5	<5	<5	----	----
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		<5	<5	<5	----	----
Bromobenzene	108-86-1	5	µg/L		<5	<5	<5	----	----
2-Chlorotoluene	95-49-8	5	µg/L		<5	<5	<5	----	----
4-Chlorotoluene	106-43-4	5	µg/L		<5	<5	<5	----	----
1.3-Dichlorobenzene	541-73-1	5	µg/L		<5	<5	<5	----	----
1.4-Dichlorobenzene	106-46-7	5	µg/L		<5	<5	<5	----	----
1.2-Dichlorobenzene	95-50-1	5	µg/L		<5	<5	<5	----	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L		<5	<5	<5	----	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L		<5	<5	<5	----	----
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		<5	<5	<5	----	----
Bromodichloromethane	75-27-4	5	µg/L		<5	<5	<5	----	----
Dibromochloromethane	124-48-1	5	µg/L		<5	<5	<5	----	----
Bromoform	75-25-2	5	µg/L		<5	<5	<5	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		**13.5**	**10.1**	<1.0	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	<1.0	<1.0	----	----
2-Methylphenol	95-48-7	1.0	µg/L		**10.3**	**9.1**	<1.0	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		**54.4**	**153**	<2.0	----	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	<1.0	<1.0	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L		**3.8**	**4.0**	<1.0	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	<1.0	<1.0	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	<1.0	<1.0	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	<1.0	<1.0	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	<1.0	<1.0	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WK11	WK13	AST2	----	----
				Client sampling date / time	03-FEB-2015 17:30	03-FEB-2015 19:05	03-FEB-2015 18:30	----	----
Compound	CAS Number	LOR	Unit		ES1502485-001	ES1502485-003	ES1502485-005	----	----
EP075(SIM)A: Phenolic Compounds - Continued									
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	<1.0	<1.0	----	----
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	<2.0	<2.0	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		**2.4**	**1.4**	<1.0	----	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	<1.0	<1.0	----	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	<1.0	<1.0	----	----
Fluorene	86-73-7	1.0	µg/L		<1.0	<1.0	<1.0	----	----
Phenanthrene	85-01-8	1.0	µg/L		<1.0	<1.0	<1.0	----	----
Anthracene	120-12-7	1.0	µg/L		<1.0	<1.0	<1.0	----	----
Fluoranthene	206-44-0	1.0	µg/L		<1.0	<1.0	<1.0	----	----
Pyrene	129-00-0	1.0	µg/L		<1.0	<1.0	<1.0	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	<1.0	<1.0	----	----
Chrysene	218-01-9	1.0	µg/L		<1.0	<1.0	<1.0	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	<1.0	<1.0	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	<1.0	<1.0	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	<1.0	<1.0	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	<1.0	<1.0	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	<1.0	<1.0	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		**2.4**	**1.4**	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	<0.5	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		**680**	**990**	**90**	----	----
C10 - C14 Fraction	----	50	µg/L		**210**	**250**	<50	----	----
C15 - C28 Fraction	----	100	µg/L		**400**	<100	<100	----	----
C29 - C36 Fraction	----	50	µg/L		**280**	<50	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		**890**	**250**	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		**720**	**1070**	**90**	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		**300**	**490**	**70**	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L		**190**	**250**	<100	----	----
>C16 - C34 Fraction	----	100	µg/L		**570**	<100	<100	----	----
>C34 - C40 Fraction	----	100	µg/L		**100**	<100	<100	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WK11	WK13	AST2	----	----
				Client sampling date / time	03-FEB-2015 17:30	03-FEB-2015 19:05	03-FEB-2015 18:30	----	----
Compound	CAS Number	LOR	Unit		ES1502485-001	ES1502485-003	ES1502485-005	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C40 Fraction (sum)	----	100	µg/L		860	250	<100	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		190	250	<100	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		151	199	10	----	----
Toluene	108-88-3	2	µg/L		202	264	10	----	----
Ethylbenzene	100-41-4	2	µg/L		4	7	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		52	88	<2	----	----
ortho-Xylene	95-47-6	2	µg/L		13	18	<2	----	----
^ Total Xylenes	1330-20-7	2	µg/L		65	106	<2	----	----
^ Sum of BTEX	----	1	µg/L		422	576	20	----	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	----	----
EP262: Ethanolamines									
Ethanolamine	141-43-5	1	µg/L		41	12	6	----	----
Diethanolamine	111-42-2	1	µg/L		14	7	20	----	----
Methyl diethanolamine (MDEA)	105-59-9	1	µg/L		3	10	13	----	----
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		95.3	87.4	96.5	----	----
Toluene-D8	2037-26-5	0.1	%		107	96.0	98.0	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		89.0	91.2	90.5	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		22.3	22.7	16.7	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%		43.9	46.0	25.0	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%		55.2	58.6	21.2	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		66.9	72.9	54.6	----	----
Anthracene-d10	1719-06-8	0.1	%		68.8	65.5	50.4	----	----
4-Terphenyl-d14	1718-51-0	0.1	%		72.0	81.7	60.6	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		95.5	87.7	96.7	----	----
Toluene-D8	2037-26-5	0.1	%		115	104	106	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		111	112	112	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78.3	133.2
Toluene-D8	2037-26-5	79.1	128.9
4-Bromofluorobenzene	460-00-4	80.8	123.7
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27.4	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1502614**	Page	: 1 of 10
Amendment	: **2**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: SDaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 04-FEB-2015
Sampler	: CS & AM	Issue Date	: 21-MAY-2015
Site	: ----		
		No. of samples received	: 10
Quote number	: SY/933/14	No. of samples analysed	: 2

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.**
- **ED041G:LOR raised for Sulfate analysis on various samples due to sample matrix.**
- **EG020: 'Bromine/Iodine' quantification may be unreliable due to its low solubility in acid, leading to variable volatility during measurement by ICPMS.**
- **EG020F:Poor matrix spike recovery was obtained for some elements on sample ES1502614 # 004. Results have been confirmed by reanalysis.**
- **This report has been amended following the removal of some samples from the COA as requested by Kelly-Jane Wallis on 5/5/15.**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	WK14	WK12	----	----	----
			Client sampling date / time	04-FEB-2015 11:10	04-FEB-2015 13:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1502614-001	ES1502614-003	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.43**	**7.70**	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**8790**	**7490**	----	----	----
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	----	10	mg/L	----	**4210**	----	----	----
Total Dissolved Solids @180°C	----	10	mg/L	**5980**	----	----	----	----
EA025: Suspended Solids								
Suspended Solids (SS)	----	5	mg/L	<5	**18**	----	----	----
ED009: Anions								
Chloride	16887-00-6	0.100	mg/L	**509**	**717**	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**4620**	**3380**	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**4620**	**3380**	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	<10	----	----	----
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	**564**	**772**	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**59**	**44**	----	----	----
Magnesium	7439-95-4	1	mg/L	**6**	**4**	----	----	----
Sodium	7440-23-5	1	mg/L	**2520**	**1920**	----	----	----
Potassium	7440-09-7	1	mg/L	**12**	**14**	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.01**	<0.01	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	----	----	----
Arsenic	7440-38-2	0.001	mg/L	**0.003**	**0.004**	----	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	----	----	----
Barium	7440-39-3	0.001	mg/L	**11.0**	**5.31**	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L	**0.020**	**0.002**	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.002**	<0.001	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WK14	WK12	----	----	----
				Client sampling date / time	04-FEB-2015 11:10	04-FEB-2015 13:00	----	----	----
					ES1502614-001	ES1502614-003	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	----	----	----
Nickel	7440-02-0	0.001	mg/L		**0.004**	**0.020**	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	----	----	----
Zinc	7440-66-6	0.005	mg/L		**0.011**	**0.013**	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.098**	**0.117**	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		<0.001	**0.003**	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	----	----	----
Strontium	7440-24-6	0.001	mg/L		**6.53**	**4.07**	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	----	----	----
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	----	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	----	----	----
Boron	7440-42-8	0.05	mg/L		**10.9**	**6.75**	----	----	----
Iron	7439-89-6	0.05	mg/L		**5.47**	**6.63**	----	----	----
Bromine	7726-95-6	0.1	mg/L		**0.7**	**0.5**	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	----	----	----
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L		**33.2**	**30.8**	----	----	----
EK010/011: Chlorine									
Chlorine - Free	----	0.2	mg/L		<0.2	<0.2	----	----	----
Chlorine - Total Residual	----	0.2	mg/L		<0.2	<0.2	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.6**	**1.0**	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**5.38**	**2.87**	----	----	----
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	----	0.01	mg/L		**5.33**	**2.81**	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----	0.01	mg/L		<0.01	<0.01	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	<0.01	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	<0.01	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	WK14	WK12	----	----	----
			Client sampling date / time	04-FEB-2015 11:10	04-FEB-2015 13:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1502614-001	ES1502614-003	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	6.5	3.9	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	6.5	3.9	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	2.82	1.90	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.03	----	----	----
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	108	89.3	----	----	----
Total Cations	----	0.01	meq/L	113	86.4	----	----	----
Ionic Balance	----	0.01	%	2.26	1.71	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	261	40	----	----	----
EP033: C1 - C4 Hydrocarbon Gases								
Methane	74-82-8	10	µg/L	6810	9320	----	----	----
Ethene	74-85-1	10	µg/L	<10	<10	----	----	----
Ethane	74-84-0	10	µg/L	946	36	----	----	----
Propene	115-07-1	10	µg/L	<10	<10	----	----	----
Propane	74-98-6	10	µg/L	53	<10	----	----	----
Butene	25167-67-3	10	µg/L	<10	<10	----	----	----
Butane	106-97-8	10	µg/L	<10	<10	----	----	----
EP074A: Monocyclic Aromatic Hydrocarbons								
Styrene	100-42-5	5	µg/L	<5	<5	----	----	----
Isopropylbenzene	98-82-8	5	µg/L	<5	<5	----	----	----
n-Propylbenzene	103-65-1	5	µg/L	<5	<5	----	----	----
1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	----	----	----
sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	----	----	----
1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	----	----	----
tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	----	----	----
p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	----	----	----
n-Butylbenzene	104-51-8	5	µg/L	<5	<5	----	----	----
EP074B: Oxygenated Compounds								
Vinyl Acetate	108-05-4	50	µg/L	<50	<50	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WK14	WK12	----	----	----
				Client sampling date / time	04-FEB-2015 11:10	04-FEB-2015 13:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1502614-001	ES1502614-003	----	----	----
EP074B: Oxygenated Compounds - Continued									
2-Butanone (MEK)	78-93-3	50	µg/L		<50	<50	----	----	----
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L		<50	<50	----	----	----
2-Hexanone (MBK)	591-78-6	50	µg/L		<50	<50	----	----	----
EP074C: Sulfonated Compounds									
Carbon disulfide	75-15-0	5	µg/L		<5	<5	----	----	----
EP074D: Fumigants									
2.2-Dichloropropane	594-20-7	5	µg/L		<5	<5	----	----	----
1.2-Dichloropropane	78-87-5	5	µg/L		<5	<5	----	----	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L		<5	<5	----	----	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L		<5	<5	----	----	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	<5	----	----	----
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	<50	----	----	----
Chloromethane	74-87-3	50	µg/L		<50	<50	----	----	----
Vinyl chloride	75-01-4	50	µg/L		<50	<50	----	----	----
Bromomethane	74-83-9	50	µg/L		<50	<50	----	----	----
Chloroethane	75-00-3	50	µg/L		<50	<50	----	----	----
Trichlorofluoromethane	75-69-4	50	µg/L		<50	<50	----	----	----
1.1-Dichloroethene	75-35-4	5	µg/L		<5	<5	----	----	----
Iodomethane	74-88-4	5	µg/L		<5	<5	----	----	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L		<5	<5	----	----	----
1.1-Dichloroethane	75-34-3	5	µg/L		<5	<5	----	----	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L		<5	<5	----	----	----
1.1.1-Trichloroethane	71-55-6	5	µg/L		<5	<5	----	----	----
1.1-Dichloropropylene	563-58-6	5	µg/L		<5	<5	----	----	----
Carbon Tetrachloride	56-23-5	5	µg/L		<5	<5	----	----	----
1.2-Dichloroethane	107-06-2	5	µg/L		<5	<5	----	----	----
Trichloroethene	79-01-6	5	µg/L		<5	<5	----	----	----
Dibromomethane	74-95-3	5	µg/L		<5	<5	----	----	----
1.1.2-Trichloroethane	79-00-5	5	µg/L		<5	<5	----	----	----
1.3-Dichloropropane	142-28-9	5	µg/L		<5	<5	----	----	----
Tetrachloroethene	127-18-4	5	µg/L		<5	<5	----	----	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L		<5	<5	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	WK14	WK12	----	----	----
			Client sampling date / time	04-FEB-2015 11:10	04-FEB-2015 13:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1502614-001	ES1502614-003	----	----	----
EP074E: Halogenated Aliphatic Compounds - Continued								
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	----	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	----	----	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	----	----	----
1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	----	----	----
Pentachloroethane	76-01-7	5	µg/L	<5	<5	----	----	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	----	----	----
Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	----	----	----
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	5	µg/L	<5	<5	----	----	----
Bromobenzene	108-86-1	5	µg/L	<5	<5	----	----	----
2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	----	----	----
4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	----	----	----
1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	----	----	----
1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	----	----	----
1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	----	----	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	----	----	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	----	----	----
EP074G: Trihalomethanes								
Chloroform	67-66-3	5	µg/L	<5	<5	----	----	----
Bromodichloromethane	75-27-4	5	µg/L	<5	<5	----	----	----
Dibromochloromethane	124-48-1	5	µg/L	<5	<5	----	----	----
Bromoform	75-25-2	5	µg/L	<5	<5	----	----	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	**4.2**	**1.1**	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L	**2.6**	<1.0	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	**40.0**	**5.8**	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L	**1.0**	<1.0	----	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	----	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WK14	WK12	----	----	----
				Client sampling date / time	04-FEB-2015 11:10	04-FEB-2015 13:00	----	----	----
					ES1502614-001	ES1502614-003	----	----	----
EP075(SIM)A: Phenolic Compounds - Continued									
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	<1.0	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	<2.0	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	<1.0	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	<1.0	----	----	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	<1.0	----	----	----
Fluorene	86-73-7	1.0	µg/L		<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1.0	µg/L		<1.0	<1.0	----	----	----
Anthracene	120-12-7	1.0	µg/L		<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1.0	µg/L		<1.0	<1.0	----	----	----
Pyrene	129-00-0	1.0	µg/L		<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	<1.0	----	----	----
Chrysene	218-01-9	1.0	µg/L		<1.0	<1.0	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	<1.0	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	<1.0	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	<1.0	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L		<0.5	<0.5	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L		<0.5	<0.5	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		**770**	**30**	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L		**210**	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L		**150**	<50	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		**360**	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		**820**	**30**	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		**200**	**20**	----	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L		<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L		**320**	**110**	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WK14	WK12	----	----	----
				Client sampling date / time	04-FEB-2015 11:10	04-FEB-2015 13:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1502614-001	ES1502614-003	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C40 Fraction (sum)	----	100	µg/L		**320**	**110**	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		**257**	**2**	----	----	----
Toluene	108-88-3	2	µg/L		**294**	**4**	----	----	----
Ethylbenzene	100-41-4	2	µg/L		**4**	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		**49**	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L		**13**	<2	----	----	----
^ Total Xylenes	1330-20-7	2	µg/L		**62**	<2	----	----	----
^ Sum of BTEX	----	1	µg/L		**617**	**6**	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	<5	----	----	----
EP262: Ethanolamines									
Ethanolamine	141-43-5	1	µg/L		**16**	**17**	----	----	----
Diethanolamine	111-42-2	1	µg/L		**15**	**7**	----	----	----
Methyl diethanolamine (MDEA)	105-59-9	1	µg/L		**10**	**7**	----	----	----
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**93.2**	**90.3**	----	----	----
Toluene-D8	2037-26-5	0.1	%		**101**	**101**	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		**92.2**	**90.8**	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		**15.3**	**21.2**	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%		**33.1**	**44.6**	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%		**46.0**	**43.7**	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		**26.0**	**43.3**	----	----	----
Anthracene-d10	1719-06-8	0.1	%		**60.5**	**62.2**	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%		**61.2**	**61.6**	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**93.5**	**90.6**	----	----	----
Toluene-D8	2037-26-5	0.1	%		**109**	**110**	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		**113**	**113**	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78.3	133.2
Toluene-D8	2037-26-5	79.1	128.9
4-Bromofluorobenzene	460-00-4	80.8	123.7
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27.4	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1502642**	Page	: 1 of 10
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: SDaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 05-FEB-2015
Sampler	: CS/AM	Issue Date	: 19-MAY-2015
Site	: ----		
		No. of samples received	: 21
Quote number	: SY/933/14	No. of samples analysed	: 4

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.**
- **ED041G/EK057G/EK071G:LOR raised for Sulfate/Nitrite/Reactive P analysis on various samples due to sample matrix.**
- **EG020: 'Bromine/Iodine' quantification may be unreliable due to its low solubility in acid, leading to variable volatility during measurement by ICPMS.**
- **EG020F:Poor matrix spike recovery was obtained for some elements on sample ES1502642 # 003. Results have been confirmed by reanalysis.**
- **EK059-EK058G-EK057G: LOR raised for NOx-Nitrate-Nitrite on various samples due to sample matrix.**
- **This report has been amended following the removal of some samples from the COA and a sample ID change as requested by Kelly-Jane Wallis on 5/5/15.**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WK11	WK14	WK13	AST2	----
				Client sampling date / time	04-FEB-2015 16:00	04-FEB-2015 17:30	04-FEB-2015 18:00	04-FEB-2015 18:20	----
Compound	CAS Number	LOR	Unit		ES1502642-002	ES1502642-004	ES1502642-006	ES1502642-007	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		8.04	7.85	8.30	9.15	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		10600	8780	7660	6220	----
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	----	10	mg/L		8160	5680	4580	4450	----
EA025: Suspended Solids									
Suspended Solids (SS)	----	5	mg/L		186	11	7	83	----
ED009: Anions									
Chloride	16887-00-6	0.100	mg/L		739	484	594	489	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	559	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		4580	4500	3420	2220	----
Total Alkalinity as CaCO3	----	1	mg/L		4580	4500	3420	2780	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<10	<10	<10	<10	----
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		736	488	591	483	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		41	34	27	8	----
Magnesium	7439-95-4	1	mg/L		5	6	3	2	----
Sodium	7440-23-5	1	mg/L		2630	2260	1930	1600	----
Potassium	7440-09-7	1	mg/L		23	15	17	19	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		0.02	0.01	0.04	0.03	----
Arsenic	7440-38-2	0.001	mg/L		0.005	0.002	0.005	0.004	----
Boron	7440-42-8	0.05	mg/L		21.7	0.30	6.43	11.0	----
Strontium	7440-24-6	0.001	mg/L		3.47	3.29	5.07	2.64	----
Barium	7440-39-3	0.001	mg/L		17.2	5.27	7.06	3.68	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L		0.0002	<0.0001	<0.0001	<0.0001	----
Cobalt	7440-48-4	0.001	mg/L		0.002	<0.001	<0.001	<0.001	----
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WK11	WK14	WK13	AST2	----
				Client sampling date / time	04-FEB-2015 16:00	04-FEB-2015 17:30	04-FEB-2015 18:00	04-FEB-2015 18:20	----
Compound	CAS Number	LOR	Unit		ES1502642-002	ES1502642-004	ES1502642-006	ES1502642-007	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Chromium	7440-47-3	0.001	mg/L		**0.005**	**0.006**	**0.001**	**0.002**	----
Copper	7440-50-8	0.001	mg/L		**0.017**	**0.002**	**0.003**	**0.006**	----
Manganese	7439-96-5	0.001	mg/L		**0.164**	**0.049**	**0.035**	**0.037**	----
Molybdenum	7439-98-7	0.001	mg/L		**0.003**	<0.001	**0.002**	**0.007**	----
Nickel	7440-02-0	0.001	mg/L		**0.008**	**0.002**	**0.003**	**0.004**	----
Lead	7439-92-1	0.001	mg/L		**0.001**	<0.001	<0.001	**0.008**	----
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	**0.001**	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	----
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	----
Zinc	7440-66-6	0.005	mg/L		**0.025**	**0.006**	**0.015**	**0.013**	----
Iron	7439-89-6	0.05	mg/L		**15.5**	**2.70**	**0.70**	**4.07**	----
Bromine	7726-95-6	0.1	mg/L		**1.3**	**0.3**	**1.0**	**0.7**	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	----
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L		**37.2**	**35.1**	**29.5**	**20.2**	----
EK010/011: Chlorine									
Chlorine - Free	----	0.2	mg/L		<0.2	<0.2	<0.2	<0.2	----
Chlorine - Total Residual	----	0.2	mg/L		<0.2	<0.2	<0.2	<0.2	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.9**	**0.6**	**1.1**	**1.0**	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**7.40**	**5.21**	**4.26**	**0.02**	----
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	----	0.01	mg/L		**7.34**	**5.16**	**4.10**	**0.01**	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----	0.01	mg/L		<0.10	<0.10	<0.01	<0.01	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.10	<0.10	<0.01	<0.01	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.10	<0.10	<0.01	<0.01	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WK11	WK14	WK13	AST2	----
				Client sampling date / time	04-FEB-2015 16:00	04-FEB-2015 17:30	04-FEB-2015 18:00	04-FEB-2015 18:20	----
					ES1502642-002	ES1502642-004	ES1502642-006	ES1502642-007	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**10.0**	**6.3**	**5.8**	**6.9**	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ **Total Nitrogen as N**	----	0.1	mg/L		**10.0**	**6.3**	**5.8**	**6.9**	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**4.13**	**2.75**	**2.98**	**2.54**	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.10	**0.08**	<0.10	<0.10	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**112**	**104**	**85.0**	**69.2**	----
Total Cations	----	0.01	meq/L		**117**	**101**	**86.0**	**70.6**	----
Ionic Balance	----	0.01	%		**2.19**	**1.43**	**0.51**	**1.00**	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**1150**	**242**	**448**	**444**	----
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L		<5	<5	<5	<5	----
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8	10	µg/L		**6050**	**7770**	**7600**	**1130**	----
Ethene	74-85-1	10	µg/L		<10	<10	<10	<10	----
Ethane	74-84-0	10	µg/L		**1080**	**1150**	**1500**	**68**	----
Propene	115-07-1	10	µg/L		<10	<10	<10	<10	----
Propane	74-98-6	10	µg/L		**108**	**70**	**150**	<10	----
Butene	25167-67-3	10	µg/L		<10	<10	<10	<10	----
Butane	106-97-8	10	µg/L		<10	<10	<10	<10	----
EP074A: Monocyclic Aromatic Hydrocarbons									
Styrene	100-42-5	5	µg/L		<5	<5	<5	<5	----
Isopropylbenzene	98-82-8	5	µg/L		<5	<5	<5	<5	----
n-Propylbenzene	103-65-1	5	µg/L		<5	<5	<5	<5	----
1.3.5-Trimethylbenzene	108-67-8	5	µg/L		<5	<5	<5	<5	----
sec-Butylbenzene	135-98-8	5	µg/L		<5	<5	<5	<5	----
1.2.4-Trimethylbenzene	95-63-6	5	µg/L		<5	<5	<5	<5	----
tert-Butylbenzene	98-06-6	5	µg/L		<5	<5	<5	<5	----
p-Isopropyltoluene	99-87-6	5	µg/L		<5	<5	<5	<5	----
n-Butylbenzene	104-51-8	5	µg/L		<5	<5	<5	<5	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WK11	WK14	WK13	AST2	----
				Client sampling date / time	04-FEB-2015 16:00	04-FEB-2015 17:30	04-FEB-2015 18:00	04-FEB-2015 18:20	----
					ES1502642-002	ES1502642-004	ES1502642-006	ES1502642-007	----
EP074B: Oxygenated Compounds									
Vinyl Acetate	108-05-4	50	µg/L		<50	<50	<50	<50	----
2-Butanone (MEK)	78-93-3	50	µg/L		<50	<50	**60**	<50	----
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L		<50	<50	<50	<50	----
2-Hexanone (MBK)	591-78-6	50	µg/L		<50	<50	<50	<50	----
EP074C: Sulfonated Compounds									
Carbon disulfide	75-15-0	5	µg/L		<5	<5	<5	<5	----
EP074D: Fumigants									
2.2-Dichloropropane	594-20-7	5	µg/L		<5	<5	<5	<5	----
1.2-Dichloropropane	78-87-5	5	µg/L		<5	<5	<5	<5	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L		<5	<5	<5	<5	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L		<5	<5	<5	<5	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	<5	<5	<5	----
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	<50	<50	<50	----
Chloromethane	74-87-3	50	µg/L		<50	<50	<50	<50	----
Vinyl chloride	75-01-4	50	µg/L		<50	<50	<50	<50	----
Bromomethane	74-83-9	50	µg/L		<50	<50	<50	<50	----
Chloroethane	75-00-3	50	µg/L		<50	<50	<50	<50	----
Trichlorofluoromethane	75-69-4	50	µg/L		<50	<50	<50	<50	----
1.1-Dichloroethene	75-35-4	5	µg/L		<5	<5	<5	<5	----
Iodomethane	74-88-4	5	µg/L		<5	<5	<5	<5	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L		<5	<5	<5	<5	----
1.1-Dichloroethane	75-34-3	5	µg/L		<5	<5	<5	<5	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L		<5	<5	<5	<5	----
1.1.1-Trichloroethane	71-55-6	5	µg/L		<5	<5	<5	<5	----
1.1-Dichloropropylene	563-58-6	5	µg/L		<5	<5	<5	<5	----
Carbon Tetrachloride	56-23-5	5	µg/L		<5	<5	<5	<5	----
1.2-Dichloroethane	107-06-2	5	µg/L		<5	<5	<5	<5	----
Trichloroethene	79-01-6	5	µg/L		<5	<5	<5	<5	----
Dibromomethane	74-95-3	5	µg/L		<5	<5	<5	<5	----
1.1.2-Trichloroethane	79-00-5	5	µg/L		<5	<5	<5	<5	----
1.3-Dichloropropane	142-28-9	5	µg/L		<5	<5	<5	<5	----
Tetrachloroethene	127-18-4	5	µg/L		<5	<5	<5	<5	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WK11	WK14	WK13	AST2	----
				Client sampling date / time	04-FEB-2015 16:00	04-FEB-2015 17:30	04-FEB-2015 18:00	04-FEB-2015 18:20	----
Compound	CAS Number	LOR	Unit		ES1502642-002	ES1502642-004	ES1502642-006	ES1502642-007	----
EP074E: Halogenated Aliphatic Compounds - Continued									
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L		<5	<5	<5	<5	----
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L		<5	<5	<5	<5	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	<5	<5	<5	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L		<5	<5	<5	<5	----
1.2.3-Trichloropropane	96-18-4	5	µg/L		<5	<5	<5	<5	----
Pentachloroethane	76-01-7	5	µg/L		<5	<5	<5	<5	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L		<5	<5	<5	<5	----
Hexachlorobutadiene	87-68-3	5	µg/L		<5	<5	<5	<5	----
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		<5	<5	<5	<5	----
Bromobenzene	108-86-1	5	µg/L		<5	<5	<5	<5	----
2-Chlorotoluene	95-49-8	5	µg/L		<5	<5	<5	<5	----
4-Chlorotoluene	106-43-4	5	µg/L		<5	<5	<5	<5	----
1.3-Dichlorobenzene	541-73-1	5	µg/L		<5	<5	<5	<5	----
1.4-Dichlorobenzene	106-46-7	5	µg/L		<5	<5	<5	<5	----
1.2-Dichlorobenzene	95-50-1	5	µg/L		<5	<5	<5	<5	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L		<5	<5	<5	<5	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L		<5	<5	<5	<5	----
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		<5	<5	<5	<5	----
Bromodichloromethane	75-27-4	5	µg/L		<5	<5	<5	<5	----
Dibromochloromethane	124-48-1	5	µg/L		<5	<5	<5	<5	----
Bromoform	75-25-2	5	µg/L		<5	<5	<5	<5	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		**14.2**	**5.9**	**6.2**	<1.0	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
2-Methylphenol	95-48-7	1.0	µg/L		**12.2**	**4.0**	**6.5**	<1.0	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		**75.5**	**51.2**	**110**	<2.0	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L		**4.7**	**1.4**	**2.3**	<1.0	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WK11	WK14	WK13	AST2	----
				Client sampling date / time	04-FEB-2015 16:00	04-FEB-2015 17:30	04-FEB-2015 18:00	04-FEB-2015 18:20	----
Compound	CAS Number	LOR	Unit		ES1502642-002	ES1502642-004	ES1502642-006	ES1502642-007	----
EP075(SIM)A: Phenolic Compounds - Continued									
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		**2.4**	**1.4**	**1.3**	<1.0	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
Fluorene	86-73-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
Phenanthrene	85-01-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
Anthracene	120-12-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
Fluoranthene	206-44-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
Pyrene	129-00-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
Chrysene	218-01-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		**2.4**	**1.4**	**1.3**	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		**1080**	**730**	**810**	**60**	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L		**200**	**100**	<100	<100	----
C29 - C36 Fraction	----	50	µg/L		**200**	**100**	<50	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		**400**	**200**	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		**1090**	**730**	**820**	**60**	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		**300**	**170**	**240**	**20**	----
>C10 - C16 Fraction	>C10_C16	100	µg/L		<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L		**350**	**180**	**120**	<100	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WK11	WK14	WK13	AST2	----
				Client sampling date / time	04-FEB-2015 16:00	04-FEB-2015 17:30	04-FEB-2015 18:00	04-FEB-2015 18:20	----
					ES1502642-002	ES1502642-004	ES1502642-006	ES1502642-007	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		**350**	**180**	**120**	<100	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	<100	<100	<100	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		**319**	**218**	**229**	**16**	----
Toluene	108-88-3	2	µg/L		**356**	**269**	**261**	**17**	----
Ethylbenzene	100-41-4	2	µg/L		**7**	**4**	**5**	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		**90**	**51**	**74**	**3**	----
ortho-Xylene	95-47-6	2	µg/L		**21**	**14**	**16**	<2	----
^ **Total Xylenes**	1330-20-7	2	µg/L		**111**	**65**	**90**	**3**	----
^ **Sum of BTEX**	----	1	µg/L		**793**	**556**	**585**	**36**	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	----
EP262: Ethanolamines									
Ethanolamine	141-43-5	1	µg/L		**40**	**19**	**15**	**13**	----
Diethanolamine	111-42-2	1	µg/L		**27**	**5**	**4**	**2**	----
Methyl diethanolamine (MDEA)	105-59-9	1	µg/L		<1	**6**	**4**	**12**	----
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**109**	**105**	**104**	**98.3**	----
Toluene-D8	2037-26-5	0.1	%		**112**	**113**	**109**	**119**	----
4-Bromofluorobenzene	460-00-4	0.1	%		**106**	**106**	**104**	**108**	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		**25.3**	**23.7**	**21.0**	**18.2**	----
2-Chlorophenol-D4	93951-73-6	0.1	%		**51.7**	**47.6**	**42.4**	**29.6**	----
2.4.6-Tribromophenol	118-79-6	0.1	%		**47.8**	**51.5**	**46.6**	**30.9**	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		**77.5**	**46.8**	**39.5**	**35.6**	----
Anthracene-d10	1719-06-8	0.1	%		**72.2**	**69.8**	**74.7**	**61.2**	----
4-Terphenyl-d14	1718-51-0	0.1	%		**73.1**	**69.7**	**67.7**	**62.7**	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**125**	**120**	**119**	**109**	----
Toluene-D8	2037-26-5	0.1	%		**117**	**118**	**115**	**101**	----
4-Bromofluorobenzene	460-00-4	0.1	%		**105**	**106**	**104**	**91.4**	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78.3	133.2
Toluene-D8	2037-26-5	79.1	128.9
4-Bromofluorobenzene	460-00-4	80.8	123.7
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27.4	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1502776**	Page	: 1 of 4
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
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Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 05-FEB-2015
Sampler	: ----	Issue Date	: 13-MAY-2015
Site	: ----		
		No. of samples received	: 20
Quote number	: SY/933/14	No. of samples analysed	: 5

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **This report has been amended following the removal of some samples from the COA and a sample ID change as requested by Kelly-Jane Wallis on 5/5/15.**

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WK13	AST2	WK12	WK14	WK11
				Client sampling date / time	05-FEB-2015 11:00	05-FEB-2015 10:30	05-FEB-2015 11:40	05-FEB-2015 12:20	05-FEB-2015 13:00
					ES1502776-002	ES1502776-003	ES1502776-005	ES1502776-007	ES1502776-009
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		**202**	**18**	**1**	**190**	**296**
Toluene	108-88-3	2	µg/L		**241**	**20**	<2	**224**	**352**
Ethylbenzene	100-41-4	2	µg/L		**5**	<2	<2	**4**	**9**
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		**72**	**3**	<2	**53**	**112**
ortho-Xylene	95-47-6	2	µg/L		**16**	<2	<2	**13**	**26**
^ **Total Xylenes**	1330-20-7	2	µg/L		**88**	**3**	<2	**66**	**138**
^ **Sum of BTEX**	----	1	µg/L		**536**	**41**	**1**	**484**	**795**
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**122**	**97.8**	**98.9**	**114**	**113**
Toluene-D8	2037-26-5	0.1	%		**114**	**102**	**107**	**108**	**110**
4-Bromofluorobenzene	460-00-4	0.1	%		**115**	**99.1**	**104**	**106**	**106**

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1502783**	Page	: 1 of 10
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: SDaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523 A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 05-FEB-2015
Sampler	: CS/AM	Issue Date	: 13-MAY-2015
Site	: ----		
		No. of samples received	: 9
Quote number	: SY/933/14	No. of samples analysed	: 5

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.**
- **ED041G:LOR raised for Sulfate analysis on various samples due to sample matrix.**
- **EG020: 'Bromine/Iodine' quantification may be unreliable due to its low solubility in acid, leading to variable volatility during measurement by ICPMS.**
- **EK057G/EK071G:LOR raised for Nitrite/Reactive P analysis on sample ID(WK12 U/S) due to sample matrix.**
- **EK059G-EK058G-EK057G: LOR raised for NOx- Nitrate- Nitrite on sample ID (WK12 U/S,WK14) due to sample matrix.**
- **EP033: Results for WK11 U/S and WK11 have been confirmed by re-analysis.**
- **This report has been amended following the removal of some samples from the COA and a sample ID change as requested by Kelly-Jane Wallis on 5/5/15.**

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WK13	AST2	WK12	WK14	WK11
				Client sampling date / time	05-FEB-2015 11:00	05-FEB-2015 10:30	05-FEB-2015 11:40	05-FEB-2015 12:20	05-FEB-2015 13:00
					ES1502783-002	ES1502783-003	ES1502783-005	ES1502783-007	ES1502783-009
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**8.04**	**8.99**	**7.63**	**7.44**	**8.26**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**7810**	**6300**	**7350**	**8880**	**10600**
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	----	10	mg/L		**5060**	**3900**	**4870**	**5370**	**7710**
EA025: Suspended Solids									
Suspended Solids (SS)	----	5	mg/L		**9**	**82**	**130**	<5	**37**
ED009: Anions									
Chloride	16887-00-6	0.100	mg/L		**674**	**511**	**764**	**504**	**728**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	**350**	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**3300**	**2420**	**3280**	**4620**	**5100**
Total Alkalinity as CaCO3	----	1	mg/L		**3300**	**2780**	**3280**	**4620**	**5100**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<10	<10	<10	<10	<10
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		**701**	**540**	**781**	**538**	**745**
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**38**	**21**	**38**	**47**	**71**
Magnesium	7439-95-4	1	mg/L		**5**	**4**	**4**	**5**	**6**
Sodium	7440-23-5	1	mg/L		**1800**	**1500**	**1970**	**2560**	**2990**
Potassium	7440-09-7	1	mg/L		**12**	**14**	**12**	**12**	**17**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.08**	**0.06**	<0.01	**0.02**	<0.01
Arsenic	7440-38-2	0.001	mg/L		**0.004**	**0.004**	**0.002**	**0.003**	**0.003**
Boron	7440-42-8	0.05	mg/L		**5.28**	**9.27**	**6.35**	**0.45**	**14.4**
Strontium	7440-24-6	0.001	mg/L		**4.27**	**2.75**	**4.78**	**5.20**	**10.5**
Barium	7440-39-3	0.001	mg/L		**0.256**	**2.81**	**5.02**	**7.25**	**17.6**
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.001**
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: WK13	AST2	WK12	WK14	WK11
				Client sampling date / time: 05-FEB-2015 11:00	05-FEB-2015 10:30	05-FEB-2015 11:40	05-FEB-2015 12:20	05-FEB-2015 13:00
				ES1502783-002	ES1502783-003	ES1502783-005	ES1502783-007	ES1502783-009
EG020F: Dissolved Metals by ICP-MS - Continued								
Chromium	7440-47-3	0.001	mg/L	**0.002**	**0.002**	**0.002**	**0.014**	**0.004**
Copper	7440-50-8	0.001	mg/L	**0.017**	**0.020**	**0.001**	**0.004**	**0.005**
Manganese	7439-96-5	0.001	mg/L	**0.032**	**0.029**	**0.434**	**0.066**	**0.134**
Molybdenum	7439-98-7	0.001	mg/L	**0.002**	**0.006**	**0.003**	**0.003**	**0.002**
Nickel	7440-02-0	0.001	mg/L	**0.004**	**0.004**	**0.004**	**0.004**	**0.006**
Lead	7439-92-1	0.001	mg/L	<0.001	**0.005**	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L	<0.001	**0.001**	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Tin	7440-31-5	0.001	mg/L	**0.002**	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	**0.046**	**0.016**	**0.006**	**0.008**	**0.012**
Iron	7439-89-6	0.05	mg/L	**0.52**	**2.65**	**38.8**	**4.07**	**13.4**
Bromine	7726-95-6	0.1	mg/L	**1.0**	**0.7**	**0.6**	**0.6**	**1.4**
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	**29.5**	**21.2**	**26.0**	**32.9**	**34.3**
EK010/011: Chlorine								
Chlorine - Free	----	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorine - Total Residual	----	0.2	mg/L	<0.2	<0.2	**0.2**	<0.2	<0.2
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	**1.5**	**1.0**	**1.0**	**0.6**	**0.8**
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**4.74**	**0.06**	**2.63**	**5.42**	**7.93**
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	----	0.01	mg/L	**4.32**	**0.02**	**2.52**	**5.31**	**7.79**
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.10	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.20**	**0.01**	<0.01	<0.10	**0.05**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.20**	**0.01**	<0.01	<0.10	**0.05**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: WK13	AST2	WK12	WK14	WK11
				Client sampling date / time: 05-FEB-2015 11:00	05-FEB-2015 10:30	05-FEB-2015 11:40	05-FEB-2015 12:20	05-FEB-2015 13:00
				ES1502783-002	ES1502783-003	ES1502783-005	ES1502783-007	ES1502783-009
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**5.5**	**5.4**	**3.6**	**5.5**	**9.9**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ **Total Nitrogen as N**	----	0.1	mg/L	**5.7**	**5.4**	**3.6**	**5.5**	**10.0**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**3.02**	**2.05**	**1.62**	**2.25**	**2.50**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.09**	**0.01**	<0.01	**0.24**	**0.06**
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	**85.7**	**70.8**	**87.6**	**107**	**123**
Total Cations	----	0.01	meq/L	**80.9**	**67.0**	**88.2**	**114**	**134**
Ionic Balance	----	0.01	%	**2.94**	**2.81**	**0.32**	**3.06**	**4.45**
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**648**	**451**	**51**	**265**	**1180**
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	<5	<5	<5	<5
EP033: C1 - C4 Hydrocarbon Gases								
Methane	74-82-8	10	µg/L	**8080**	**1430**	**7180**	**6380**	**5870**
Ethene	74-85-1	10	µg/L	<10	<10	<10	<10	<10
Ethane	74-84-0	10	µg/L	**1600**	**96**	<10	**1080**	**1370**
Propene	115-07-1	10	µg/L	<10	<10	<10	<10	<10
Propane	74-98-6	10	µg/L	**168**	**12**	<10	**97**	**109**
Butene	25167-67-3	10	µg/L	<10	<10	<10	<10	<10
Butane	106-97-8	10	µg/L	**11**	<10	<10	<10	<10
EP074A: Monocyclic Aromatic Hydrocarbons								
Styrene	100-42-5	5	µg/L	<5	<5	<5	<5	<5
Isopropylbenzene	98-82-8	5	µg/L	<5	<5	<5	<5	<5
n-Propylbenzene	103-65-1	5	µg/L	<5	<5	<5	<5	<5
1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	<5	<5	<5
sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	<5	<5	<5
1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	<5	<5	**5**
tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	<5	<5	<5
p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	<5	<5	<5
n-Butylbenzene	104-51-8	5	µg/L	<5	<5	<5	<5	<5

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WK13	AST2	WK12	WK14	WK11
				Client sampling date / time	05-FEB-2015 11:00	05-FEB-2015 10:30	05-FEB-2015 11:40	05-FEB-2015 12:20	05-FEB-2015 13:00
					ES1502783-002	ES1502783-003	ES1502783-005	ES1502783-007	ES1502783-009
EP074B: Oxygenated Compounds									
Vinyl Acetate	108-05-4	50	µg/L		<50	<50	<50	<50	<50
2-Butanone (MEK)	78-93-3	50	µg/L		**80**	<50	<50	<50	<50
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L		<50	<50	<50	<50	<50
2-Hexanone (MBK)	591-78-6	50	µg/L		<50	<50	<50	<50	<50
EP074C: Sulfonated Compounds									
Carbon disulfide	75-15-0	5	µg/L		<5	<5	<5	<5	<5
EP074D: Fumigants									
2.2-Dichloropropane	594-20-7	5	µg/L		<5	<5	<5	<5	<5
1.2-Dichloropropane	78-87-5	5	µg/L		<5	<5	<5	<5	<5
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L		<5	<5	<5	<5	<5
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L		<5	<5	<5	<5	<5
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	<5	<5	<5	<5
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	<50	<50	<50	<50
Chloromethane	74-87-3	50	µg/L		<50	<50	<50	<50	<50
Vinyl chloride	75-01-4	50	µg/L		<50	<50	<50	<50	<50
Bromomethane	74-83-9	50	µg/L		<50	<50	<50	<50	<50
Chloroethane	75-00-3	50	µg/L		<50	<50	<50	<50	<50
Trichlorofluoromethane	75-69-4	50	µg/L		<50	<50	<50	<50	<50
1.1-Dichloroethene	75-35-4	5	µg/L		<5	<5	<5	<5	<5
Iodomethane	74-88-4	5	µg/L		<5	<5	<5	<5	<5
trans-1.2-Dichloroethene	156-60-5	5	µg/L		<5	<5	<5	<5	<5
1.1-Dichloroethane	75-34-3	5	µg/L		<5	<5	<5	<5	<5
cis-1.2-Dichloroethene	156-59-2	5	µg/L		<5	<5	<5	<5	<5
1.1.1-Trichloroethane	71-55-6	5	µg/L		<5	<5	<5	<5	<5
1.1-Dichloropropylene	563-58-6	5	µg/L		<5	<5	<5	<5	<5
Carbon Tetrachloride	56-23-5	5	µg/L		<5	<5	<5	<5	<5
1.2-Dichloroethane	107-06-2	5	µg/L		<5	<5	<5	<5	<5
Trichloroethene	79-01-6	5	µg/L		<5	<5	<5	<5	<5
Dibromomethane	74-95-3	5	µg/L		<5	<5	<5	<5	<5
1.1.2-Trichloroethane	79-00-5	5	µg/L		<5	<5	<5	<5	<5
1.3-Dichloropropane	142-28-9	5	µg/L		<5	<5	<5	<5	<5
Tetrachloroethene	127-18-4	5	µg/L		<5	<5	<5	<5	<5

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WK13	AST2	WK12	WK14	WK11
				Client sampling date / time	05-FEB-2015 11:00	05-FEB-2015 10:30	05-FEB-2015 11:40	05-FEB-2015 12:20	05-FEB-2015 13:00
					ES1502783-002	ES1502783-003	ES1502783-005	ES1502783-007	ES1502783-009
EP074E: Halogenated Aliphatic Compounds - Continued									
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L		<5	<5	<5	<5	<5
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L		<5	<5	<5	<5	<5
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	<5	<5	<5	<5
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L		<5	<5	<5	<5	<5
1.2.3-Trichloropropane	96-18-4	5	µg/L		<5	<5	<5	<5	<5
Pentachloroethane	76-01-7	5	µg/L		<5	<5	<5	<5	<5
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L		<5	<5	<5	<5	<5
Hexachlorobutadiene	87-68-3	5	µg/L		<5	<5	<5	<5	<5
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		<5	<5	<5	<5	<5
Bromobenzene	108-86-1	5	µg/L		<5	<5	<5	<5	<5
2-Chlorotoluene	95-49-8	5	µg/L		<5	<5	<5	<5	<5
4-Chlorotoluene	106-43-4	5	µg/L		<5	<5	<5	<5	<5
1.3-Dichlorobenzene	541-73-1	5	µg/L		<5	<5	<5	<5	<5
1.4-Dichlorobenzene	106-46-7	5	µg/L		<5	<5	<5	<5	<5
1.2-Dichlorobenzene	95-50-1	5	µg/L		<5	<5	<5	<5	<5
1.2.4-Trichlorobenzene	120-82-1	5	µg/L		<5	<5	<5	<5	<5
1.2.3-Trichlorobenzene	87-61-6	5	µg/L		<5	<5	<5	<5	<5
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		<5	<5	<5	<5	<5
Bromodichloromethane	75-27-4	5	µg/L		<5	<5	<5	<5	<5
Dibromochloromethane	124-48-1	5	µg/L		<5	<5	<5	<5	<5
Bromoform	75-25-2	5	µg/L		<5	<5	<5	<5	<5
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		**8.8**	<1.0	**1.4**	**6.3**	**14.9**
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	95-48-7	1.0	µg/L		**8.4**	<1.0	**9.5**	**4.4**	**13.4**
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		**146**	<2.0	**20.5**	**42.3**	**59.5**
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4-Dimethylphenol	105-67-9	1.0	µg/L		**3.7**	<1.0	<1.0	**1.7**	**5.0**
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WK13	AST2	WK12	WK14	WK11
				Client sampling date / time	05-FEB-2015 11:00	05-FEB-2015 10:30	05-FEB-2015 11:40	05-FEB-2015 12:20	05-FEB-2015 13:00
					ES1502783-002	ES1502783-003	ES1502783-005	ES1502783-007	ES1502783-009
EP075(SIM)A: Phenolic Compounds - Continued									
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		**1.5**	<1.0	<1.0	**1.6**	**3.2**
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L		**1.5**	<0.5	<0.5	**1.6**	**3.2**
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		**770**	**60**	<20	**690**	**1240**
C10 - C14 Fraction	----	50	µg/L		**160**	<50	**80**	**80**	**110**
C15 - C28 Fraction	----	100	µg/L		<100	<100	**400**	**150**	**130**
C29 - C36 Fraction	----	50	µg/L		<50	<50	**340**	**110**	**150**
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		**160**	<50	**820**	**340**	**390**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		**800**	**60**	<20	**710**	**1280**
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		**260**	<20	<20	**210**	**400**
>C10 - C16 Fraction	>C10_C16	100	µg/L		**150**	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		**100**	<100	**580**	**230**	**240**

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WK13	AST2	WK12	WK14	WK11
				Client sampling date / time	05-FEB-2015 11:00	05-FEB-2015 10:30	05-FEB-2015 11:40	05-FEB-2015 12:20	05-FEB-2015 13:00
					ES1502783-002	ES1502783-003	ES1502783-005	ES1502783-007	ES1502783-009
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C34 - C40 Fraction	----	100	µg/L		<100	<100	**200**	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		**250**	<100	**780**	**230**	**240**
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		**150**	<100	<100	<100	<100
EP262: Ethanolamines									
Ethanolamine	141-43-5	1	µg/L		**18**	**13**	**27**	**13**	**26**
Diethanolamine	111-42-2	1	µg/L		**19**	**6**	**9**	**27**	**103**
Methyl diethanolamine (MDEA)	105-59-9	1	µg/L		**6**	**9**	**10**	**4**	**3**
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**116**	**101**	**101**	**109**	**108**
Toluene-D8	2037-26-5	0.1	%		**115**	**104**	**110**	**109**	**111**
4-Bromofluorobenzene	460-00-4	0.1	%		**110**	**95.3**	**99.7**	**104**	**103**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		**26.3**	**18.4**	**35.9**	**29.4**	**28.8**
2-Chlorophenol-D4	93951-73-6	0.1	%		**49.9**	**29.4**	**64.3**	**53.7**	**54.1**
2.4.6-Tribromophenol	118-79-6	0.1	%		**63.5**	**20.9**	**66.0**	**64.0**	**61.8**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		**50.4**	**30.4**	**51.3**	**51.8**	**53.8**
Anthracene-d10	1719-06-8	0.1	%		**72.4**	**43.7**	**72.4**	**75.7**	**73.5**
4-Terphenyl-d14	1718-51-0	0.1	%		**71.4**	**38.6**	**72.1**	**71.9**	**69.9**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**122**	**97.8**	**98.9**	**114**	**113**
Toluene-D8	2037-26-5	0.1	%		**114**	**102**	**107**	**108**	**110**
4-Bromofluorobenzene	460-00-4	0.1	%		**115**	**99.1**	**104**	**106**	**106**

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78.3	133.2
Toluene-D8	2037-26-5	79.1	128.9
4-Bromofluorobenzene	460-00-4	80.8	123.7
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27.4	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1502916**	Page	: 1 of 10
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: SDaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523 A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 06-FEB-2015
Sampler	: CS & AM	Issue Date	: 13-MAY-2015
Site	: ----		
		No. of samples received	: 9
Quote number	: SY/933/14	No. of samples analysed	: 5

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Merrin Avery	Supervisor - Inorganic	Newcastle - Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **ED041G-EK057G-EK071G: LOR raised for Sulfate-Nitrite- Reactive phosphorous on various samples due to sample matrix.**
- **EG020: Bromine quantification may be unreliable due to its low solubility in acid, leading to variable volatility during measurement by ICPMS.**
- **EK059G-EK058G: LOR raised for NOx - Nitrate on various samples due to sample matrix.**
- **Ionic Balance out of acceptable limits due to analytes not quantified in this report.**
- **This report has been amended following the removal of some samples from the COA and a sample ID change as requested by Kelly-Jane Wallis on 5/5/15.**

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	AST2	WK13	WK12	WK14	WK11
				Client sampling date / time	06-FEB-2015 09:00	06-FEB-2015 09:45	06-FEB-2015 10:30	06-FEB-2015 11:30	06-FEB-2015 12:30
					ES1502916-001	ES1502916-003	ES1502916-005	ES1502916-007	ES1502916-009
EA005: pH									
pH Value	----	0.01	pH Unit		**8.96**	**7.91**	**7.69**	**7.34**	**7.21**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**6370**	**7930**	**7490**	**8860**	**10700**
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	----	10	mg/L		**3920**	**4730**	**4480**	**5730**	**7630**
EA025: Suspended Solids									
Suspended Solids (SS)	----	5	mg/L		**78**	**6**	**74**	**16**	**17**
ED009: Anions									
Chloride	16887-00-6	0.100	mg/L		**524**	**714**	**849**	**546**	**809**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		**350**	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**2350**	**3220**	**3350**	**4720**	**4900**
Total Alkalinity as CaCO3	----	1	mg/L		**2700**	**3220**	**3350**	**4720**	**4900**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<10	<10	<1	<10	<10
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		**504**	**694**	**733**	**531**	**709**
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**7**	**21**	**17**	**34**	**42**
Magnesium	7439-95-4	1	mg/L		**2**	**3**	**4**	**6**	**6**
Sodium	7440-23-5	1	mg/L		**1860**	**2270**	**2300**	**2720**	**3480**
Potassium	7440-09-7	1	mg/L		**16**	**15**	**13**	**15**	**22**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.01**	<0.01	<0.01	**0.02**	<0.01
Arsenic	7440-38-2	0.001	mg/L		**0.005**	**0.002**	**0.002**	**0.004**	**0.003**
Boron	7440-42-8	0.05	mg/L		**11.7**	**0.08**	**7.29**	**11.9**	**11.9**
Strontium	7440-24-6	0.001	mg/L		**2.26**	**2.81**	**3.48**	**7.00**	**9.91**
Barium	7440-39-3	0.001	mg/L		**2.40**	**3.37**	**1.44**	**6.76**	**12.3**
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	**0.0004**	**0.0002**	**0.0002**
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	**0.001**	**0.001**	**0.002**
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	AST2	WK13	WK12	WK14	WK11
				Client sampling date / time	06-FEB-2015 09:00	06-FEB-2015 09:45	06-FEB-2015 10:30	06-FEB-2015 11:30	06-FEB-2015 12:30
					ES1502916-001	ES1502916-003	ES1502916-005	ES1502916-007	ES1502916-009
EG020F: Dissolved Metals by ICP-MS - Continued									
Chromium	7440-47-3	0.001	mg/L		**0.002**	<0.001	**0.005**	**0.010**	**0.006**
Copper	7440-50-8	0.001	mg/L		**0.005**	**0.003**	**0.005**	**0.006**	**0.012**
Manganese	7439-96-5	0.001	mg/L		**0.022**	**0.019**	**0.010**	**0.072**	**0.092**
Molybdenum	7439-98-7	0.001	mg/L		**0.014**	**0.002**	**0.008**	**0.004**	**0.004**
Nickel	7440-02-0	0.001	mg/L		**0.003**	**0.002**	**0.004**	**0.005**	**0.007**
Lead	7439-92-1	0.001	mg/L		**0.005**	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		**0.001**	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	**0.002**
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L		**0.012**	<0.005	**0.006**	**0.006**	**0.015**
Iron	7439-89-6	0.05	mg/L		**3.08**	**0.08**	**0.06**	**0.11**	**0.18**
Bromine	7726-95-6	0.1	mg/L		**0.7**	**0.7**	**0.5**	**0.8**	**1.3**
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L		**20.1**	**28.3**	**22.9**	**32.4**	**31.7**
EK010/011: Chlorine									
Chlorine - Free	----	0.2	mg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Chlorine - Total Residual	----	0.2	mg/L		<0.2	<0.2	<0.2	<0.2	<0.2
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**1.0**	**1.8**	**1.0**	**0.6**	**0.9**
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.04**	**4.91**	**2.74**	**5.37**	**8.12**
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	----	0.01	mg/L		**0.04**	**2.06**	**2.62**	**5.26**	**7.98**
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----	0.01	mg/L		<0.01	<0.01	<0.10	<0.10	<0.10
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	<0.01	<0.10	<0.10	<0.10
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	<0.01	<0.10	<0.10	<0.10
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	AST2	WK13	WK12	WK14	WK11
			Client sampling date / time	06-FEB-2015 09:00	06-FEB-2015 09:45	06-FEB-2015 10:30	06-FEB-2015 11:30	06-FEB-2015 12:30
Compound	CAS Number	LOR	Unit	ES1502916-001	ES1502916-003	ES1502916-005	ES1502916-007	ES1502916-009
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	7.0	6.3	3.8	6.4	9.5
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	7.0	6.3	3.8	6.4	9.5
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	2.60	3.75	1.78	2.57	3.53
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.58	<0.10	<0.01	<0.10
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	68.2	83.9	87.6	109	118
Total Cations	----	0.01	meq/L	81.8	100	102	121	154
Ionic Balance	----	0.01	%	9.05	8.90	7.31	4.98	13.4
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	455	757	43	268	1200
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	<5	<5	<5	<5
EP033: C1 - C4 Hydrocarbon Gases								
Methane	74-82-8	10	µg/L	1580	7350	7100	5380	3360
Ethene	74-85-1	10	µg/L	<10	<10	<10	<10	<10
Ethane	74-84-0	10	µg/L	108	1390	20	1240	917
Propene	115-07-1	10	µg/L	<10	<10	<10	<10	<10
Propane	74-98-6	10	µg/L	14	158	<10	87	66
Butene	25167-67-3	10	µg/L	<10	<10	<10	<10	<10
Butane	106-97-8	10	µg/L	<10	10	<10	<10	<10
EP074A: Monocyclic Aromatic Hydrocarbons								
Styrene	100-42-5	5	µg/L	<5	<5	<5	<5	<5
Isopropylbenzene	98-82-8	5	µg/L	<5	<5	<5	<5	<5
n-Propylbenzene	103-65-1	5	µg/L	<5	<5	<5	<5	<5
1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	<5	<5	<5
sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	<5	<5	<5
1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	<5	<5	<5
tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	<5	<5	<5
p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	<5	<5	<5
n-Butylbenzene	104-51-8	5	µg/L	<5	<5	<5	<5	<5

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	AST2	WK13	WK12	WK14	WK11
				Client sampling date / time	06-FEB-2015 09:00	06-FEB-2015 09:45	06-FEB-2015 10:30	06-FEB-2015 11:30	06-FEB-2015 12:30
					ES1502916-001	ES1502916-003	ES1502916-005	ES1502916-007	ES1502916-009
EP074B: Oxygenated Compounds									
Vinyl Acetate	108-05-4	50	µg/L		<50	<50	<50	<50	<50
2-Butanone (MEK)	78-93-3	50	µg/L		<50	**160**	<50	<50	<50
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L		<50	<50	<50	<50	<50
2-Hexanone (MBK)	591-78-6	50	µg/L		<50	<50	<50	<50	<50
EP074C: Sulfonated Compounds									
Carbon disulfide	75-15-0	5	µg/L		<5	<5	<5	<5	<5
EP074D: Fumigants									
2.2-Dichloropropane	594-20-7	5	µg/L		<5	<5	<5	<5	<5
1.2-Dichloropropane	78-87-5	5	µg/L		<5	<5	<5	<5	<5
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L		<5	<5	<5	<5	<5
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L		<5	<5	<5	<5	<5
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	<5	<5	<5	<5
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	<50	<50	<50	<50
Chloromethane	74-87-3	50	µg/L		<50	<50	<50	<50	<50
Vinyl chloride	75-01-4	50	µg/L		<50	<50	<50	<50	<50
Bromomethane	74-83-9	50	µg/L		<50	<50	<50	<50	<50
Chloroethane	75-00-3	50	µg/L		<50	<50	<50	<50	<50
Trichlorofluoromethane	75-69-4	50	µg/L		<50	<50	<50	<50	<50
1.1-Dichloroethene	75-35-4	5	µg/L		<5	<5	<5	<5	<5
Iodomethane	74-88-4	5	µg/L		<5	<5	<5	<5	<5
trans-1.2-Dichloroethene	156-60-5	5	µg/L		<5	<5	<5	<5	<5
1.1-Dichloroethane	75-34-3	5	µg/L		<5	<5	<5	<5	<5
cis-1.2-Dichloroethene	156-59-2	5	µg/L		<5	<5	<5	<5	<5
1.1.1-Trichloroethane	71-55-6	5	µg/L		<5	<5	<5	<5	<5
1.1-Dichloropropylene	563-58-6	5	µg/L		<5	<5	<5	<5	<5
Carbon Tetrachloride	56-23-5	5	µg/L		<5	<5	<5	<5	<5
1.2-Dichloroethane	107-06-2	5	µg/L		<5	<5	<5	<5	<5
Trichloroethene	79-01-6	5	µg/L		<5	<5	<5	<5	<5
Dibromomethane	74-95-3	5	µg/L		<5	<5	<5	<5	<5
1.1.2-Trichloroethane	79-00-5	5	µg/L		<5	<5	<5	<5	<5
1.3-Dichloropropane	142-28-9	5	µg/L		<5	<5	<5	<5	<5
Tetrachloroethene	127-18-4	5	µg/L		<5	<5	<5	<5	<5

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	AST2	WK13	WK12	WK14	WK11
				Client sampling date / time	06-FEB-2015 09:00	06-FEB-2015 09:45	06-FEB-2015 10:30	06-FEB-2015 11:30	06-FEB-2015 12:30
					ES1502916-001	ES1502916-003	ES1502916-005	ES1502916-007	ES1502916-009
EP074E: Halogenated Aliphatic Compounds - Continued									
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L		<5	<5	<5	<5	<5
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L		<5	<5	<5	<5	<5
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	<5	<5	<5	<5
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L		<5	<5	<5	<5	<5
1.2.3-Trichloropropane	96-18-4	5	µg/L		<5	<5	<5	<5	<5
Pentachloroethane	76-01-7	5	µg/L		<5	<5	<5	<5	<5
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L		<5	<5	<5	<5	<5
Hexachlorobutadiene	87-68-3	5	µg/L		<5	<5	<5	<5	<5
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		<5	<5	<5	<5	<5
Bromobenzene	108-86-1	5	µg/L		<5	<5	<5	<5	<5
2-Chlorotoluene	95-49-8	5	µg/L		<5	<5	<5	<5	<5
4-Chlorotoluene	106-43-4	5	µg/L		<5	<5	<5	<5	<5
1.3-Dichlorobenzene	541-73-1	5	µg/L		<5	<5	<5	<5	<5
1.4-Dichlorobenzene	106-46-7	5	µg/L		<5	<5	<5	<5	<5
1.2-Dichlorobenzene	95-50-1	5	µg/L		<5	<5	<5	<5	<5
1.2.4-Trichlorobenzene	120-82-1	5	µg/L		<5	<5	<5	<5	<5
1.2.3-Trichlorobenzene	87-61-6	5	µg/L		<5	<5	<5	<5	<5
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		<5	<5	<5	<5	<5
Bromodichloromethane	75-27-4	5	µg/L		<5	<5	<5	<5	<5
Dibromochloromethane	124-48-1	5	µg/L		<5	<5	<5	<5	<5
Bromoform	75-25-2	5	µg/L		<5	<5	<5	<5	<5
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	**11.5**	<1.0	**6.0**	**14.4**
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	**10.8**	**9.6**	**3.8**	**12.9**
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	**200**	**22.8**	**68.8**	**78.1**
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	**3.5**	<1.0	**1.3**	**4.2**
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	AST2	WK13	WK12	WK14	WK11
				Client sampling date / time	06-FEB-2015 09:00	06-FEB-2015 09:45	06-FEB-2015 10:30	06-FEB-2015 11:30	06-FEB-2015 12:30
					ES1502916-001	ES1502916-003	ES1502916-005	ES1502916-007	ES1502916-009
EP075(SIM)A: Phenolic Compounds - Continued									
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	**1.3**	<1.0	**1.4**	**3.1**
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L		<0.5	**1.3**	<0.5	**1.4**	**3.1**
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		**150**	**770**	<20	**830**	**1200**
C10 - C14 Fraction	----	50	µg/L		<50	**200**	<50	<50	**110**
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	**180**
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	**190**
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		<50	**200**	<50	<50	**480**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		**160**	**840**	<20	**880**	**1290**
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		**110**	**410**	<20	**320**	**500**
>C10 - C16 Fraction	>C10_C16	100	µg/L		<100	**190**	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	**300**

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: AST2	WK13	WK12	WK14	WK11
				Client sampling date / time: 06-FEB-2015 09:00	06-FEB-2015 09:45	06-FEB-2015 10:30	06-FEB-2015 11:30	06-FEB-2015 12:30
				ES1502916-001	ES1502916-003	ES1502916-005	ES1502916-007	ES1502916-009
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L	<100	**190**	<100	<100	**300**
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L	<100	**190**	<100	<100	<100
EP262: Ethanolamines								
Ethanolamine	141-43-5	1	µg/L	**5**	**17**	**21**	**9**	**17**
Diethanolamine	111-42-2	1	µg/L	**4**	**6**	**3**	**8**	**26**
Methyl diethanolamine (MDEA)	105-59-9	1	µg/L	**6**	<1	**4**	**2**	<1
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	**92.4**	**96.6**	**95.6**	**105**	**101**
Toluene-D8	2037-26-5	0.1	%	**97.2**	**102**	**98.4**	**106**	**105**
4-Bromofluorobenzene	460-00-4	0.1	%	**86.4**	**88.7**	**88.8**	**93.5**	**90.2**
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	**25.0**	**30.4**	**26.3**	**28.9**	**22.7**
2-Chlorophenol-D4	93951-73-6	0.1	%	**43.9**	**57.2**	**55.0**	**60.1**	**47.0**
2.4.6-Tribromophenol	118-79-6	0.1	%	**38.1**	**56.3**	**45.1**	**47.1**	**52.6**
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**45.6**	**63.3**	**61.8**	**82.2**	**66.4**
Anthracene-d10	1719-06-8	0.1	%	**74.2**	**79.5**	**67.8**	**74.5**	**73.5**
4-Terphenyl-d14	1718-51-0	0.1	%	**74.0**	**86.4**	**78.1**	**78.0**	**83.6**
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	**92.6**	**97.0**	**95.9**	**105**	**102**
Toluene-D8	2037-26-5	0.1	%	**105**	**110**	**107**	**115**	**114**
4-Bromofluorobenzene	460-00-4	0.1	%	**97.3**	**100**	**101**	**105**	**102**

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78.3	133.2
Toluene-D8	2037-26-5	79.1	128.9
4-Bromofluorobenzene	460-00-4	80.8	123.7
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27.4	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1502917**	Page	: 1 of 4
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
Address	: GPO BOX 5394 SYDNEY NSW, AUSTRALIA 2001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: SDaykin@pb.com.au	E-mail	: loren.schiavon@alsglobal.com
Telephone	: +61 02 92725100	Telephone	: +61 2 8784 8503
Facsimile	: +61 02 92725101	Facsimile	: +61 2 8784 8500
Project	: 2268523 A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 06-FEB-2015
Sampler	: CS & AM	Issue Date	: 13-MAY-2015
Site	: ----		
		No. of samples received	: 18
Quote number	: SY/933/14	No. of samples analysed	: 5

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **This report has been amended following the removal of some samples from the COA and a sample ID change as requested by Kelly-Jane Wallis on 5/5/15.**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	AST2	WK13	WK12	WK14	WK11
				Client sampling date / time	06-FEB-2015 09:00	06-FEB-2015 09:45	06-FEB-2015 10:30	06-FEB-2015 11:30	06-FEB-2015 12:30
Compound	CAS Number	LOR	Unit		ES1502917-001	ES1502917-003	ES1502917-005	ES1502917-007	ES1502917-009
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		**20**	**145**	<1	**181**	**231**
Toluene	108-88-3	2	µg/L		**25**	**180**	<2	**213**	**308**
Ethylbenzene	100-41-4	2	µg/L		<2	**3**	<2	**3**	**5**
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		**3**	**47**	<2	**45**	**75**
ortho-Xylene	95-47-6	2	µg/L		<2	**9**	<2	**10**	**16**
^ **Total Xylenes**	1330-20-7	2	µg/L		**3**	**56**	<2	**55**	**91**
^ **Sum of BTEX**	----	1	µg/L		**48**	**384**	<1	**452**	**635**
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**84.1**	**82.8**	**81.9**	**91.4**	**84.3**
Toluene-D8	2037-26-5	0.1	%		**98.4**	**102**	**102**	**97.3**	**97.1**
4-Bromofluorobenzene	460-00-4	0.1	%		**81.1**	**88.9**	**81.1**	**87.1**	**91.1**

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1504724**	Page	: 1 of 10
Amendment	: **1**		
Client	: **PARSONS BRINCKERHOFF AUST P/L**	Laboratory	: Environmental Division Sydney
Contact	: SEAN DAYKIN	Contact	: Loren Schiavon
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Project	: 2268523A	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 26-FEB-2015
Sampler	: CS,AM	Issue Date	: 11-MAY-2015
Site	: ----		
		No. of samples received	: 1
Quote number	: SY/933/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Barbara Coupland	Quality Officer	Newcastle - Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **This report has been amended as a result of a request to change sample identification numbers (IDs) received by ALS from Kelly-Jane Wallis on 5/5/15. All analysis results are as per the previous report.**

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: AST2	----	----	----	----
				Client sampling date / time: 26-FEB-2015 11:45	----	----	----	----
				ES1504724-001	----	----	----	----
EA005: pH								
pH Value	----	0.01	pH Unit	**9.24**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**6760**	----	----	----	----
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	----	10	mg/L	**4690**	----	----	----	----
EA025: Suspended Solids								
Suspended Solids (SS)	----	5	mg/L	**90**	----	----	----	----
ED009: Anions								
Chloride	16887-00-6	0.100	mg/L	**721**	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	**600**	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**2350**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**2950**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	----	----	----	----
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	**552**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**16**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**3**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**1780**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**16**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	----	----	----	----
Antimony	7440-36-0	0.001	mg/L	**0.001**	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	**0.004**	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	----	----	----	----
Barium	7440-39-3	0.001	mg/L	**2.87**	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.002**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: AST2	----	----	----	----
				Client sampling date / time: 26-FEB-2015 11:45	----	----	----	----
				ES1504724-001	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued								
Nickel	7440-02-0	0.001	mg/L	**0.003**	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.008**	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	**0.012**	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	**0.006**	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
Strontium	7440-24-6	0.001	mg/L	**2.40**	----	----	----	----
Tin	7440-31-5	0.001	mg/L	<0.001	----	----	----	----
Uranium	7440-61-1	0.001	mg/L	<0.001	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	----	----	----	----
Boron	7440-42-8	0.05	mg/L	**10.1**	----	----	----	----
Iron	7439-89-6	0.05	mg/L	**0.25**	----	----	----	----
Bromine	7726-95-6	0.1	mg/L	**0.7**	----	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	**20.8**	----	----	----	----
EK010/011: Chlorine								
Chlorine - Free	----	0.2	mg/L	<0.2	----	----	----	----
Chlorine - Total Residual	----	0.2	mg/L	<0.2	----	----	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	**1.0**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.02**	----	----	----	----
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	----	0.01	mg/L	<0.01	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	----	0.01	mg/L	<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	AST2	----	----	----	----
			Client sampling date / time	26-FEB-2015 11:45	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1504724-001	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**7.2**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**7.2**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**2.19**	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.01**	----	----	----	----
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	**74.5**	----	----	----	----
Total Cations	----	0.01	meq/L	**78.9**	----	----	----	----
Ionic Balance	----	0.01	%	**2.79**	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**280**	----	----	----	----
EP033: C1 - C4 Hydrocarbon Gases								
Methane	74-82-8	10	µg/L	**1830**	----	----	----	----
Ethene	74-85-1	10	µg/L	<10	----	----	----	----
Ethane	74-84-0	10	µg/L	<10	----	----	----	----
Propene	115-07-1	10	µg/L	<10	----	----	----	----
Propane	74-98-6	10	µg/L	<10	----	----	----	----
Butene	25167-67-3	10	µg/L	<10	----	----	----	----
Butane	106-97-8	10	µg/L	<10	----	----	----	----
EP074A: Monocyclic Aromatic Hydrocarbons								
Styrene	100-42-5	5	µg/L	<5	----	----	----	----
Isopropylbenzene	98-82-8	5	µg/L	<5	----	----	----	----
n-Propylbenzene	103-65-1	5	µg/L	<5	----	----	----	----
1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	----	----	----	----
sec-Butylbenzene	135-98-8	5	µg/L	<5	----	----	----	----
1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	----	----	----	----
tert-Butylbenzene	98-06-6	5	µg/L	<5	----	----	----	----
p-Isopropyltoluene	99-87-6	5	µg/L	<5	----	----	----	----
n-Butylbenzene	104-51-8	5	µg/L	<5	----	----	----	----
EP074B: Oxygenated Compounds								
Vinyl Acetate	108-05-4	50	µg/L	<50	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: AST2	----	----	----	----
				Client sampling date / time: 26-FEB-2015 11:45	----	----	----	----
				ES1504724-001	----	----	----	----
EP074B: Oxygenated Compounds - Continued								
2-Butanone (MEK)	78-93-3	50	µg/L	<50	----	----	----	----
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	----	----	----	----
2-Hexanone (MBK)	591-78-6	50	µg/L	<50	----	----	----	----
EP074C: Sulfonated Compounds								
Carbon disulfide	75-15-0	5	µg/L	<5	----	----	----	----
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	5	µg/L	<5	----	----	----	----
1.2-Dichloropropane	78-87-5	5	µg/L	<5	----	----	----	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	----	----	----	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	----	----	----	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	----	----	----	----
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	50	µg/L	<50	----	----	----	----
Chloromethane	74-87-3	50	µg/L	<50	----	----	----	----
Vinyl chloride	75-01-4	50	µg/L	<50	----	----	----	----
Bromomethane	74-83-9	50	µg/L	<50	----	----	----	----
Chloroethane	75-00-3	50	µg/L	<50	----	----	----	----
Trichlorofluoromethane	75-69-4	50	µg/L	<50	----	----	----	----
1.1-Dichloroethene	75-35-4	5	µg/L	<5	----	----	----	----
Iodomethane	74-88-4	5	µg/L	<5	----	----	----	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	----	----	----	----
1.1-Dichloroethane	75-34-3	5	µg/L	<5	----	----	----	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	----	----	----	----
1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	----	----	----	----
1.1-Dichloropropylene	563-58-6	5	µg/L	<5	----	----	----	----
Carbon Tetrachloride	56-23-5	5	µg/L	<5	----	----	----	----
1.2-Dichloroethane	107-06-2	5	µg/L	<5	----	----	----	----
Trichloroethene	79-01-6	5	µg/L	<5	----	----	----	----
Dibromomethane	74-95-3	5	µg/L	<5	----	----	----	----
1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	----	----	----	----
1.3-Dichloropropane	142-28-9	5	µg/L	<5	----	----	----	----
Tetrachloroethene	127-18-4	5	µg/L	<5	----	----	----	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: AST2	----	----	----	----
				Client sampling date / time: 26-FEB-2015 11:45	----	----	----	----
				ES1504724-001	----	----	----	----
EP074E: Halogenated Aliphatic Compounds - Continued								
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	----	----	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	----	----	----	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	----	----	----	----
1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	----	----	----	----
Pentachloroethane	76-01-7	5	µg/L	<5	----	----	----	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	----	----	----	----
Hexachlorobutadiene	87-68-3	5	µg/L	<5	----	----	----	----
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	5	µg/L	<5	----	----	----	----
Bromobenzene	108-86-1	5	µg/L	<5	----	----	----	----
2-Chlorotoluene	95-49-8	5	µg/L	<5	----	----	----	----
4-Chlorotoluene	106-43-4	5	µg/L	<5	----	----	----	----
1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	----	----	----	----
1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	----	----	----	----
1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	----	----	----	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	----	----	----	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	----	----	----	----
EP074G: Trihalomethanes								
Chloroform	67-66-3	5	µg/L	<5	----	----	----	----
Bromodichloromethane	75-27-4	5	µg/L	<5	----	----	----	----
Dibromochloromethane	124-48-1	5	µg/L	<5	----	----	----	----
Bromoform	75-25-2	5	µg/L	<5	----	----	----	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	**1.3**	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L	<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	**10.6**	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	----	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	----	----	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	----	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID: AST2	----	----	----	----
				Client sampling date / time: 26-FEB-2015 11:45	----	----	----	----
				ES1504724-001	----	----	----	----
EP075(SIM)A: Phenolic Compounds - Continued								
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	----	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L	<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L	<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L	<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	**20**	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	**30**	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L	**30**	----	----	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	AST2	----	----	----	----
				Client sampling date / time	26-FEB-2015 11:45	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1504724-001	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ Total Xylenes	1330-20-7	2	µg/L		<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP262: Ethanolamines									
Ethanolamine	141-43-5	1	µg/L		<1	----	----	----	----
Diethanolamine	111-42-2	1	µg/L		<1	----	----	----	----
Methyl diethanolamine (MDEA)	105-59-9	1	µg/L		<1	----	----	----	----
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**123**	----	----	----	----
Toluene-D8	2037-26-5	0.1	%		**100**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		**104**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		**12.0**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%		**23.9**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%		**22.2**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		**32.4**	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%		**35.4**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%		**42.2**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**114**	----	----	----	----
Toluene-D8	2037-26-5	0.1	%		**104**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		**106**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78.3	133.2
Toluene-D8	2037-26-5	79.1	128.9
4-Bromofluorobenzene	460-00-4	80.8	123.7
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27.4	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

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CERTIFICATE OF ANALYSIS 121884

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	1 Water		
Date samples received / completed instructions received	13/01/2015	/	13/01/2015

This report supersedes the previous report R00 due to an amendment to client sample ID.

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	20/01/15	/	5/05/15
Date of Preliminary Report:	Not Issued		

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics		
Our Reference:	UNITS	121884-1
Your Reference	----------	AST2
Date Sampled	----------	12/01/2015
Type of sample		Water
Date prepared	-	14/01/2015
Date analysed	-	14/01/2015
THPS in Water by uHPLC*	µg/L	61
Sulphate, SO4	mg/L	4

Metals in Waters - Acid extractable		
Our Reference:	UNITS	121884-1
Your Reference	----------	AST2
Date Sampled	----------	12/01/2015
Type of sample		Water
Date prepared	-	15/01/2015
Date analysed	-	15/01/2015
Phosphorus - Total	mg/L	3.2

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 2268523A

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			14/01/2015	121884-1	14/01/2015 || 14/01/2015	LCS-W1	14/01/2015
Date analysed	-			14/01/2015	121884-1	14/01/2015 || 14/01/2015	LCS-W1	14/01/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	121884-1	61 || 62 || RPD: 2	LCS-W1	96%
Sulphate, SO4	mg/L	1	Inorg-081	<1	121884-1	4 || [N/T]	LCS-W1	99%

QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			15/01/2015	[NT]	[NT]	LCS-W1	15/01/2015
Date analysed	-			15/01/2015	[NT]	[NT]	LCS-W1	15/01/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	[NT]	[NT]	LCS-W1	115%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	121884-1	14/01/2015
Date analysed	-	[NT]	[NT]	121884-1	14/01/2015
THPS in Water by uHPLC*	µg/L	[NT]	[NT]	121884-1	100%
Sulphate, SO4	mg/L	[NT]	[NT]	[NR]	[NR]

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

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CERTIFICATE OF ANALYSIS 122757

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	12 Waters		
Date samples received / completed instructions received	30/01/15	/	30/01/15

This report supersedes the previous report R00 due to an amendment to client sample ID (ELS #1).

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	6/02/15	/	5/05/15
Date of Preliminary Report:	Not Issued		

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics						
Our Reference:	UNITS	122757-1	122757-2	122757-3	122757-4	122757-5
Your Reference	----------	AST2	WKSW01	WKMB01	WKMB02	WKMB03
Date Sampled	----------	28/01/2015	28/01/2015	29/01/2015	29/01/2015	29/01/2015
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	02/02/2015	02/02/2015	02/02/2015	02/02/2015	02/02/2015
Date analysed	-	02/02/2015	02/02/2015	02/02/2015	02/02/2015	02/02/2015
THPS in Water by uHPLC*	µg/L	65	<50	89	<50	<50
Sulphate, SO4	mg/L	<1	4	91	15	<1

Miscellaneous Inorganics						
Our Reference:	UNITS	122757-6	122757-7	122757-8	122757-9	122757-10
Your Reference	----------	WKMB06A	WKMB06B	WKSW02	WKSW03	GR-P3
Date Sampled	----------	29/01/2015	29/01/2015	29/01/2015	29/01/2015	29/01/2015
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	02/02/2015	02/02/2015	02/02/2015	02/02/2015	02/02/2015
Date analysed	-	02/02/2015	02/02/2015	02/02/2015	02/02/2015	02/02/2015
THPS in Water by uHPLC*	µg/L	<50	<50	<50	<50	<50
Sulphate, SO4	mg/L	42	38	11	6	74

Miscellaneous Inorganics			
Our Reference:	UNITS	122757-11	122757-12
Your Reference	----------	GW080487	QA2
Date Sampled	----------	30/01/2015	30/01/2015
Type of sample		Water	Water
Date prepared	-	02/02/2015	02/02/2015
Date analysed	-	02/02/2015	02/02/2015
THPS in Water by uHPLC*	µg/L	<50	<50
Sulphate, SO4	mg/L	92	91

Metals in Waters - Acid extractable						
Our Reference:	UNITS	122757-1	122757-2	122757-3	122757-4	122757-5
Your Reference	----------	AST2	WKSW01	WKMB01	WKMB02	WKMB03
Date Sampled	----------	28/01/2015	28/01/2015	29/01/2015	29/01/2015	29/01/2015
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	03/02/2015	03/02/2015	03/02/2015	03/02/2015	03/02/2015
Date analysed	-	03/02/2015	03/02/2015	03/02/2015	03/02/2015	03/02/2015
Phosphorus - Total	mg/L	2.8	0.2	0.09	0.09	0.1

Metals in Waters - Acid extractable						
Our Reference:	UNITS	122757-6	122757-7	122757-8	122757-9	122757-10
Your Reference	----------	WKMB06A	WKMB06B	WKSW02	WKSW03	GR-P3
Date Sampled	----------	29/01/2015	29/01/2015	29/01/2015	29/01/2015	29/01/2015
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	03/02/2015	03/02/2015	03/02/2015	03/02/2015	03/02/2015
Date analysed	-	03/02/2015	03/02/2015	03/02/2015	03/02/2015	03/02/2015
Phosphorus - Total	mg/L	0.3	0.9	0.2	0.1	<0.05

Metals in Waters - Acid extractable			
Our Reference:	UNITS	122757-11	122757-12
Your Reference	----------	GW080487	QA2
Date Sampled	----------	30/01/2015	30/01/2015
Type of sample		Water	Water
Date prepared	-	03/02/2015	03/02/2015
Date analysed	-	03/02/2015	03/02/2015
Phosphorus - Total	mg/L	<0.05	<0.05

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 2268523A

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			02/02/2015	122757-1	02/02/2015 || 02/02/2015	122757-2	02/02/2015
Date analysed	-			02/02/2015	122757-1	02/02/2015 || 02/02/2015	122757-2	02/02/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	122757-1	65 || 64 || RPD: 2	122757-2	104%
Sulphate, SO4	mg/L	1	Inorg-081	<1	122757-1	<1 || <1	122757-2	114%

QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			03/02/2015	122757-1	03/02/2015 || 03/02/2015	LCS-1	03/02/2015
Date analysed	-			03/02/2015	122757-1	03/02/2015 || 03/02/2015	LCS-1	03/02/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	122757-1	2.8 || 2.8 || RPD: 0	LCS-1	106%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	122757-11	02/02/2015 || 02/02/2015	LCS-1	03/02/2015
Date analysed	-	122757-11	02/02/2015 || 02/02/2015	LCS-1	03/02/2015
THPS in Water by uHPLC*	µg/L	122757-11	<50 || <50	LCS-1	94%
Sulphate, SO4	mg/L	122757-11	92 || 91 || RPD: 1	LCS-1	109%

QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	122757-11	03/02/2015 || 03/02/2015
Date analysed	-	122757-11	03/02/2015 || 03/02/2015
Phosphorus - Total	mg/L	122757-11	<0.05 || <0.05

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

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CERTIFICATE OF ANALYSIS 122818

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	2 Waters		
Date samples received / completed instructions received	02/02/15	/	02/02/15

This report supersedes the previous report R01 due to an amendment to client sample ID (ELS #1).

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	3/02/15	/	5/05/15
Date of Preliminary Report:	Not Issued		

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	122818-1 AST2 02/02/2015 Water	122818-2 QA 02/02/2015 Water
Date prepared	-	02/02/2015	02/02/2015
Date analysed	-	02/02/2015	02/02/2015
THPS in Water by uHPLC*	µg/L	72	59
Sulphate, SO4	mg/L	<1	<1

Metals in Waters - Acid extractable			
Our Reference:	UNITS	122818-1	122818-2
Your Reference	----------	AST2	QA
Date Sampled	----------	02/02/2015	02/02/2015
Type of sample		Water	Water
Date prepared	-	03/02/2015	03/02/2015
Date analysed	-	03/02/2015	03/02/2015
Phosphorus - Total	mg/L	2.7	2.6

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 2268523A

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			02/02/2015	122818-1	02/02/2015 || 3/2/2015	LCS-W1	02/02/2015
Date analysed	-			02/02/2015	122818-1	02/02/2015 || 3/2/2015	LCS-W1	02/02/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	122818-1	72 || 72 || RPD: 0	LCS-W1	94%
Sulphate, SO4	mg/L	1	Inorg-081	<1	122818-1	<1 || [N/T]	LCS-W1	102%
QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			03/02/2015	[NT]	[NT]	LCS-W1	03/02/2015
Date analysed	-			03/02/2015	[NT]	[NT]	LCS-W1	03/02/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	[NT]	[NT]	LCS-W1	106%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	122818-2	3/2/2015
Date analysed	-	[NT]	[NT]	122818-2	3/2/2015
THPS in Water by uHPLC*	µg/L	[NT]	[NT]	122818-2	113%
Sulphate, SO4	mg/L	[NT]	[NT]	[NR]	[NR]

Report Comments:

Sample number 2 was received with headspace. Samples for THPS analysis should be collected in sealed vilas with no headspace.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

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Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

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www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 122955

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	5 Waters		
Date samples received / completed instructions received	04/02/15	/	04/02/15

This report supersedes the previous report R00 due an amendment to client sample ID (ELS #5) and the removal of results for sample ELS #2 & 4.

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	5/02/15	/	6/05/15
Date of Preliminary Report:	Not Issued		

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	122955-1 WK11 03/02/2015 Water	122955-3 WK13 03/02/2015 Water	122955-5 AST2 03/02/2015 Water
Date prepared	-	4/2/2015	4/2/2015	4/2/2015
Date analysed	-	4/2/2015	4/2/2015	4/2/2015
THPS in Water by uHPLC*	µg/L	90	57	<50
Sulphate, SO4	mg/L	4	1	<1

Metals in Waters - Acid extractable				
Our Reference:	UNITS	122955-1	122955-3	122955-5
Your Reference	----------	WK11	WK13	AST2
Date Sampled	----------	03/02/2015	03/02/2015	03/02/2015
Type of sample		Water	Water	Water
Date prepared	-	05/02/2015	05/02/2015	05/02/2015
Date analysed	-	05/02/2015	05/02/2015	05/02/2015
Phosphorus - Total	mg/L	4.9	3.7	2.7

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 2268523A

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			04/02/2015	122955-1	4/2/2015 || 4/2/2015	LCS-1	04/02/2015
Date analysed	-			04/02/2015	122955-1	4/2/2015 || 4/2/2015	LCS-1	04/02/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	122955-1	90 || 92 || RPD: 2	LCS-1	100%
Sulphate, SO4	mg/L	1	Inorg-081	<1	122955-1	4 || 3 || RPD: 29	LCS-1	108%
QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			05/02/2015	122955-1	05/02/2015 || 05/02/2015	LCS-W1	05/02/2015
Date analysed	-			05/02/2015	122955-1	05/02/2015 || 05/02/2015	LCS-W1	05/02/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	122955-1	4.9 || 5.0 || RPD: 2	LCS-W1	110%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	122955-2	04/02/2015
Date analysed	-	[NT]	[NT]	122955-2	04/02/2015
THPS in Water by uHPLC*	µg/L	[NT]	[NT]	122955-2	73%
Sulphate, SO4	mg/L	[NT]	[NT]	122955-2	105%
QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	122955-2	05/02/2015
Date analysed	-	[NT]	[NT]	122955-2	05/02/2015
Phosphorus - Total	mg/L	[NT]	[NT]	122955-2	114%

Report Comments:

Samples for THPS analysis were collected in 250 ml amber bottles and some headspace was present in all the samples. Samples for THPS analysis should be collected in sealed vials with NO headspace, kept at <6°C and analysed within 3 days.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

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CERTIFICATE OF ANALYSIS 123059

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	7 Waters		
Date samples received / completed instructions received	05/02/2015	/	05/02/2015

This report supersedes the previous report R00 due to an amendment to client sample ID (ELS #7) and the removal of results for ELS #1, 3 & 5.

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	6/02/15	/	6/05/15
Date of Preliminary Report:	Not Issued		

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	123059-2 WK11 4/02/2015 Water	123059-4 WK14 4/02/2015 Water	123059-6 WK13 4/02/2015 Water	123059-7 AST2 4/02/2015 Water
Date prepared	-	05/02/2015	05/02/2015	05/02/2015	05/02/2015
Date analysed	-	05/02/2015	05/02/2015	05/02/2015	05/02/2015
THPS in Water by uHPLC*	µg/L	83	67	64	<50
Sulphate, SO4	mg/L	5	2	2	<1

Metals in Waters - Acid extractable					
Our Reference:	UNITS	123059-2	123059-4	123059-6	123059-7
Your Reference	----------	WK11	WK14	WK13	AST2
Date Sampled	----------	4/02/2015	4/02/2015	4/02/2015	4/02/2015
Type of sample		Water	Water	Water	Water
Date prepared	-	06/02/2015	06/02/2015	06/02/2015	06/02/2015
Date analysed	-	06/02/2015	06/02/2015	06/02/2015	06/02/2015
Phosphorus - Total	mg/L	5.1	3.3	3.7	2.9

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			05/02/2015	[NT]	[NT]	LCS-W1	05/02/2015
Date analysed	-			05/02/2015	[NT]	[NT]	LCS-W1	05/02/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	[NT]	[NT]	LCS-W1	104%
Sulphate, SO4	mg/L	1	Inorg-081	<1	[NT]	[NT]	LCS-W1	110%

QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			06/02/2015	123059-4	06/02/2015 || 06/02/2015	LCS-W1	06/02/2015
Date analysed	-			06/02/2015	123059-4	06/02/2015 || 06/02/2015	LCS-W1	06/02/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	123059-4	3.3 || 3.3 || RPD: 0	LCS-W1	115%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	123059-2	06/02/2015
Date analysed	-	[NT]	[NT]	123059-2	06/02/2015
THPS in Water by uHPLC*	µg/L	[NT]	[NT]	123059-2	60%
Sulphate, SO4	mg/L	[NT]	[NT]	[NR]	[NR]

Report Comments:

Samples for THPS analysis were collected in 250 ml amber bottles and some headspace was present in all the samples. Samples for THPS analysis should be collected in sealed vials with NO headspace, kept at <6°C and analysed within 3 days.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

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LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

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CERTIFICATE OF ANALYSIS 123060

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	4 Waters		
Date samples received / completed instructions received	05/02/2015	/	05/02/2015

This report supersedes the previous report R00 due to the removal of results for ELS #2 & 4.

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	6/02/15	/	6/05/15
Date of Preliminary Report:	Not Issued		

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	123060-1 WK14 4/02/2015 Water	123060-3 WK12 4/02/2015 Water
Date prepared	-	05/02/2015	05/02/2015
Date analysed	-	05/02/2015	05/02/2015
THPS in Water by uHPLC*	µg/L	<50	<50
Sulphate, SO4	mg/L	2	<1

Metals in Waters - Acid extractable			
Our Reference:	UNITS	123060-1	123060-3
Your Reference	----------	WK14	WK12
Date Sampled	----------	4/02/2015	4/02/2015
Type of sample		Water	Water
Date prepared	-	06/02/2015	06/02/2015
Date analysed	-	06/02/2015	06/02/2015
Phosphorus - Total	mg/L	3.3	2.2

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			05/02/2015	123060-1	05/02/2015 || 05/02/2015	LCS-W1	05/02/2015
Date analysed	-			05/02/2015	123060-1	05/02/2015 || 05/02/2015	LCS-W1	05/02/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	123060-1	<50 || <50	LCS-W1	101%
Sulphate, SO4	mg/L	1	Inorg-081	<1	123060-1	2 || [N/T]	LCS-W1	110%
QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			06/02/2015	123060-1	06/02/2015 || 06/02/2015	LCS-W1	06/02/2015
Date analysed	-			06/02/2015	123060-1	06/02/2015 || 06/02/2015	LCS-W1	06/02/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	123060-1	3.3 || 3.4 || RPD: 3	LCS-W1	115%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	123060-2	6/2/2015
Date analysed	-	[NT]	[NT]	123060-2	6/2/2015
THPS in Water by uHPLC*	µg/L	[NT]	[NT]	123060-2	58%
Sulphate, SO4	mg/L	[NT]	[NT]	[NR]	[NR]
QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	123060-2	06/02/2015
Date analysed	-	[NT]	[NT]	123060-2	06/02/2015
Phosphorus - Total	mg/L	[NT]	[NT]	123060-2	115%

Report Comments:

Samples for THPS analysis were collected in 250 ml amber bottles and some headspace was present in all the samples. Samples for THPS analysis should be collected in sealed vials with NO headspace, kept at <6°C and analysed within 3 days.
Spike recovery for sample 123060-2 for THPS at 58%, this is outside QC acceptance criteria, however, LCS recovery acceptable at 101%.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

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Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

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CERTIFICATE OF ANALYSIS 123117

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	9 Waters		
Date samples received / completed instructions received	06/02/2015	/	06/02/2015

This report supersedes the previous report R00 due to an amendment to client sample ID (ELS #3) and the removal of results for ELS #1, 4, 6 & 8.

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	10/02/15	/	6/05/15
Date of Preliminary Report:	Not Issued		

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics						
Our Reference:	UNITS	123117-2	123117-3	123117-5	123117-7	123117-9
Your Reference	----------	WK13	AST2	WK12	WK14	WK11
Date Sampled	----------	5/02/2015	5/02/2015	5/02/2015	5/02/2015	5/02/2015
Time Sampled		11:00	10:30	11:40	12:20	13:00
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	06/02/2015	06/02/2015	06/02/2015	06/02/2015	06/02/2015
Date analysed	-	06/02/2015	06/02/2015	06/02/2015	06/02/2015	06/02/2015
THPS in Water by uHPLC*	µg/L	170	87	150	140	230
Sulphate, SO4	mg/L	2	<1	<1	2	5

Metals in Waters - Acid extractable						
Our Reference:	UNITS	123117-2	123117-3	123117-5	123117-7	123117-9
Your Reference	----------	WK13	AST2	WK12	WK14	WK11
Date Sampled	----------	5/02/2015	5/02/2015	5/02/2015	5/02/2015	5/02/2015
Time Sampled		11:00	10:30	11:40	12:20	13:00
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	06/02/2015	06/02/2015	06/02/2015	06/02/2015	06/02/2015
Date analysed	-	06/02/2015	06/02/2015	06/02/2015	06/02/2015	06/02/2015
Phosphorus - Total	mg/L	4.0	2.7	2.0	3.0	4.5

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 2268523A

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			6/2/2015	[NT]	[NT]	LCS-W1	06/02/2015
Date analysed	-			6/2/2015	[NT]	[NT]	LCS-W1	06/02/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	[NT]	[NT]	LCS-W1	103%
Sulphate, SO4	mg/L	1	Inorg-081	<1	[NT]	[NT]	LCS-W1	111%
QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			06/02/2015	[NT]	[NT]	LCS-W1	06/02/2015
Date analysed	-			06/02/2015	[NT]	[NT]	LCS-W1	06/02/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	[NT]	[NT]	LCS-W1	106%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	123117-2	06/02/2015
Date analysed	-	[NT]	[NT]	123117-2	06/02/2015
THPS in Water by uHPLC*	µg/L	[NT]	[NT]	123117-2	62%
Sulphate, SO4	mg/L	[NT]	[NT]	123117-2	114%
QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	123117-2	06/02/2015
Date analysed	-	[NT]	[NT]	123117-2	06/02/2015
Phosphorus - Total	mg/L	[NT]	[NT]	123117-2	118%

Report Comments:

Samples for THPS analysis were collected in 250 ml amber bottles and some headspace was present in all the samples. Samples for THPS analysis should be collected in sealed vials with NO headspace, kept at <6°C and analysed within 3 days.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

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CERTIFICATE OF ANALYSIS 123154

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	9 Waters		
Date samples received / completed instructions received	06/02/2015	/	06/02/2015

This report supersedes the previous report R00 due to an amendment to client sample ID (ELS #1) and the removal of results for ELS #2, 4, 6 & 8.

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	9/02/15	/	6/05/15
Date of Preliminary Report:	Not Issued		

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics						
Our Reference:	UNITS	123154-1	123154-3	123154-5	123154-7	123154-9
Your Reference	----------	AST2	WK 13	WK12	WK14	WK11
Date Sampled	----------	06/02/2015	06/02/2015	06/02/2015	06/02/2015	06/02/2015
Time Sampled		09:00	09:45	10:30	11:30	12:30
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	09/02/2015	09/02/2015	09/02/2015	09/02/2015	09/02/2015
Date analysed	-	09/02/2015	09/02/2015	09/02/2015	09/02/2015	09/02/2015
THPS in Water by uHPLC*	µg/L	100	140	100	81	62
Sulphate, SO4	mg/L	<1	2	<1	2	5

Metals in Waters - Acid extractable						
Our Reference:	UNITS	123154-1	123154-3	123154-5	123154-7	123154-9
Your Reference	----------	AST2	WK 13	WK12	WK14	WK11
Date Sampled	----------	06/02/2015	06/02/2015	06/02/2015	06/02/2015	06/02/2015
Time Sampled		09:00	09:45	10:30	11:30	12:30
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	09/02/2015	09/02/2015	09/02/2015	09/02/2015	09/02/2015
Date analysed	-	09/02/2015	09/02/2015	09/02/2015	09/02/2015	09/02/2015
Phosphorus - Total	mg/L	2.9	4.6	2.0	3.0	4.5

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 2268523A

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			9/2/2015	123154-1	09/02/2015 || 09/02/2015	LCS-W1	09/02/2015
Date analysed	-			9/2/2015	123154-1	09/02/2015 || 09/02/2015	LCS-W1	09/02/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	123154-1	100 || 100 || RPD: 0	LCS-W1	104%
Sulphate, SO4	mg/L	1	Inorg-081	<1	123154-1	<1 || <1	LCS-W1	99%

QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			09/02/2015	123154-1	09/02/2015 || 09/02/2015	LCS-W1	09/02/2015
Date analysed	-			09/02/2015	123154-1	09/02/2015 || 09/02/2015	LCS-W1	09/02/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	123154-1	2.9 || 2.9 || RPD: 0	LCS-W1	113%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	123154-2	09/02/2015
Date analysed	-	[NT]	[NT]	123154-2	09/02/2015
THPS in Water by uHPLC*	µg/L	[NT]	[NT]	123154-2	78%
Sulphate, SO4	mg/L	[NT]	[NT]	123154-2	97%

QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	123154-2	09/02/2015
Date analysed	-	[NT]	[NT]	123154-2	09/02/2015
Phosphorus - Total	mg/L	[NT]	[NT]	123154-2	108%

Report Comments:

Samples for THPS analysis were collected in 250 ml amber bottles and some headspace was present in all the samples. Samples for THPS analysis should be collected in sealed vials with NO headspace, kept at <6°C and analysed within 3 days.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

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CERTIFICATE OF ANALYSIS 124237

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: Sean Daykin

Sample log in details:

Your Reference:	**2268523A**		
No. of samples:	1 Water		
Date samples received / completed instructions received	26/02/2015	/	26/02/2015

This report supersedes the previous report R00 due to an amendment to client sample ID.

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	27/02/15	/	5/05/15
Date of Preliminary Report:	Not Issued		

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Results Approved By:

Jacinta Hurst
Laboratory Manager

Miscellaneous Inorganics		
Our Reference:	UNITS	124237-1
Your Reference	----------	AST2
Date Sampled	----------	26/02/2015
Time Sampled		11:45
Type of sample		Water
Date prepared	-	26/02/2015
Date analysed	-	26/02/2015
THPS in Water by uHPLC*	µg/L	110
Sulphate, SO4	mg/L	3

Metals in Waters - Acid extractable		
Our Reference:	UNITS	124237-1
Your Reference	----------	AST2
Date Sampled	----------	26/02/2015
Time Sampled		11:45
Type of sample		Water
Date prepared	-	27/02/2015
Date analysed	-	27/02/2015
Phosphorus - Total	mg/L	2.5

Method ID	Methodology Summary
AT-021	Determination of Bis[Tetrakis(Hydroxymethyl)Phosphonium Sulfate (THPS) in waters by conversion to formaldehyde, derivatisation and analysis using ultra high performance liquid chromatography-diode array detection.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 2268523A

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			26/02/2015	124237-1	26/02/2015 || 26/02/2015	LCS-W1	26/02/2015
Date analysed	-			26/02/2015	124237-1	26/02/2015 || 26/02/2015	LCS-W1	26/02/2015
THPS in Water by uHPLC*	µg/L	50	AT-021	<50	124237-1	110 || 110 || RPD: 0	LCS-W1	102%
Sulphate, SO4	mg/L	1	Inorg-081	<1	124237-1	3 || [N/T]	LCS-W1	114%

QUALITY CONTROL Metals in Waters - Acid extractable	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			26/02/2015	[NT]	[NT]	LCS-W1	27/02/2015
Date analysed	-			26/02/2015	[NT]	[NT]	LCS-W1	27/02/2015
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	[NT]	[NT]	LCS-W1	102%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	124237-1	26/02/2015
Date analysed	-	[NT]	[NT]	124237-1	26/02/2015
THPS in Water by uHPLC*	µg/L	[NT]	[NT]	124237-1	47#
Sulphate, SO4	mg/L	[NT]	[NT]	[NR]	[NR]

Report Comments:

#:A low spike recovery has been obtained for THPS sample1. However,
an acceptable recovery has been obtained for the Laboratory Control Sample.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

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Laboratory Acceptance Criteria

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Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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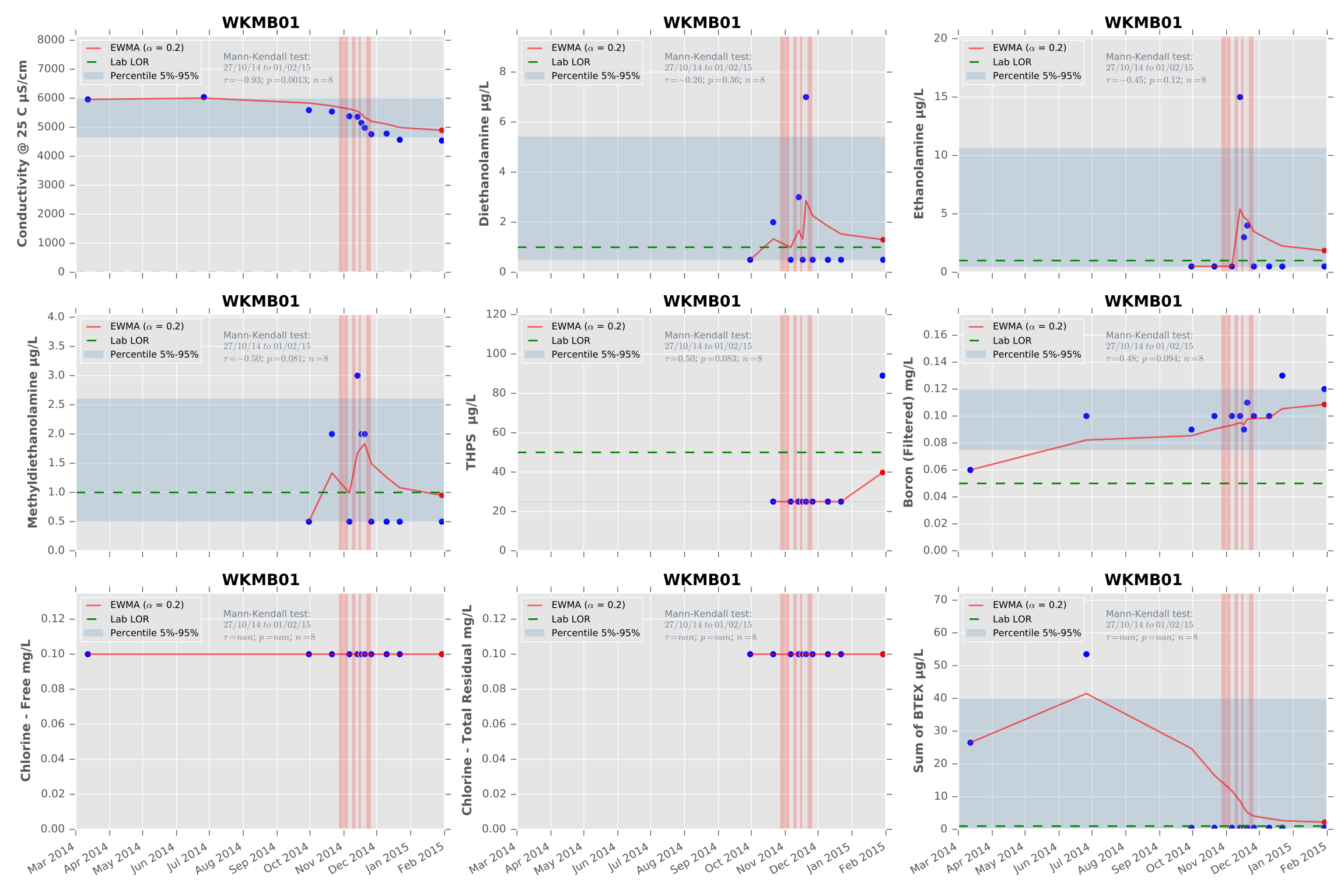
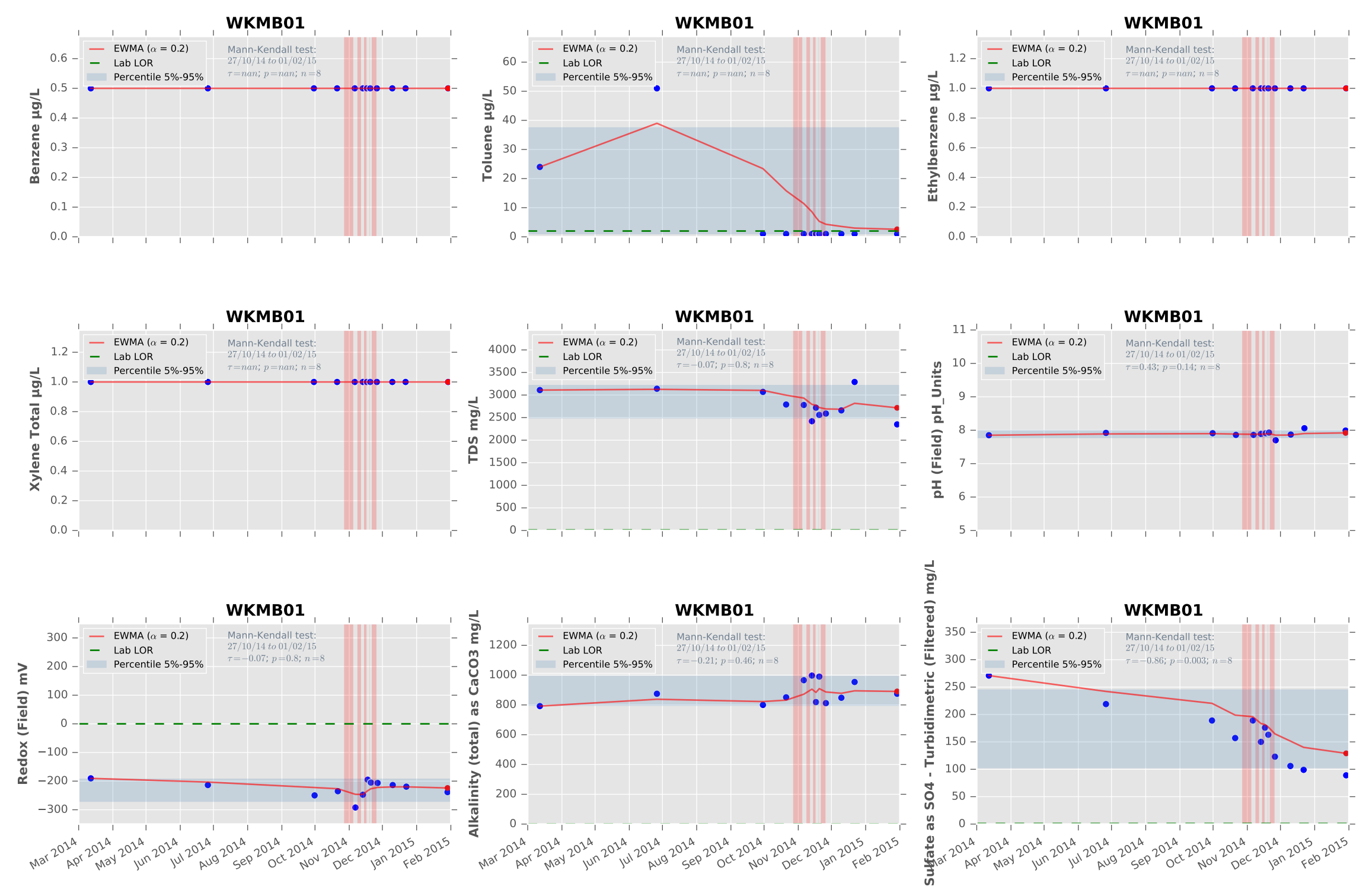
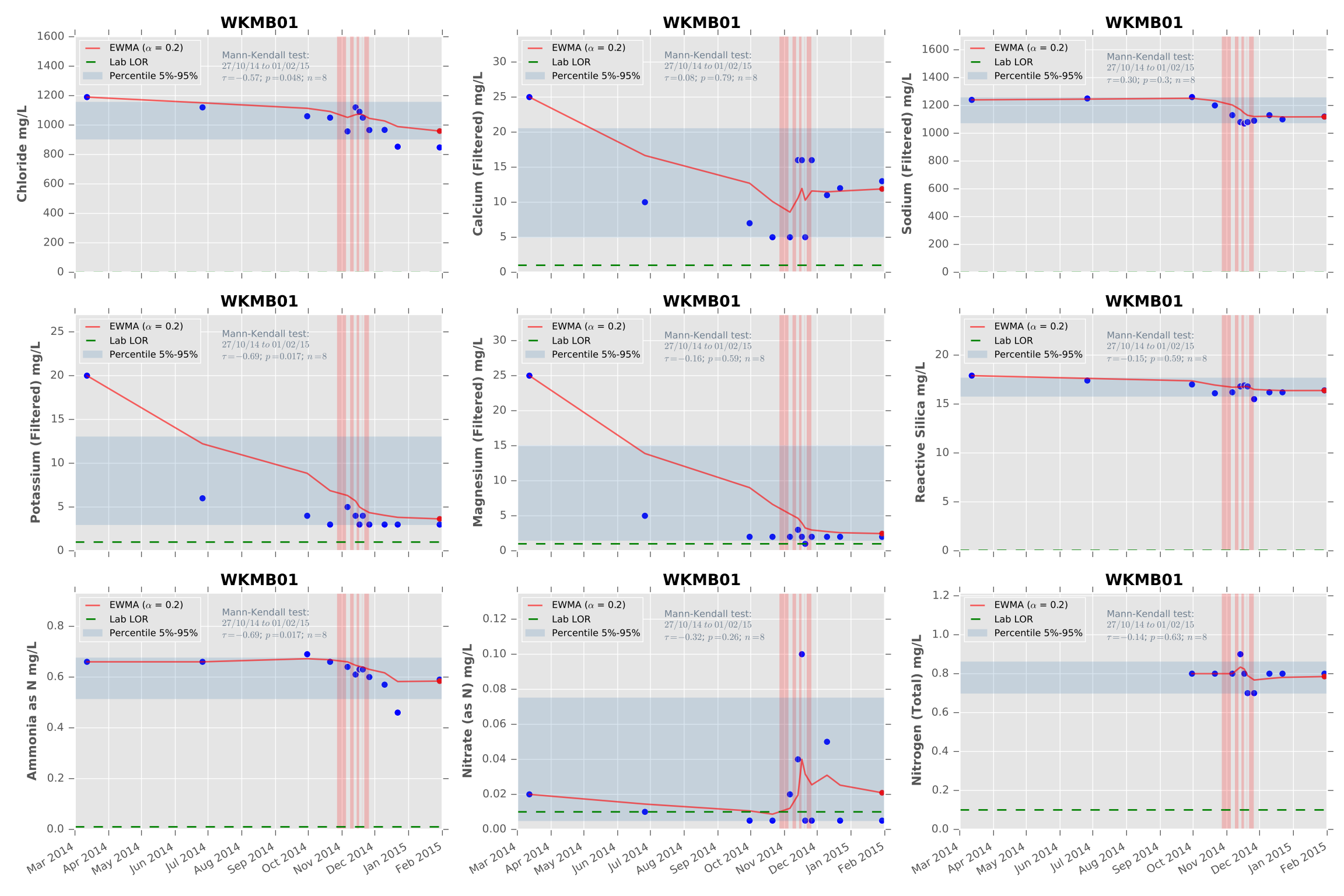
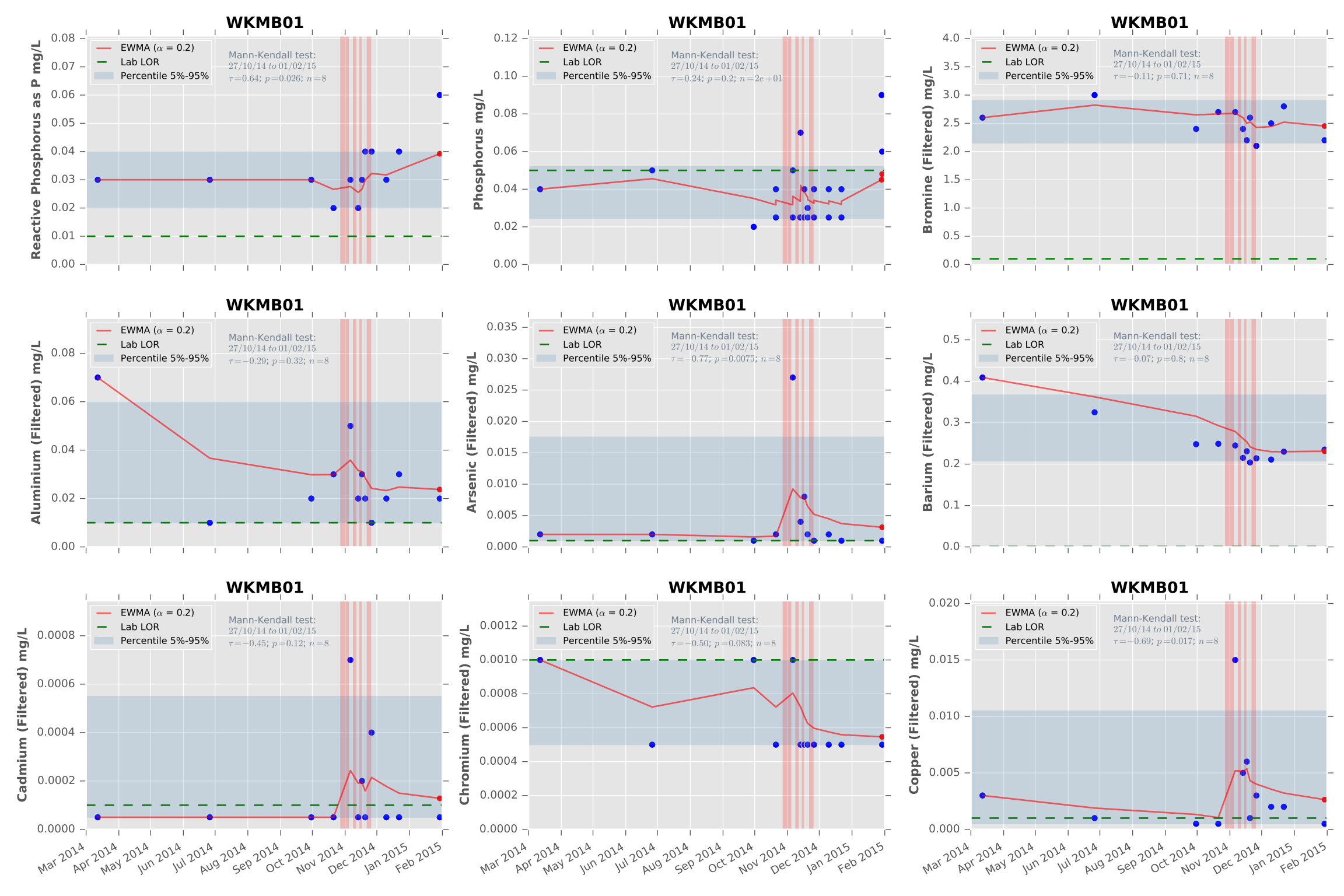
Appendix I

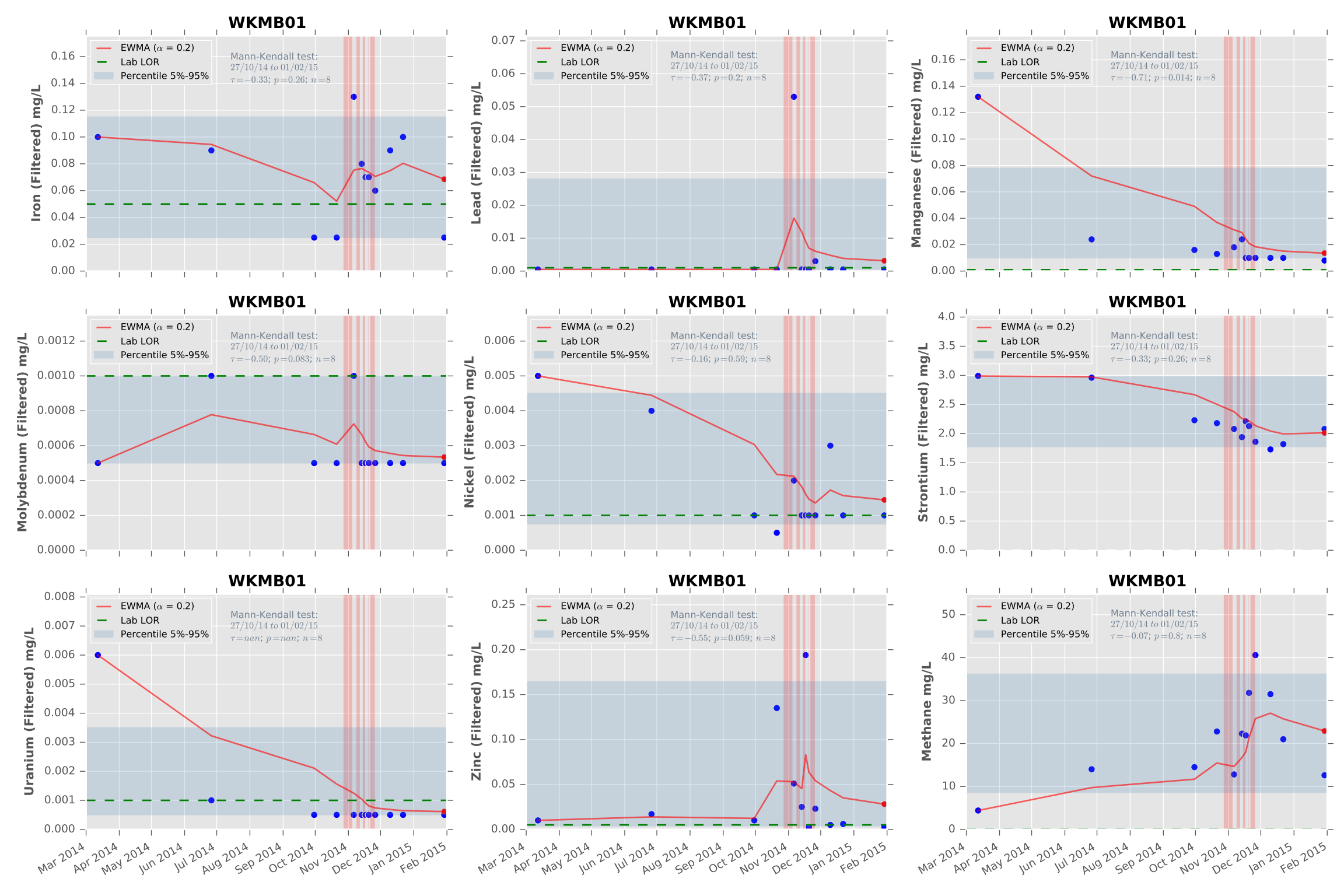
Groundwater and surface water trend analysis

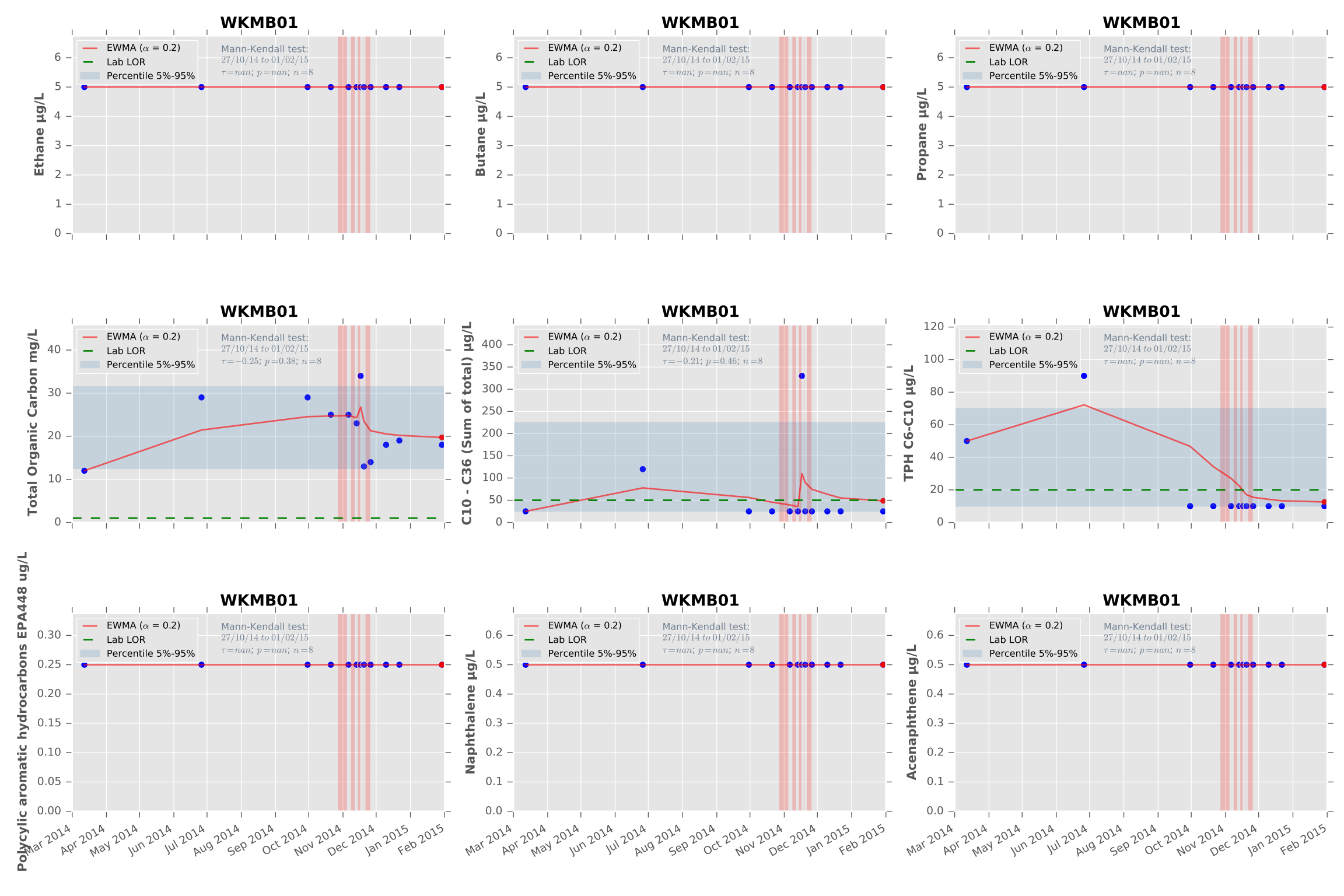

WKMB01
Conductivity @ 25 C µS/cm
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.93; p=0.0013; n=8
WKMB01
Diethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.26; p=0.36; n=8
WKMB01
Ethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.45; p=0.12; n=8
WKMB01
Methyldiethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.50; p=0.081; n=8
WKMB01
THPS µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.50; p=0.083; n=8
WKMB01
Boron (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.48; p=0.094; n=8
WKMB01
Chlorine - Free mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB01
Chlorine - Total Residual mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB01
Sum of BTEX µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

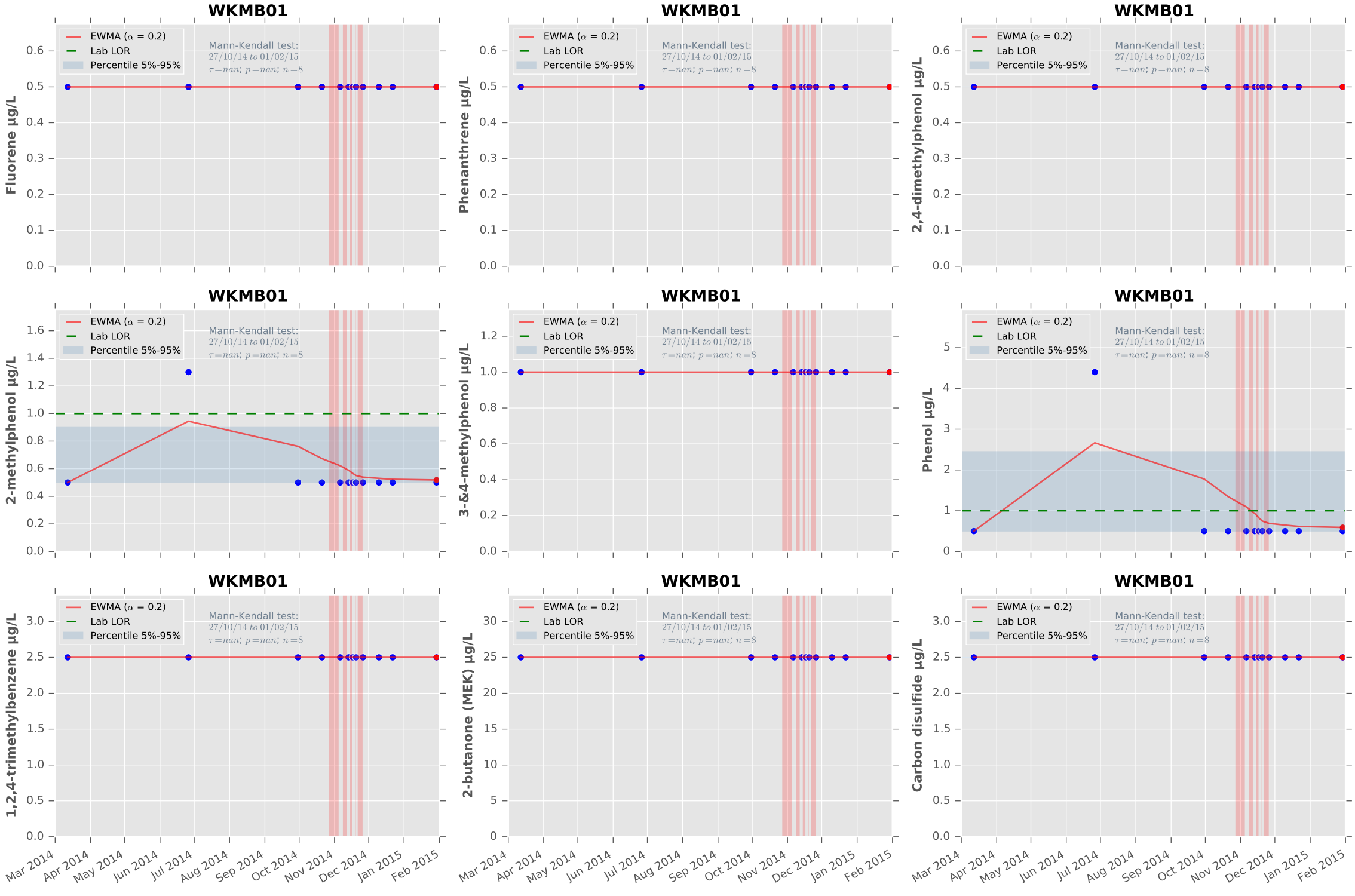

WKMB01
Benzene µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB01
Toluene µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB01
Ethylbenzene µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB01
Xylene Total µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB01
TDS mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.07; p=0.8; n=8
WKMB01
pH (Field) pH_Units
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.43; p=0.14; n=8
WKMB01
Redox (Field) mV
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.07; p=0.8; n=8
WKMB01
Alkalinity (total) as CaCO3 mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.21; p=0.46; n=8
WKMB01
Sulfate as SO4 - Turbidimetric (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.86; p=0.003; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

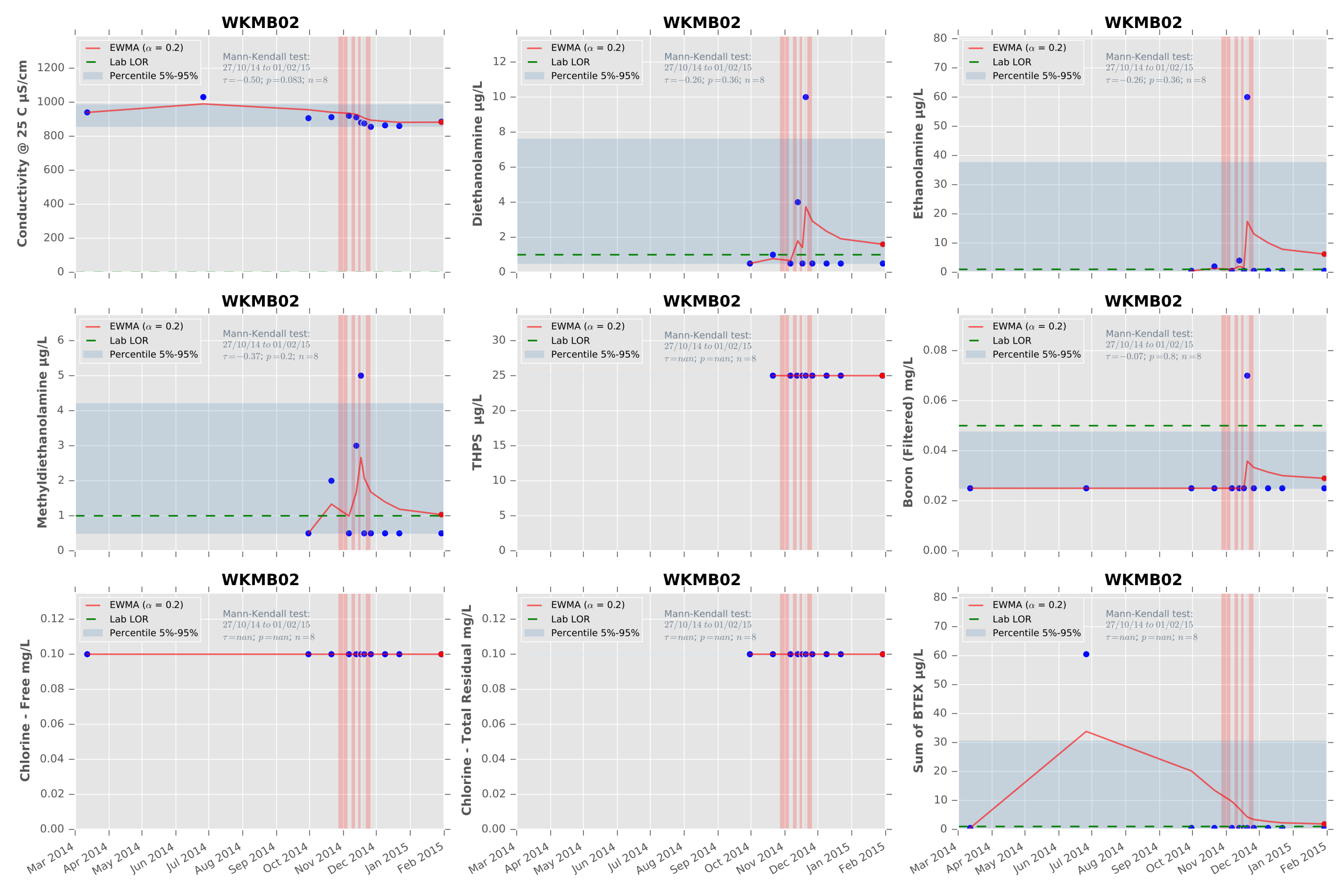

WKMB01
Chloride mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.57; p=0.048; n=8
WKMB01
Calcium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.08; p=0.79; n=8
WKMB01
Sodium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.30; p=0.3; n=8
WKMB01
Potassium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.69; p=0.017; n=8
WKMB01
Magnesium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.16; p=0.59; n=8
WKMB01
Reactive Silica mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.15; p=0.59; n=8
WKMB01
Ammonia as N mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.69; p=0.017; n=8
WKMB01
Nitrate (as N) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.32; p=0.26; n=8
WKMB01
Nitrogen (Total) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.14; p=0.63; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

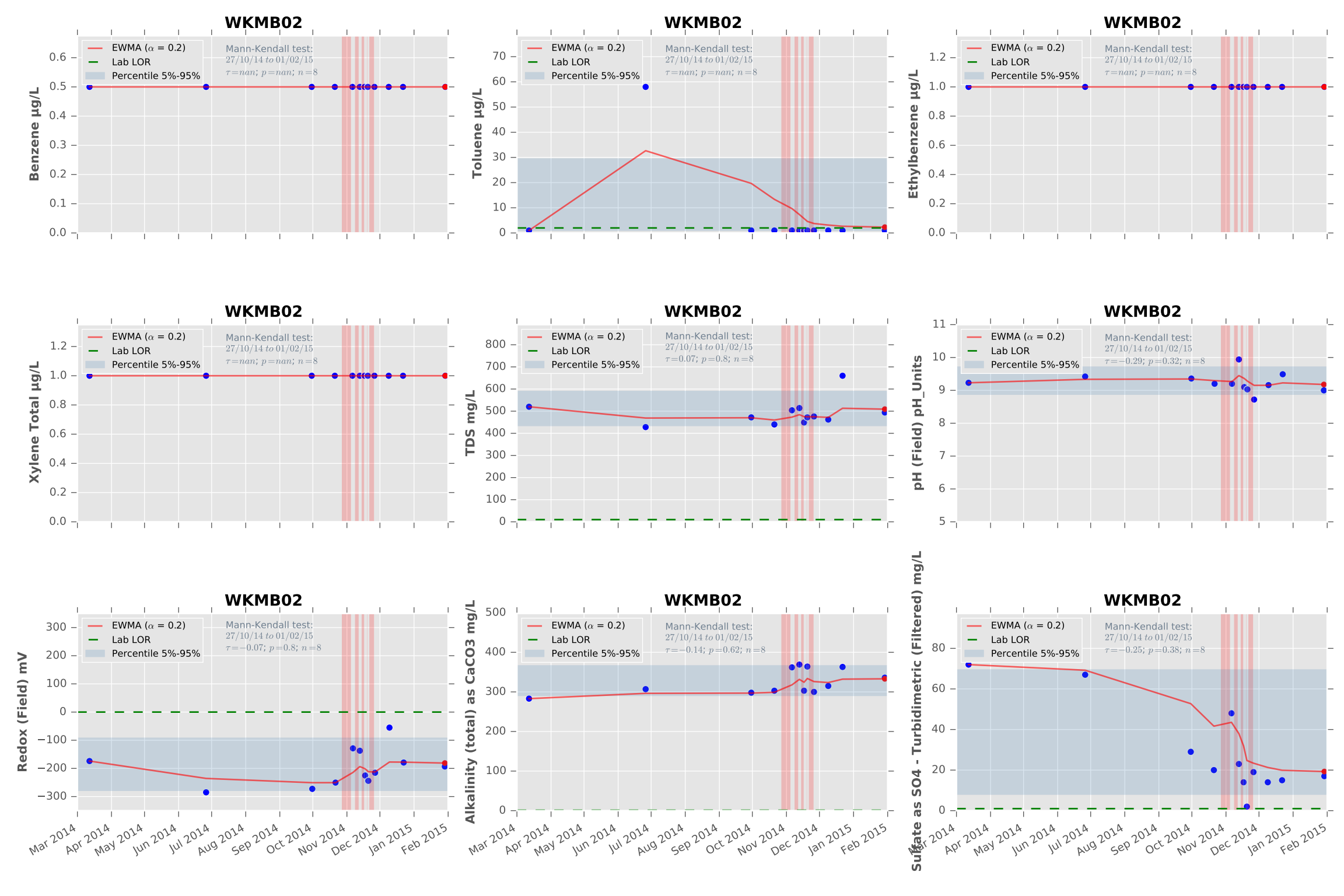

WKMB01
Reactive Phosphorus as P mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.64; p=0.026; n=8
WKMB01
Phosphorus mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.24; p=0.2; n=2e+01
WKMB01
Bromine (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.11; p=0.71; n=8
WKMB01
Aluminium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.29; p=0.32; n=8
WKMB01
Arsenic (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.77; p=0.0075; n=8
WKMB01
Barium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.07; p=0.8; n=8
WKMB01
Cadmium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.45; p=0.12; n=8
WKMB01
Chromium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.50; p=0.083; n=8
WKMB01
Copper (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.69; p=0.017; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

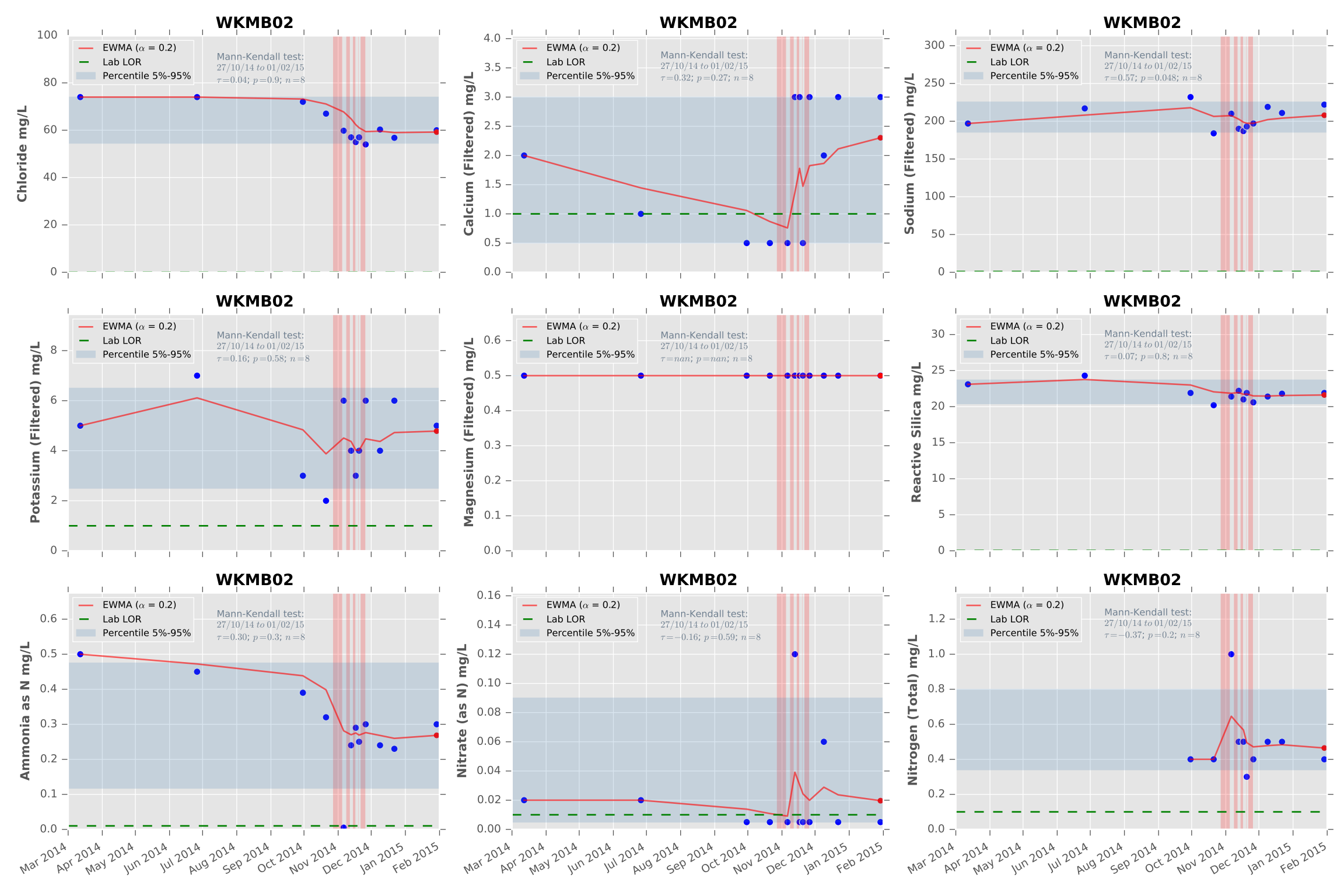

WKMB01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.33; p=0.26; n=8
Iron (Filtered) mg/L
WKMB01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.37; p=0.2; n=8
Lead (Filtered) mg/L
WKMB01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.71; p=0.014; n=8
Manganese (Filtered) mg/L
WKMB01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.50; p=0.083; n=8
Molybdenum (Filtered) mg/L
WKMB01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.16; p=0.59; n=8
Nickel (Filtered) mg/L
WKMB01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.33; p=0.26; n=8
Strontium (Filtered) mg/L
WKMB01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Uranium (Filtered) mg/L
WKMB01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.55; p=0.059; n=8
Zinc (Filtered) mg/L
WKMB01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.07; p=0.8; n=8
Methane mg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

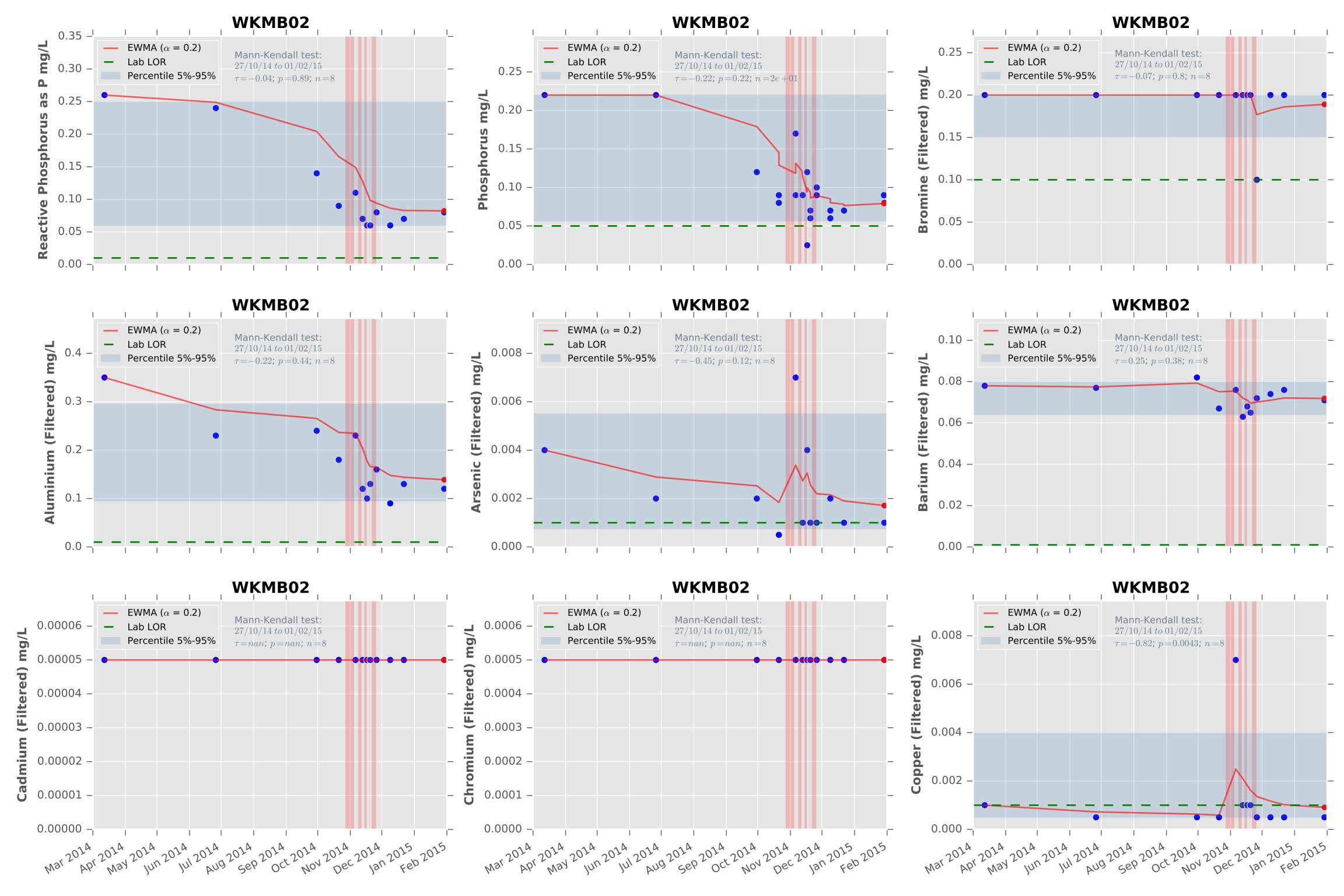

WKMB01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Ethane µg/L
Butane µg/L
Propane µg/L
Total Organic Carbon mg/L
τ=−0.25; p=0.38; n=8
C10 - C36 (Sum of total) µg/L
τ=−0.21; p=0.46; n=8
TPH C6-C10 µg/L
Polycylic aromatic hydrocarbons EPA448 ug/L
Naphthalene µg/L
Acenaphthene µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

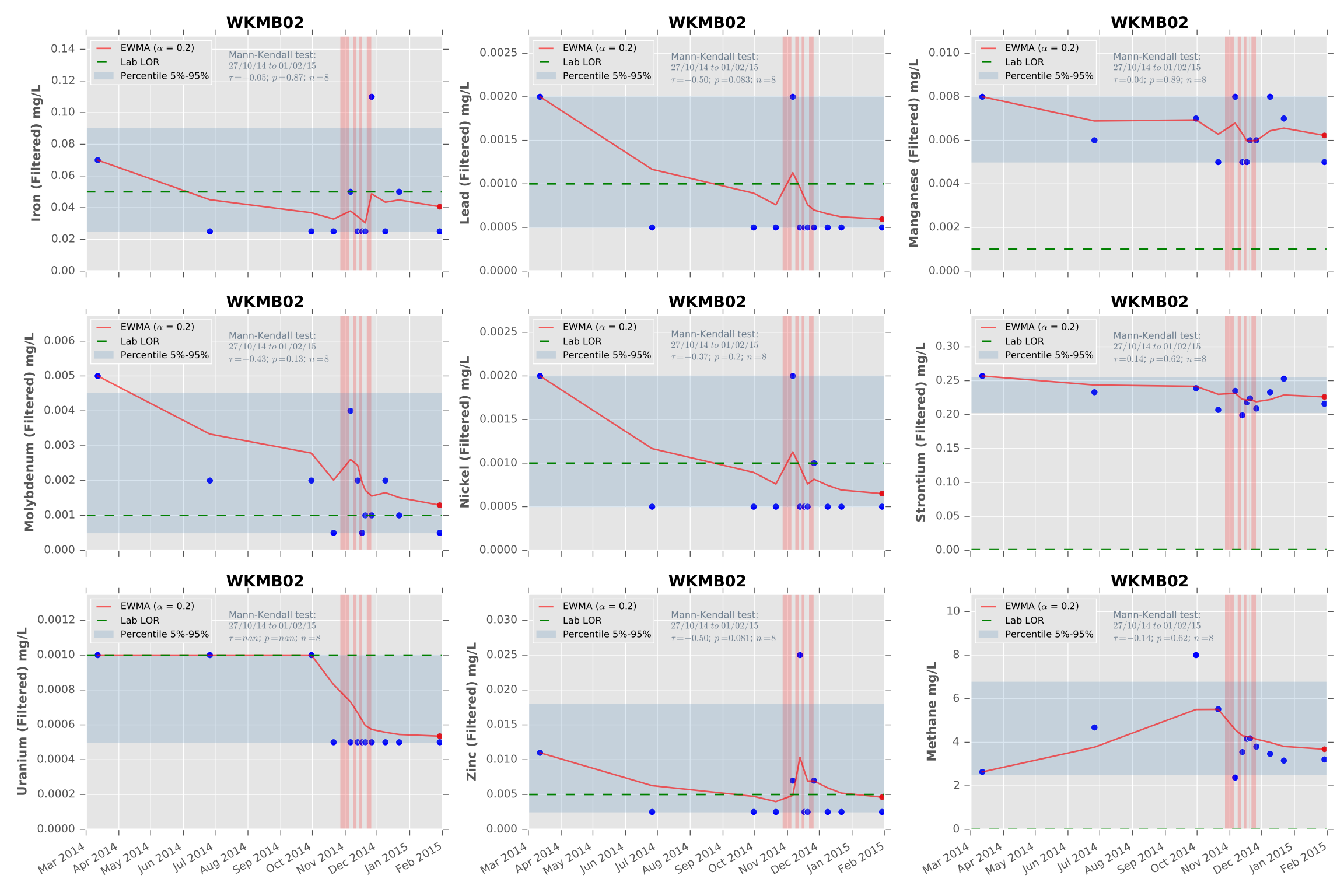

WKMB01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Fluorene µg/L
Phenanthrene µg/L
2,4-dimethylphenol µg/L
2-methylphenol µg/L
3-&4-methylphenol µg/L
Phenol µg/L
1,2,4-trimethylbenzene µg/L
2-butanone (MEK) µg/L
Carbon disulfide µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

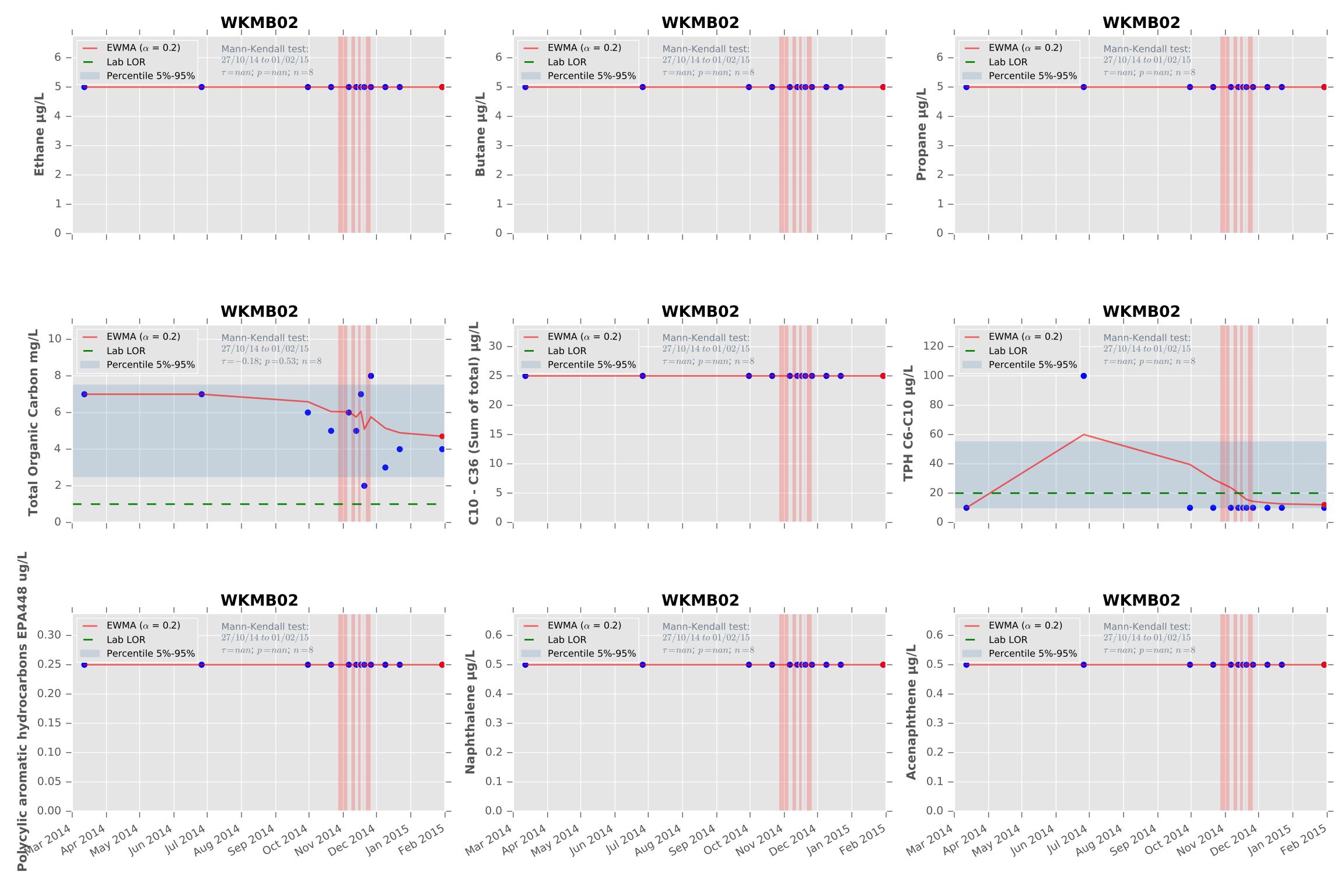

WKMB02
Conductivity @ 25 C µS/cm
Diethanolamine µg/L
Ethanolamine µg/L
Methyldiethanolamine µg/L
THPS µg/L
Boron (Filtered) mg/L
Chlorine - Free mg/L
Chlorine - Total Residual mg/L
Sum of BTEX µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.50; p=0.083; n=8
τ=−0.26; p=0.36; n=8
τ=−0.37; p=0.2; n=8
τ=nan; p=nan; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

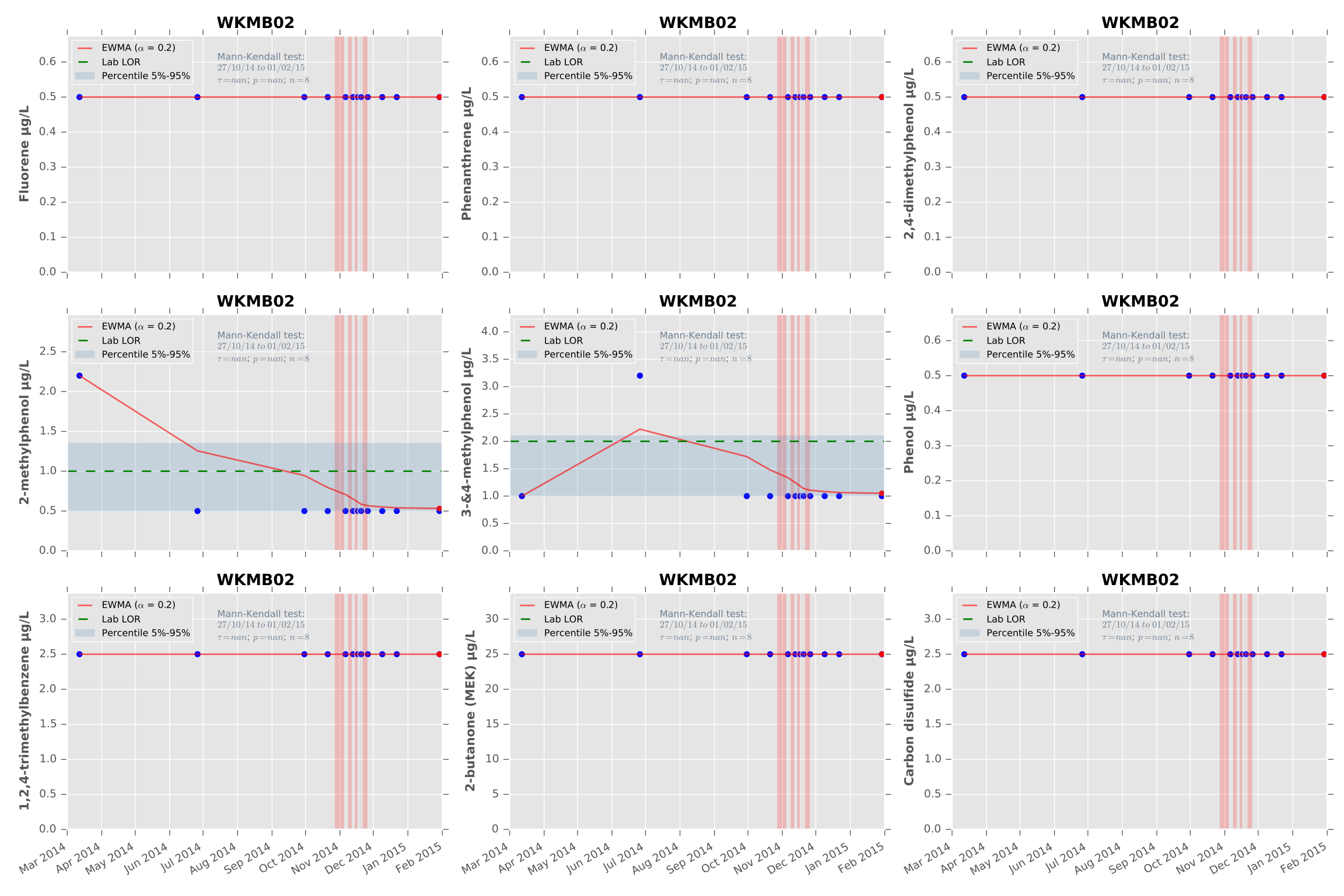

WKMB02
Benzene µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB02
Toluene µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB02
Ethylbenzene µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB02
Xylene Total µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB02
TDS mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.07; p=0.8; n=8
WKMB02
pH (Field) pH_Units
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.29; p=0.32; n=8
WKMB02
Redox (Field) mV
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.07; p=0.8; n=8
WKMB02
Alkalinity (total) as CaCO3 mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.14; p=0.62; n=8
WKMB02
Sulfate as SO4 - Turbidimetric (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.25; p=0.38; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

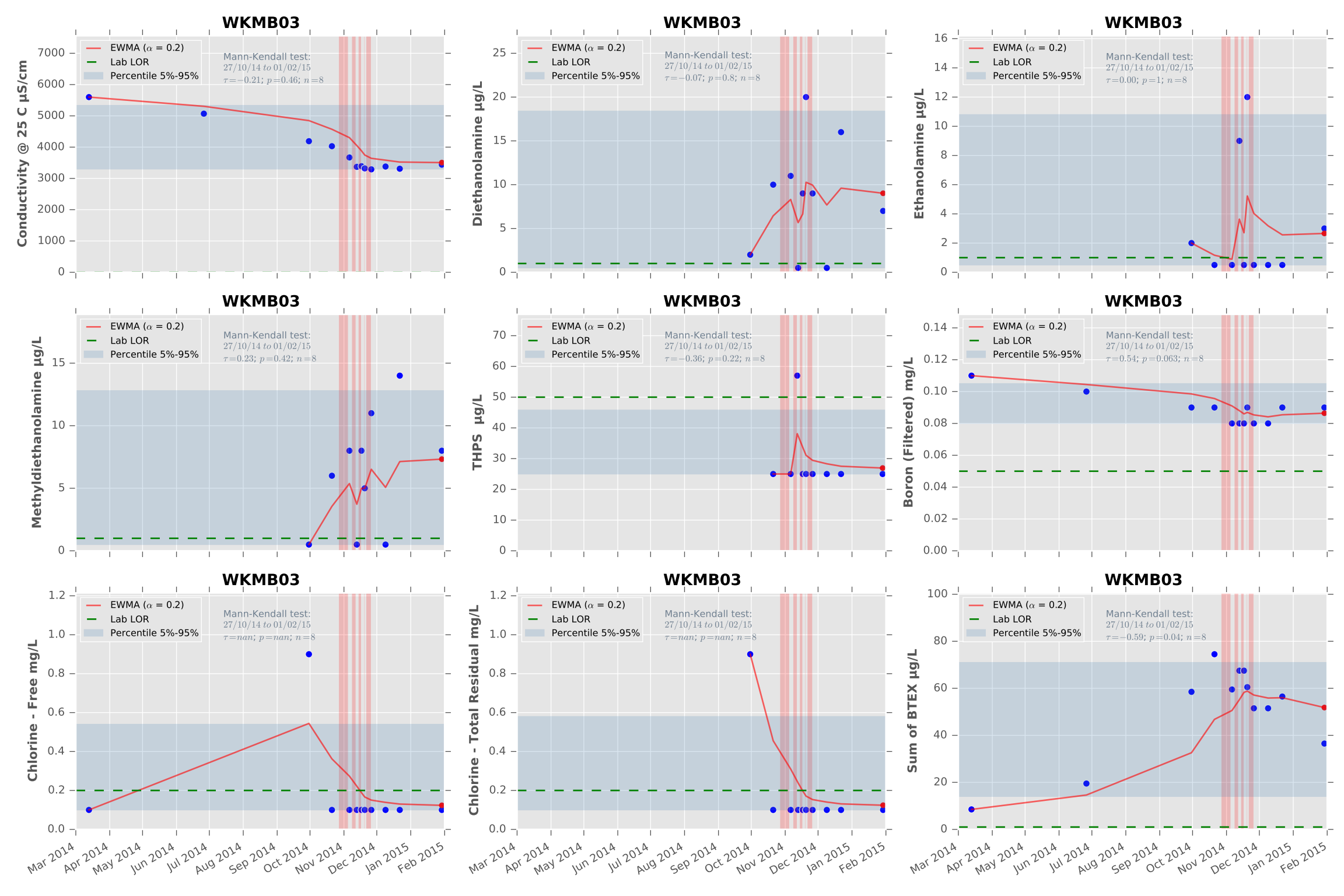

WKMB02
Chloride mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.04; p=0.9; n=8
WKMB02
Calcium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.32; p=0.27; n=8
WKMB02
Sodium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.57; p=0.048; n=8
WKMB02
Potassium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.16; p=0.58; n=8
WKMB02
Magnesium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB02
Reactive Silica mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.07; p=0.8; n=8
WKMB02
Ammonia as N mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.30; p=0.3; n=8
WKMB02
Nitrate (as N) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.16; p=0.59; n=8
WKMB02
Nitrogen (Total) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.37; p=0.2; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

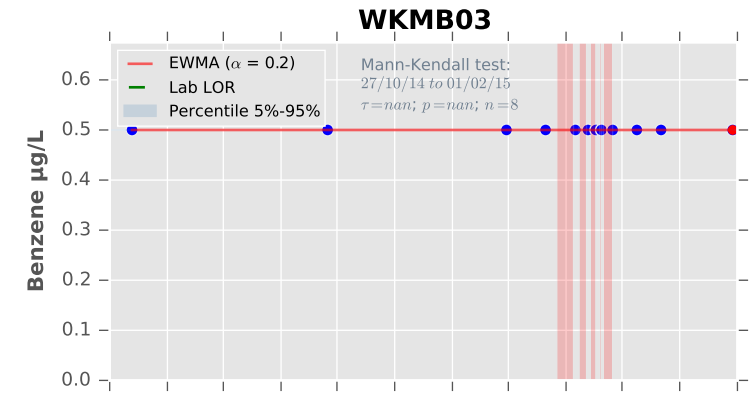

WKMB02
Reactive Phosphorus as P mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.04; p=0.89; n=8
WKMB02
Phosphorus mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.22; p=0.22; n=2e+01
WKMB02
Bromine (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.07; p=0.8; n=8
WKMB02
Aluminium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.22; p=0.44; n=8
WKMB02
Arsenic (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.45; p=0.12; n=8
WKMB02
Barium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.25; p=0.38; n=8
WKMB02
Cadmium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB02
Chromium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB02
Copper (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.82; p=0.0043; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

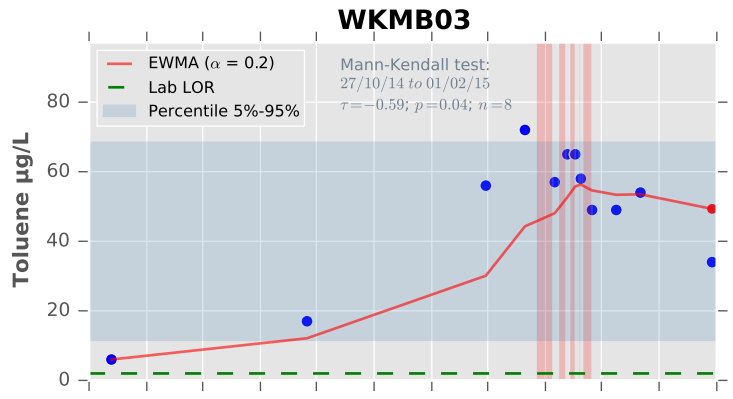

WKMB02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.05; p=0.87; n=8
Iron (Filtered) mg/L
WKMB02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.50; p=0.083; n=8
Lead (Filtered) mg/L
WKMB02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.04; p=0.89; n=8
Manganese (Filtered) mg/L
WKMB02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.43; p=0.13; n=8
Molybdenum (Filtered) mg/L
WKMB02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.37; p=0.2; n=8
Nickel (Filtered) mg/L
WKMB02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.14; p=0.62; n=8
Strontium (Filtered) mg/L
WKMB02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Uranium (Filtered) mg/L
WKMB02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.50; p=0.081; n=8
Zinc (Filtered) mg/L
WKMB02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.14; p=0.62; n=8
Methane mg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

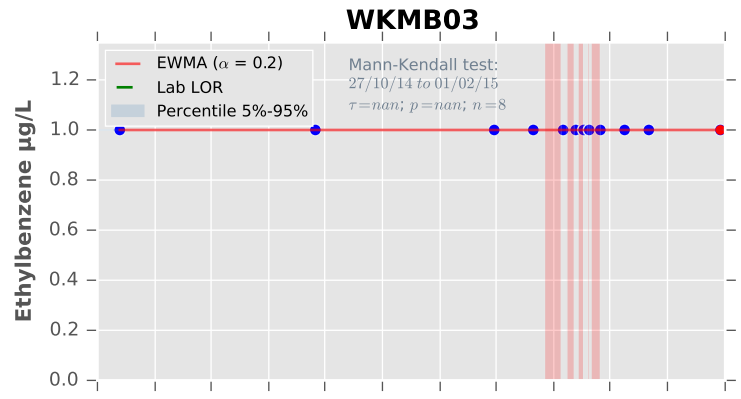

WKMB02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Ethane µg/L
Butane µg/L
Propane µg/L
Total Organic Carbon mg/L
τ=−0.18; p=0.53; n=8
C10 - C36 (Sum of total) µg/L
TPH C6-C10 µg/L
Polycylic aromatic hydrocarbons EPA448 ug/L
Naphthalene µg/L
Acenaphthene µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

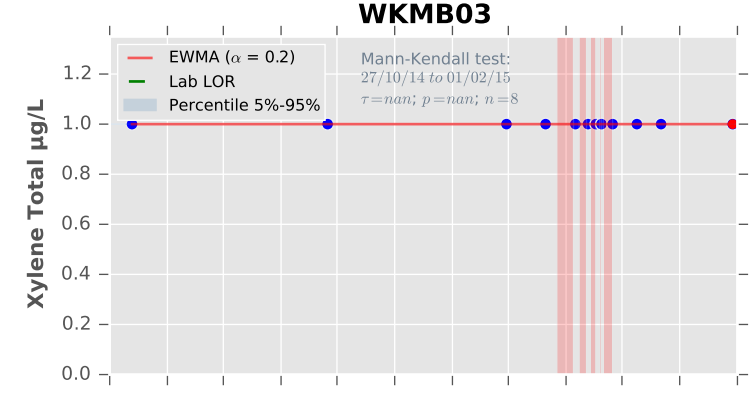

WKMB02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Fluorene µg/L
Phenanthrene µg/L
2,4-dimethylphenol µg/L
2-methylphenol µg/L
3-&4-methylphenol µg/L
Phenol µg/L
1,2,4-trimethylbenzene µg/L
2-butanone (MEK) µg/L
Carbon disulfide µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

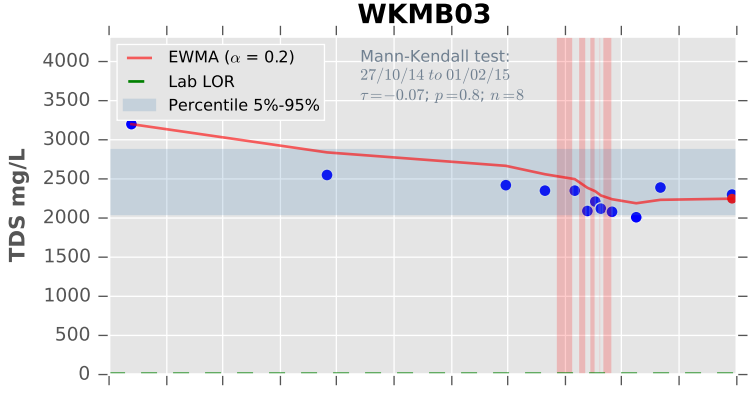

WKMB03
Conductivity @ 25 C µS/cm
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.21; p=0.46; n=8
WKMB03
Diethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.07; p=0.8; n=8
WKMB03
Ethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.00; p=1; n=8
WKMB03
Methyldiethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.23; p=0.42; n=8
WKMB03
THPS µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.36; p=0.22; n=8
WKMB03
Boron (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.54; p=0.063; n=8
WKMB03
Chlorine - Free mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB03
Chlorine - Total Residual mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB03
Sum of BTEX µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.59; p=0.04; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

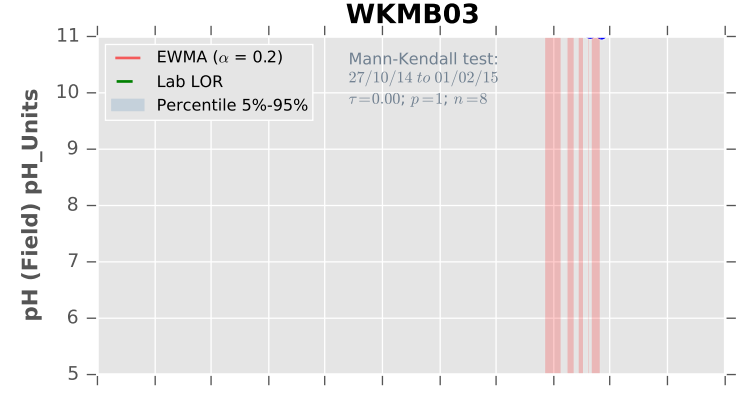

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Benzene µg/L

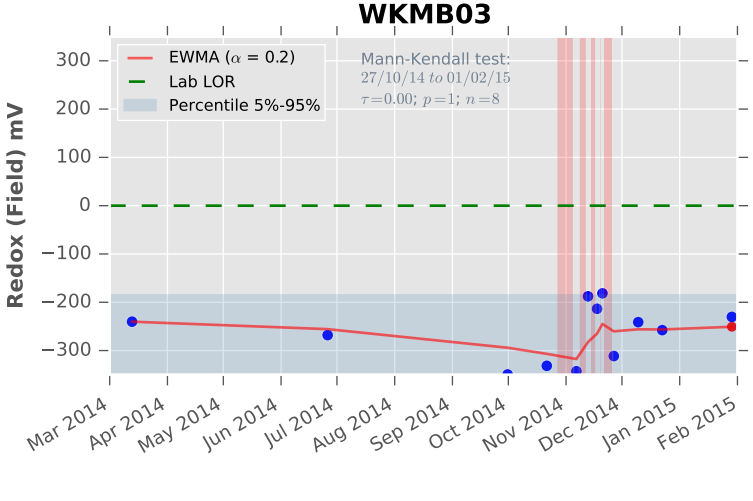

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.59; p=0.04; n=8
Toluene µg/L

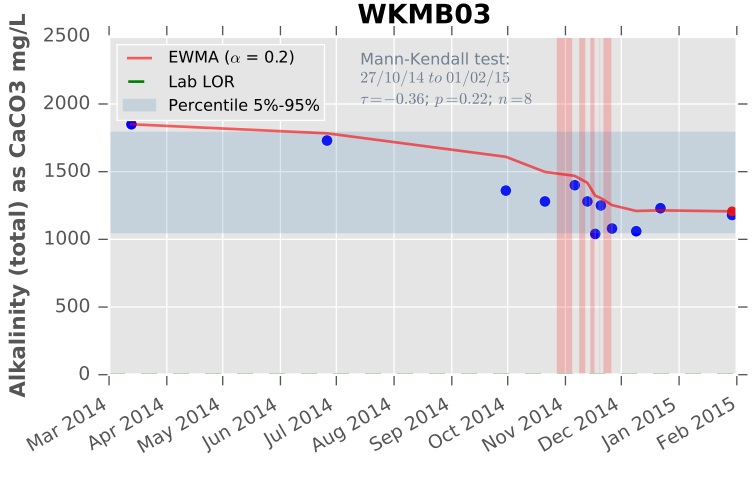

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Ethylbenzene µg/L

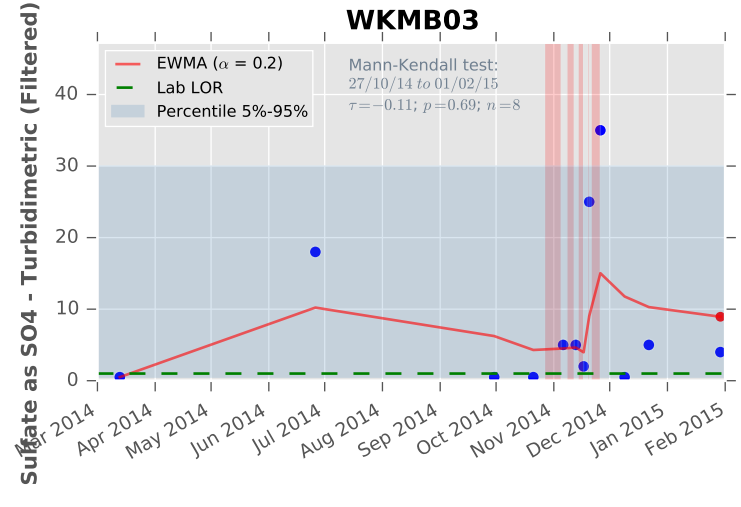

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Xylene Total µg/L

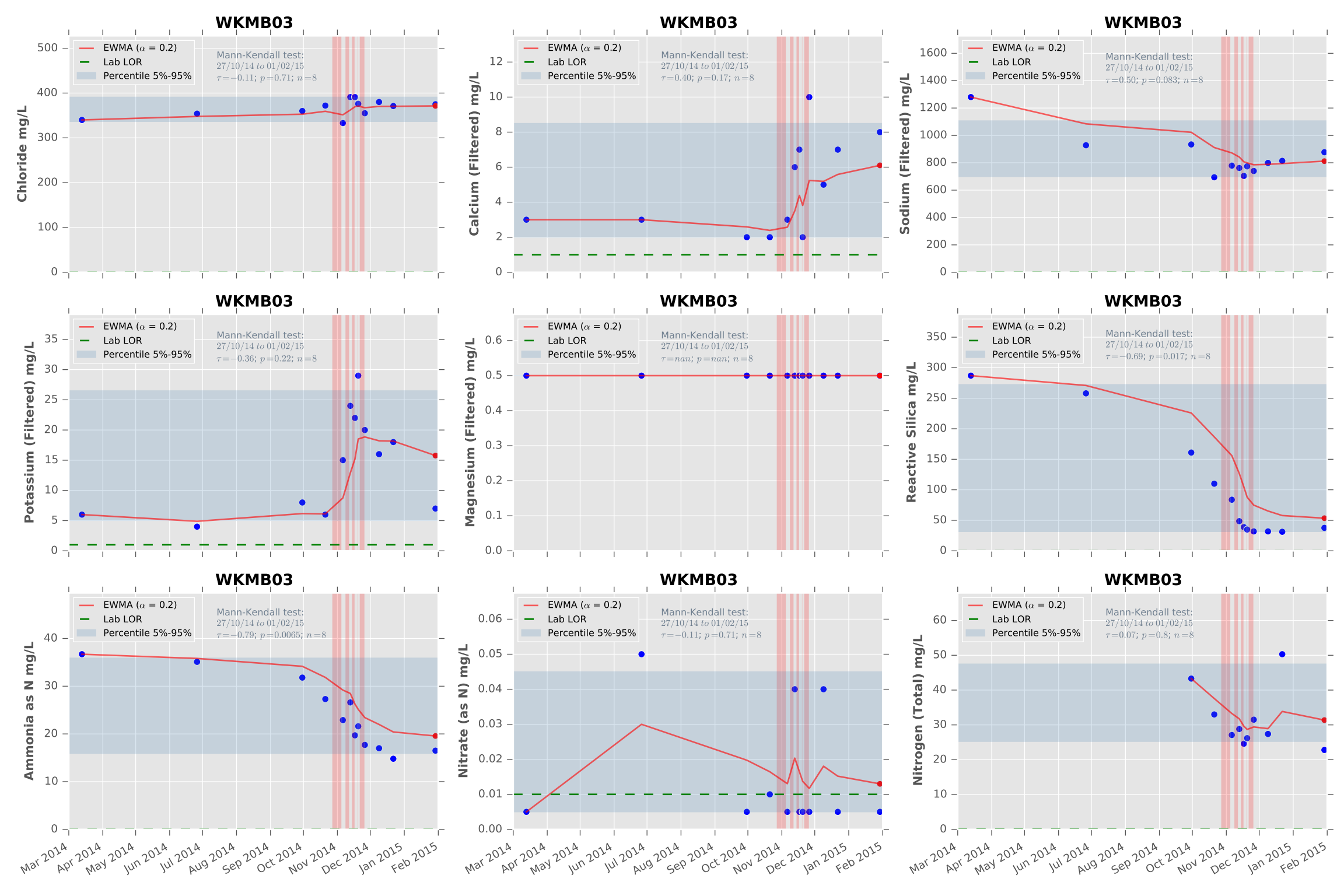

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.07; p=0.8; n=8
TDS mg/L

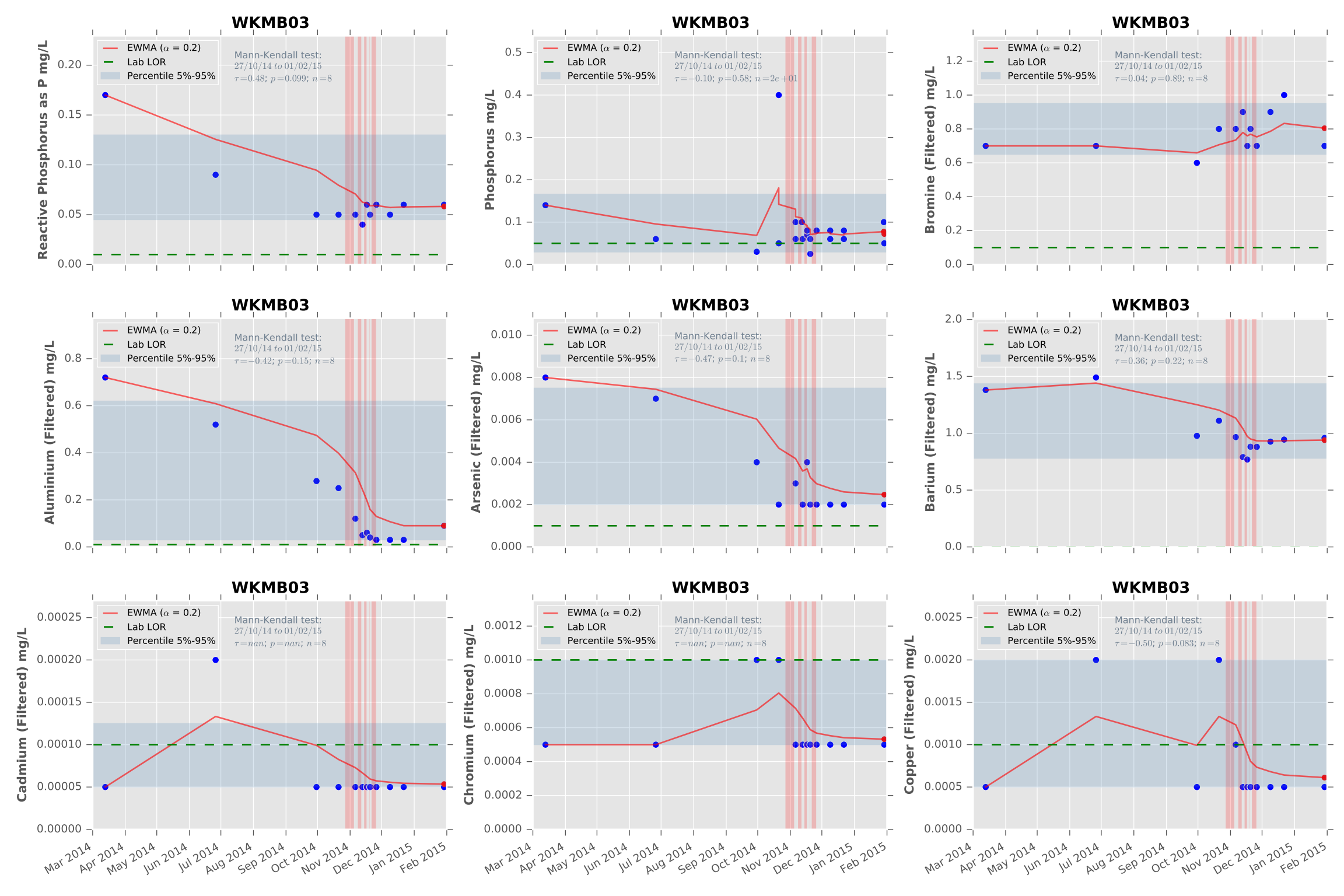

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.00; p=1; n=8
pH (Field) pH_Units

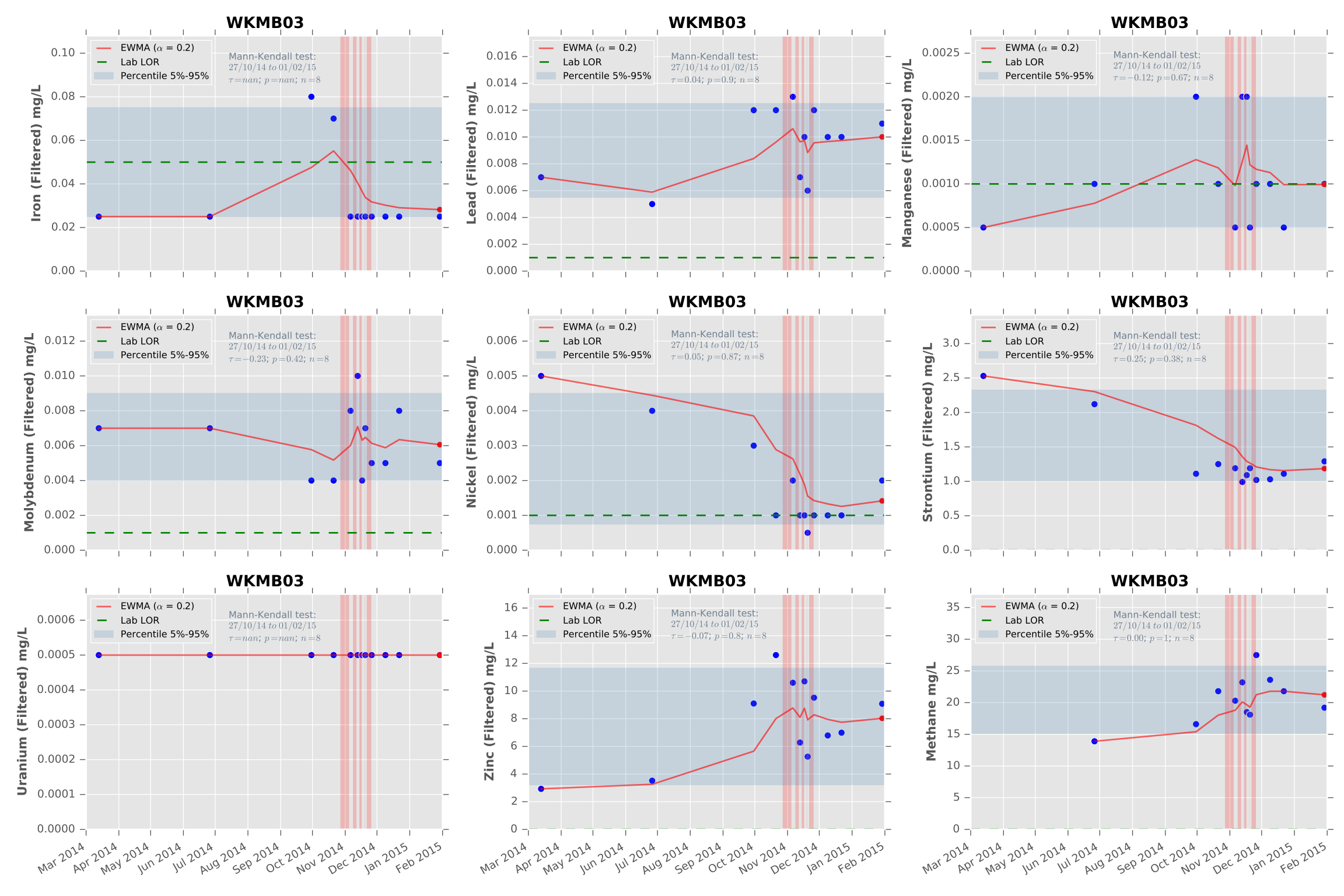

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.00; p=1; n=8
Redox (Field) mV
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

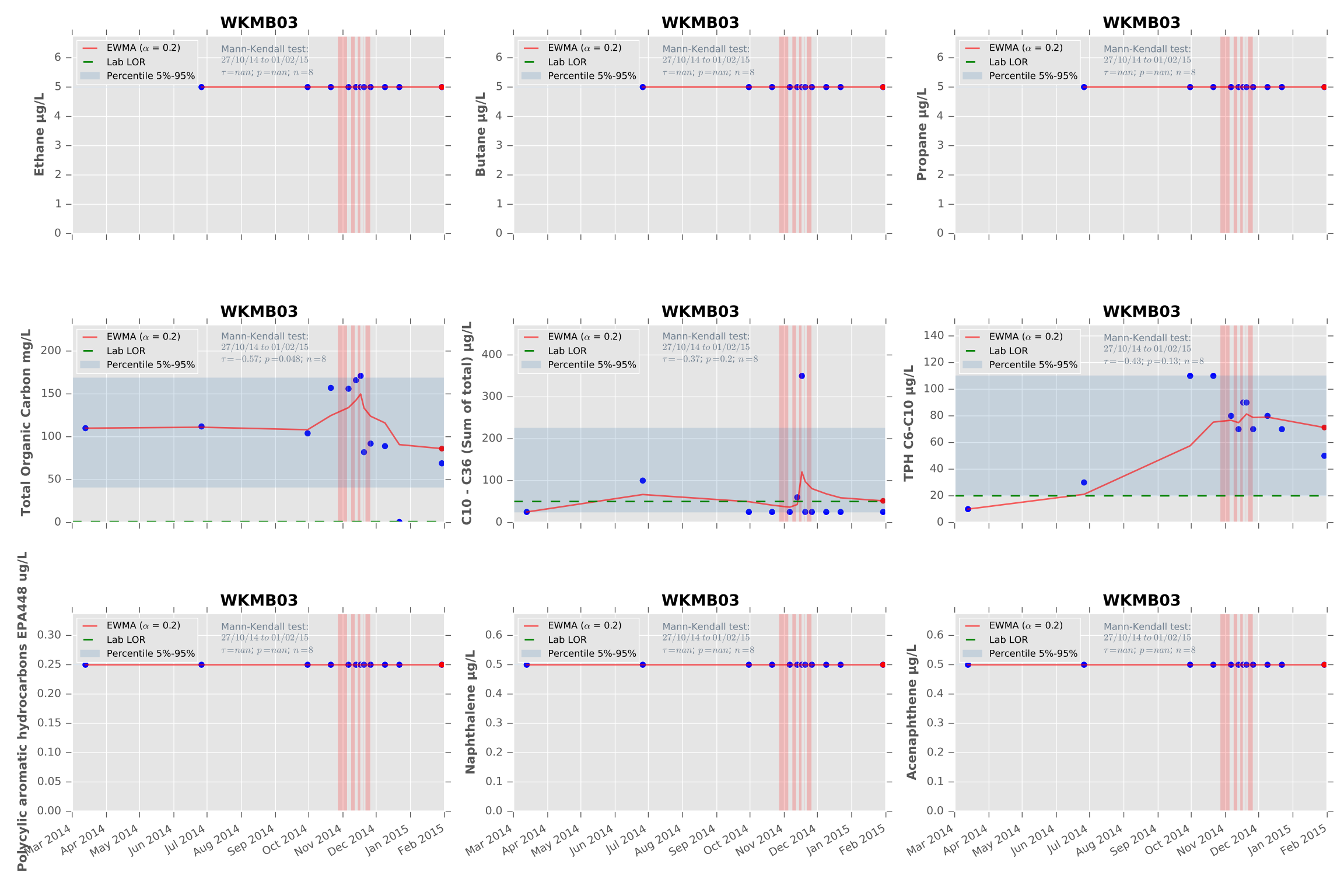

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.36; p=0.22; n=8
Alkalinity (total) as CaCO3 mg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

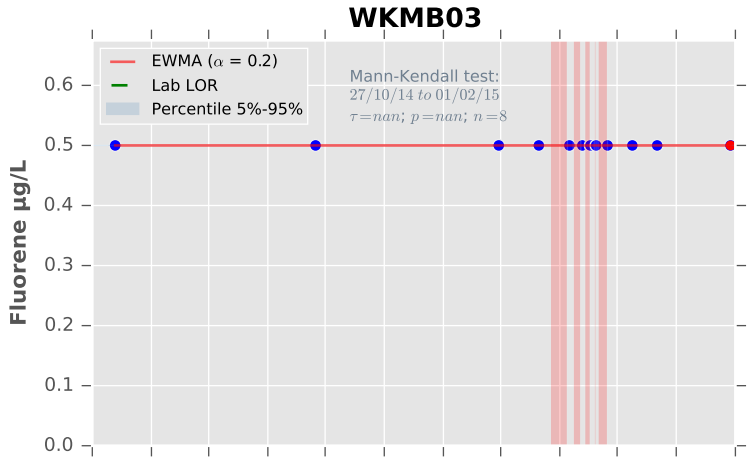

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.11; p=0.69; n=8
Sulfate as SO4 - Turbidimetric (Filtered) mg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

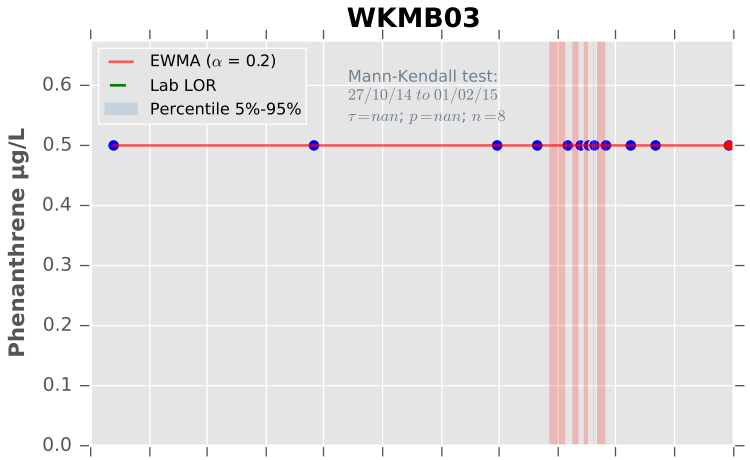

WKMB03
Chloride mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.11; p=0.71; n=8
WKMB03
Calcium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.40; p=0.17; n=8
WKMB03
Sodium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.50; p=0.083; n=8
WKMB03
Potassium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.36; p=0.22; n=8
WKMB03
Magnesium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB03
Reactive Silica mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.69; p=0.017; n=8
WKMB03
Ammonia as N mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.79; p=0.0065; n=8
WKMB03
Nitrate (as N) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.11; p=0.71; n=8
WKMB03
Nitrogen (Total) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.07; p=0.8; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

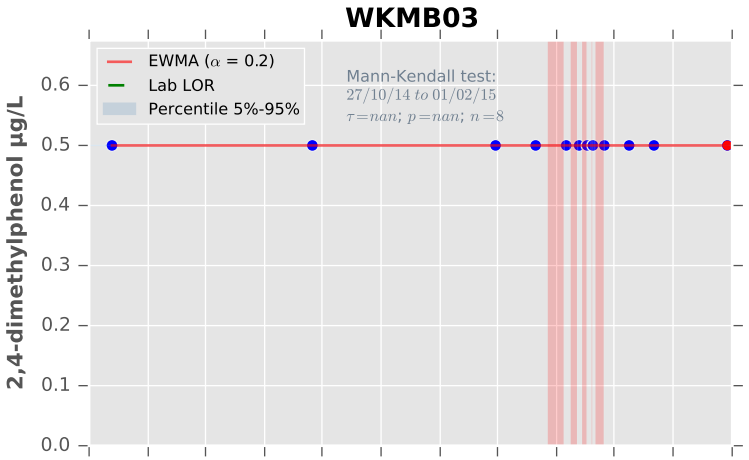

WKMB03
Reactive Phosphorus as P mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.48; p=0.099; n=8
WKMB03
Phosphorus mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.10; p=0.58; n=2e+01
WKMB03
Bromine (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.04; p=0.89; n=8
WKMB03
Aluminium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.42; p=0.15; n=8
WKMB03
Arsenic (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.47; p=0.1; n=8
WKMB03
Barium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.36; p=0.22; n=8
WKMB03
Cadmium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB03
Chromium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB03
Copper (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.50; p=0.083; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

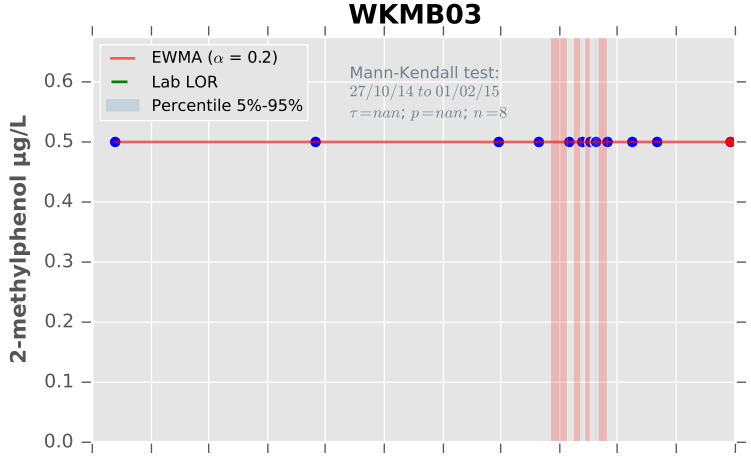

WKMB03
Iron (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB03
Lead (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.04; p=0.9; n=8
WKMB03
Manganese (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.12; p=0.67; n=8
WKMB03
Molybdenum (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.23; p=0.42; n=8
WKMB03
Nickel (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.05; p=0.87; n=8
WKMB03
Strontium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.25; p=0.38; n=8
WKMB03
Uranium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
WKMB03
Zinc (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.07; p=0.8; n=8
WKMB03
Methane mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.00; p=1; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

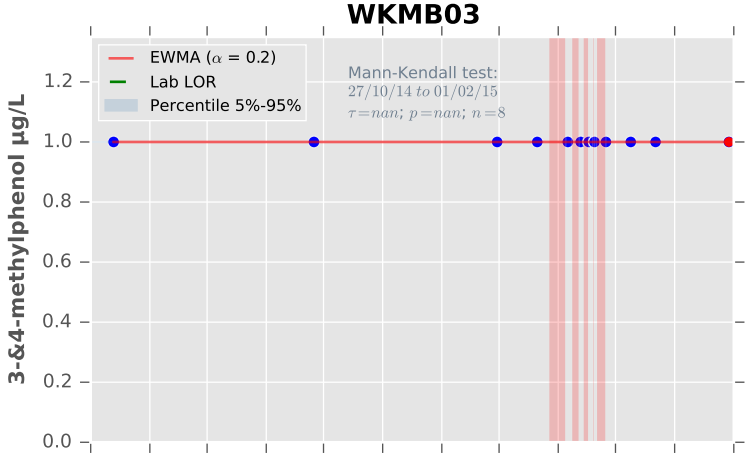

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Ethane µg/L
WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Butane µg/L
WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Propane µg/L
WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.57; p=0.048; n=8
Total Organic Carbon mg/L
WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.37; p=0.2; n=8
C10 - C36 (Sum of total) µg/L
WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.43; p=0.13; n=8
TPH C6-C10 µg/L
WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Polycylic aromatic hydrocarbons EPA448 ug/L
WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Naphthalene µg/L
WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Acenaphthene µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

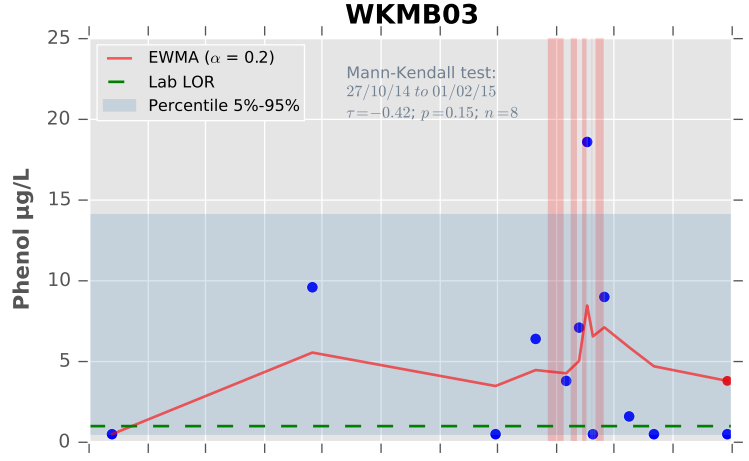

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Fluorene µg/L

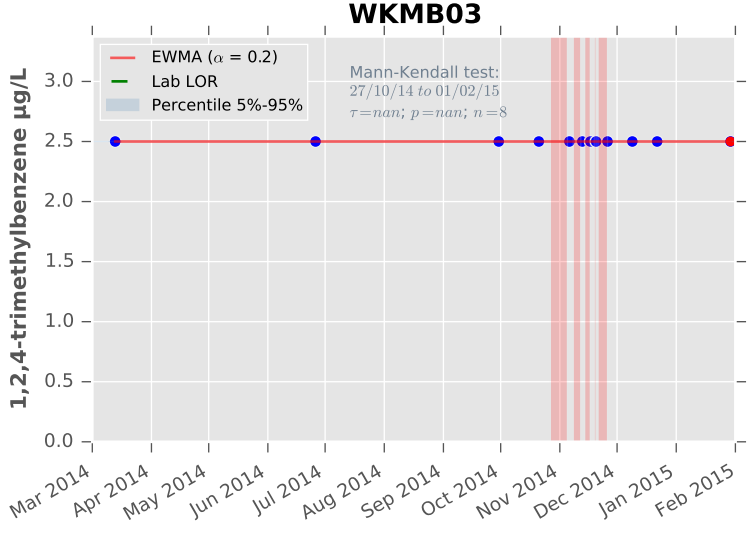

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Phenanthrene µg/L

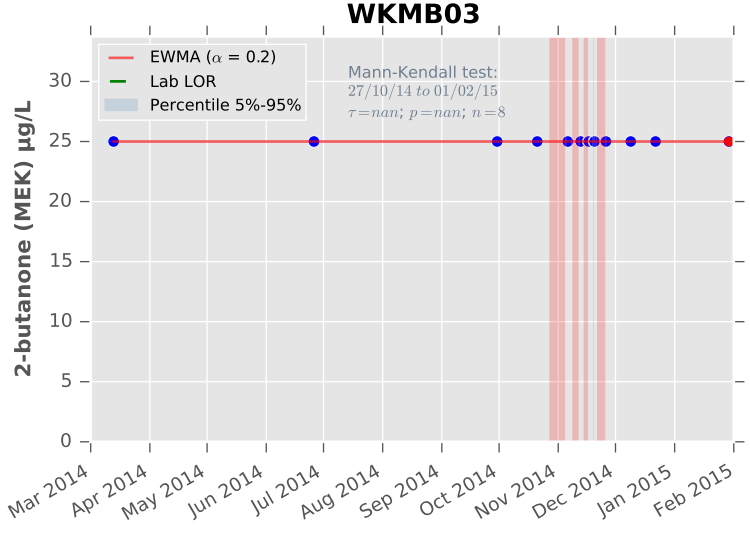

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
2,4-dimethylphenol µg/L

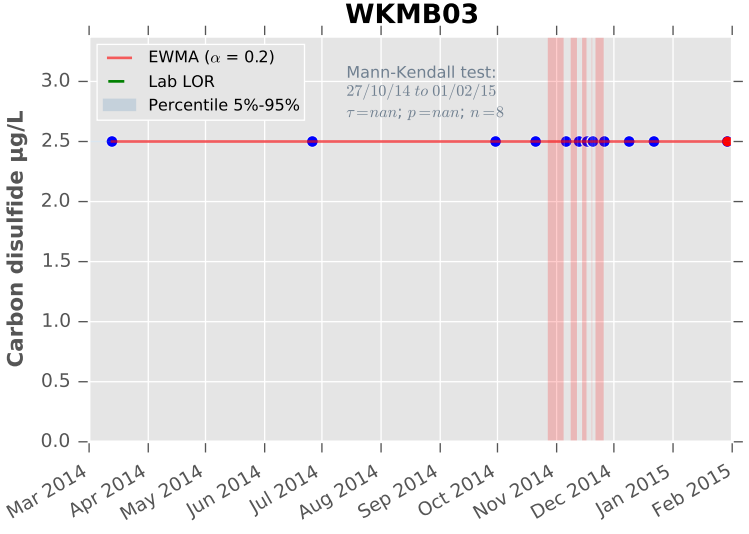

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
2-methylphenol µg/L

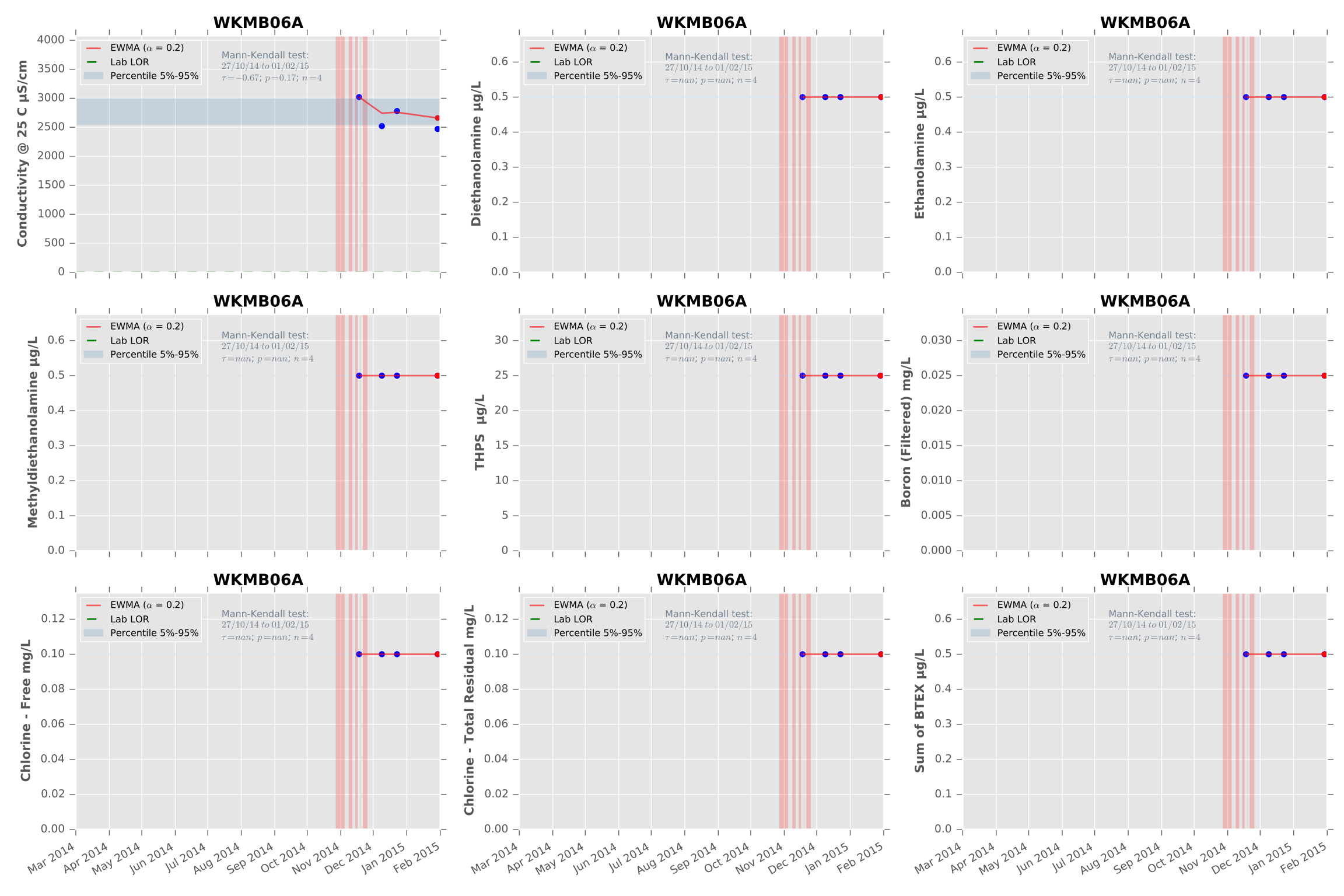

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
3-&4-methylphenol µg/L

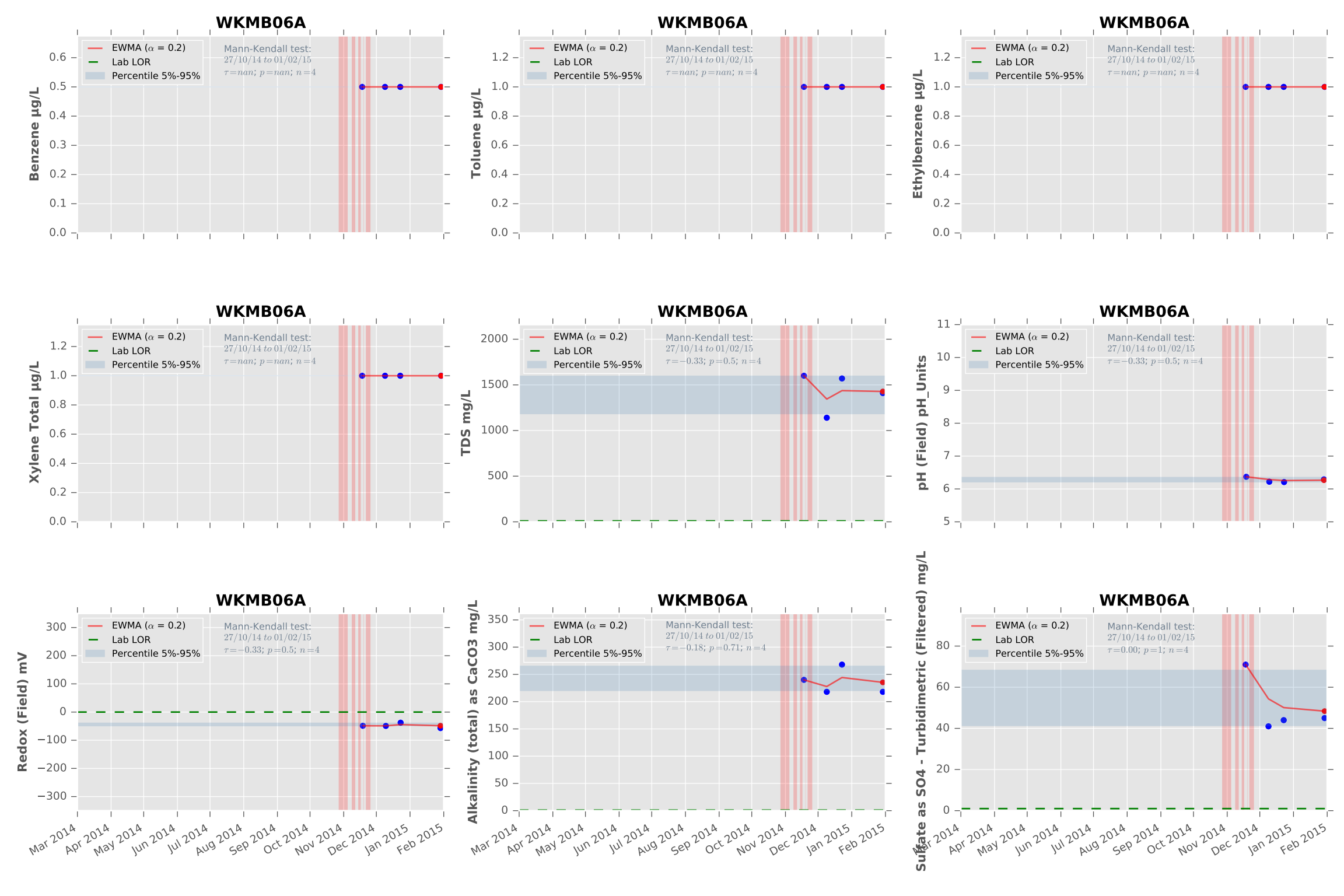

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.42; p=0.15; n=8
Phenol µg/L

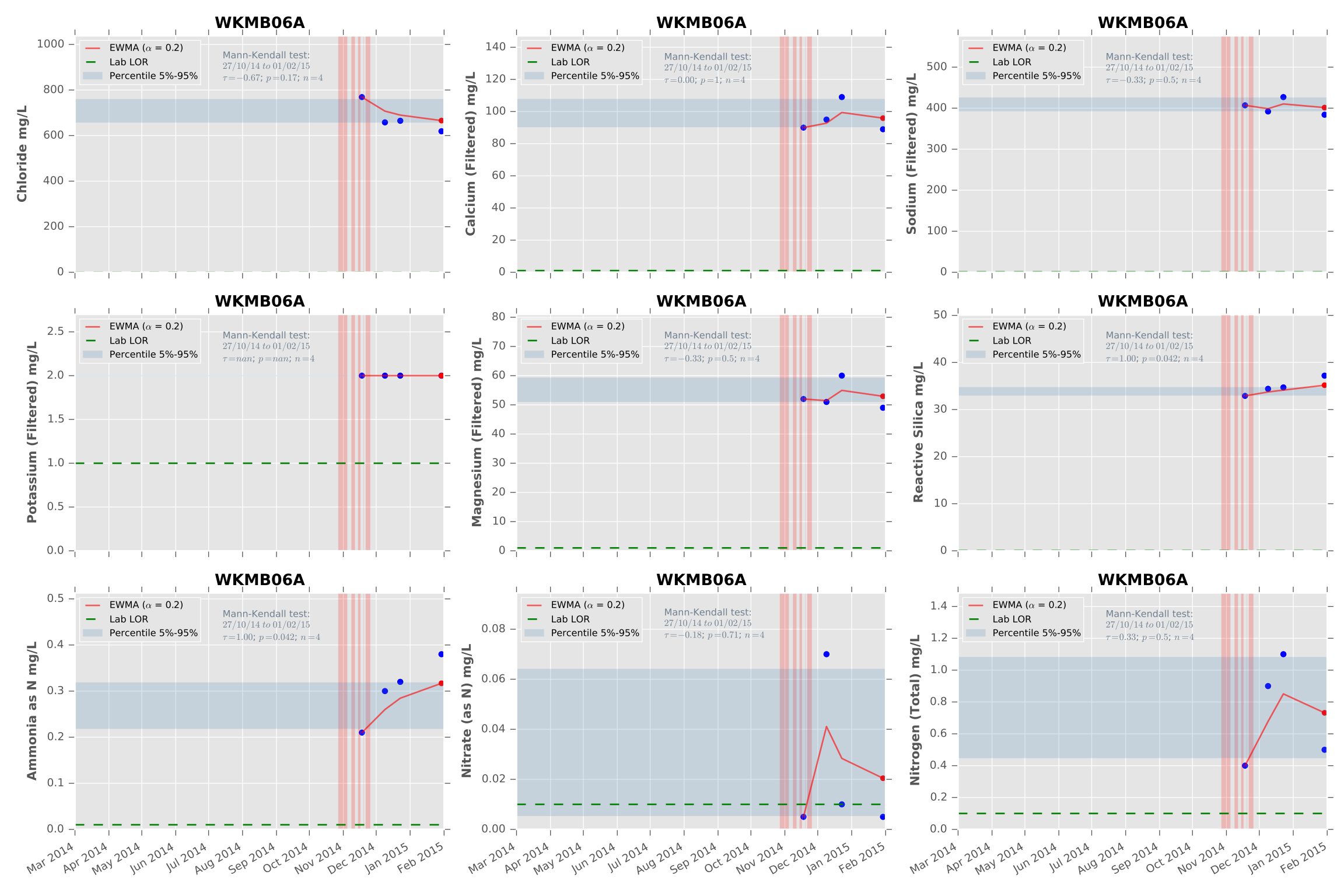

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
1,2,4-trimethylbenzene µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

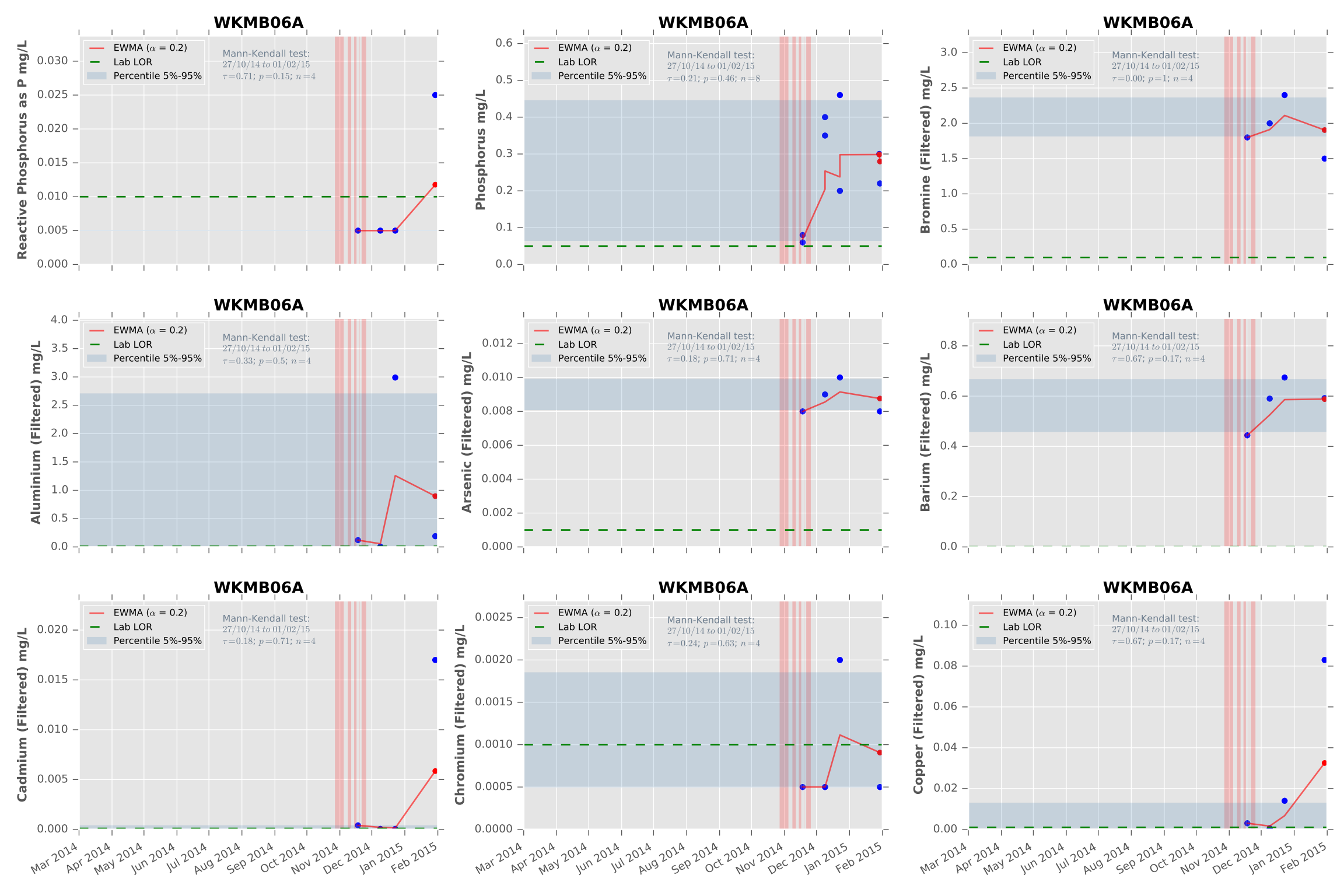

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
2-butanone (MEK) µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

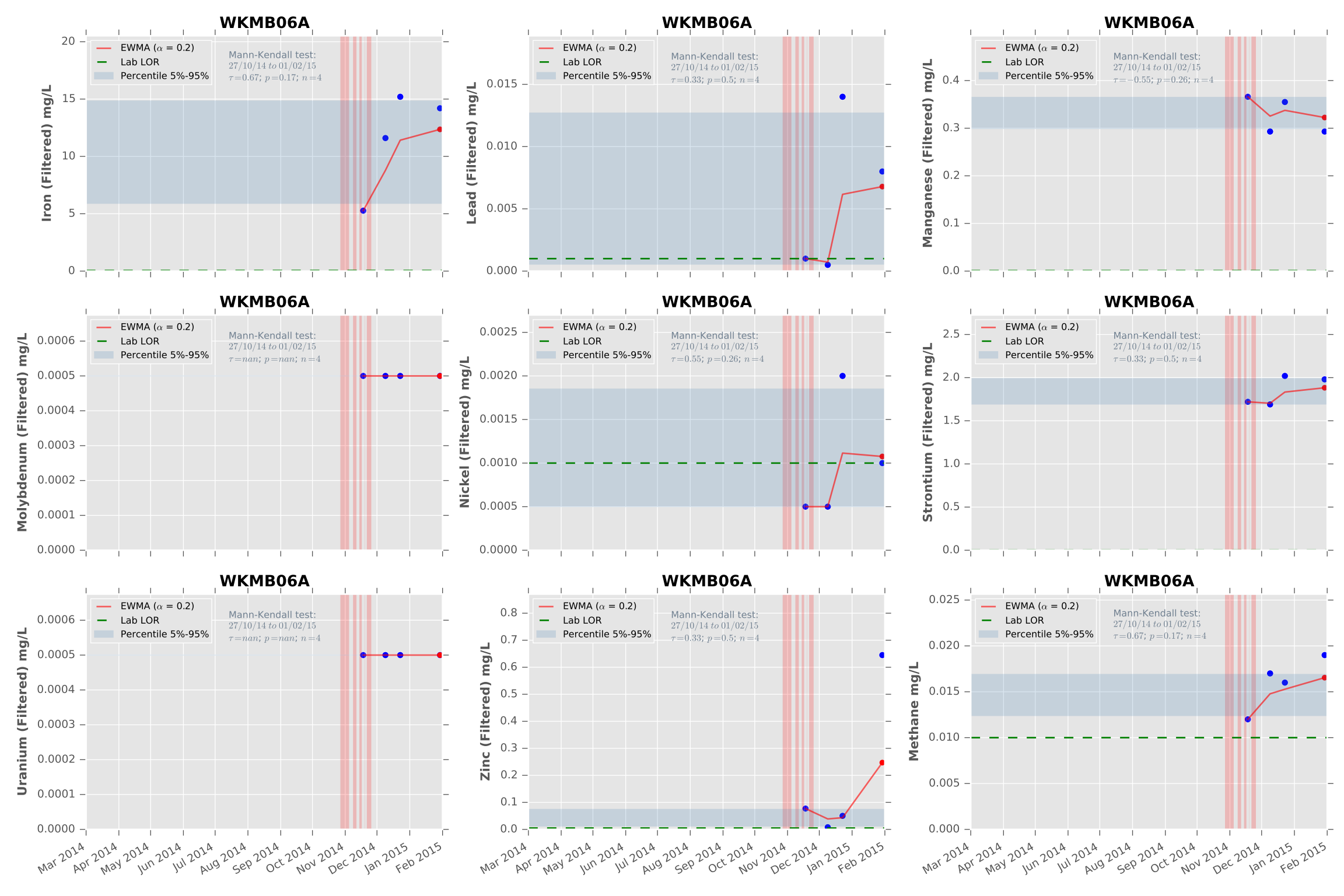

WKMB03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Carbon disulfide µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

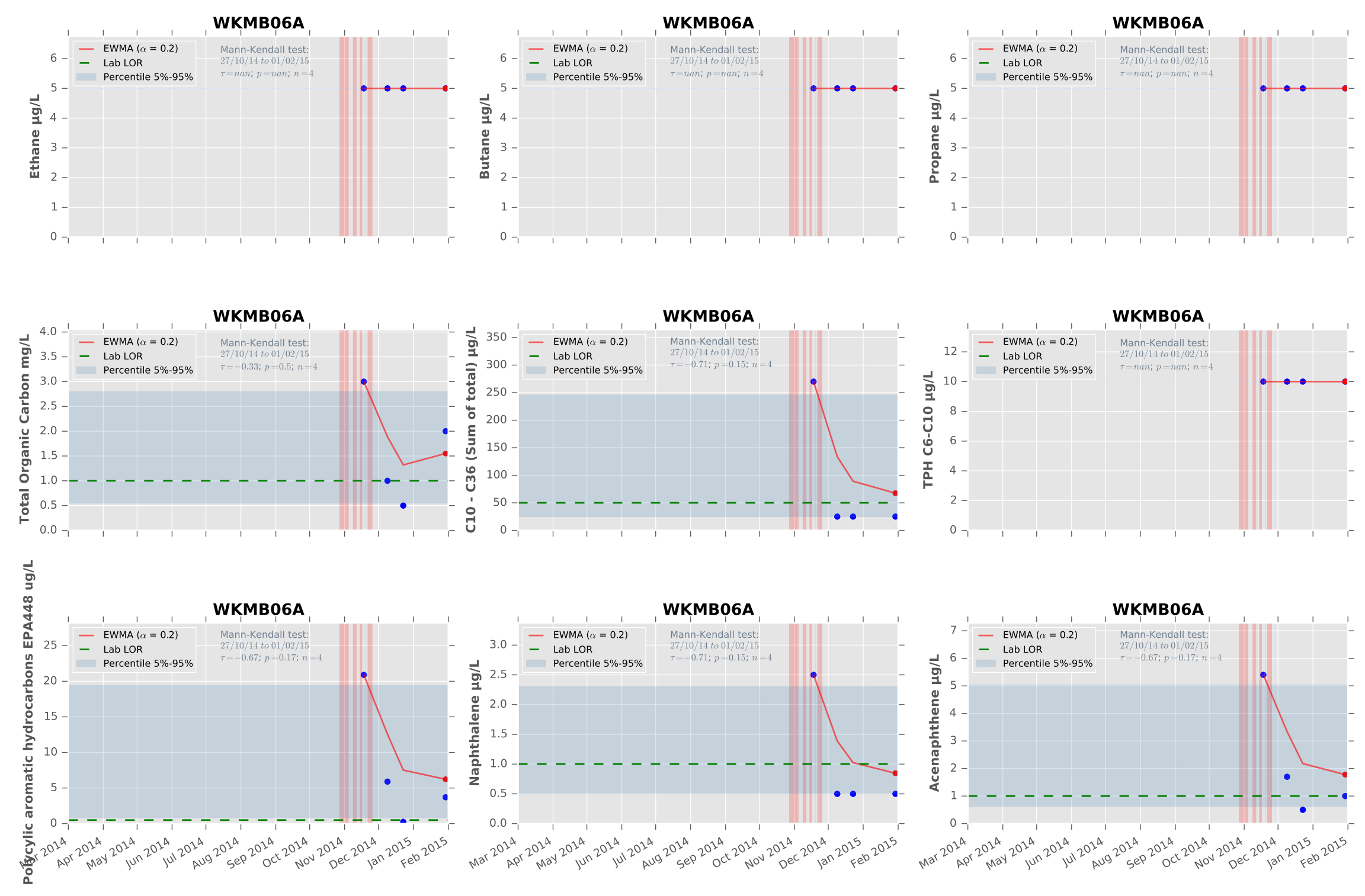

WKMB06A
Conductivity @ 25 C µS/cm
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.67; p=0.17; n=4
WKMB06A
Diethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
WKMB06A
Ethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
WKMB06A
Methyldiethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
WKMB06A
THPS µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
WKMB06A
Boron (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
WKMB06A
Chlorine - Free mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
WKMB06A
Chlorine - Total Residual mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
WKMB06A
Sum of BTEX µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

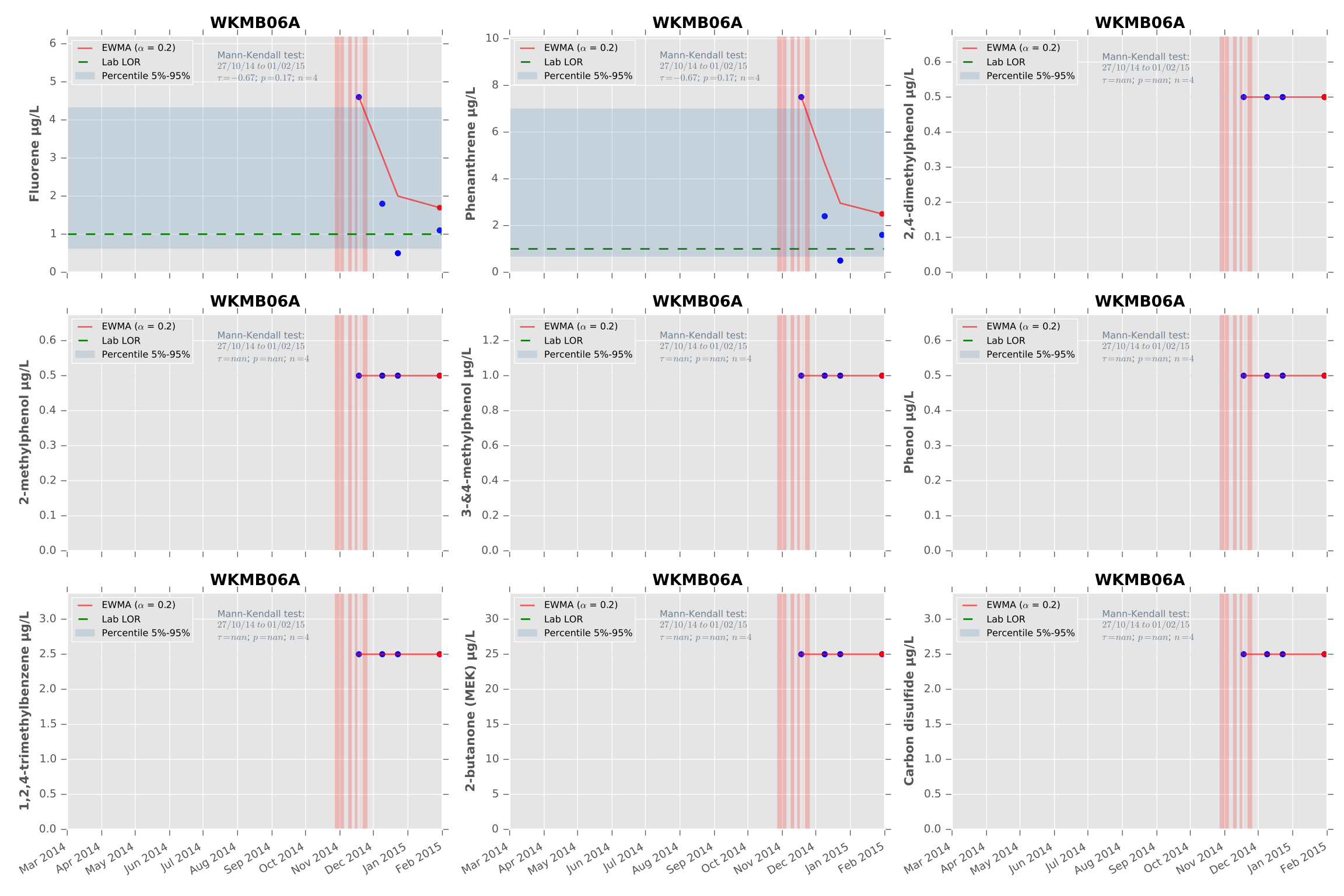

WKMB06A
Benzene µg/L
Toluene µg/L
Ethylbenzene µg/L
Xylene Total µg/L
TDS mg/L
pH (Field) pH_Units
Redox (Field) mV
Alkalinity (total) as CaCO3 mg/L
Sulfate as SO4 - Turbidimetric (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
τ=−0.33; p=0.5; n=4
τ=−0.18; p=0.71; n=4
τ=0.00; p=1; n=4
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

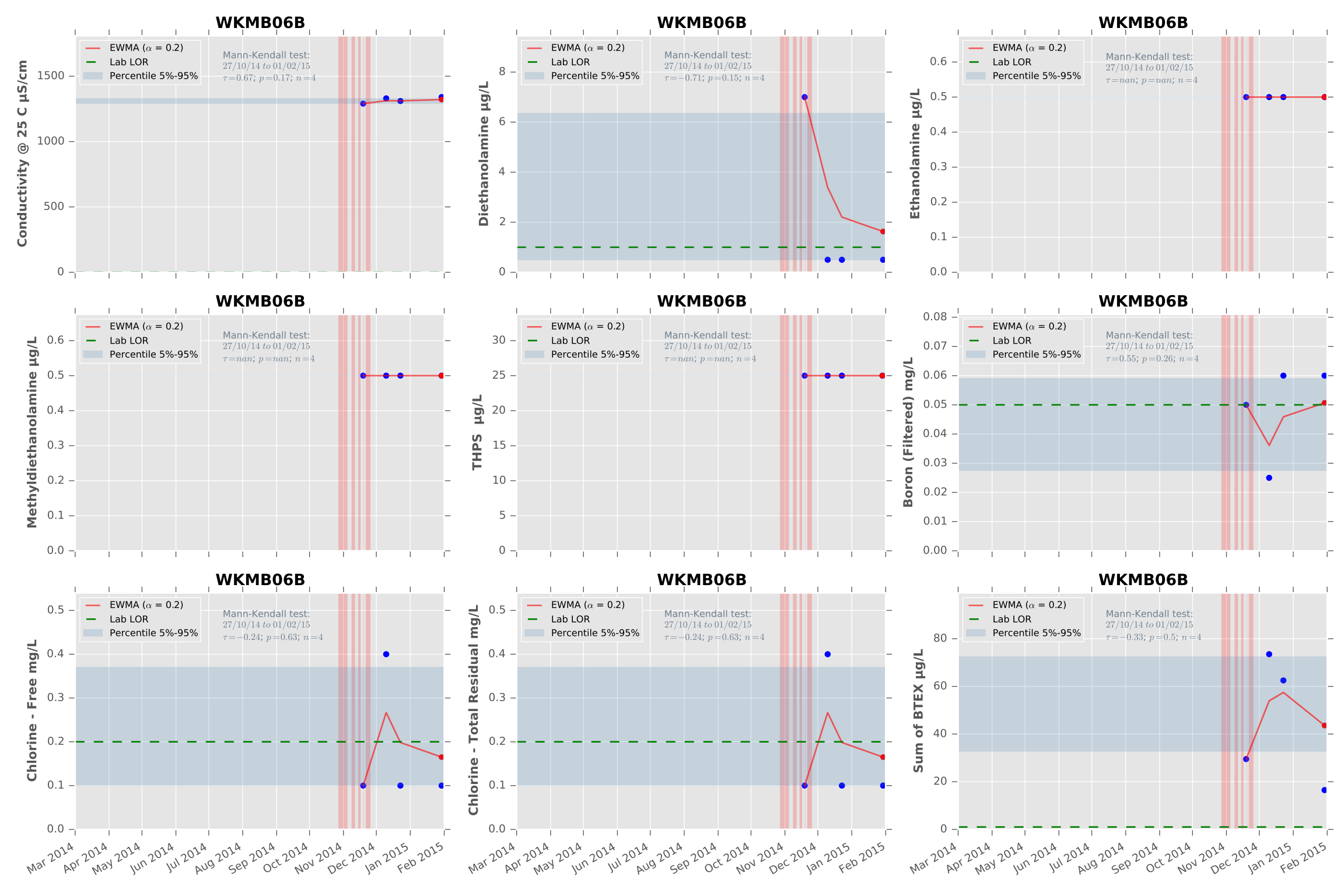

WKMB06A
Chloride mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.67; p=0.17; n=4
WKMB06A
Calcium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.00; p=1; n=4
WKMB06A
Sodium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.33; p=0.5; n=4
WKMB06A
Potassium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
WKMB06A
Magnesium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.33; p=0.5; n=4
WKMB06A
Reactive Silica mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=1.00; p=0.042; n=4
WKMB06A
Ammonia as N mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=1.00; p=0.042; n=4
WKMB06A
Nitrate (as N) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.18; p=0.71; n=4
WKMB06A
Nitrogen (Total) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.33; p=0.5; n=4
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

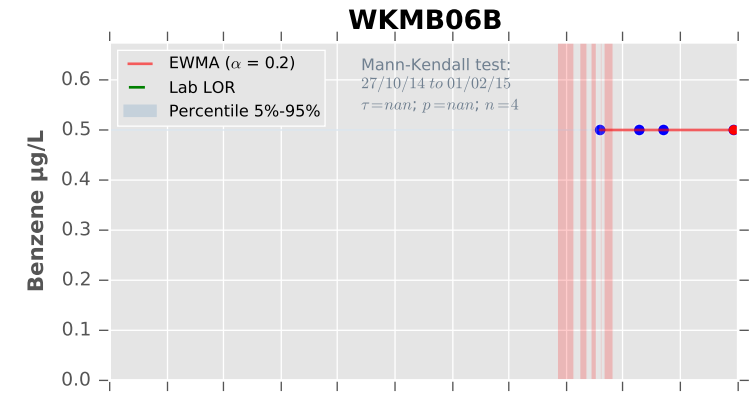

WKMB06A
Reactive Phosphorus as P mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.71; p=0.15; n=4
WKMB06A
Phosphorus mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.21; p=0.46; n=8
WKMB06A
Bromine (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.00; p=1; n=4
WKMB06A
Aluminium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.33; p=0.5; n=4
WKMB06A
Arsenic (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.18; p=0.71; n=4
WKMB06A
Barium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.67; p=0.17; n=4
WKMB06A
Cadmium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.18; p=0.71; n=4
WKMB06A
Chromium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.24; p=0.63; n=4
WKMB06A
Copper (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.67; p=0.17; n=4
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

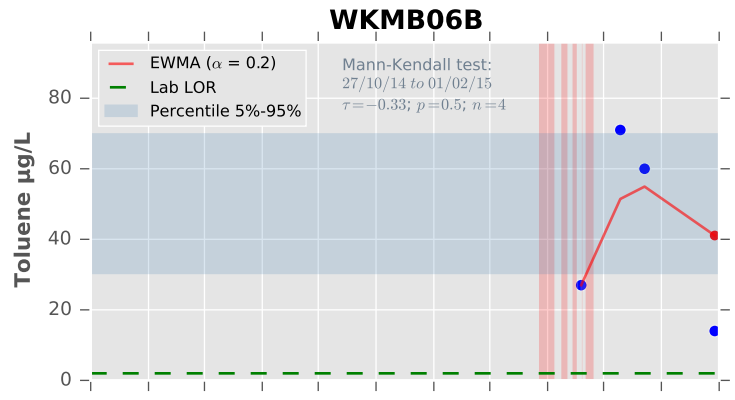

WKMB06A
Iron (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.67; p=0.17; n=4
WKMB06A
Lead (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.33; p=0.5; n=4
WKMB06A
Manganese (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=-0.55; p=0.26; n=4
WKMB06A
Molybdenum (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
WKMB06A
Nickel (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.55; p=0.26; n=4
WKMB06A
Strontium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.33; p=0.5; n=4
WKMB06A
Uranium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
WKMB06A
Zinc (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.33; p=0.5; n=4
WKMB06A
Methane mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.67; p=0.17; n=4
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

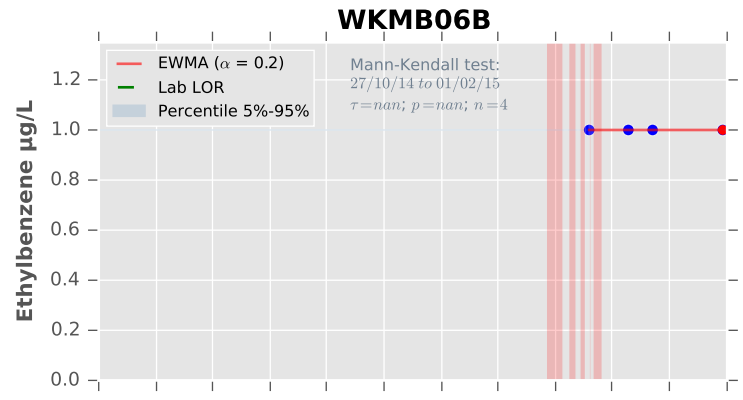

WKMB06A
Ethane µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
WKMB06A
Butane µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
WKMB06A
Propane µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
WKMB06A
Total Organic Carbon mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.33; p=0.5; n=4
WKMB06A
C10 - C36 (Sum of total) µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.71; p=0.15; n=4
WKMB06A
TPH C6-C10 µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
WKMB06A
Polycyclic aromatic hydrocarbons EPA448 ug/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.67; p=0.17; n=4
WKMB06A
Naphthalene µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.71; p=0.15; n=4
WKMB06A
Acenaphthene µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.67; p=0.17; n=4
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

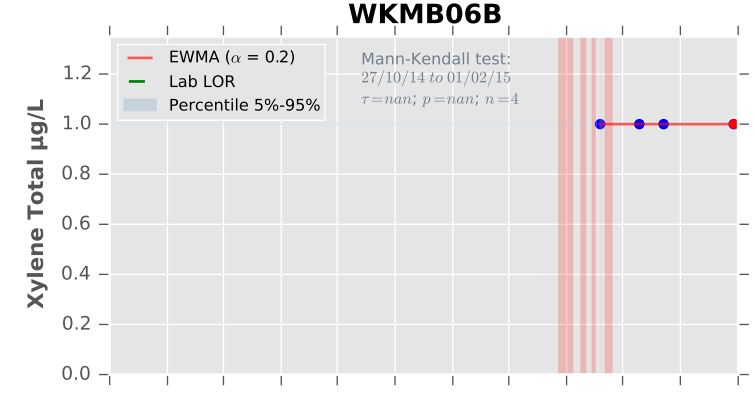

WKMB06A
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.67; p=0.17; n=4
Fluorene µg/L
Phenanthrene µg/L
2,4-dimethylphenol µg/L
τ=nan; p=nan; n=4
2-methylphenol µg/L
3-&4-methylphenol µg/L
Phenol µg/L
1,2,4-trimethylbenzene µg/L
2-butanone (MEK) µg/L
Carbon disulfide µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

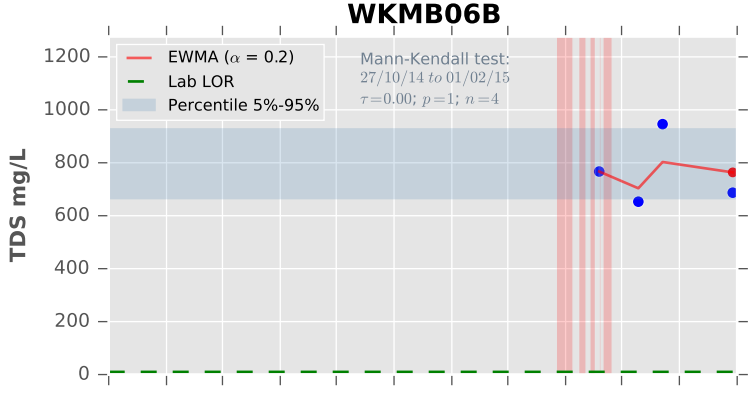

WKMB06B
Conductivity @ 25 C µS/cm
Diethanolamine µg/L
Ethanolamine µg/L
Methyldiethanolamine µg/L
THPS µg/L
Boron (Filtered) mg/L
Chlorine - Free mg/L
Chlorine - Total Residual mg/L
Sum of BTEX µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.67; p=0.17; n=4
τ=−0.71; p=0.15; n=4
τ=nan; p=nan; n=4
τ=0.55; p=0.26; n=4
τ=−0.24; p=0.63; n=4
τ=−0.33; p=0.5; n=4
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

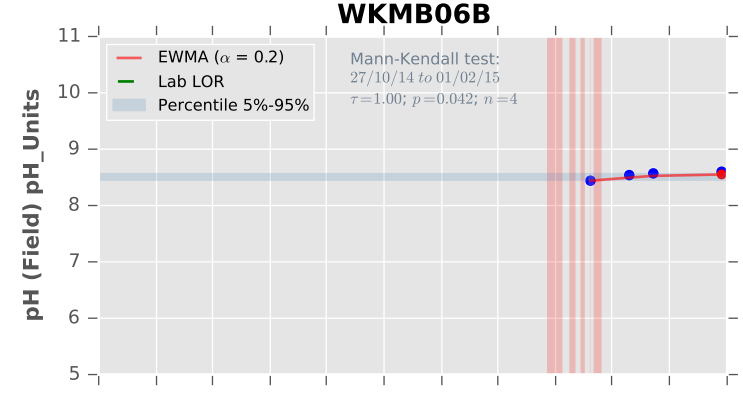

WKMB06B
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
Benzene µg/L

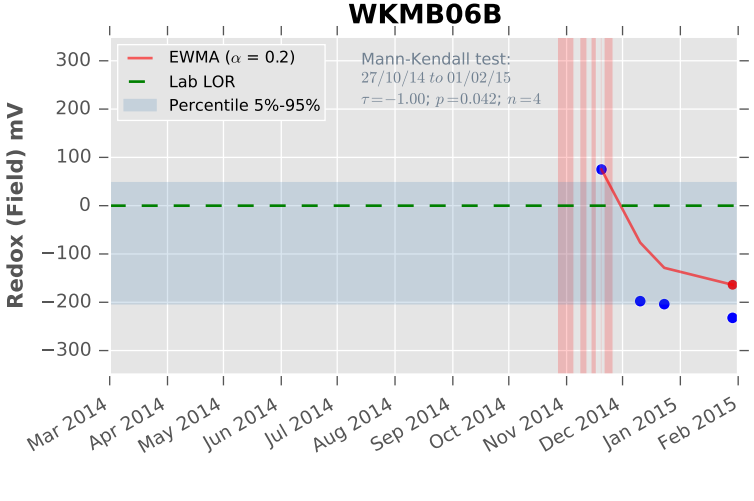

WKMB06B
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.33; p=0.5; n=4
Toluene µg/L

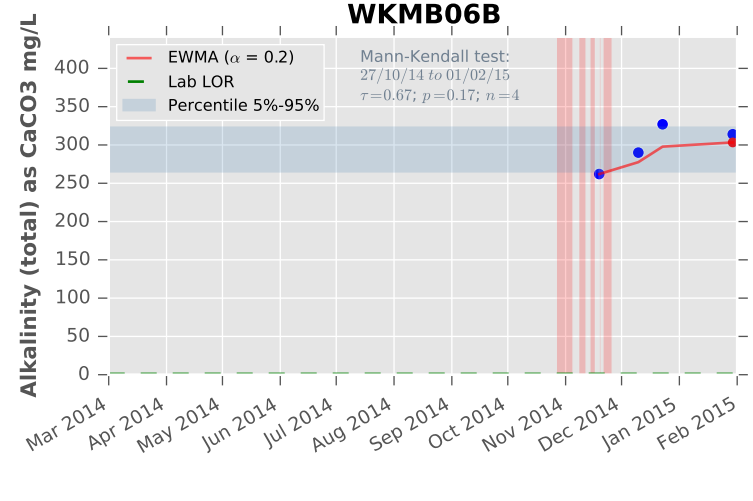

WKMB06B
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
Ethylbenzene µg/L

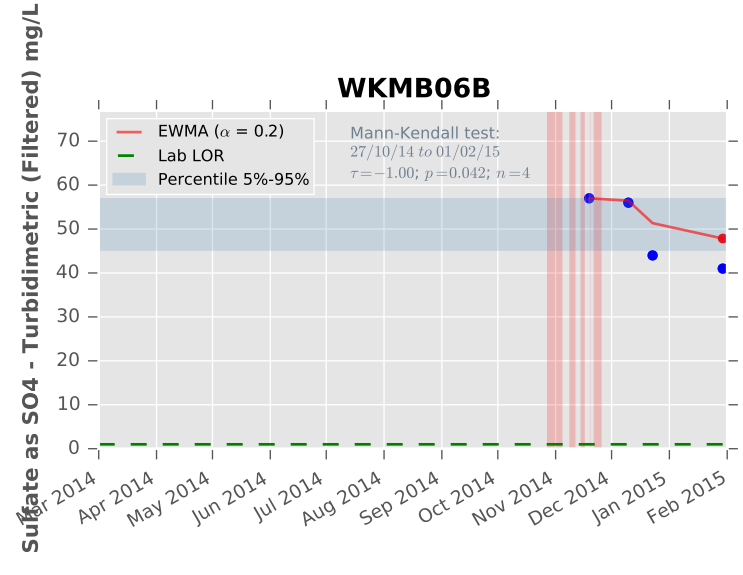

WKMB06B
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
Xylene Total µg/L

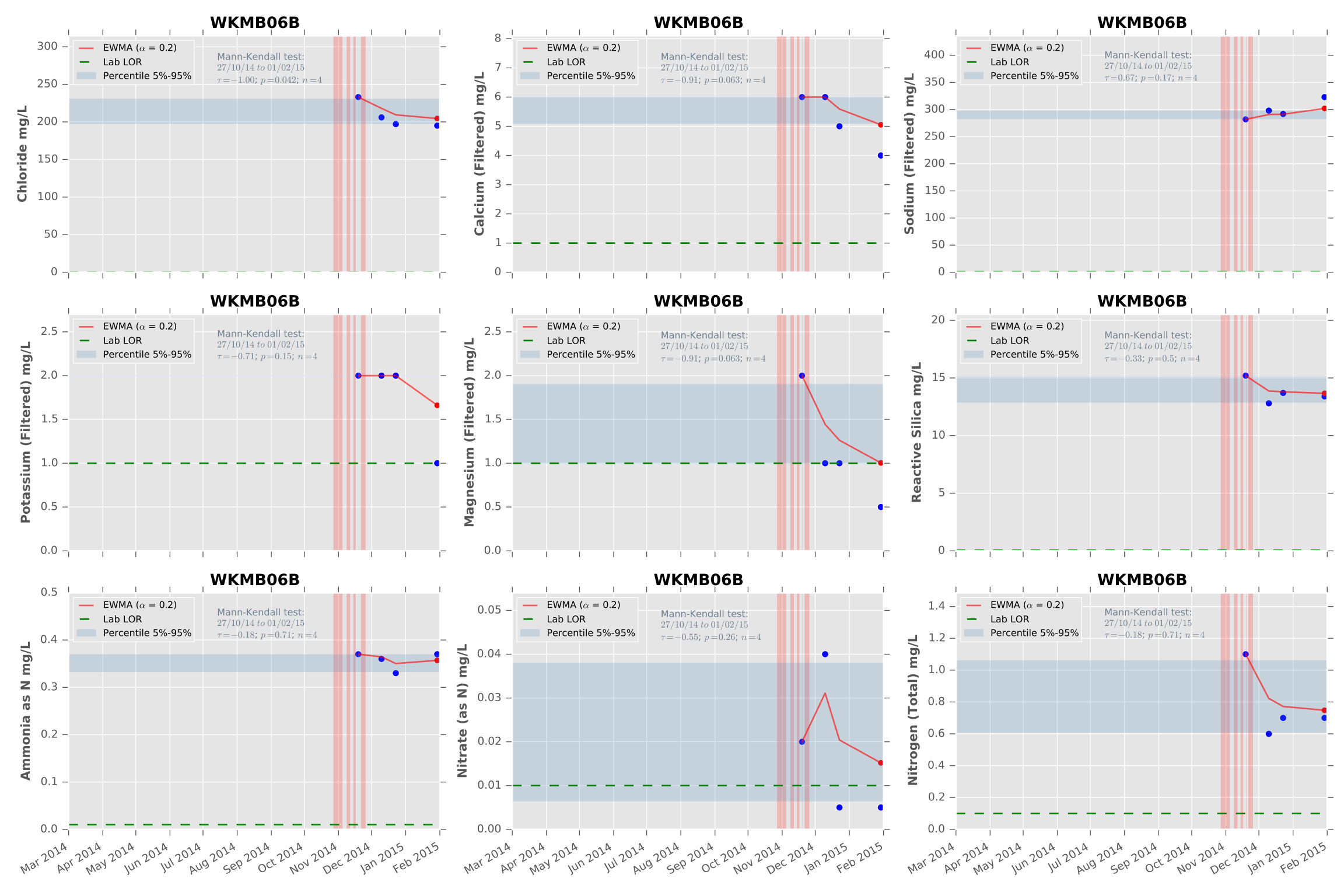

WKMB06B
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.00; p=1; n=4
TDS mg/L

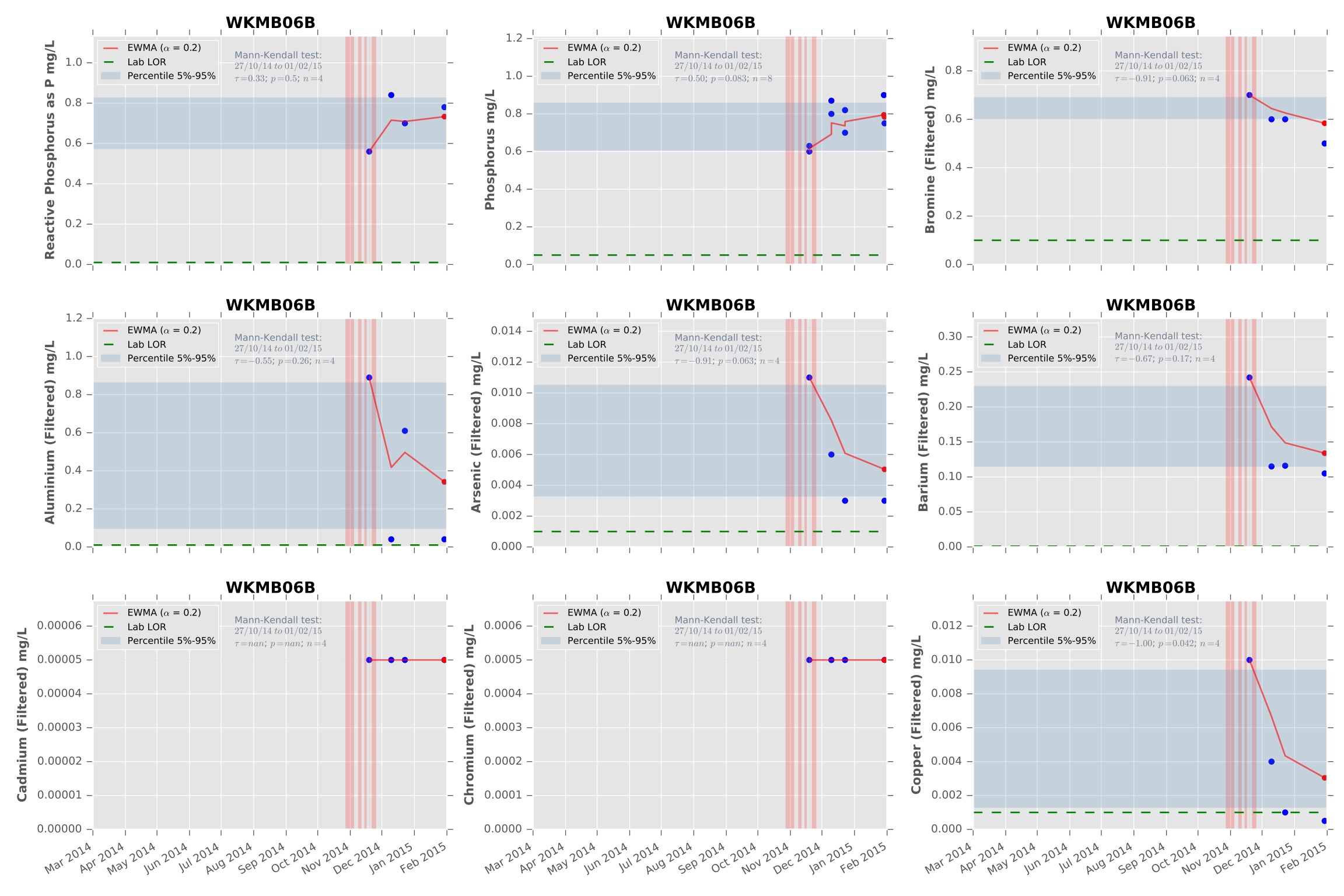

WKMB06B
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=1.00; p=0.042; n=4
pH (Field) pH_Units

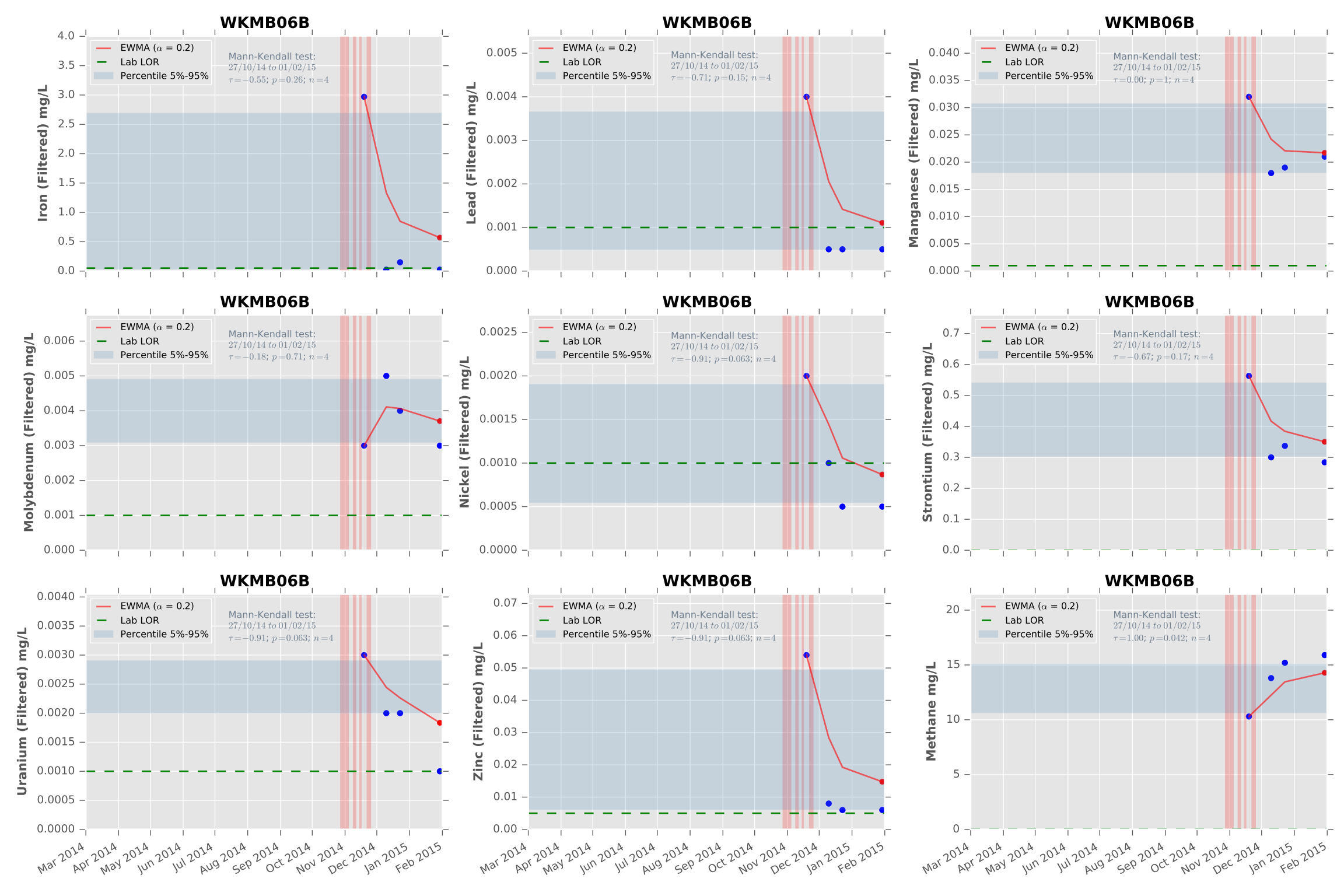

WKMB06B
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−1.00; p=0.042; n=4
Redox (Field) mV
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

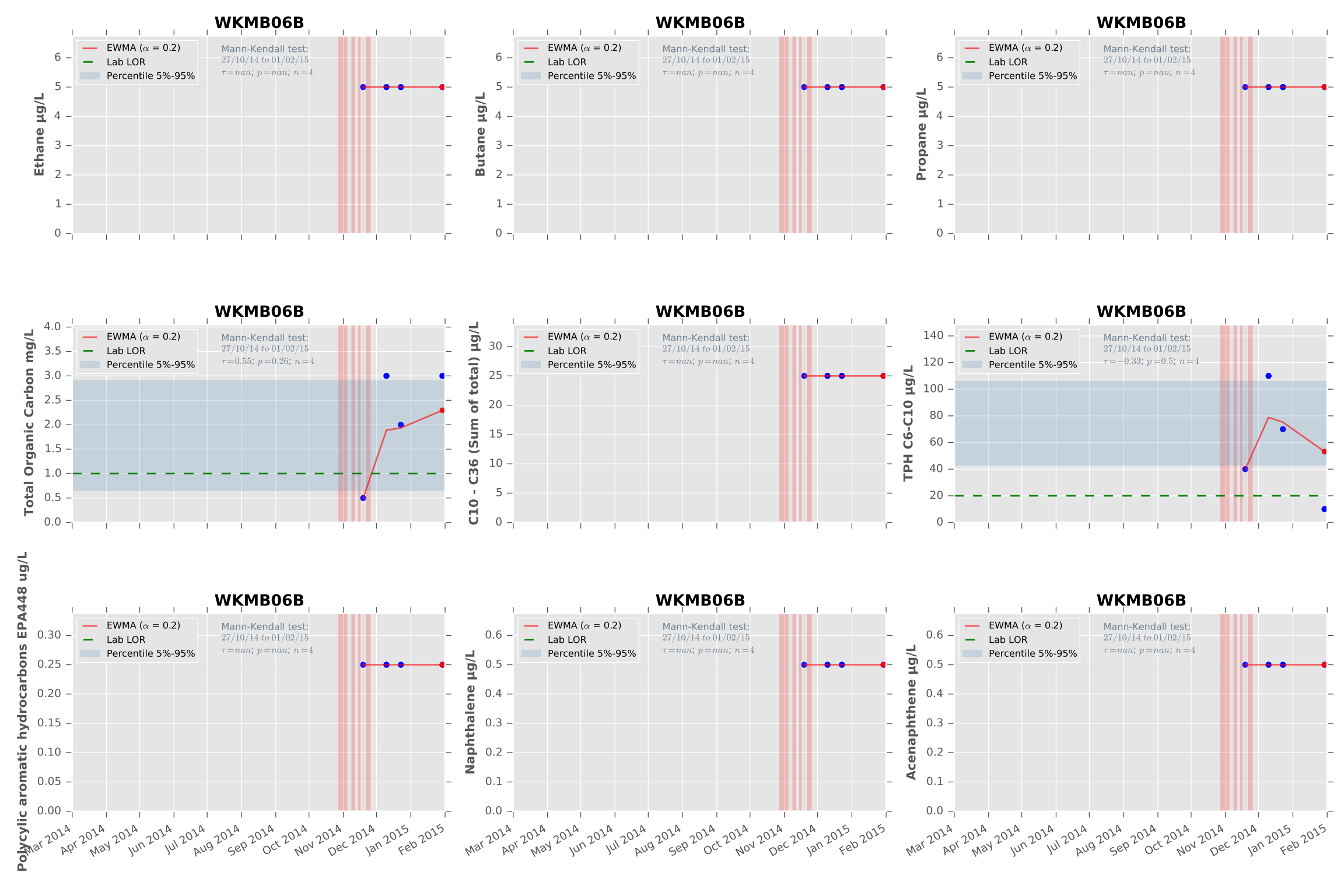

WKMB06B
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.67; p=0.17; n=4
Alkalinity (total) as CaCO3 mg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

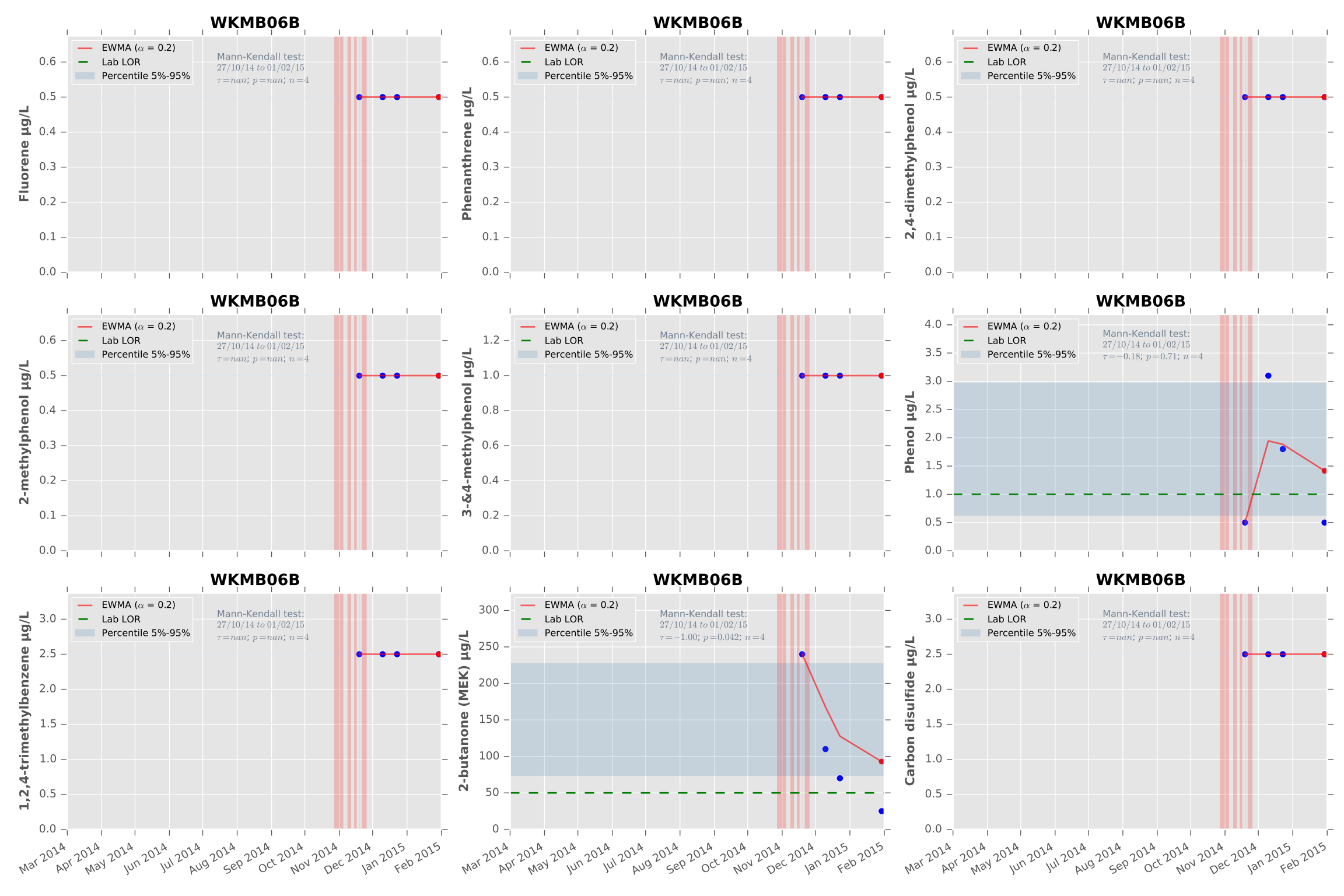

WKMB06B
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−1.00; p=0.042; n=4
Sulfate as SO4 - Turbidimetric (Filtered) mg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

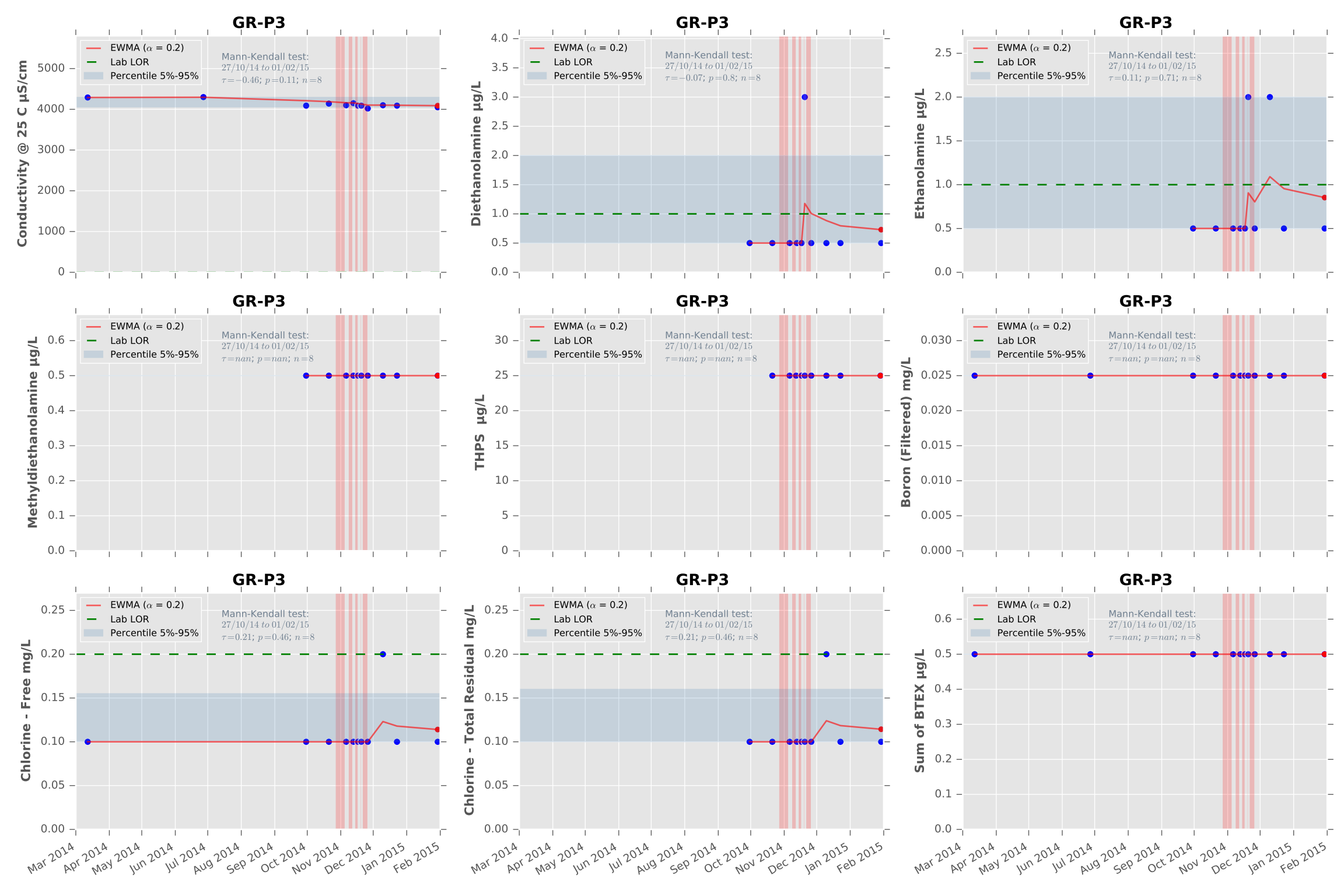

WKMB06B
Chloride mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−1.00; p=0.042; n=4
WKMB06B
Calcium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.91; p=0.063; n=4
WKMB06B
Sodium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.67; p=0.17; n=4
WKMB06B
Potassium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.71; p=0.15; n=4
WKMB06B
Magnesium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.91; p=0.063; n=4
WKMB06B
Reactive Silica mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.33; p=0.5; n=4
WKMB06B
Ammonia as N mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.18; p=0.71; n=4
WKMB06B
Nitrate (as N) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.55; p=0.26; n=4
WKMB06B
Nitrogen (Total) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.18; p=0.71; n=4
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

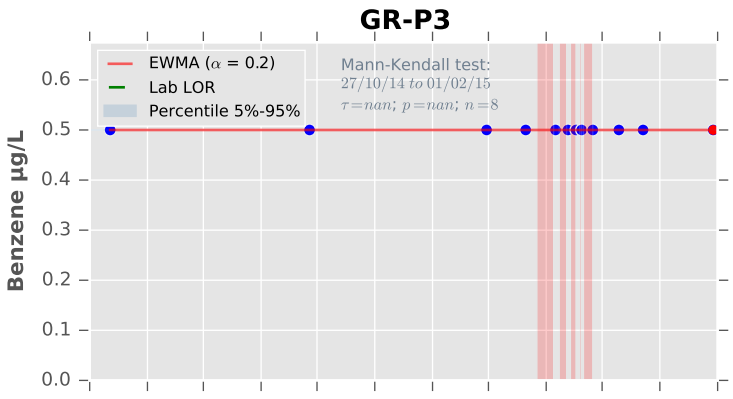

WKMB06B
Reactive Phosphorus as P mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.33; p=0.5; n=4
WKMB06B
Phosphorus mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.50; p=0.083; n=8
WKMB06B
Bromine (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.91; p=0.063; n=4
WKMB06B
Aluminium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.55; p=0.26; n=4
WKMB06B
Arsenic (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.91; p=0.063; n=4
WKMB06B
Barium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.67; p=0.17; n=4
WKMB06B
Cadmium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
WKMB06B
Chromium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
WKMB06B
Copper (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−1.00; p=0.042; n=4
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

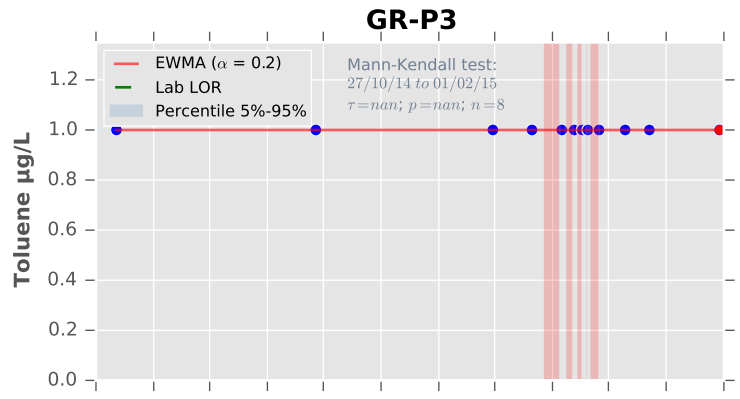

WKMB06B
Iron (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.55; p=0.26; n=4
WKMB06B
Lead (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.71; p=0.15; n=4
WKMB06B
Manganese (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.00; p=1; n=4
WKMB06B
Molybdenum (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.18; p=0.71; n=4
WKMB06B
Nickel (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.91; p=0.063; n=4
WKMB06B
Strontium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.67; p=0.17; n=4
WKMB06B
Uranium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.91; p=0.063; n=4
WKMB06B
Zinc (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.91; p=0.063; n=4
WKMB06B
Methane mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=1.00; p=0.042; n=4
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

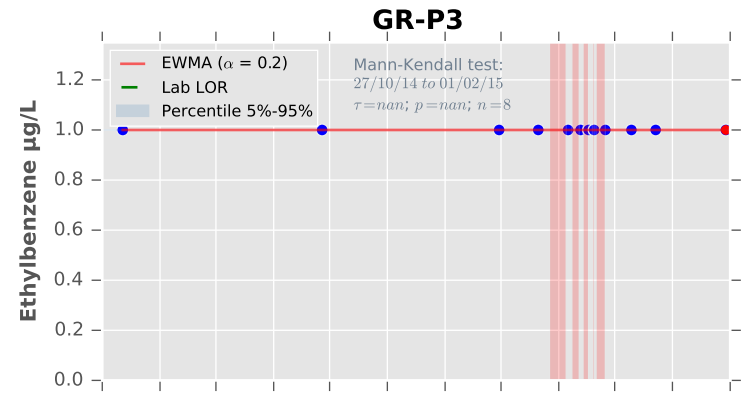

WKMB06B
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
Ethane µg/L
Butane µg/L
Propane µg/L
Total Organic Carbon mg/L
τ=0.55; p=0.26; n=4
C10 - C36 (Sum of total) µg/L
TPH C6-C10 µg/L
τ=−0.33; p=0.5; n=4
Polycylic aromatic hydrocarbons EPA448 ug/L
Naphthalene µg/L
Acenaphthene µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

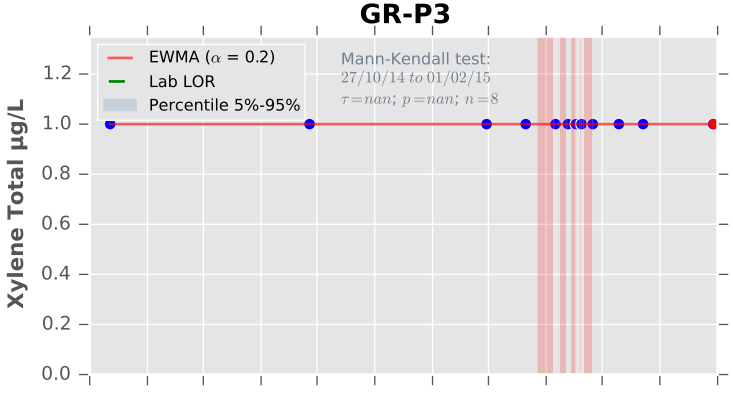

WKMB06B
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=4
Fluorene µg/L
Phenanthrene µg/L
2,4-dimethylphenol µg/L
2-methylphenol µg/L
3-&4-methylphenol µg/L
Phenol µg/L
τ=−0.18; p=0.71; n=4
1,2,4-trimethylbenzene µg/L
2-butanone (MEK) µg/L
τ=−1.00; p=0.042; n=4
Carbon disulfide µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

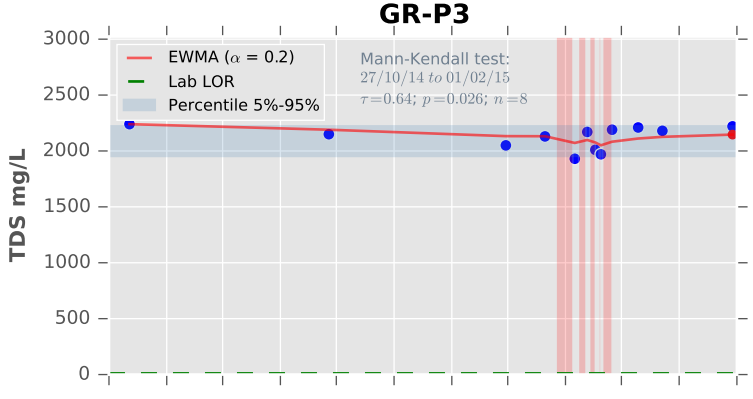

GR-P3
Conductivity @ 25 C µS/cm
Diethanolamine µg/L
Ethanolamine µg/L
Methyldiethanolamine µg/L
THPS µg/L
Boron (Filtered) mg/L
Chlorine - Free mg/L
Chlorine - Total Residual mg/L
Sum of BTEX µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.46; p=0.11; n=8
τ=−0.07; p=0.8; n=8
τ=0.11; p=0.71; n=8
τ=nan; p=nan; n=8
τ=0.21; p=0.46; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

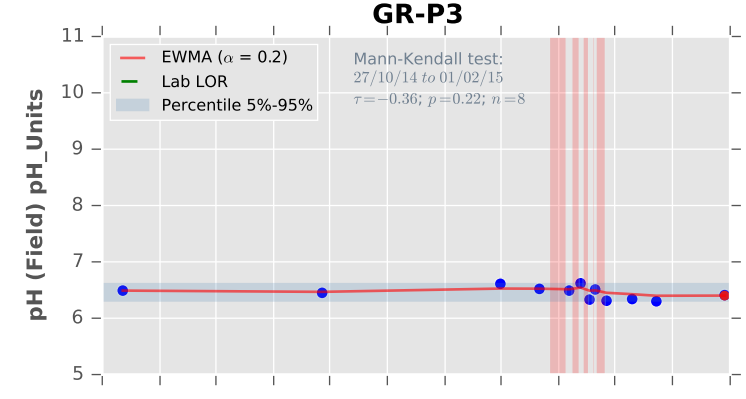

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Benzene µg/L

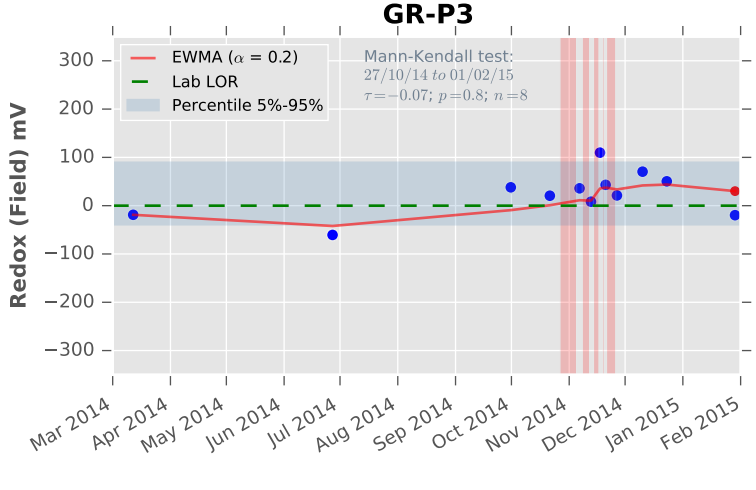

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Toluene µg/L

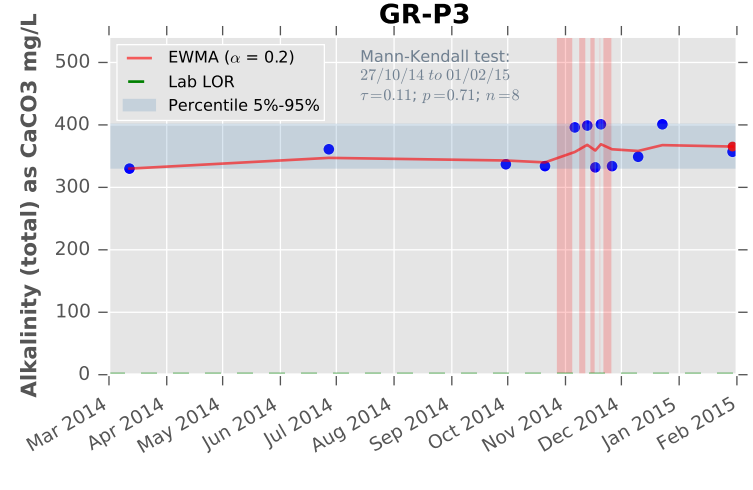

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Ethylbenzene µg/L

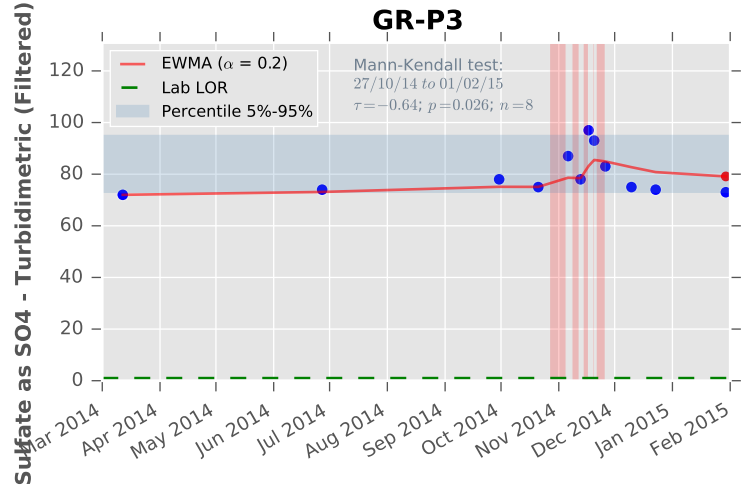

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Xylene Total µg/L

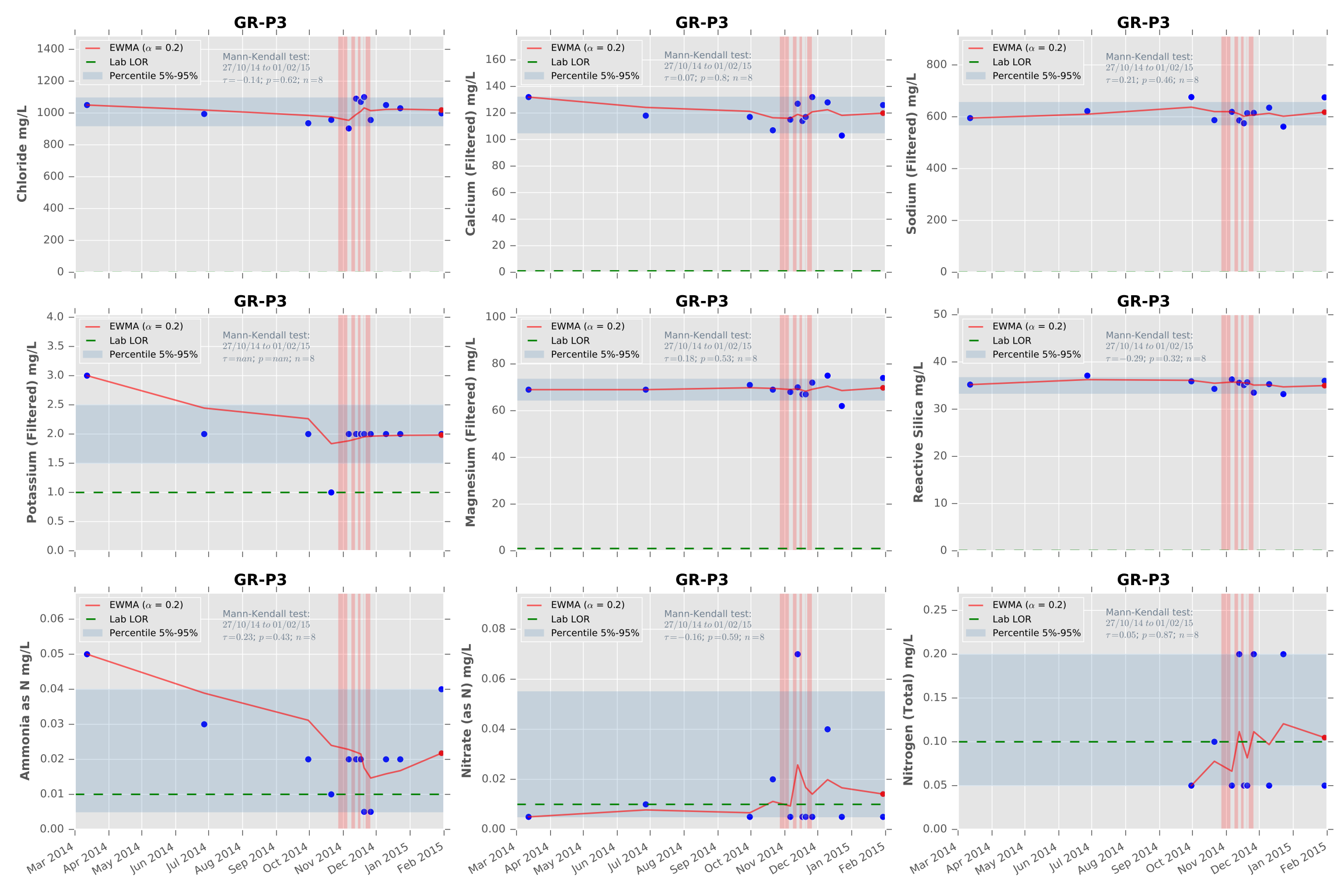

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.64; p=0.026; n=8
TDS mg/L

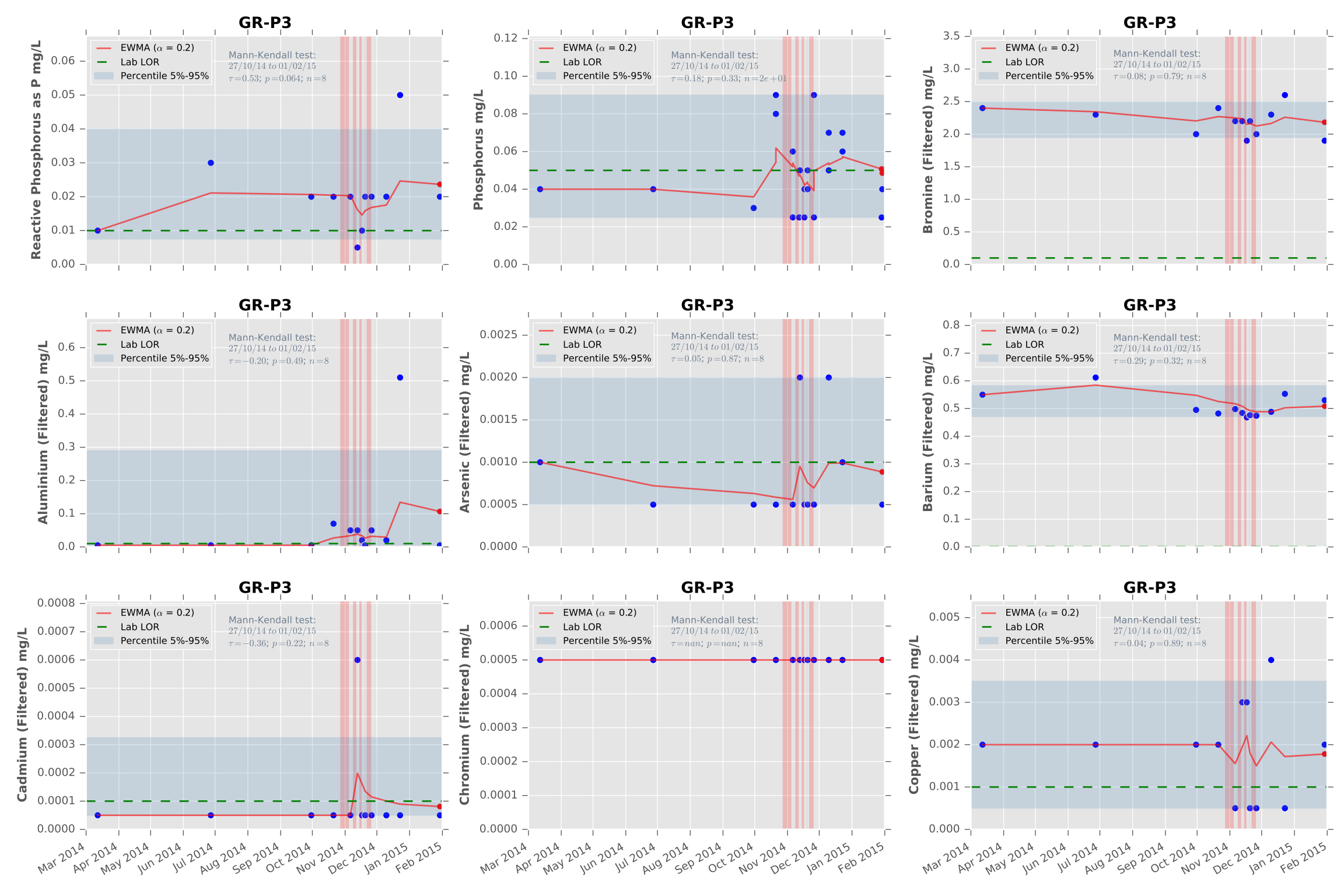

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.36; p=0.22; n=8
pH (Field) pH_Units

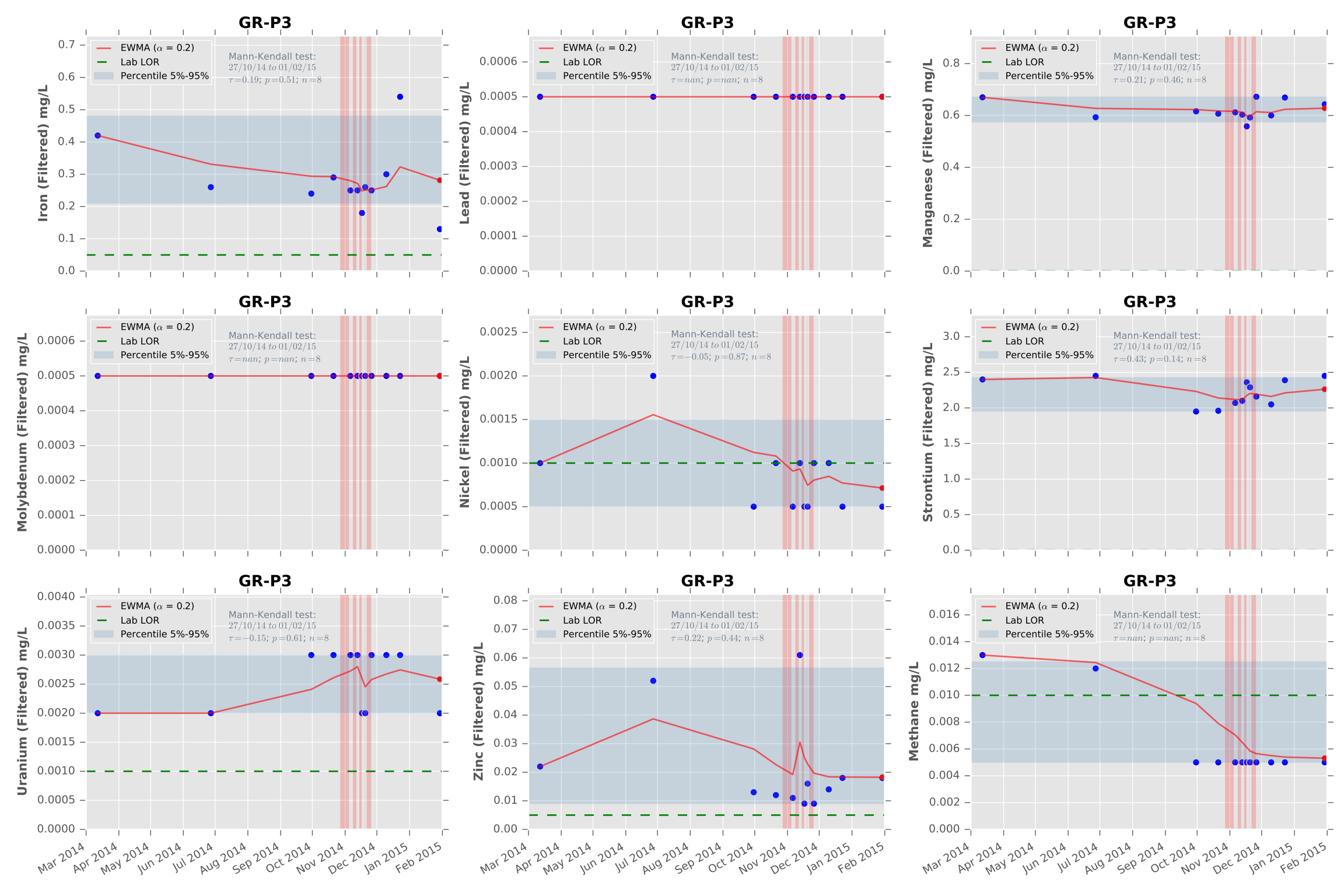

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.07; p=0.8; n=8
Redox (Field) mV
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

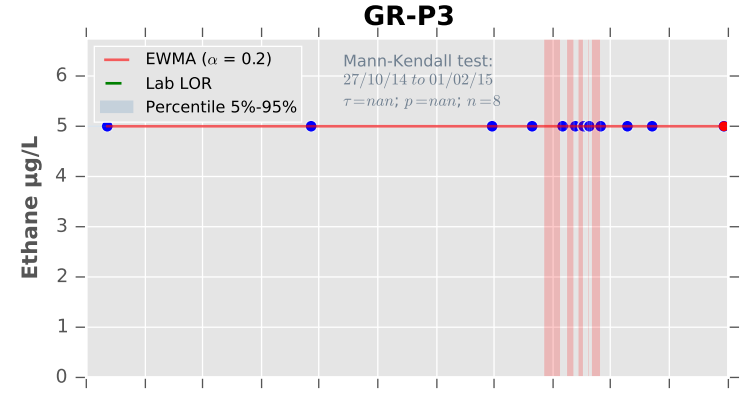

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.11; p=0.71; n=8
Alkalinity (total) as CaCO3 mg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

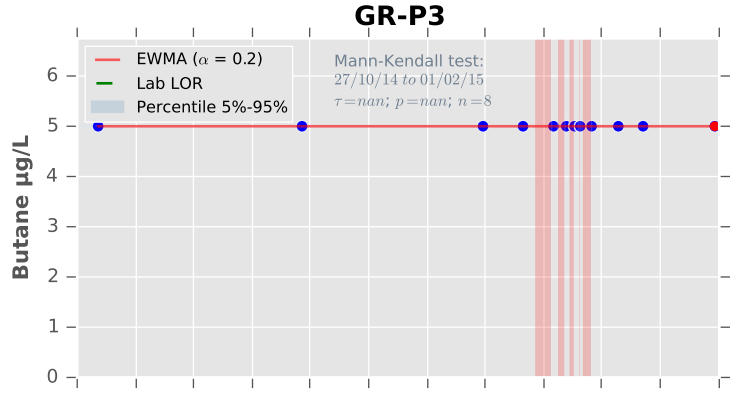

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.64; p=0.026; n=8
Sulfate as SO4 - Turbidimetric (Filtered) mg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

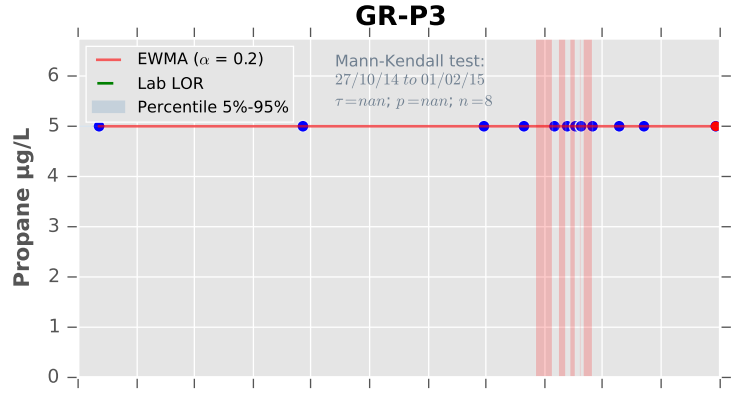

GR-P3
Chloride mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.14; p=0.62; n=8
GR-P3
Calcium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.07; p=0.8; n=8
GR-P3
Sodium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.21; p=0.46; n=8
GR-P3
Potassium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
GR-P3
Magnesium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.18; p=0.53; n=8
GR-P3
Reactive Silica mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.29; p=0.32; n=8
GR-P3
Ammonia as N mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.23; p=0.43; n=8
GR-P3
Nitrate (as N) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.16; p=0.59; n=8
GR-P3
Nitrogen (Total) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.05; p=0.87; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

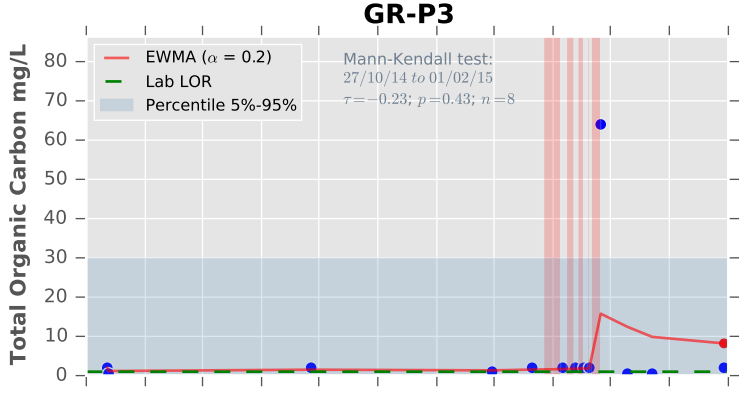

GR-P3
Reactive Phosphorus as P mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.53; p=0.064; n=8
GR-P3
Phosphorus mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.18; p=0.33; n=2e+01
GR-P3
Bromine (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.08; p=0.79; n=8
GR-P3
Aluminium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.20; p=0.49; n=8
GR-P3
Arsenic (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.05; p=0.87; n=8
GR-P3
Barium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.29; p=0.32; n=8
GR-P3
Cadmium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.36; p=0.22; n=8
GR-P3
Chromium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
GR-P3
Copper (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.04; p=0.89; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

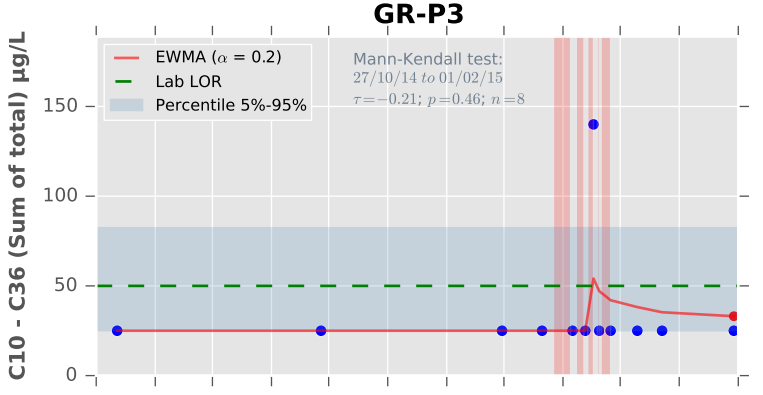

GR-P3
Iron (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.19; p=0.51; n=8
GR-P3
Lead (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
GR-P3
Manganese (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.21; p=0.46; n=8
GR-P3
Molybdenum (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
GR-P3
Nickel (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.05; p=0.87; n=8
GR-P3
Strontium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.43; p=0.14; n=8
GR-P3
Uranium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.15; p=0.61; n=8
GR-P3
Zinc (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.22; p=0.44; n=8
GR-P3
Methane mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

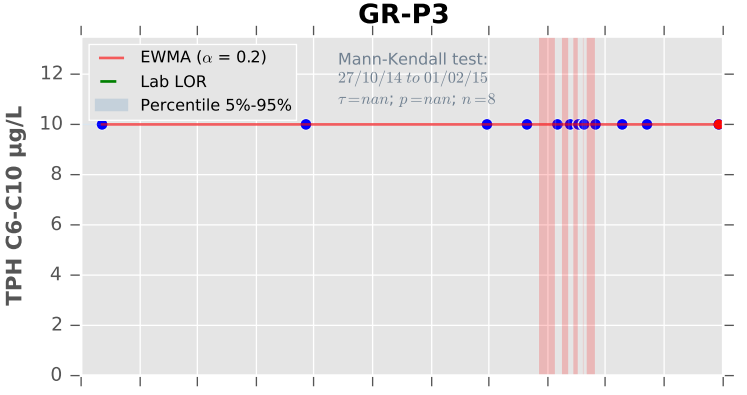

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Ethane µg/L

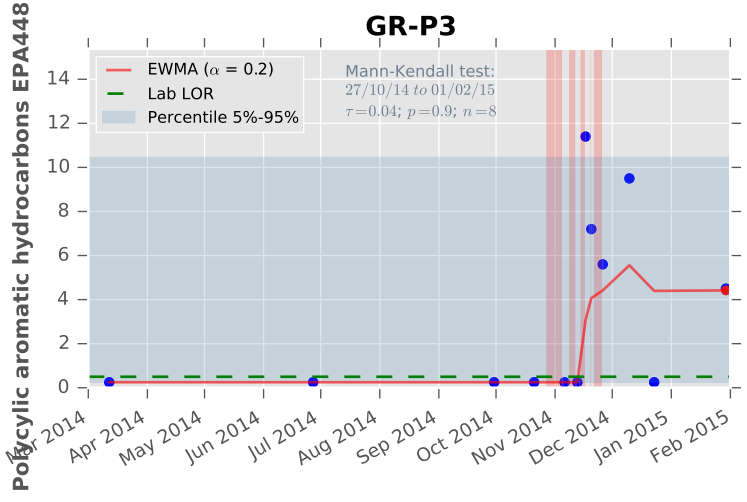

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Butane µg/L

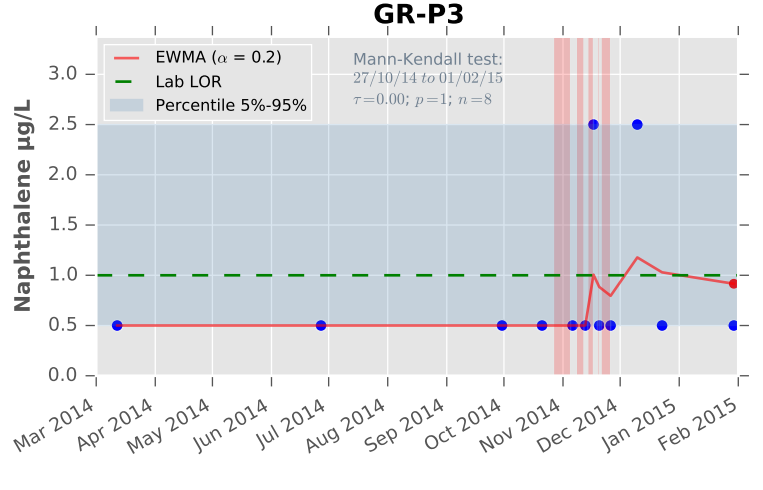

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Propane µg/L

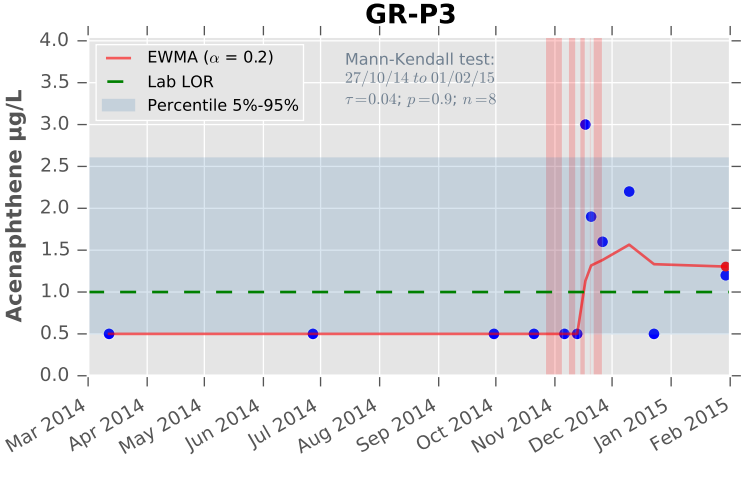

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.23; p=0.43; n=8
Total Organic Carbon mg/L

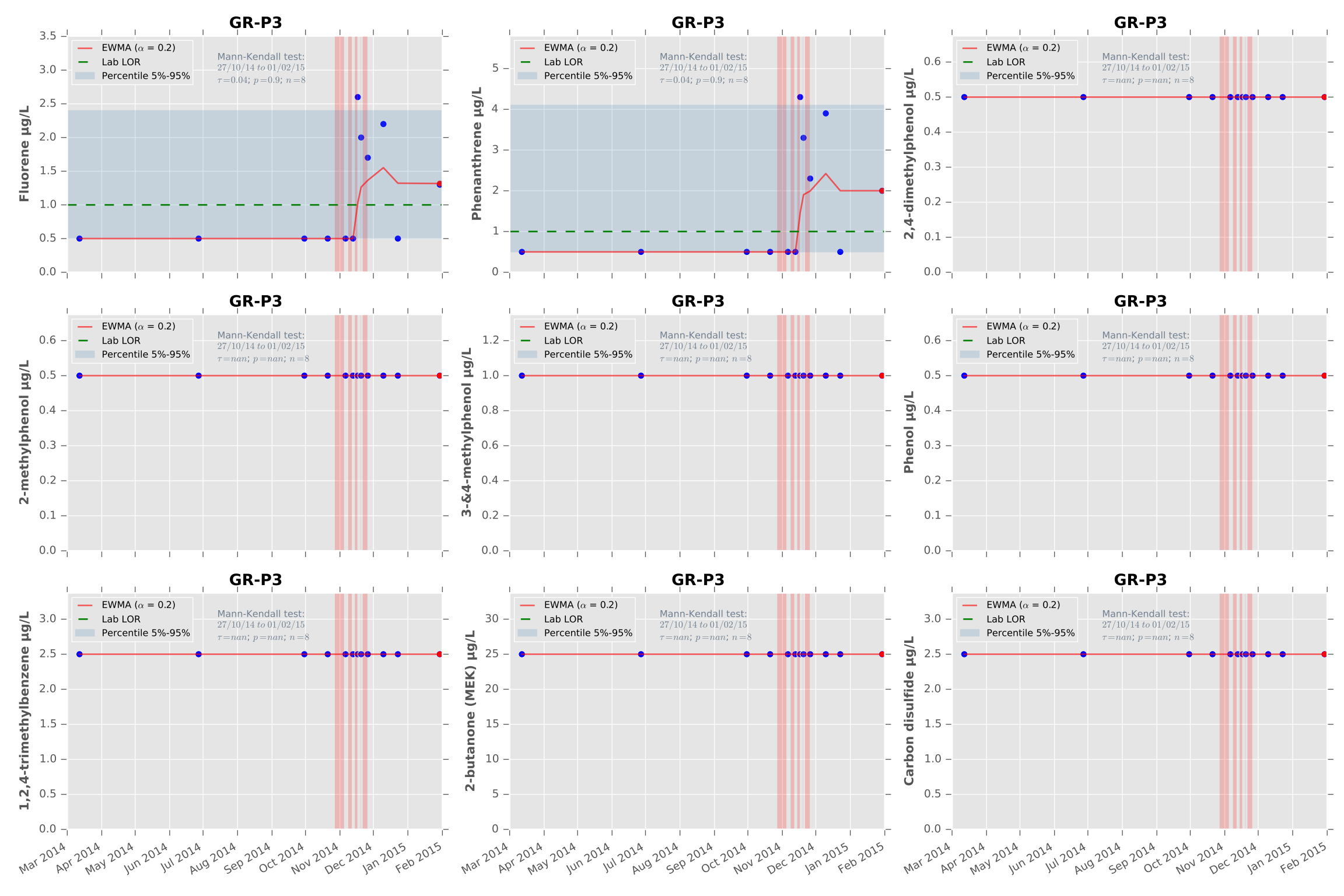

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.21; p=0.46; n=8
C10 - C36 (Sum of total) µg/L

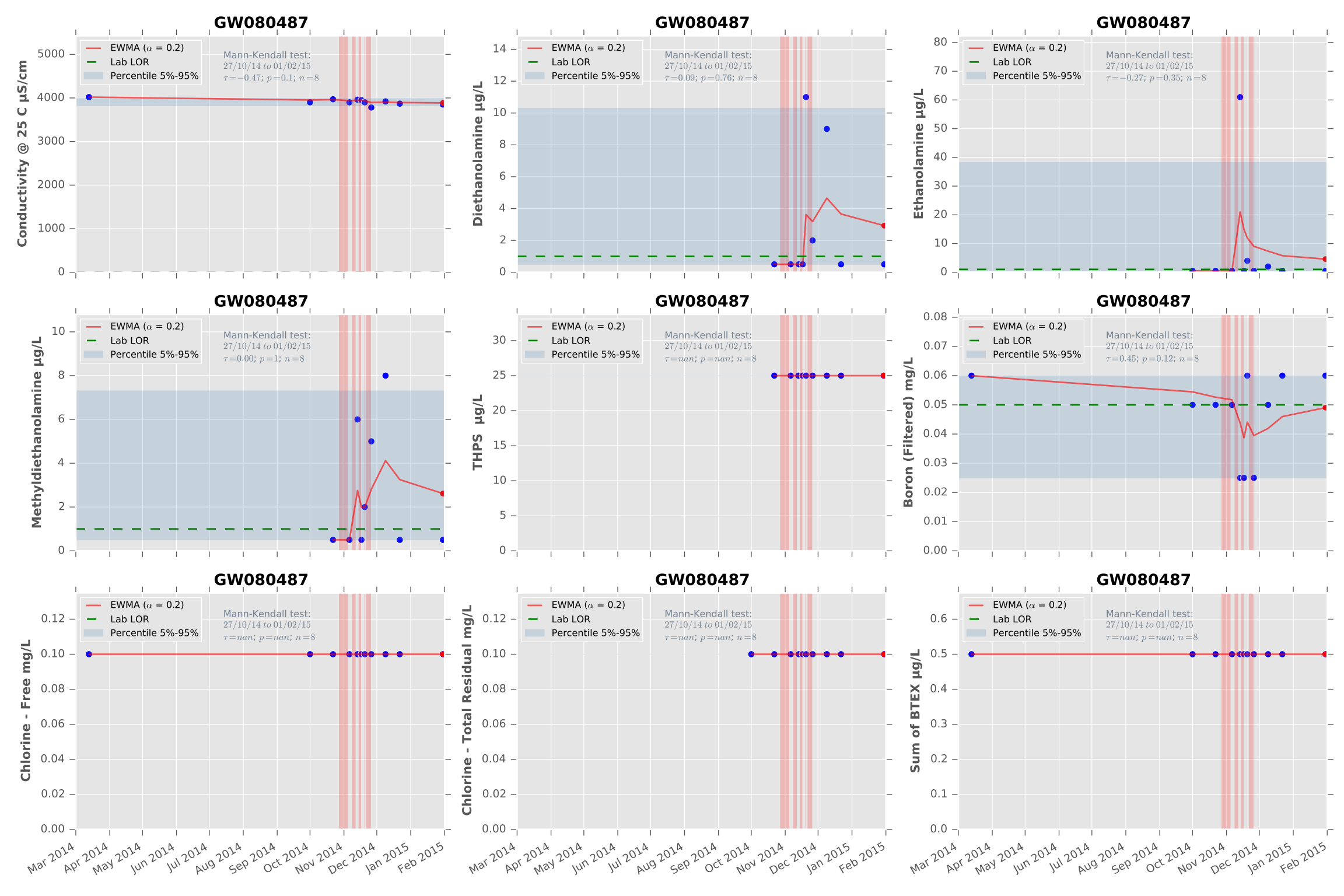

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
TPH C6-C10 µg/L

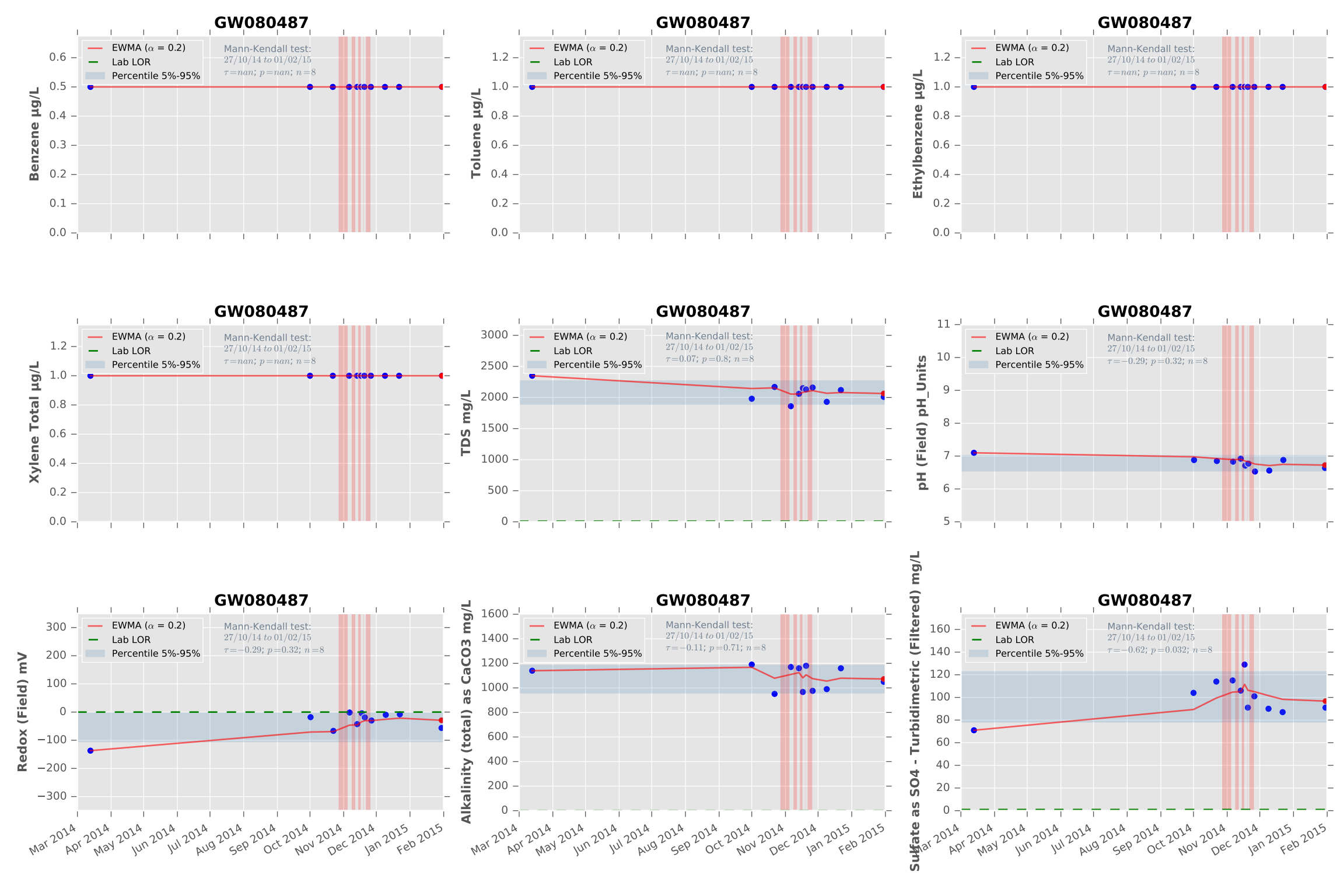

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.04; p=0.9; n=8
Polycylic aromatic hydrocarbons EPA448 ug/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

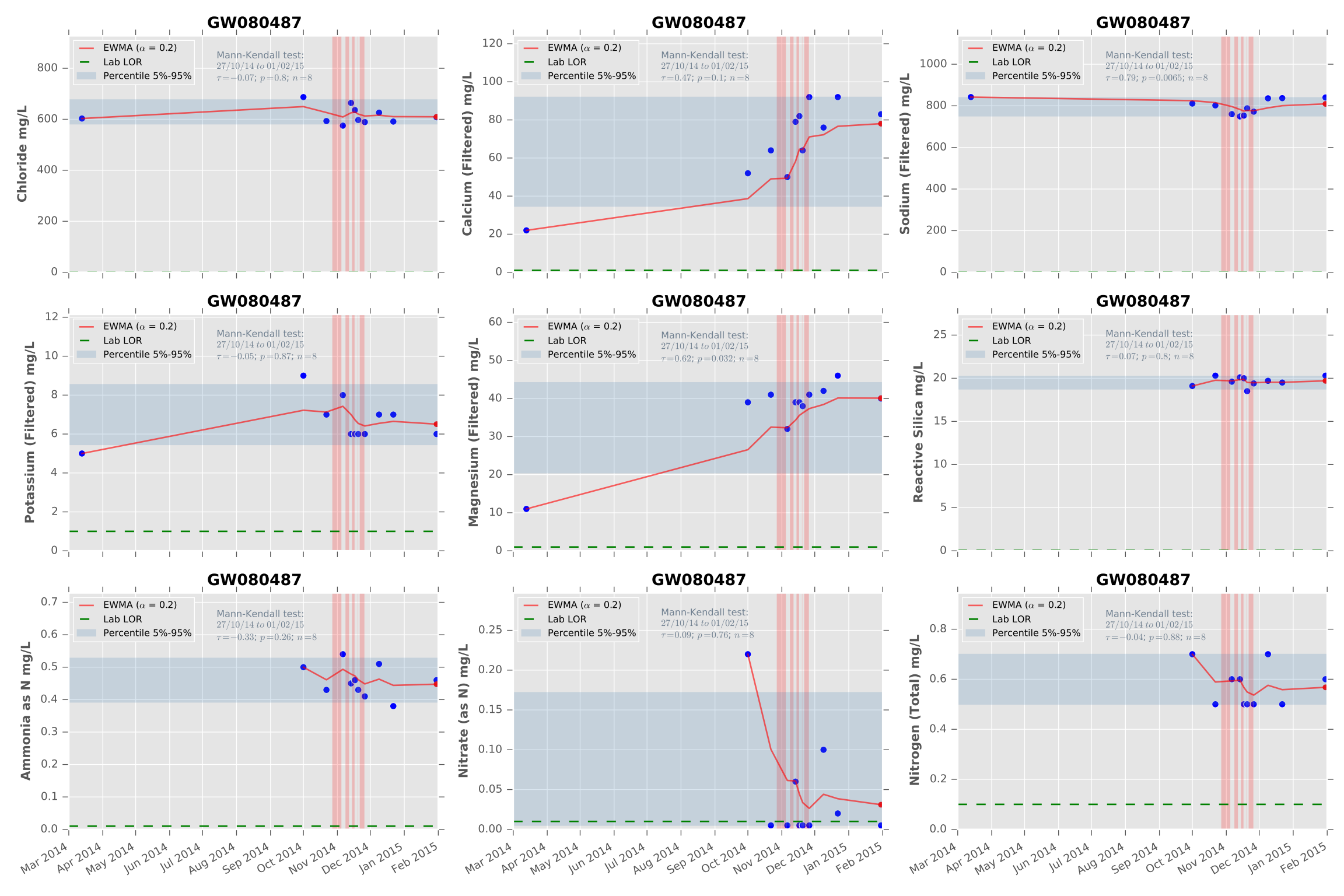

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.00; p=1; n=8
Naphthalene µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

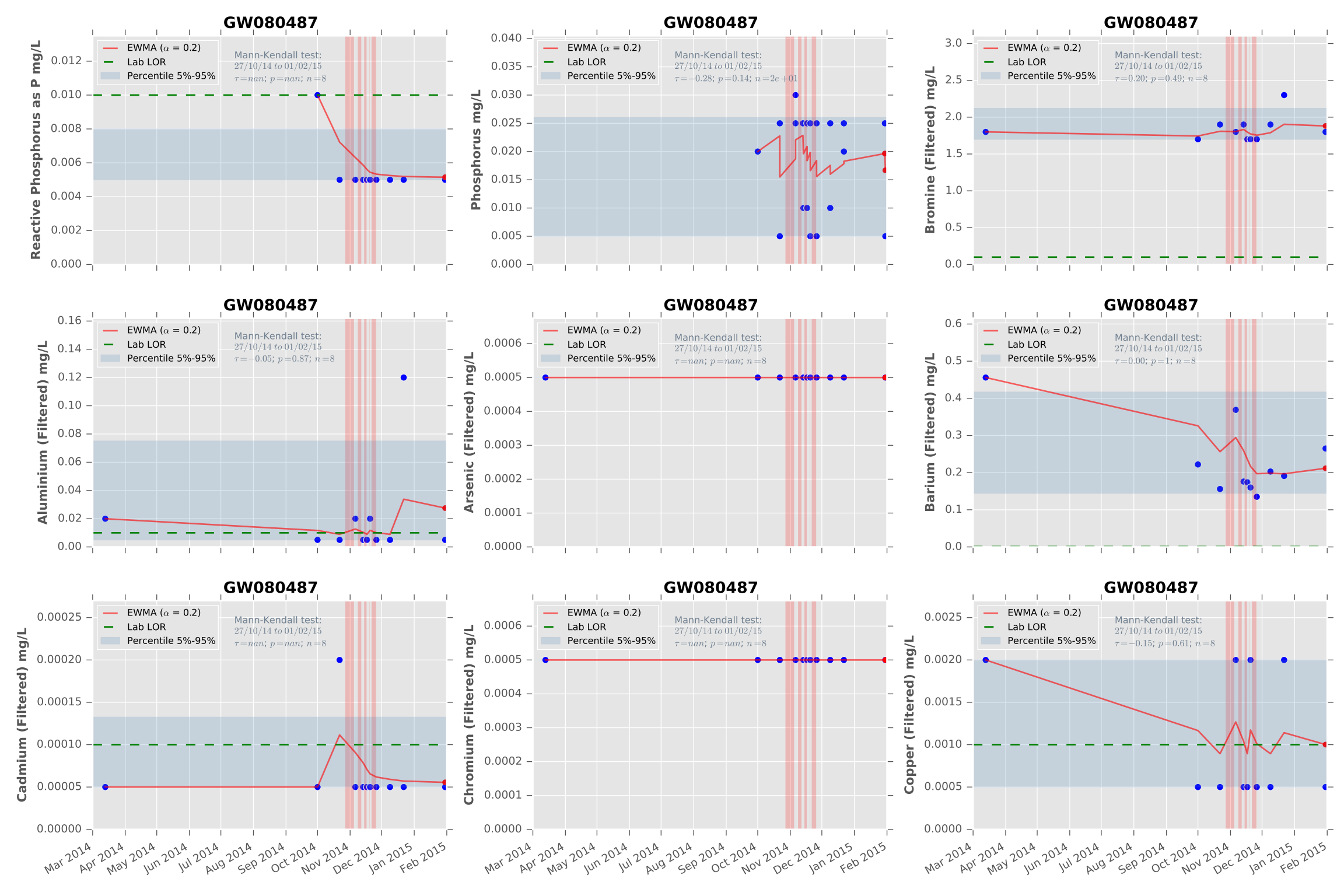

GR-P3
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.04; p=0.9; n=8
Acenaphthene µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

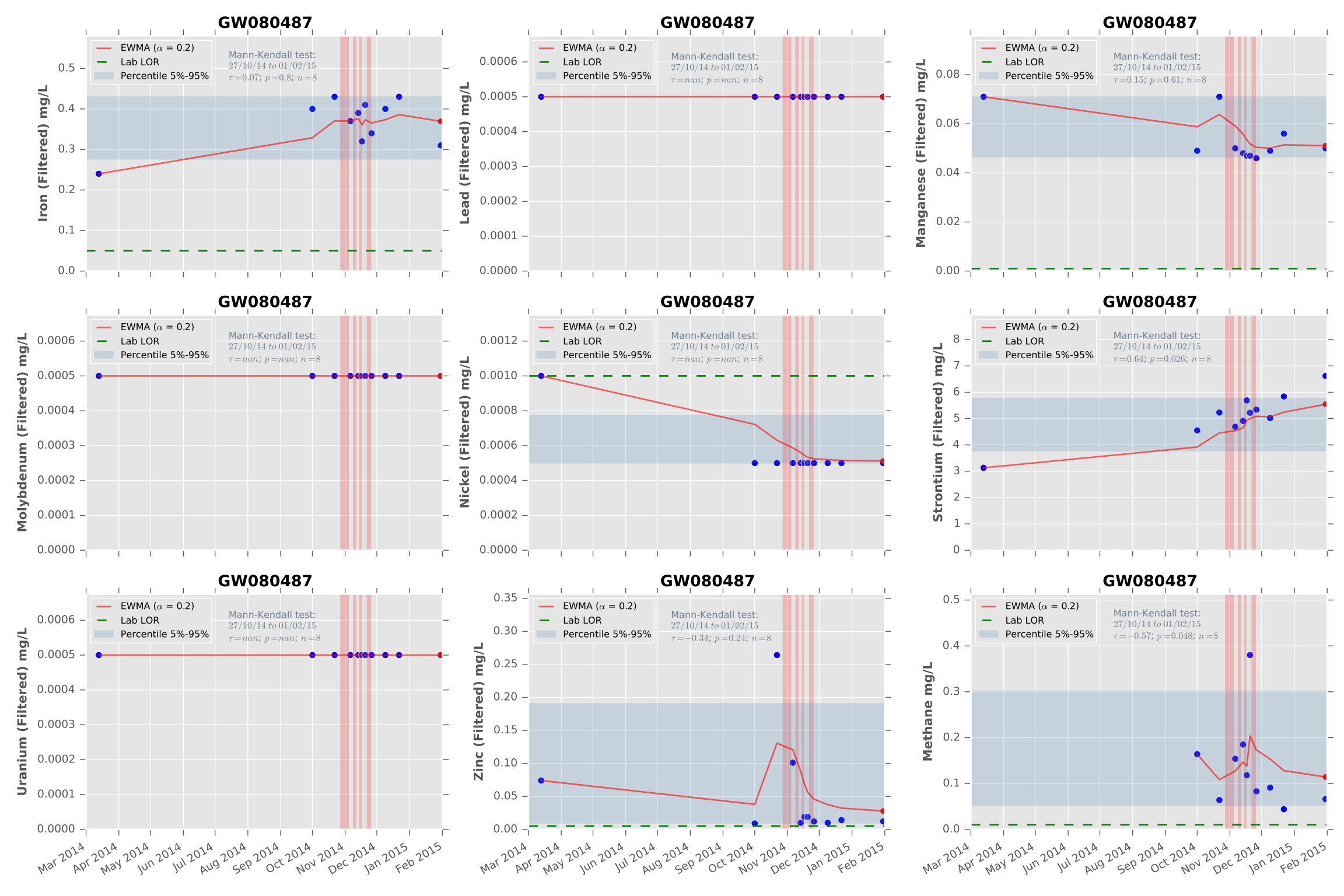

GR-P3
Fluorene µg/L
Phenanthrene µg/L
2,4-dimethylphenol µg/L
2-methylphenol µg/L
3-&4-methylphenol µg/L
Phenol µg/L
1,2,4-trimethylbenzene µg/L
2-butanone (MEK) µg/L
Carbon disulfide µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.04; p=0.9; n=8
τ=nan; p=nan; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

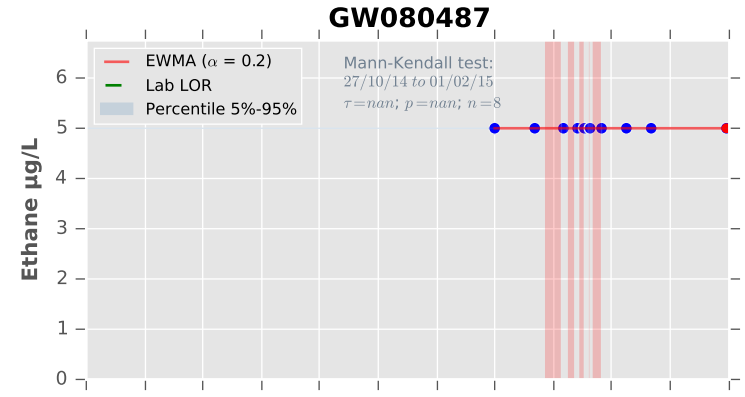

GW080487
Conductivity @ 25 C µS/cm
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.47; p=0.1; n=8
GW080487
Diethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.09; p=0.76; n=8
GW080487
Ethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.27; p=0.35; n=8
GW080487
Methyldiethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.00; p=1; n=8
GW080487
THPS µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
GW080487
Boron (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.45; p=0.12; n=8
GW080487
Chlorine - Free mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
GW080487
Chlorine - Total Residual mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
GW080487
Sum of BTEX µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

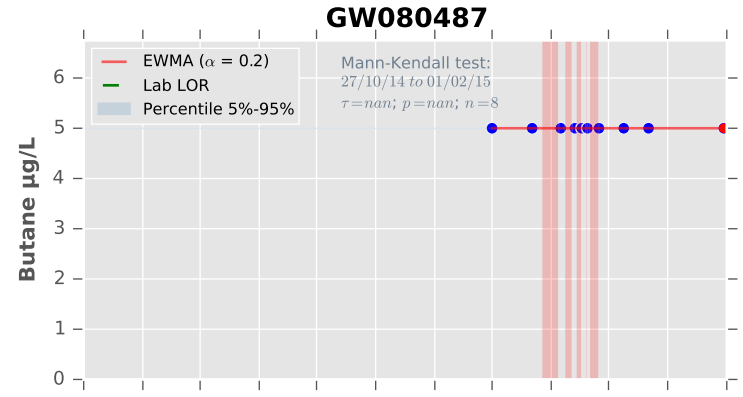

GW080487
Benzene µg/L
Toluene µg/L
Ethylbenzene µg/L
Xylene Total µg/L
TDS mg/L
pH (Field) pH_Units
Redox (Field) mV
Alkalinity (total) as CaCO3 mg/L
Sulfate as SO4 - Turbidimetric (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
τ=0.07; p=0.8; n=8
τ=−0.29; p=0.32; n=8
τ=−0.11; p=0.71; n=8
τ=−0.62; p=0.032; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

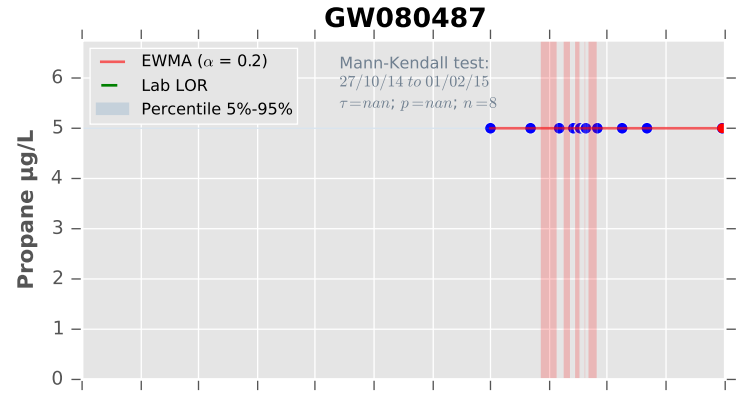

GW080487
Chloride mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.07; p=0.8; n=8
GW080487
Calcium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.47; p=0.1; n=8
GW080487
Sodium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.79; p=0.0065; n=8
GW080487
Potassium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.05; p=0.87; n=8
GW080487
Magnesium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.62; p=0.032; n=8
GW080487
Reactive Silica mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.07; p=0.8; n=8
GW080487
Ammonia as N mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.33; p=0.26; n=8
GW080487
Nitrate (as N) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.09; p=0.76; n=8
GW080487
Nitrogen (Total) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.04; p=0.88; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

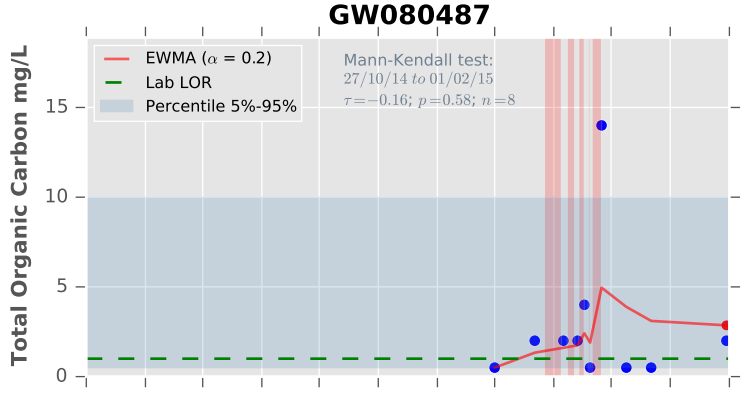

GW080487
Reactive Phosphorus as P mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
GW080487
Phosphorus mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.28; p=0.14; n=2e+01
GW080487
Bromine (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.20; p=0.49; n=8
GW080487
Aluminium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.05; p=0.87; n=8
GW080487
Arsenic (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
GW080487
Barium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.00; p=1; n=8
GW080487
Cadmium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
GW080487
Chromium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
GW080487
Copper (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.15; p=0.61; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

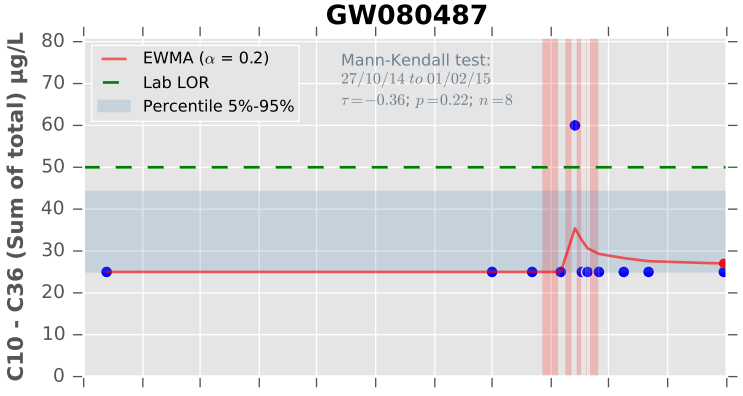

GW080487
Iron (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.07; p=0.8; n=8
GW080487
Lead (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
GW080487
Manganese (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.15; p=0.61; n=8
GW080487
Molybdenum (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
GW080487
Nickel (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
GW080487
Strontium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.64; p=0.026; n=8
GW080487
Uranium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
GW080487
Zinc (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.34; p=0.24; n=8
GW080487
Methane mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.57; p=0.048; n=8
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

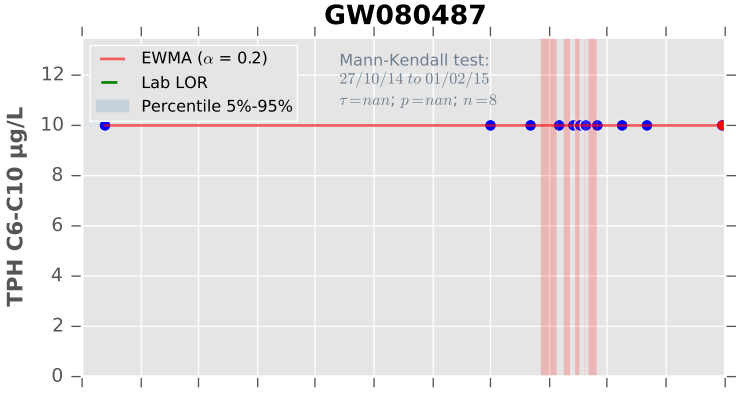

GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Ethane µg/L

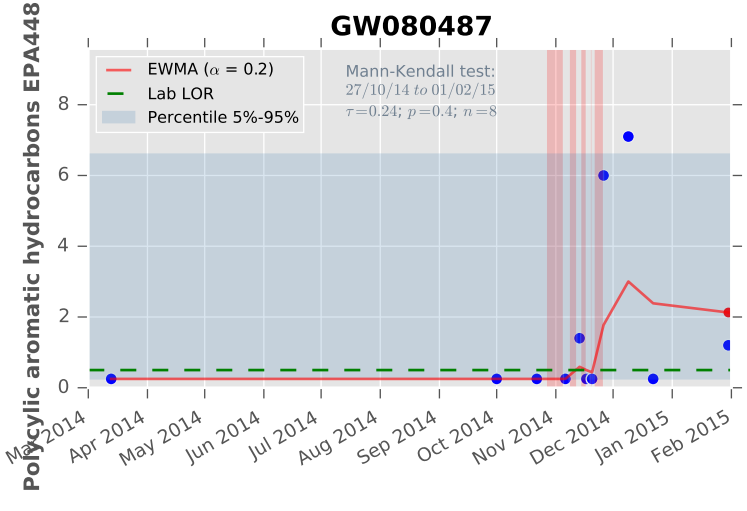

GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Butane µg/L

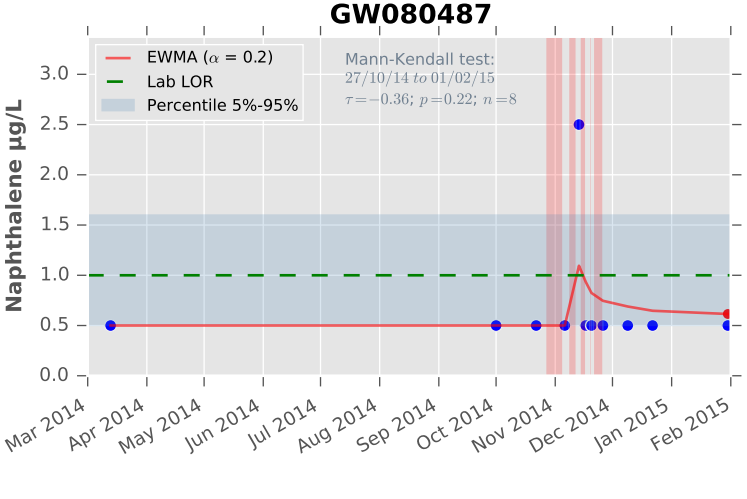

GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Propane µg/L

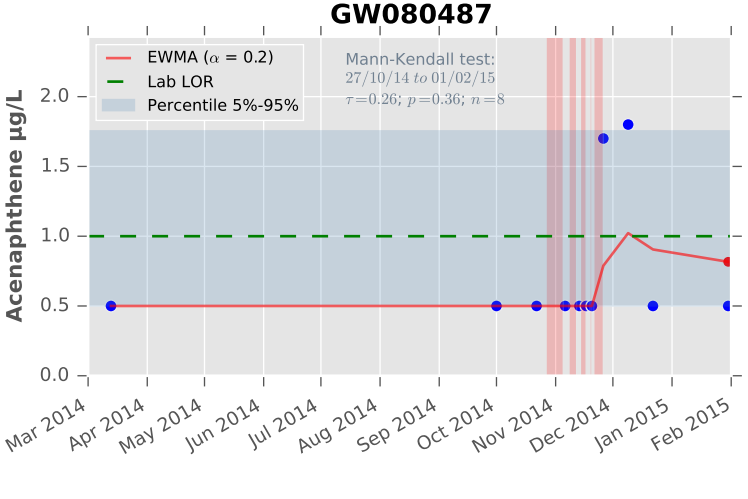

GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.16; p=0.58; n=8
Total Organic Carbon mg/L

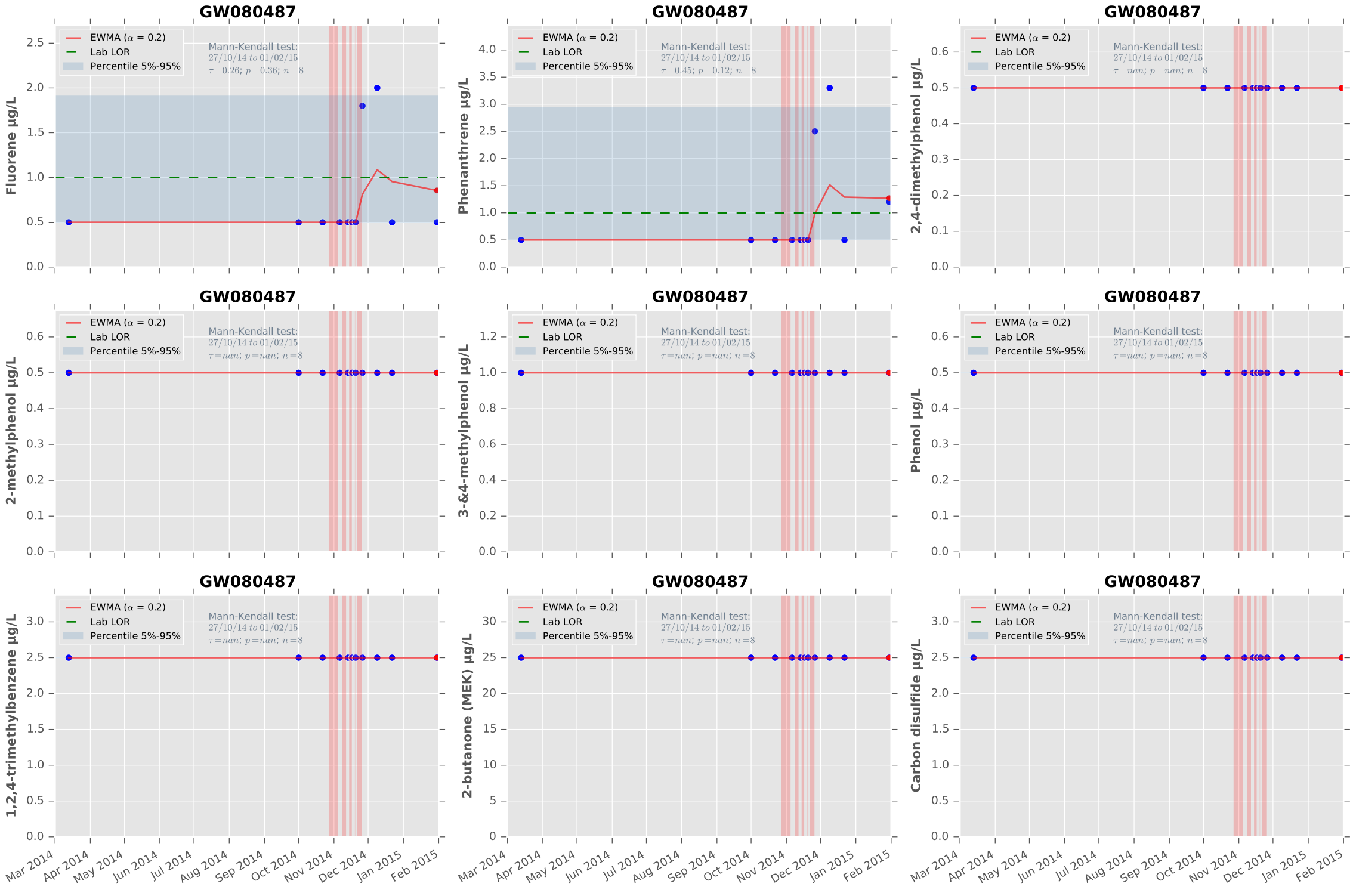

GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.36; p=0.22; n=8
C10 - C36 (Sum of total) µg/L

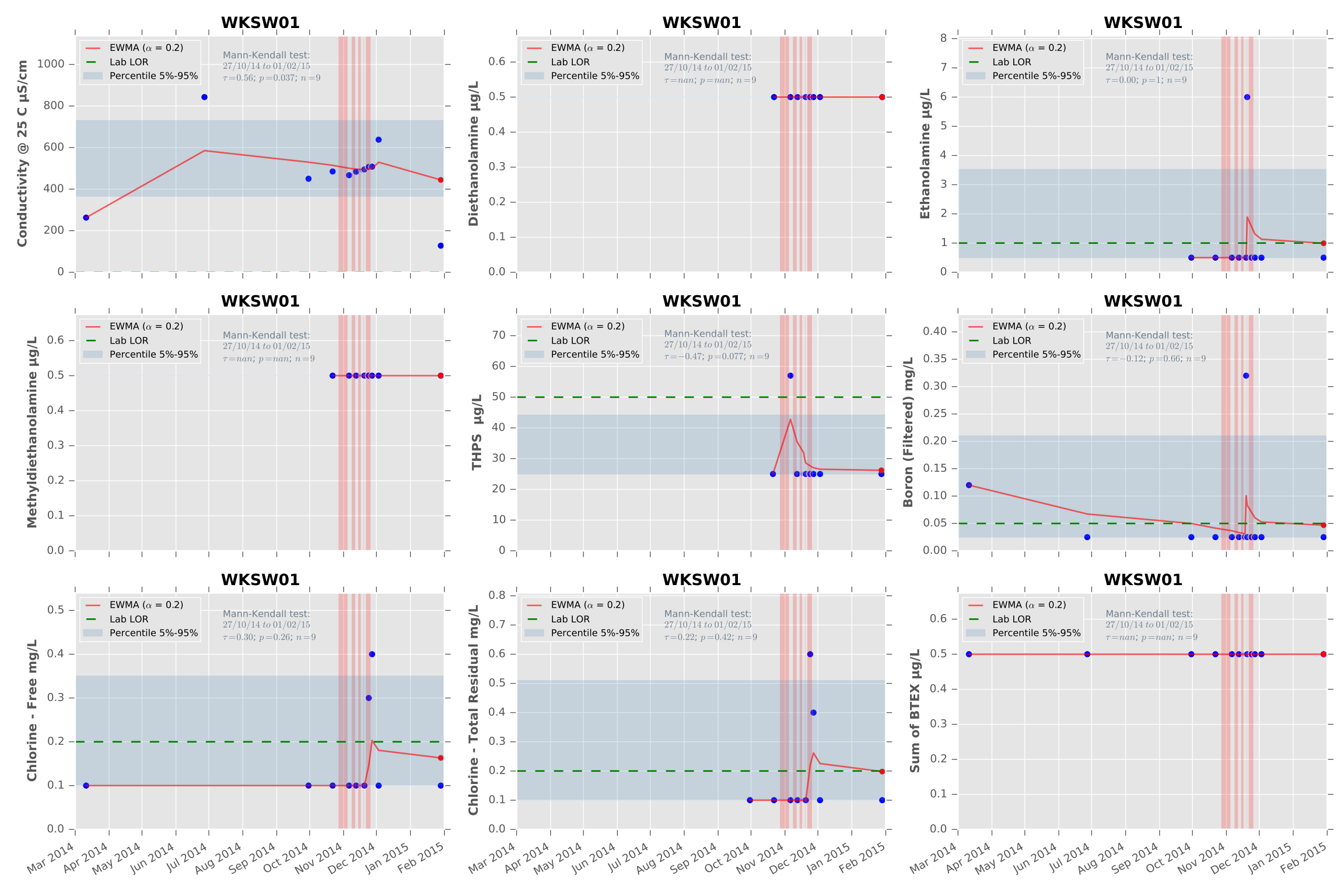

GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
TPH C6-C10 µg/L

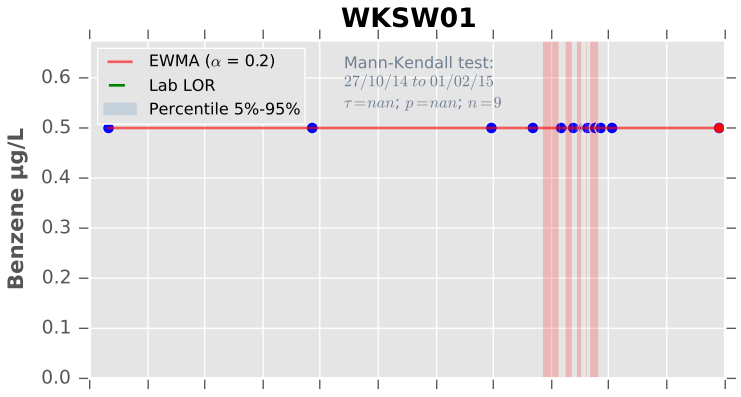

GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.24; p=0.4; n=8
Polycylic aromatic hydrocarbons EPA448 ug/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

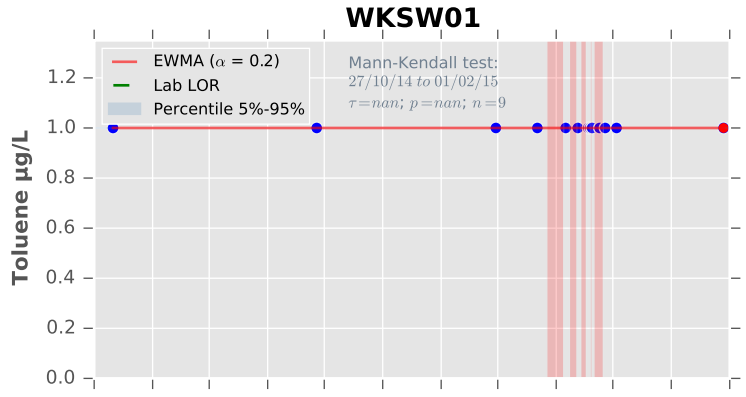

GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.36; p=0.22; n=8
Naphthalene µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

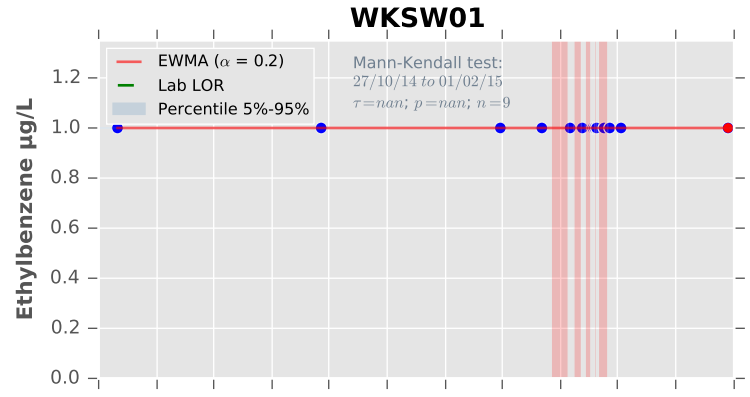

GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.26; p=0.36; n=8
Acenaphthene µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

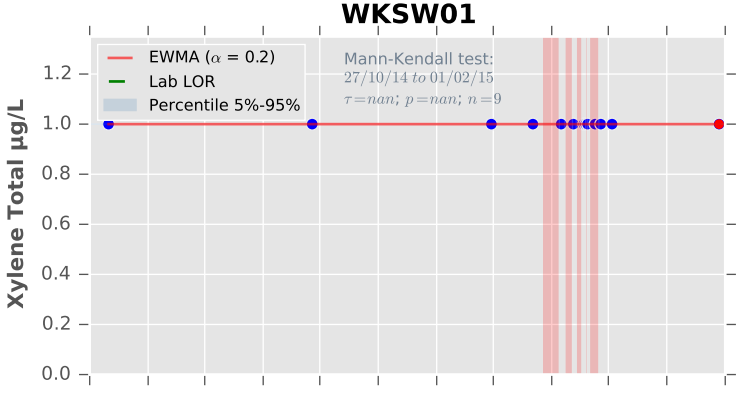

GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.26; p=0.36; n=8
Fluorene µg/L
GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.45; p=0.12; n=8
Phenanthrene µg/L
GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
2,4-dimethylphenol µg/L
GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
2-methylphenol µg/L
GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
3-&4-methylphenol µg/L
GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Phenol µg/L
GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
1,2,4-trimethylbenzene µg/L
GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
2-butanone (MEK) µg/L
GW080487
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=8
Carbon disulfide µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

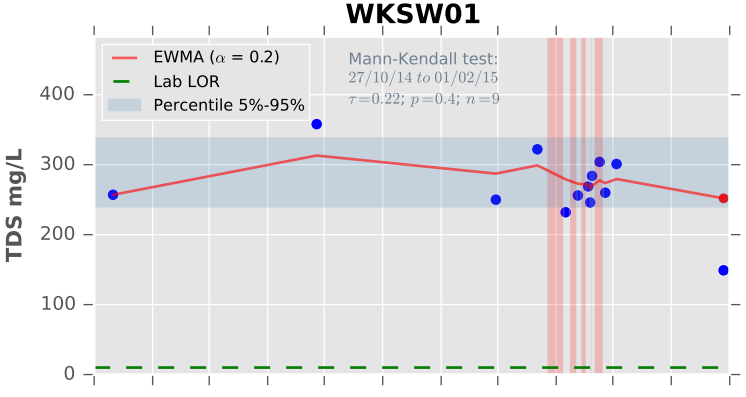

WKSW01
Conductivity @ 25 C µS/cm
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.56; p=0.037; n=9
WKSW01
Diethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW01
Ethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.00; p=1; n=9
WKSW01
Methyldiethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW01
THPS µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.47; p=0.077; n=9
WKSW01
Boron (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.12; p=0.66; n=9
WKSW01
Chlorine - Free mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.30; p=0.26; n=9
WKSW01
Chlorine - Total Residual mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.22; p=0.42; n=9
WKSW01
Sum of BTEX µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

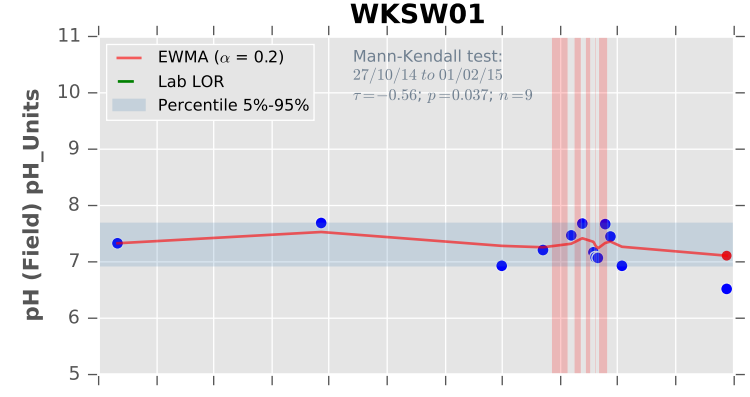

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Benzene µg/L

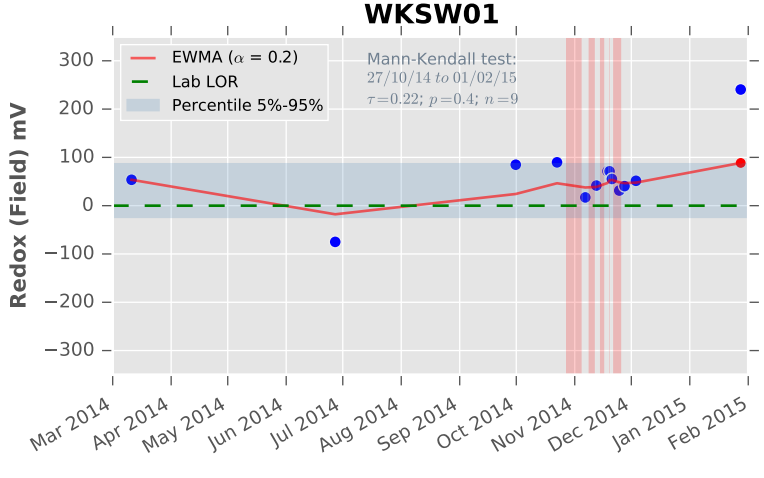

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Toluene µg/L

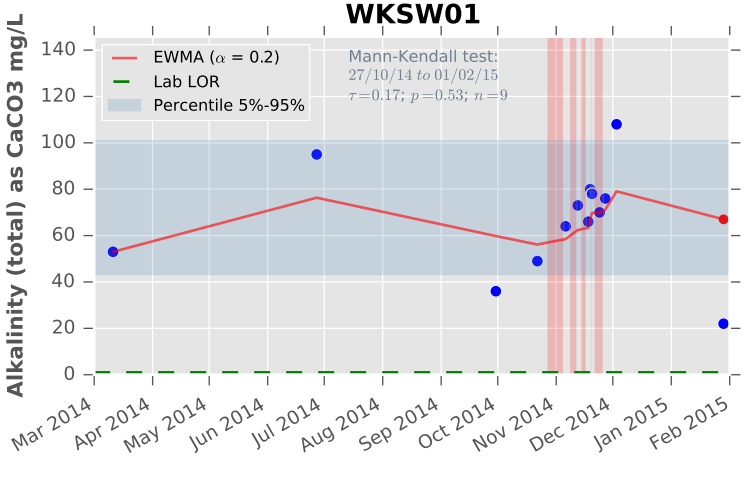

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Ethylbenzene µg/L

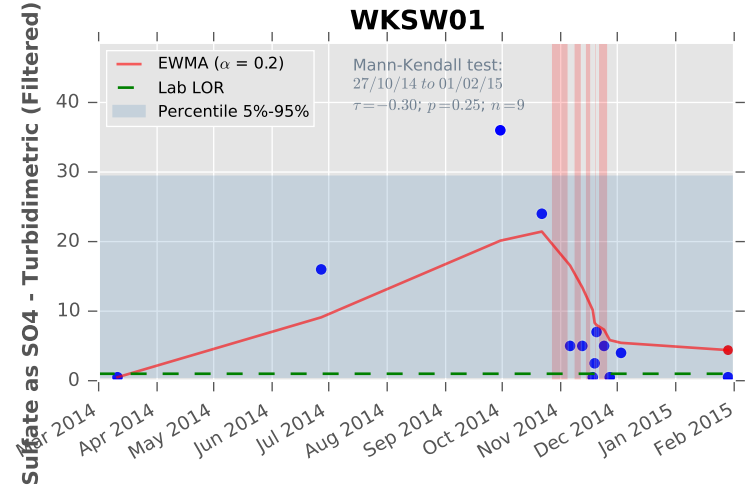

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Xylene Total µg/L

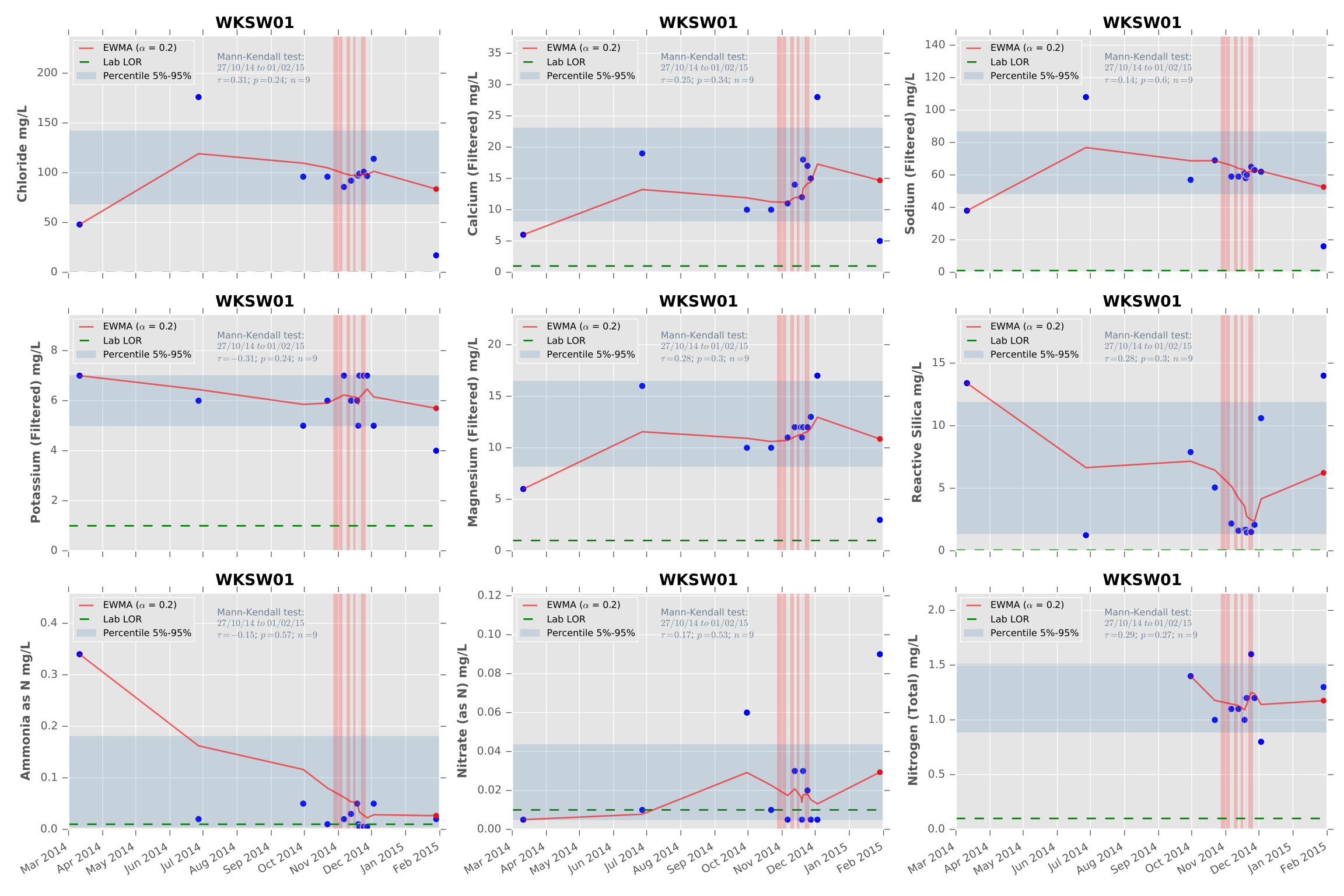

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.22; p=0.4; n=9
TDS mg/L

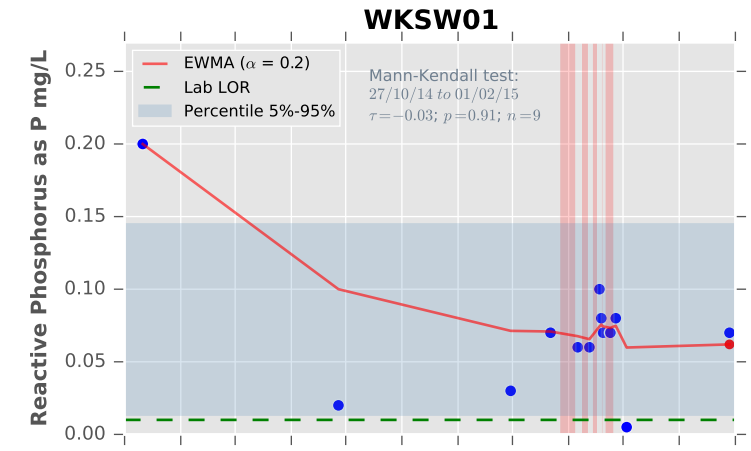

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.56; p=0.037; n=9
pH (Field) pH_Units

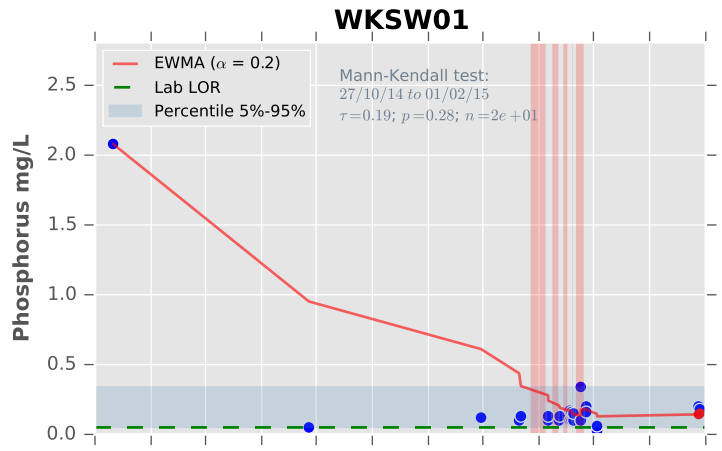

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.22; p=0.4; n=9
Redox (Field) mV
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

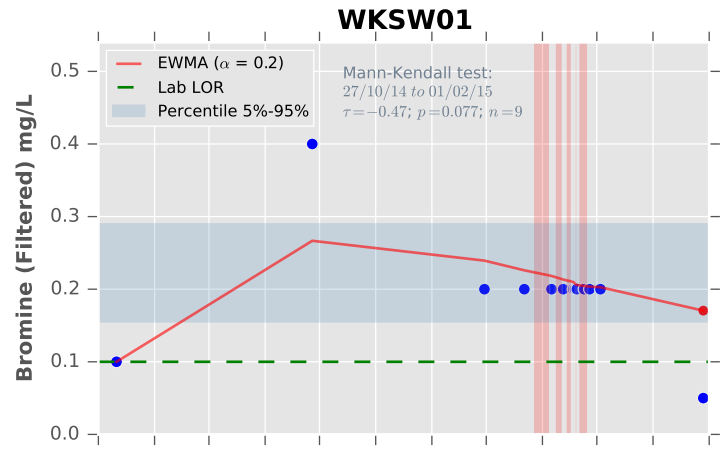

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.17; p=0.53; n=9
Alkalinity (total) as CaCO3 mg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

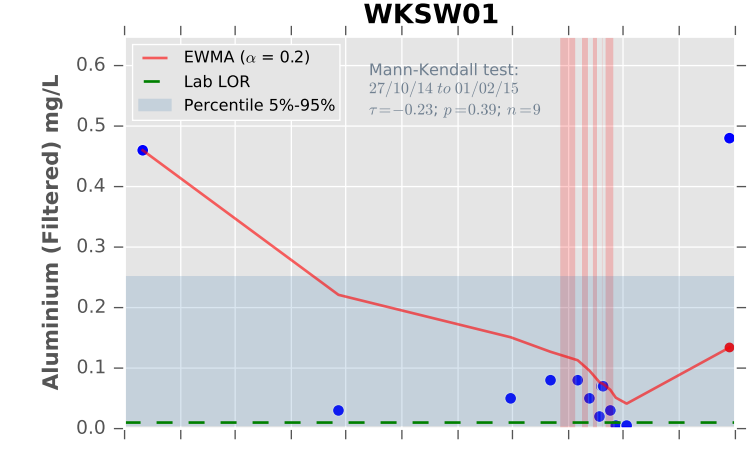

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.30; p=0.25; n=9
Sulfate as SO4 - Turbidimetric (Filtered) mg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

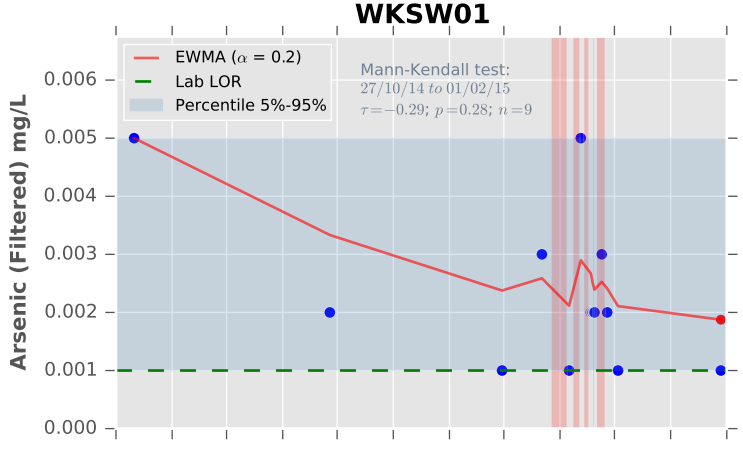

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.31; p=0.24; n=9
Chloride mg/L
WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.25; p=0.34; n=9
Calcium (Filtered) mg/L
WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.14; p=0.6; n=9
Sodium (Filtered) mg/L
WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.31; p=0.24; n=9
Potassium (Filtered) mg/L
WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.28; p=0.3; n=9
Magnesium (Filtered) mg/L
WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.28; p=0.3; n=9
Reactive Silica mg/L
WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.15; p=0.57; n=9
Ammonia as N mg/L
WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.17; p=0.53; n=9
Nitrate (as N) mg/L
WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.29; p=0.27; n=9
Nitrogen (Total) mg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

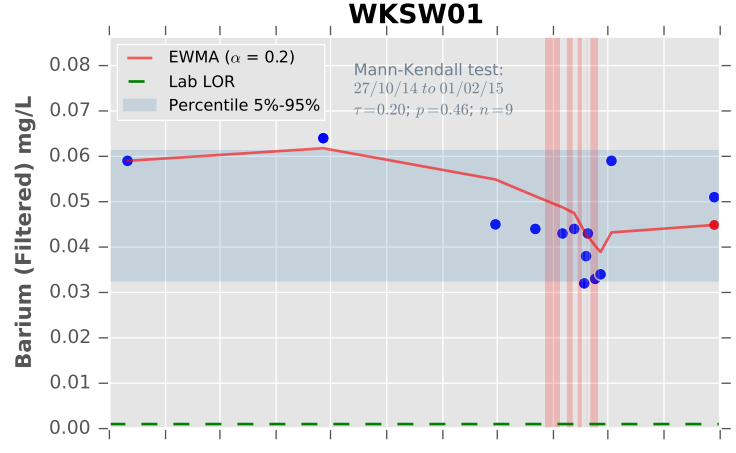

WKSW01
Reactive Phosphorus as P mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.03; p=0.91; n=9

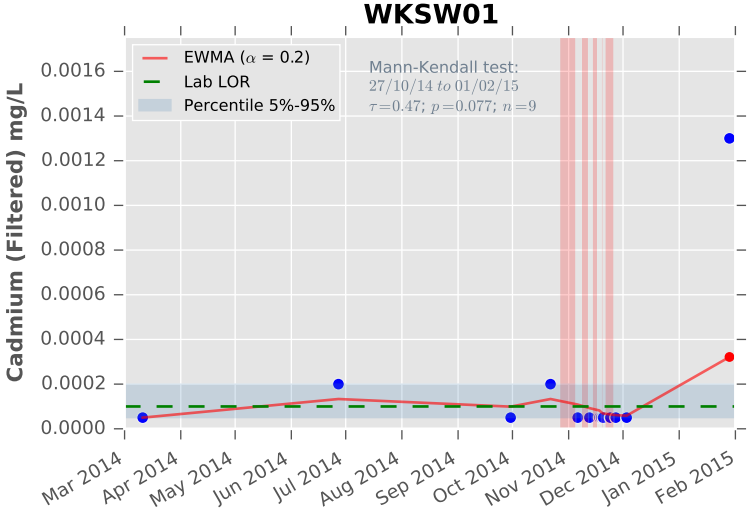

WKSW01
Phosphorus mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.19; p=0.28; n=2e+01

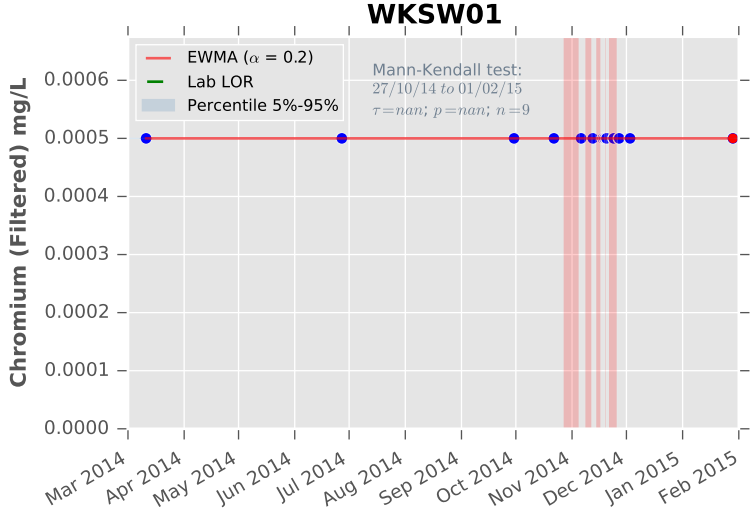

WKSW01
Bromine (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.47; p=0.077; n=9

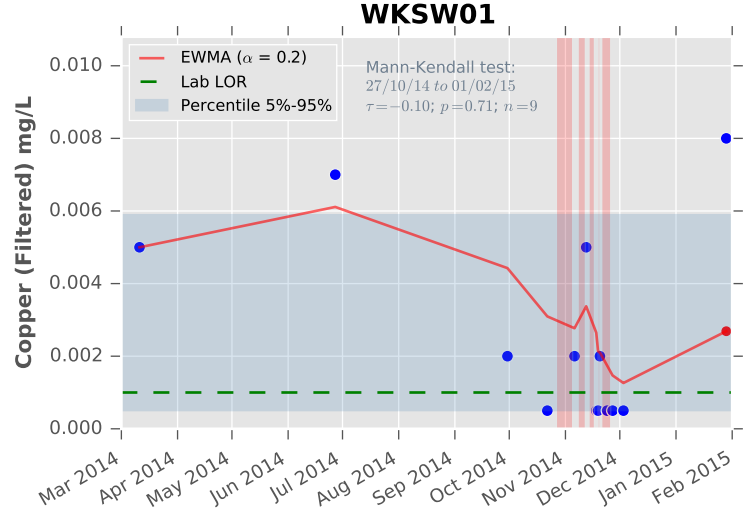

WKSW01
Aluminium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.23; p=0.39; n=9

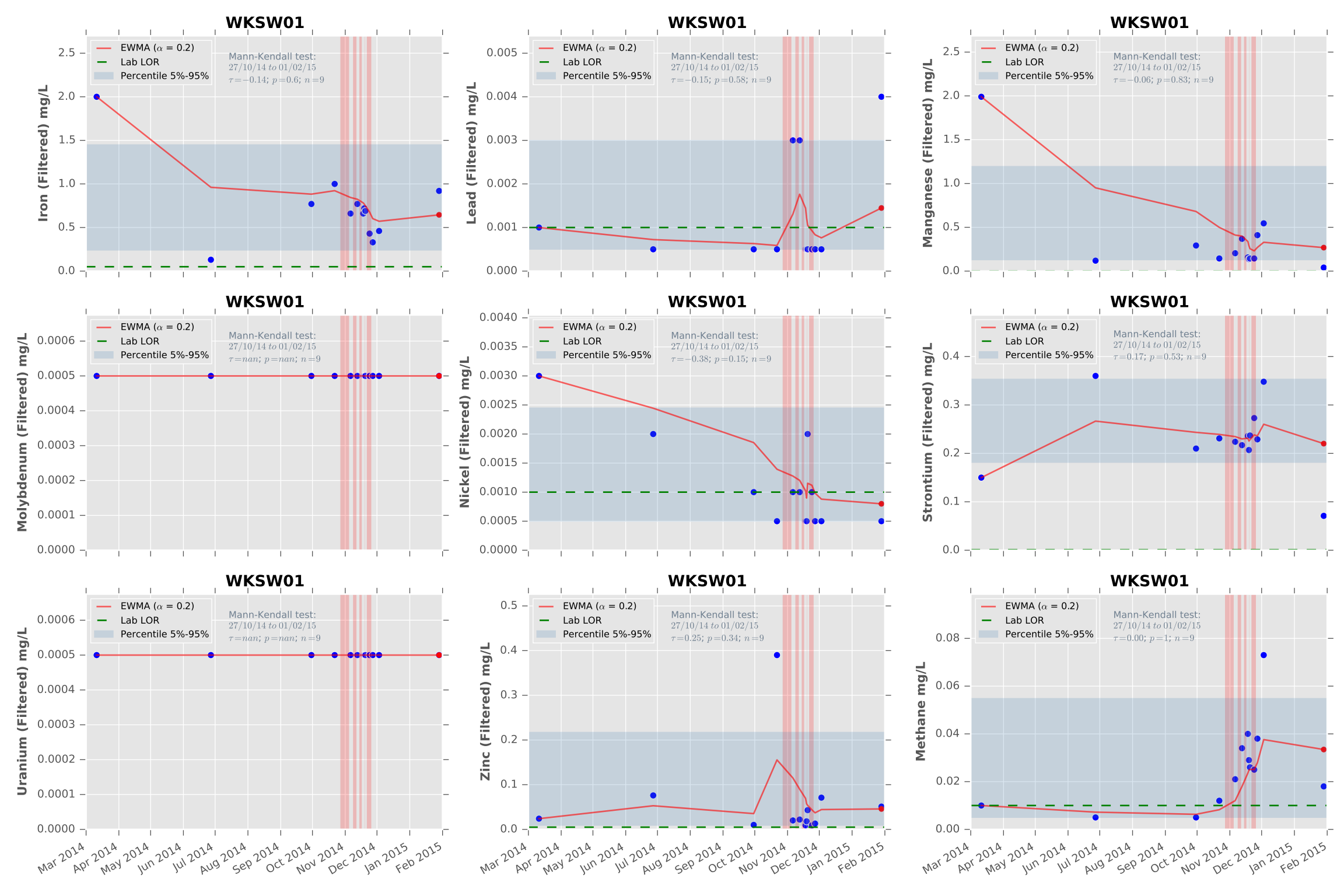

WKSW01
Arsenic (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.29; p=0.28; n=9

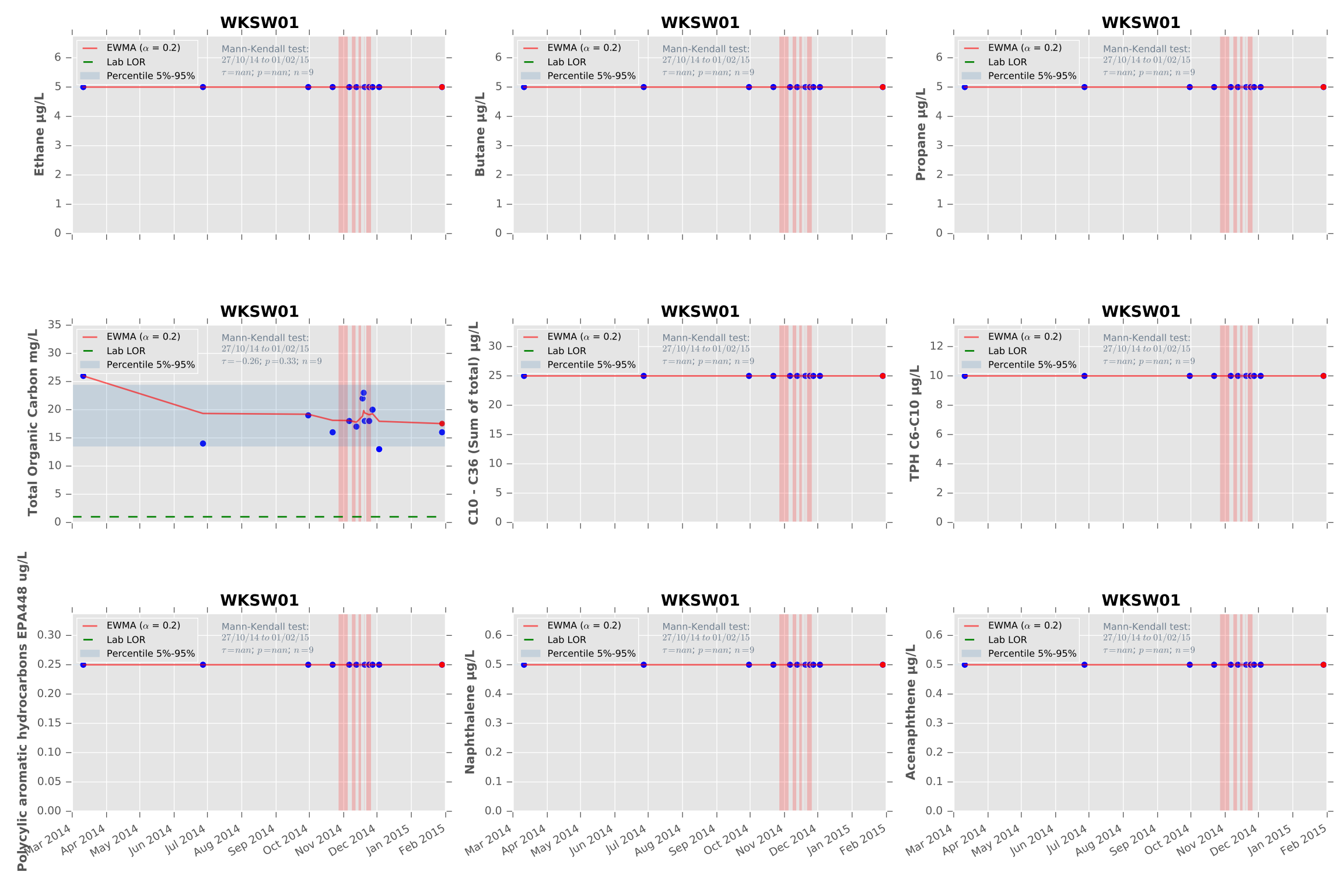

WKSW01
Barium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.20; p=0.46; n=9

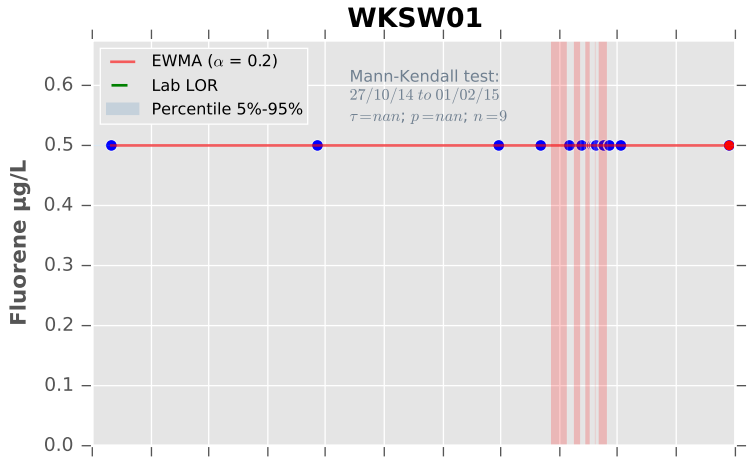

WKSW01
Cadmium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.47; p=0.077; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

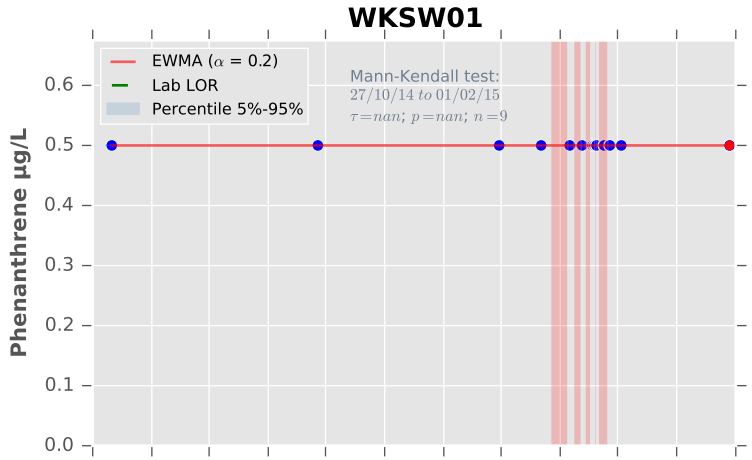

WKSW01
Chromium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

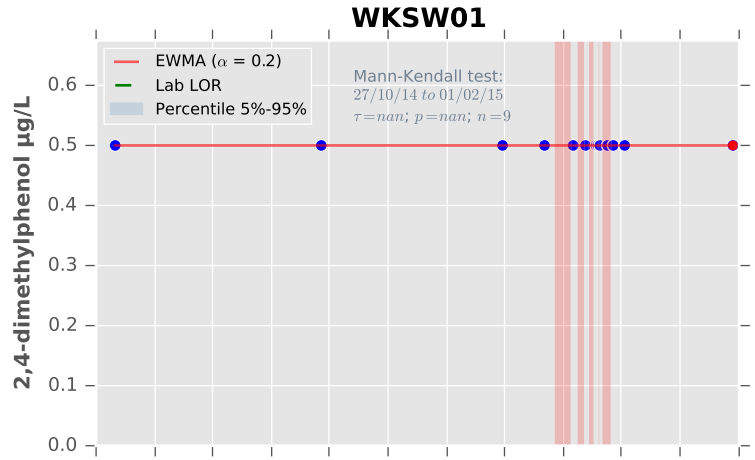

WKSW01
Copper (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.10; p=0.71; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

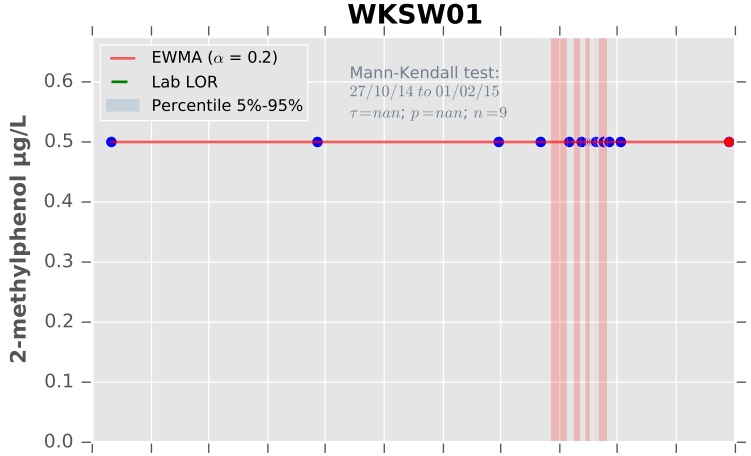

WKSW01
Iron (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.14; p=0.6; n=9
WKSW01
Lead (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.15; p=0.58; n=9
WKSW01
Manganese (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.06; p=0.83; n=9
WKSW01
Molybdenum (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW01
Nickel (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.38; p=0.15; n=9
WKSW01
Strontium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.17; p=0.53; n=9
WKSW01
Uranium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW01
Zinc (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.25; p=0.34; n=9
WKSW01
Methane mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.00; p=1; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

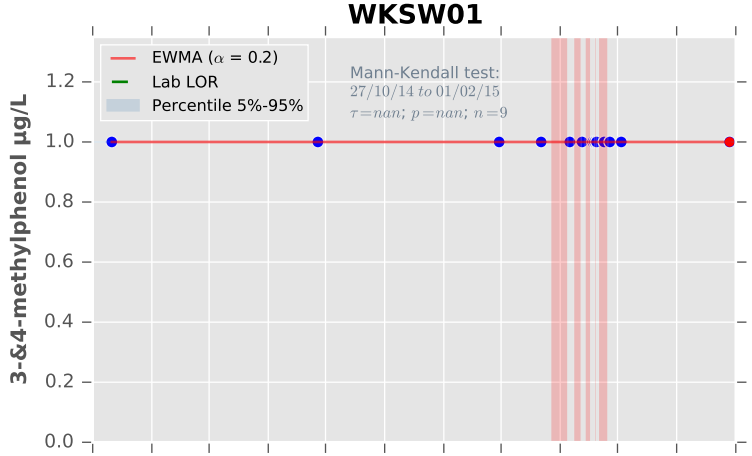

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Ethane µg/L
Butane µg/L
Propane µg/L
Total Organic Carbon mg/L
τ=−0.26; p=0.33; n=9
C10 - C36 (Sum of total) µg/L
TPH C6-C10 µg/L
Polycylic aromatic hydrocarbons EPA448 ug/L
Naphthalene µg/L
Acenaphthene µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

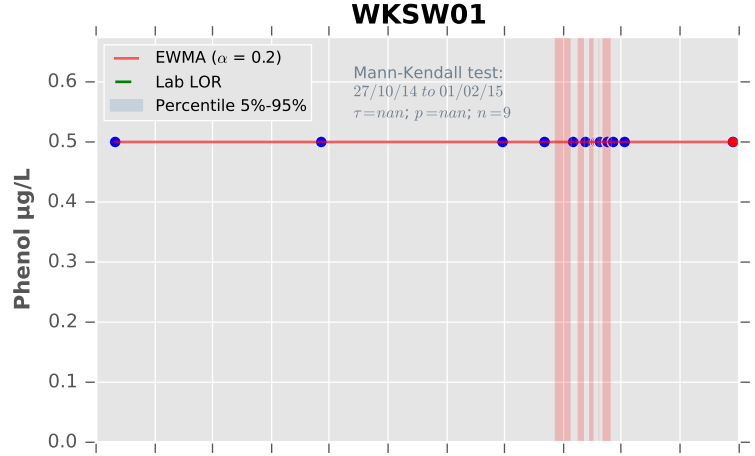

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Fluorene µg/L

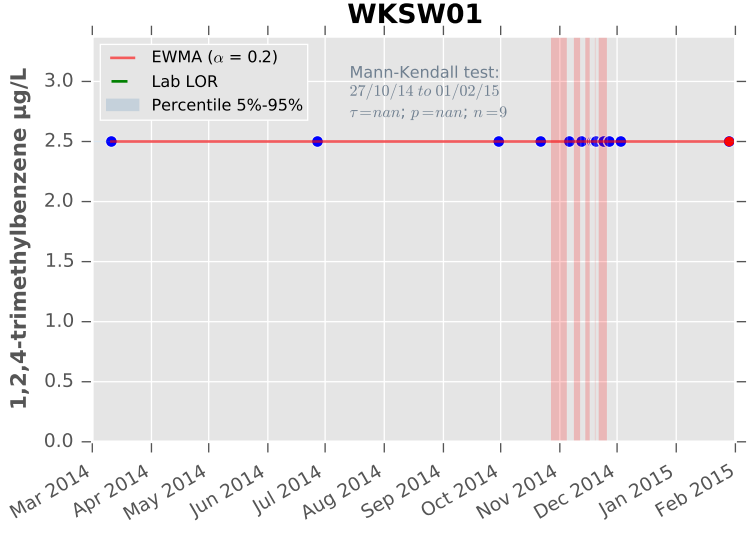

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Phenanthrene µg/L

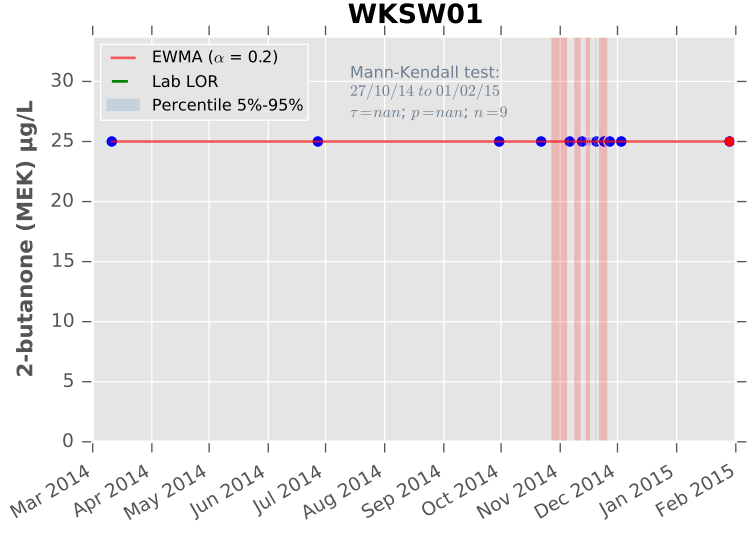

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
2,4-dimethylphenol µg/L

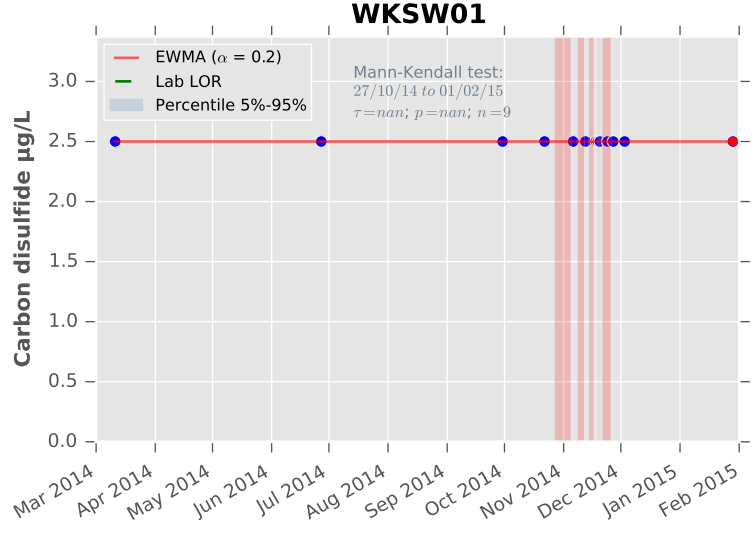

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
2-methylphenol µg/L

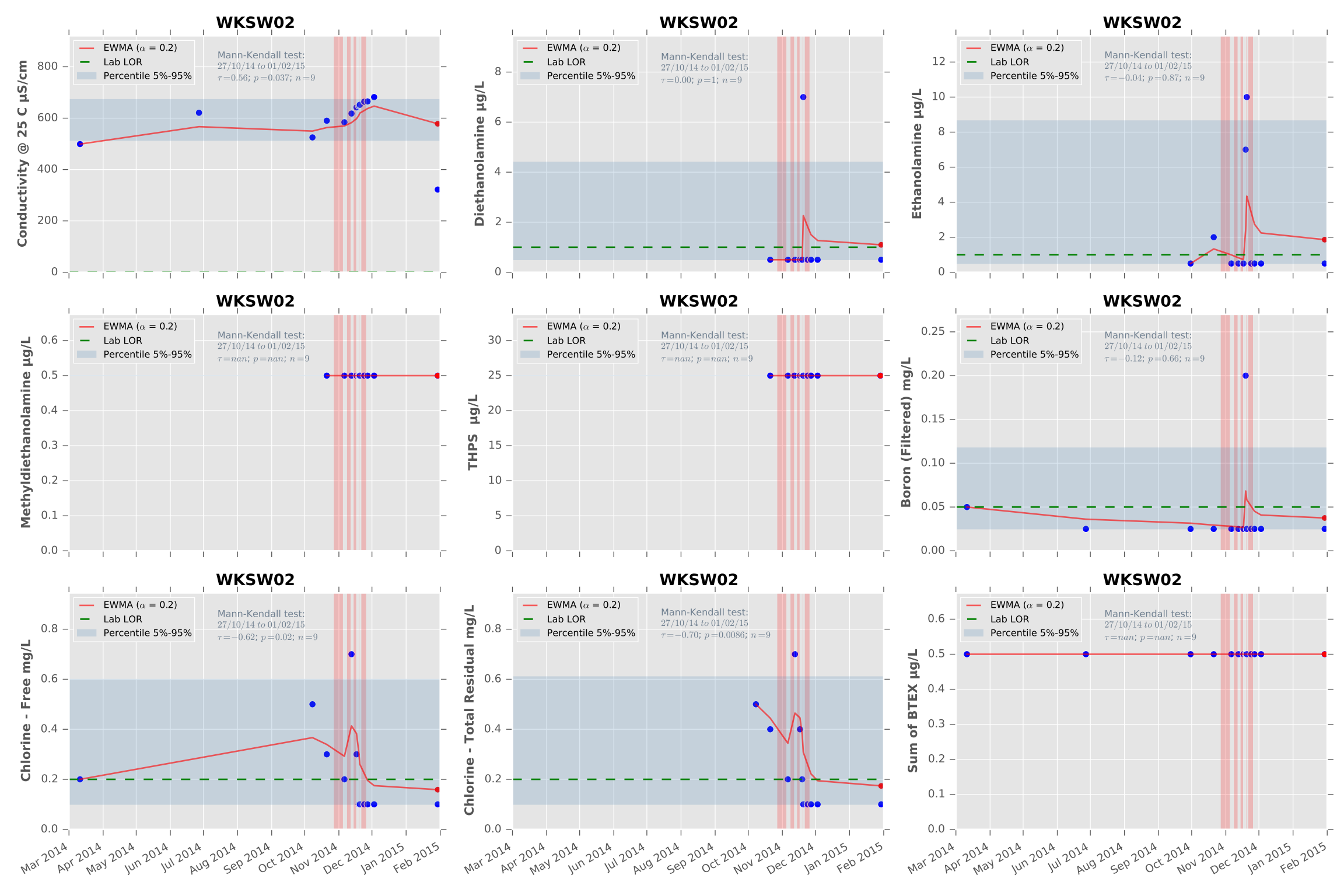

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
3-&4-methylphenol µg/L

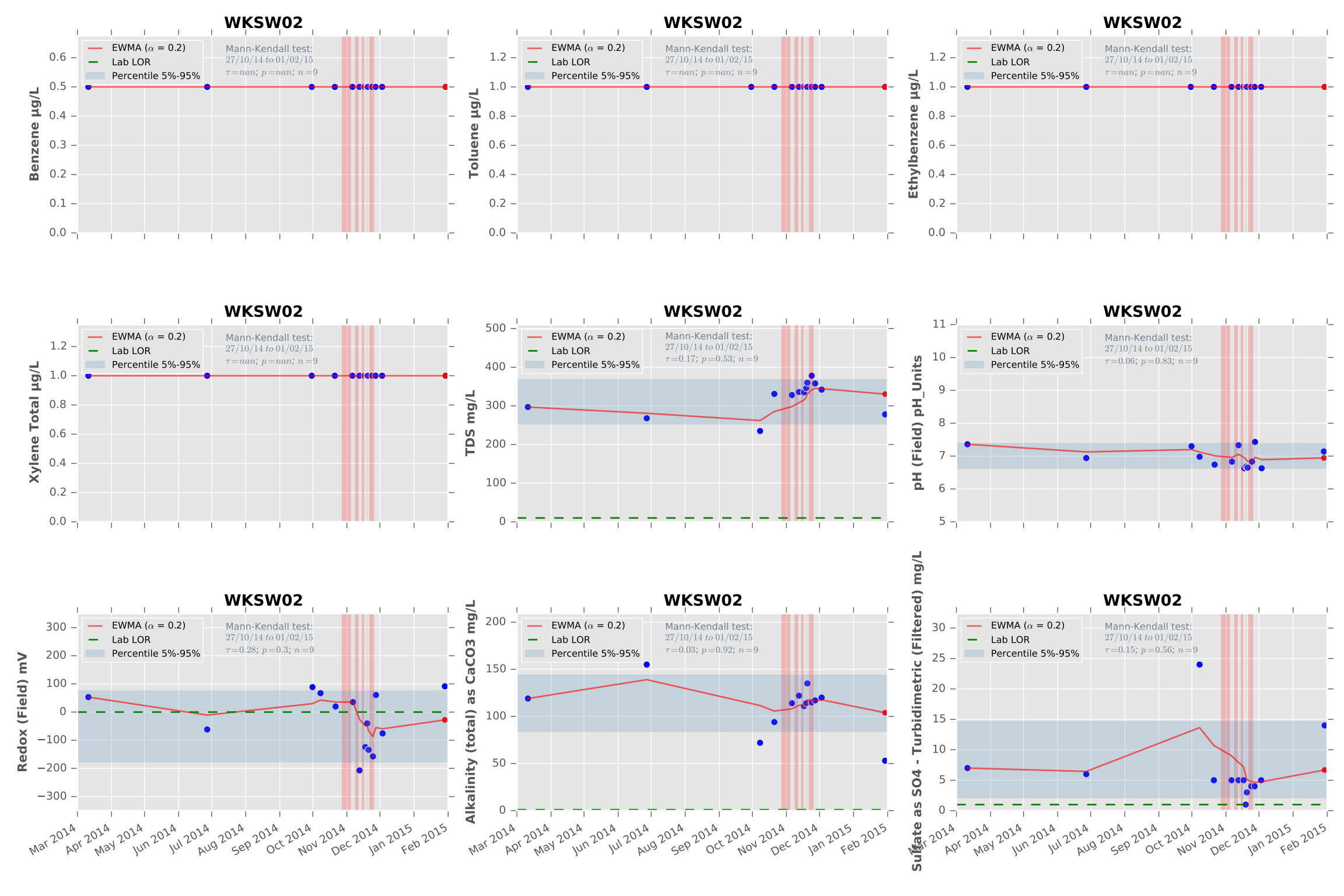

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Phenol µg/L

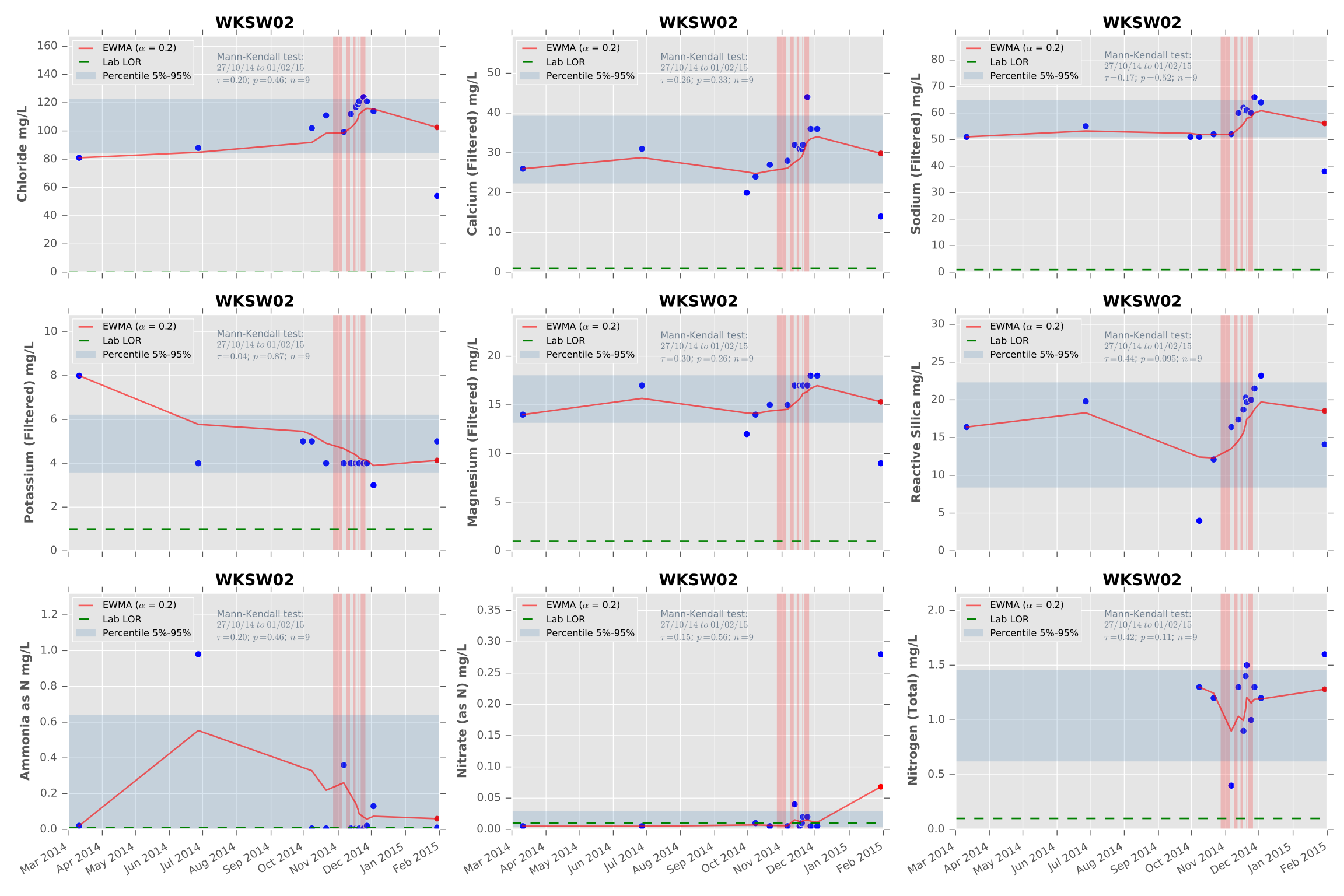

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
1,2,4-trimethylbenzene µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

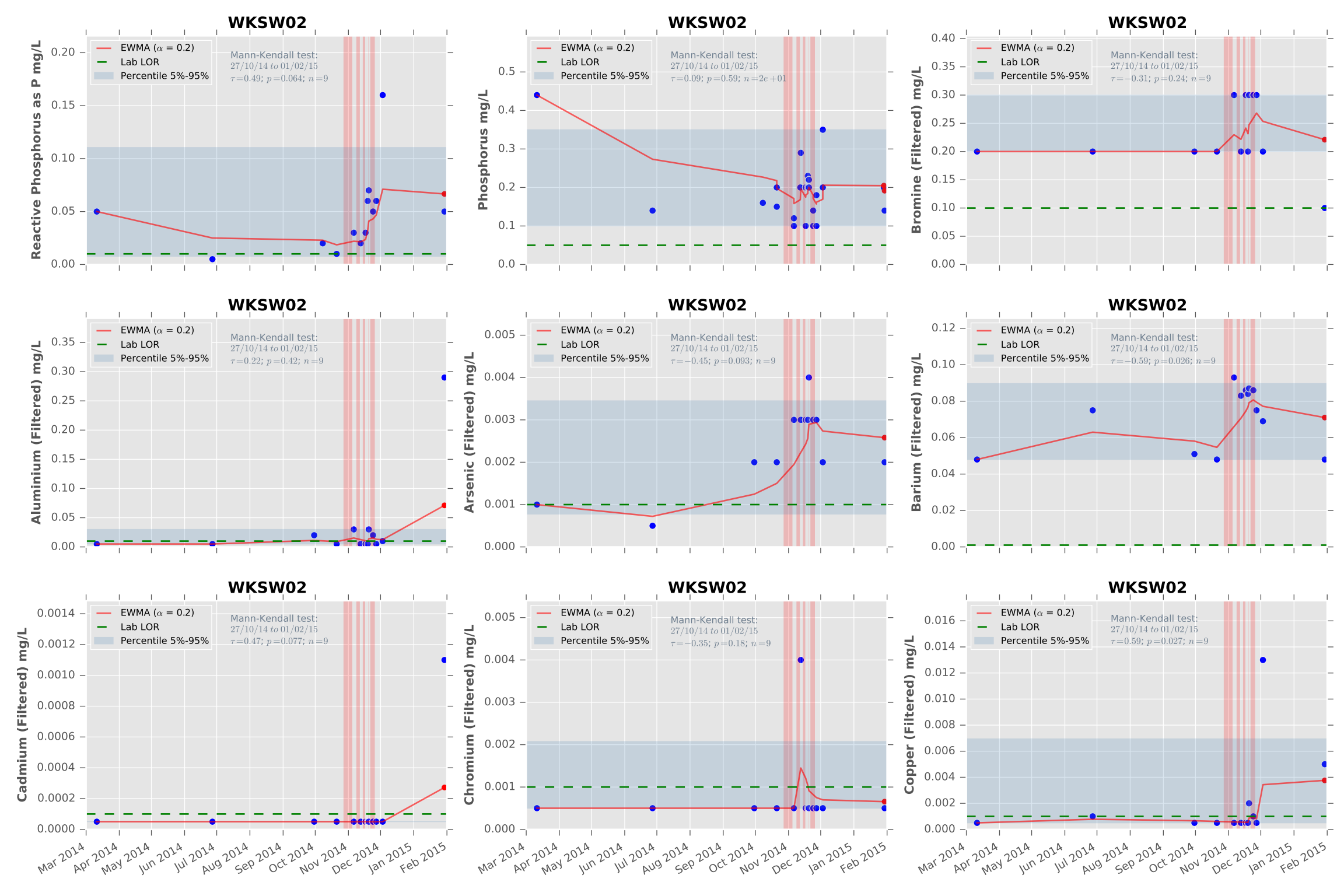

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
2-butanone (MEK) µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

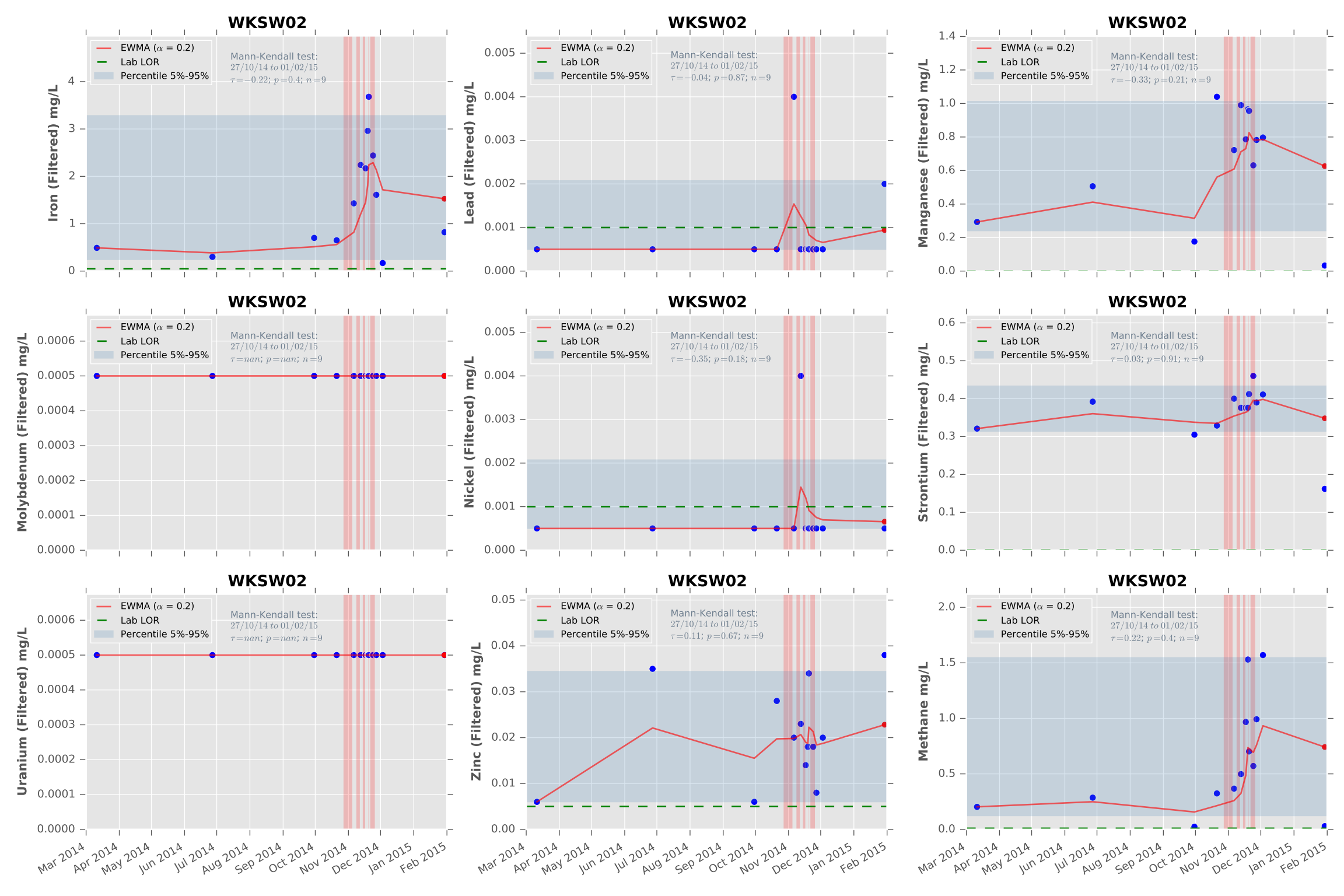

WKSW01
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Carbon disulfide µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

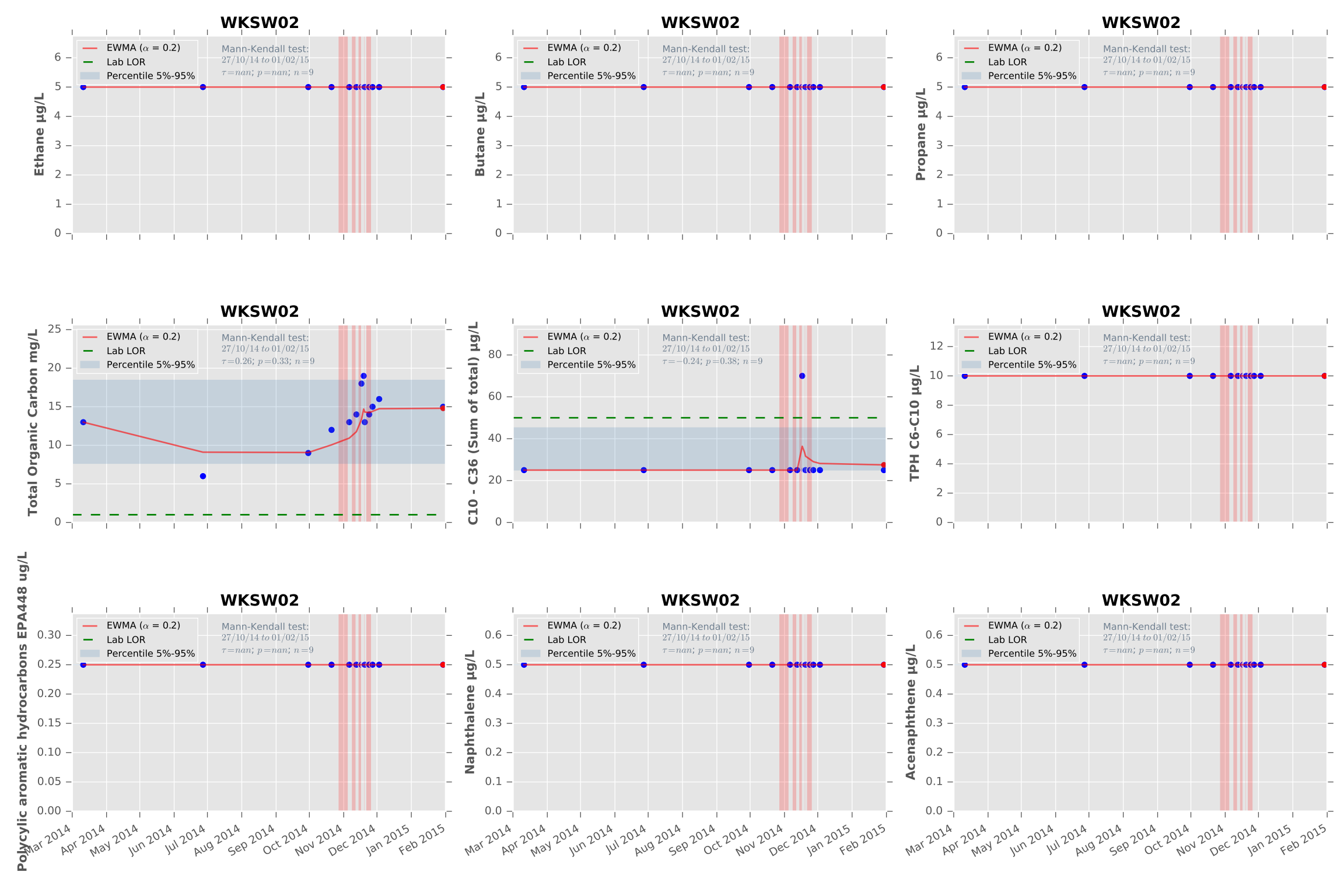

WKSW02
Conductivity @ 25 C µS/cm
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.56; p=0.037; n=9
WKSW02
Diethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.00; p=1; n=9
WKSW02
Ethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.04; p=0.87; n=9
WKSW02
Methyldiethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW02
THPS µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW02
Boron (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.12; p=0.66; n=9
WKSW02
Chlorine - Free mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.62; p=0.02; n=9
WKSW02
Chlorine - Total Residual mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.70; p=0.0086; n=9
WKSW02
Sum of BTEX µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

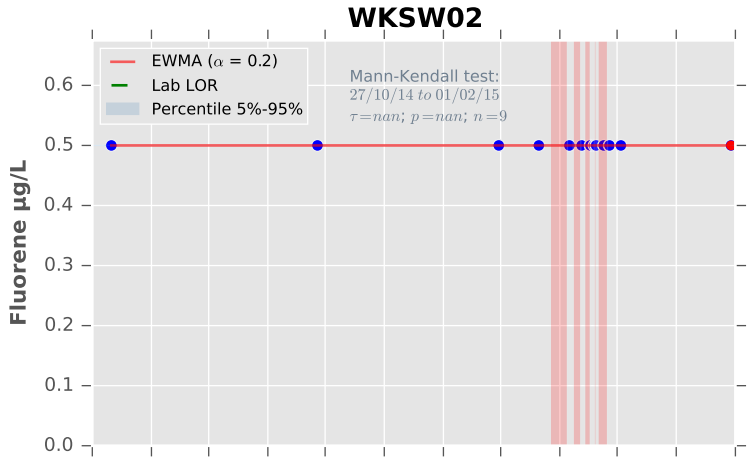

WKSW02
Benzene µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW02
Toluene µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW02
Ethylbenzene µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW02
Xylene Total µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW02
TDS mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.17; p=0.53; n=9
WKSW02
pH (Field) pH_Units
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.06; p=0.83; n=9
WKSW02
Redox (Field) mV
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.28; p=0.3; n=9
WKSW02
Alkalinity (total) as CaCO3 mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.03; p=0.92; n=9
WKSW02
Sulfate as SO4 - Turbidimetric (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.15; p=0.56; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

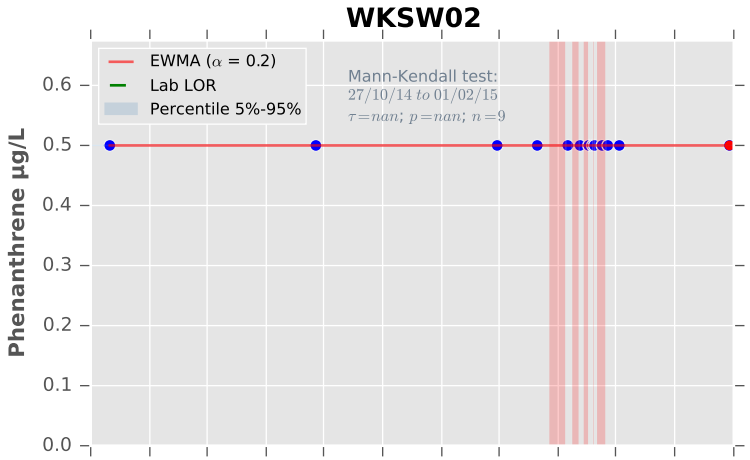

WKSW02
Chloride mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.20; p=0.46; n=9
WKSW02
Calcium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.26; p=0.33; n=9
WKSW02
Sodium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.17; p=0.52; n=9
WKSW02
Potassium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.04; p=0.87; n=9
WKSW02
Magnesium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.30; p=0.26; n=9
WKSW02
Reactive Silica mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.44; p=0.095; n=9
WKSW02
Ammonia as N mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.20; p=0.46; n=9
WKSW02
Nitrate (as N) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.15; p=0.56; n=9
WKSW02
Nitrogen (Total) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.42; p=0.11; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

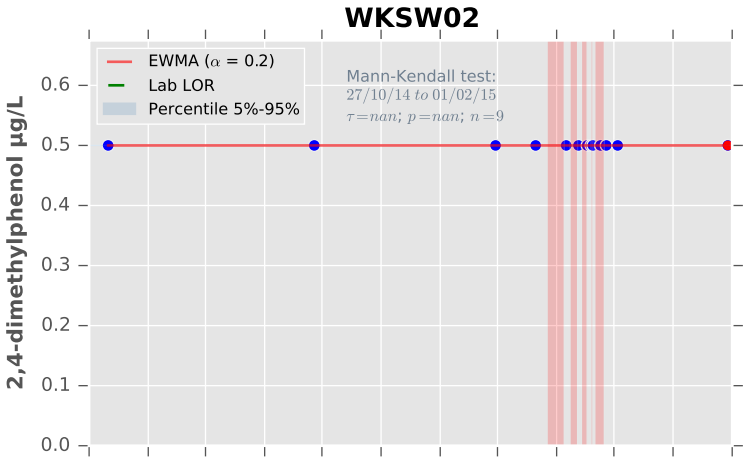

WKSW02
Reactive Phosphorus as P mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.49; p=0.064; n=9
WKSW02
Phosphorus mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.09; p=0.59; n=2e+01
WKSW02
Bromine (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.31; p=0.24; n=9
WKSW02
Aluminium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.22; p=0.42; n=9
WKSW02
Arsenic (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.45; p=0.093; n=9
WKSW02
Barium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.59; p=0.026; n=9
WKSW02
Cadmium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.47; p=0.077; n=9
WKSW02
Chromium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.35; p=0.18; n=9
WKSW02
Copper (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.59; p=0.027; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

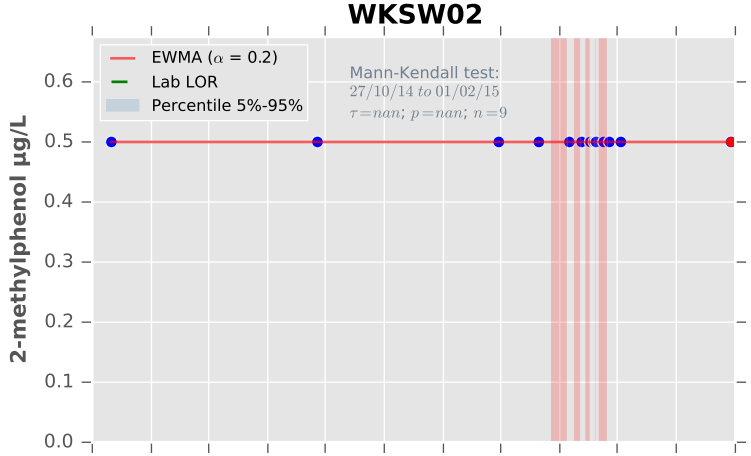

WKSW02
Iron (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.22; p=0.4; n=9
WKSW02
Lead (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.04; p=0.87; n=9
WKSW02
Manganese (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.33; p=0.21; n=9
WKSW02
Molybdenum (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW02
Nickel (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.35; p=0.18; n=9
WKSW02
Strontium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.03; p=0.91; n=9
WKSW02
Uranium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW02
Zinc (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.11; p=0.67; n=9
WKSW02
Methane mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.22; p=0.4; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

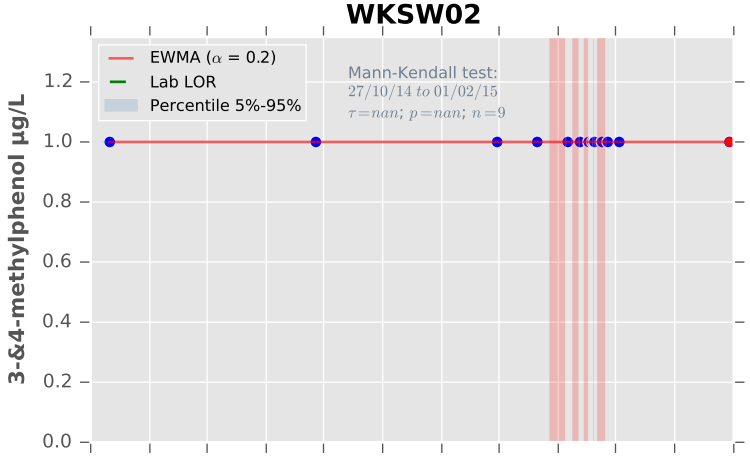

WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Ethane µg/L
WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Butane µg/L
WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Propane µg/L
WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.26; p=0.33; n=9
Total Organic Carbon mg/L
WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.24; p=0.38; n=9
C10 - C36 (Sum of total) µg/L
WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
TPH C6-C10 µg/L
WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Polycylic aromatic hydrocarbons EPA448 ug/L
WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Naphthalene µg/L
WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Acenaphthene µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

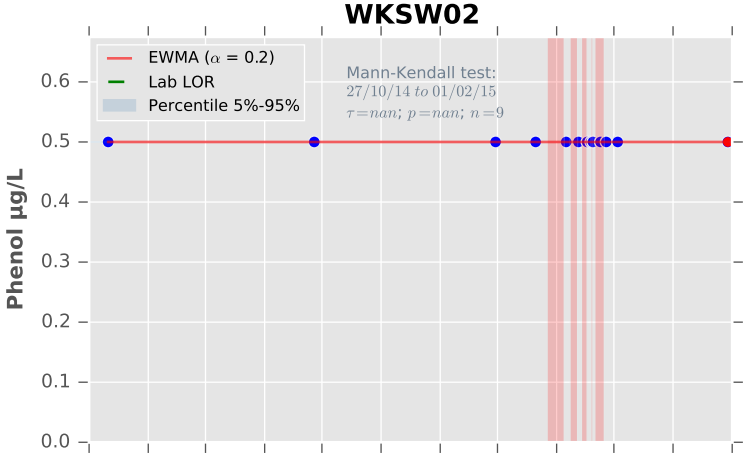

WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Fluorene µg/L

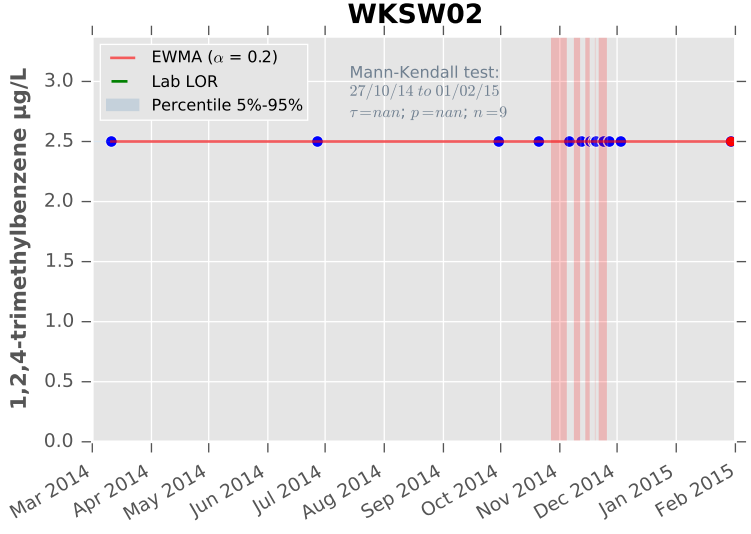

WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Phenanthrene µg/L

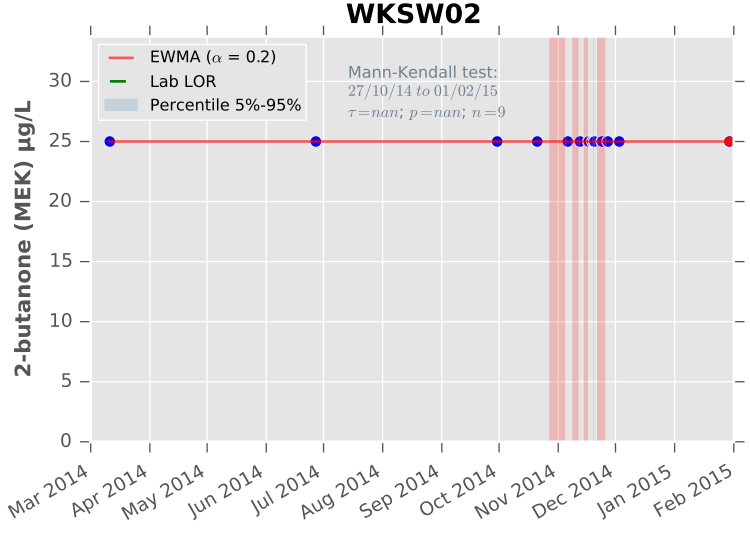

WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
2,4-dimethylphenol µg/L

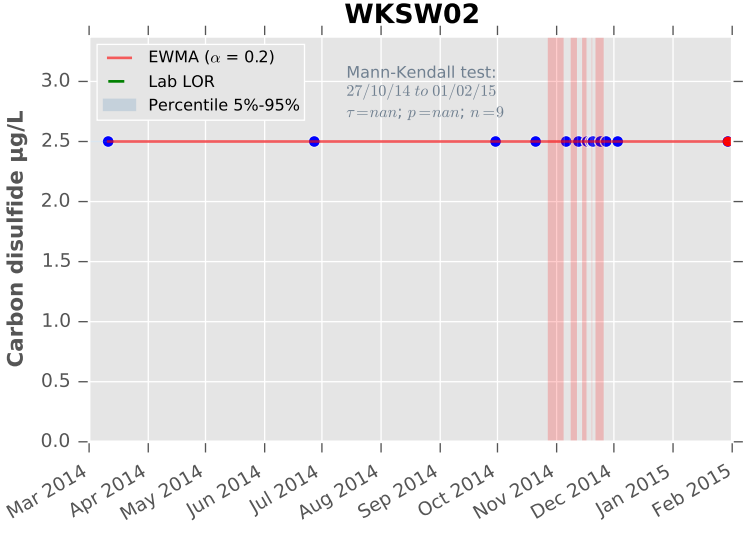

WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
2-methylphenol µg/L

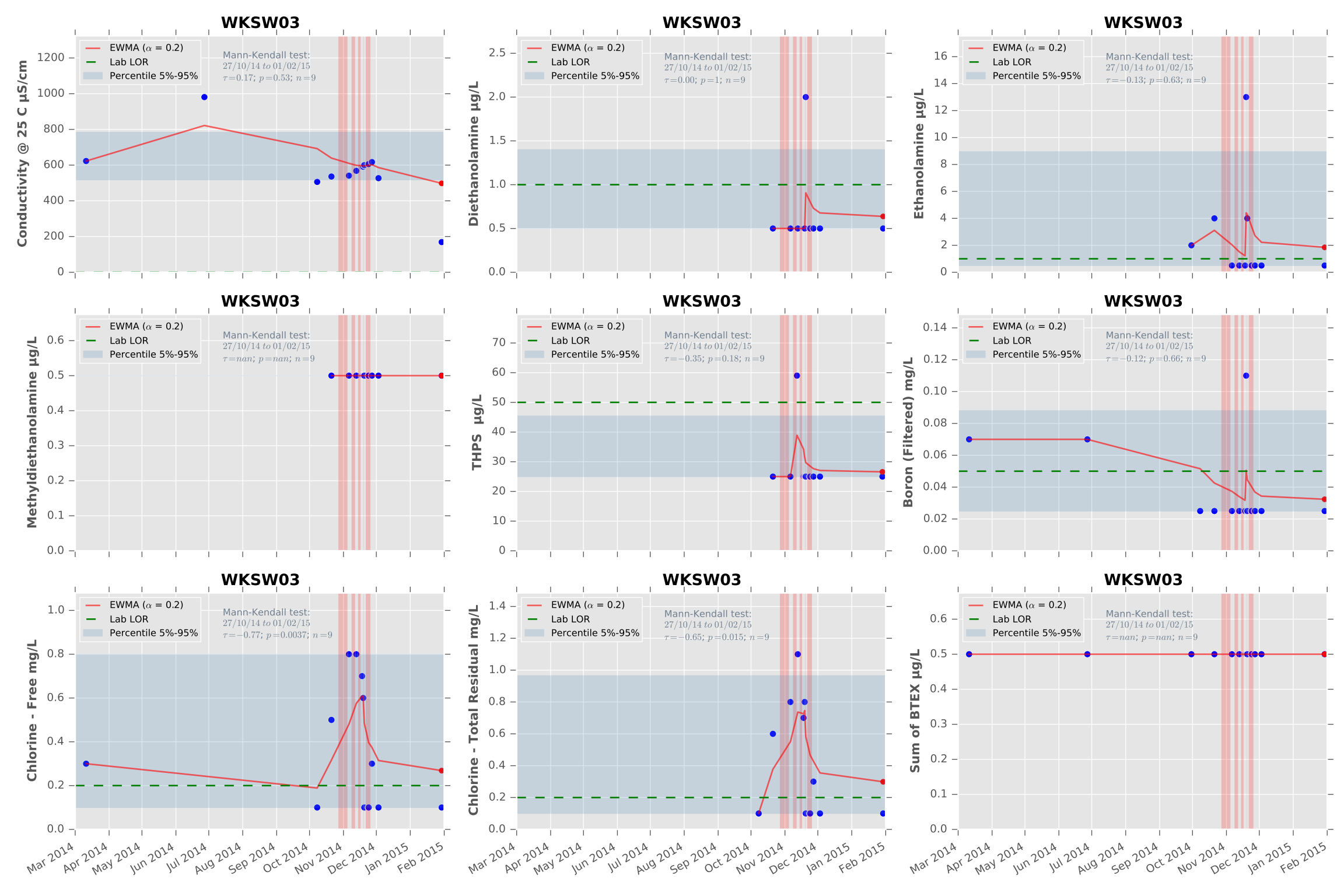

WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
3-&4-methylphenol µg/L

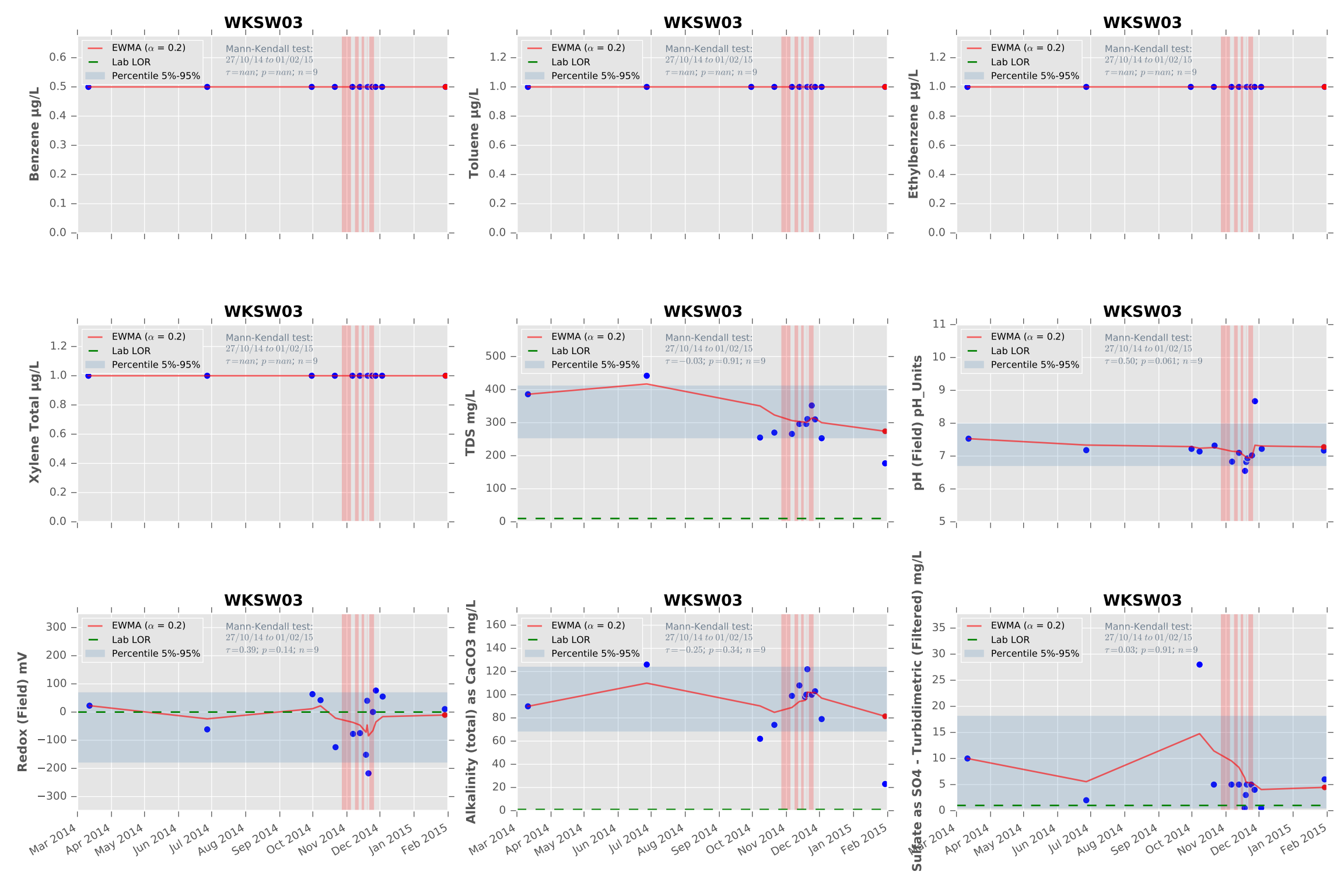

WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Phenol µg/L

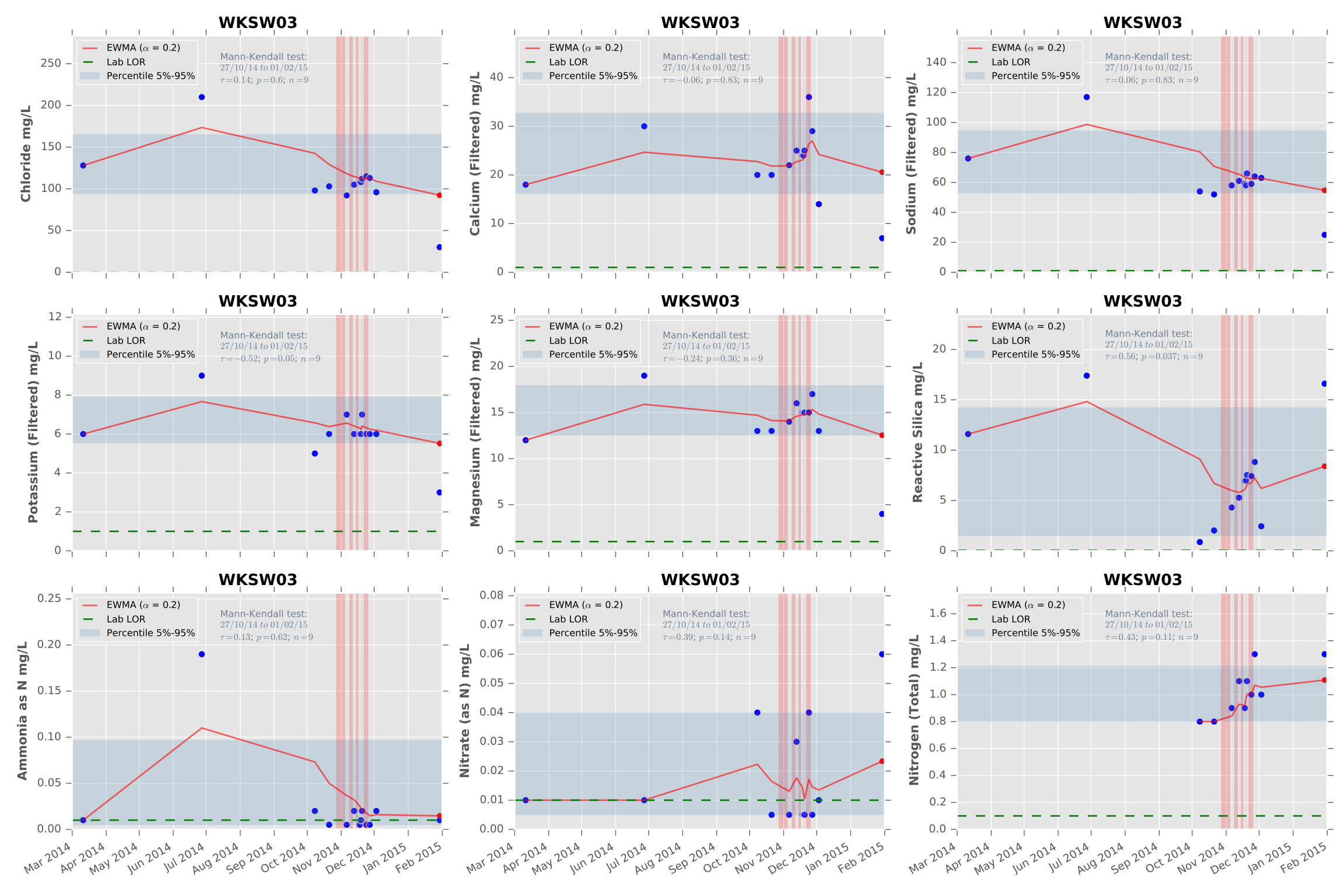

WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
1,2,4-trimethylbenzene µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015


WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
2-butanone (MEK) µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015


WKSW02
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Carbon disulfide µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015


WKSW03
Conductivity @ 25 C µS/cm
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.17; p=0.53; n=9
WKSW03
Diethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.00; p=1; n=9
WKSW03
Ethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.13; p=0.63; n=9
WKSW03
Methyldiethanolamine µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW03
THPS µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.35; p=0.18; n=9
WKSW03
Boron (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.12; p=0.66; n=9
WKSW03
Chlorine - Free mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.77; p=0.0037; n=9
WKSW03
Chlorine - Total Residual mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.65; p=0.015; n=9
WKSW03
Sum of BTEX µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015


WKSW03
Benzene µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW03
Toluene µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW03
Ethylbenzene µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW03
Xylene Total µg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW03
TDS mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.03; p=0.91; n=9
WKSW03
pH (Field) pH_Units
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.50; p=0.061; n=9
WKSW03
Redox (Field) mV
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.39; p=0.14; n=9
WKSW03
Alkalinity (total) as CaCO3 mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.25; p=0.34; n=9
WKSW03
Sulfate as SO4 - Turbidimetric (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.03; p=0.91; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015


WKSW03
Chloride mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.14; p=0.6; n=9
WKSW03
Calcium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.06; p=0.83; n=9
WKSW03
Sodium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.06; p=0.83; n=9
WKSW03
Potassium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.52; p=0.05; n=9
WKSW03
Magnesium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.24; p=0.36; n=9
WKSW03
Reactive Silica mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.56; p=0.037; n=9
WKSW03
Ammonia as N mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.13; p=0.62; n=9
WKSW03
Nitrate (as N) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.39; p=0.14; n=9
WKSW03
Nitrogen (Total) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.43; p=0.11; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
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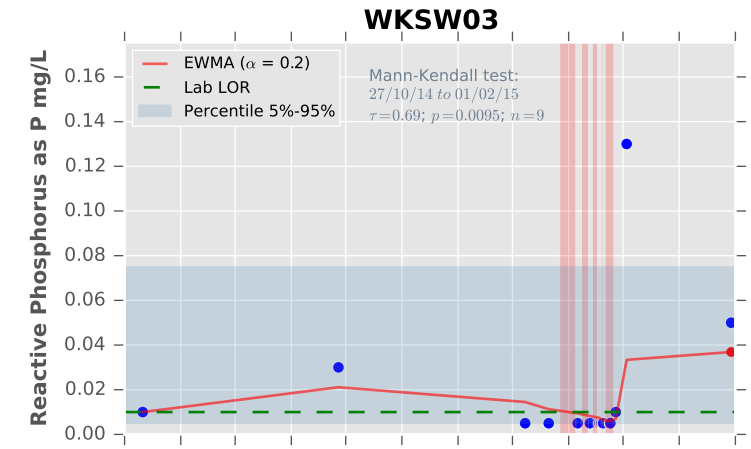
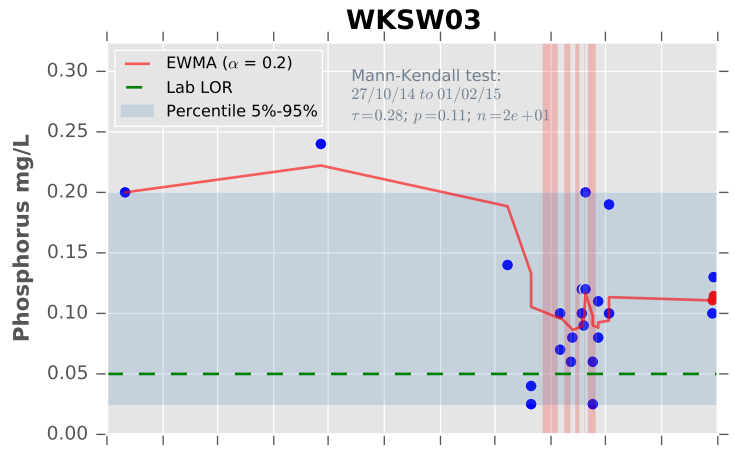
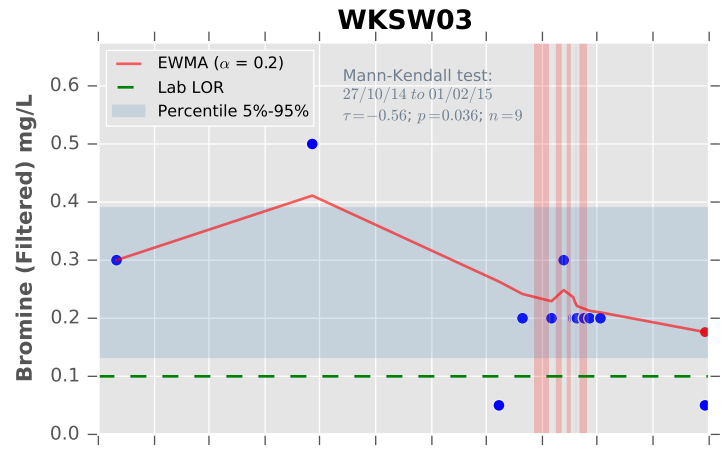
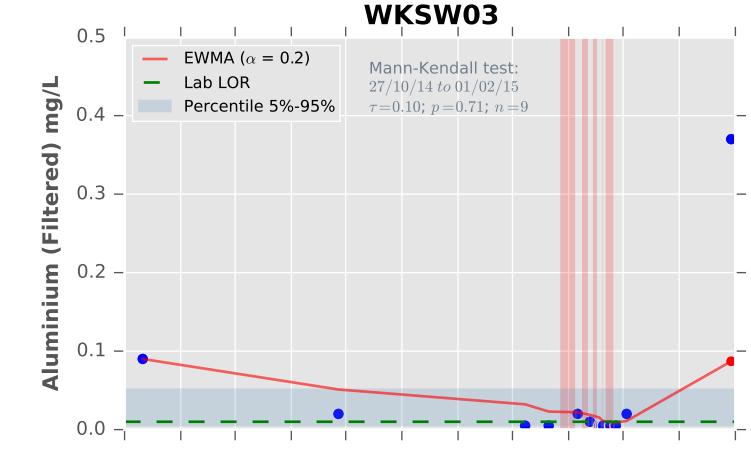
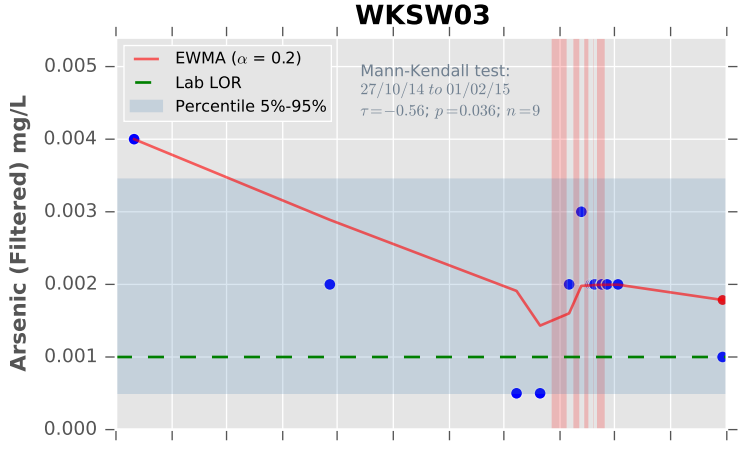
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015

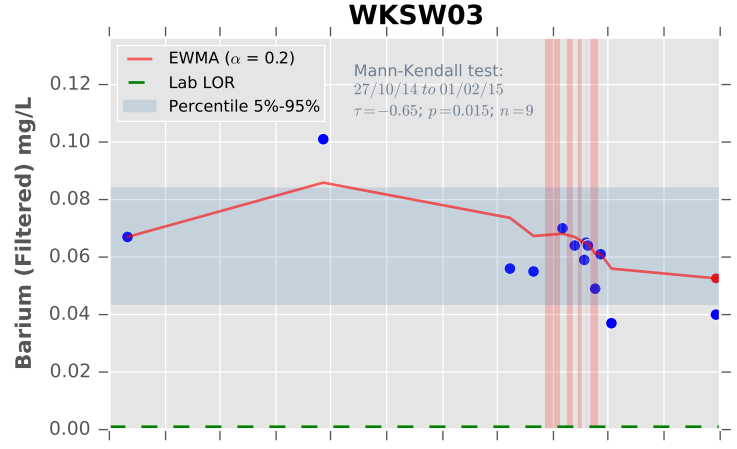

WKSW03
Reactive Phosphorus as P mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.69; p=0.0095; n=9

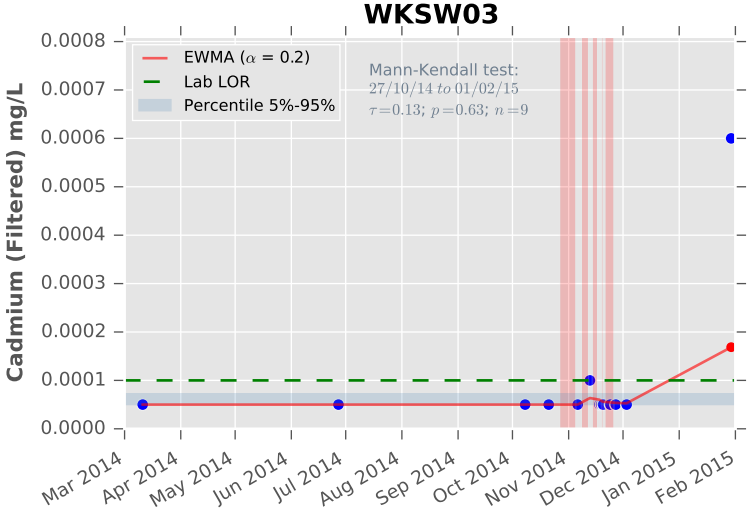

WKSW03
Phosphorus mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.28; p=0.11; n=2e+01


WKSW03
Bromine (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.56; p=0.036; n=9


WKSW03
Aluminium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.10; p=0.71; n=9


WKSW03
Arsenic (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.56; p=0.036; n=9


WKSW03
Barium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.65; p=0.015; n=9


WKSW03
Cadmium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.13; p=0.63; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
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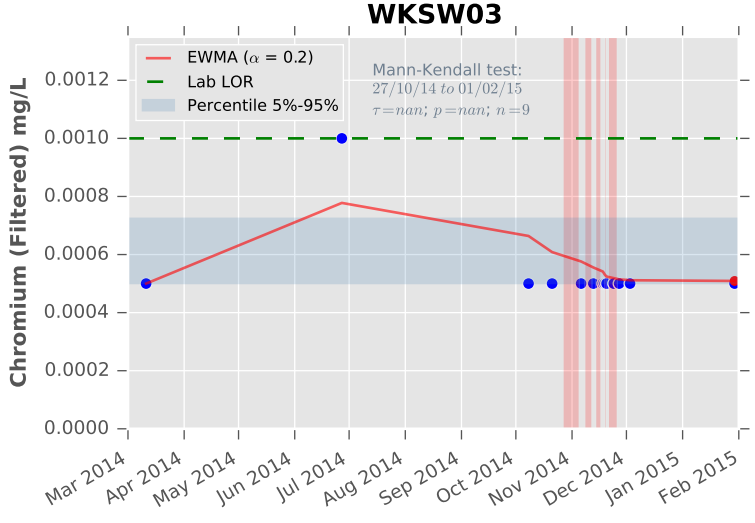
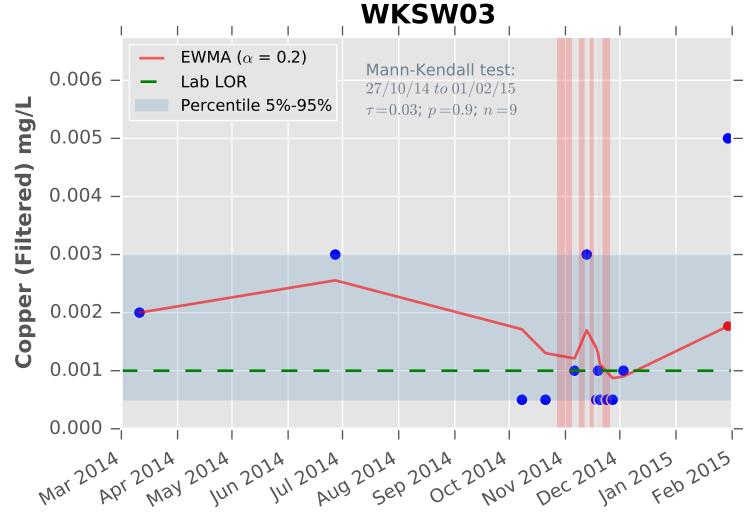
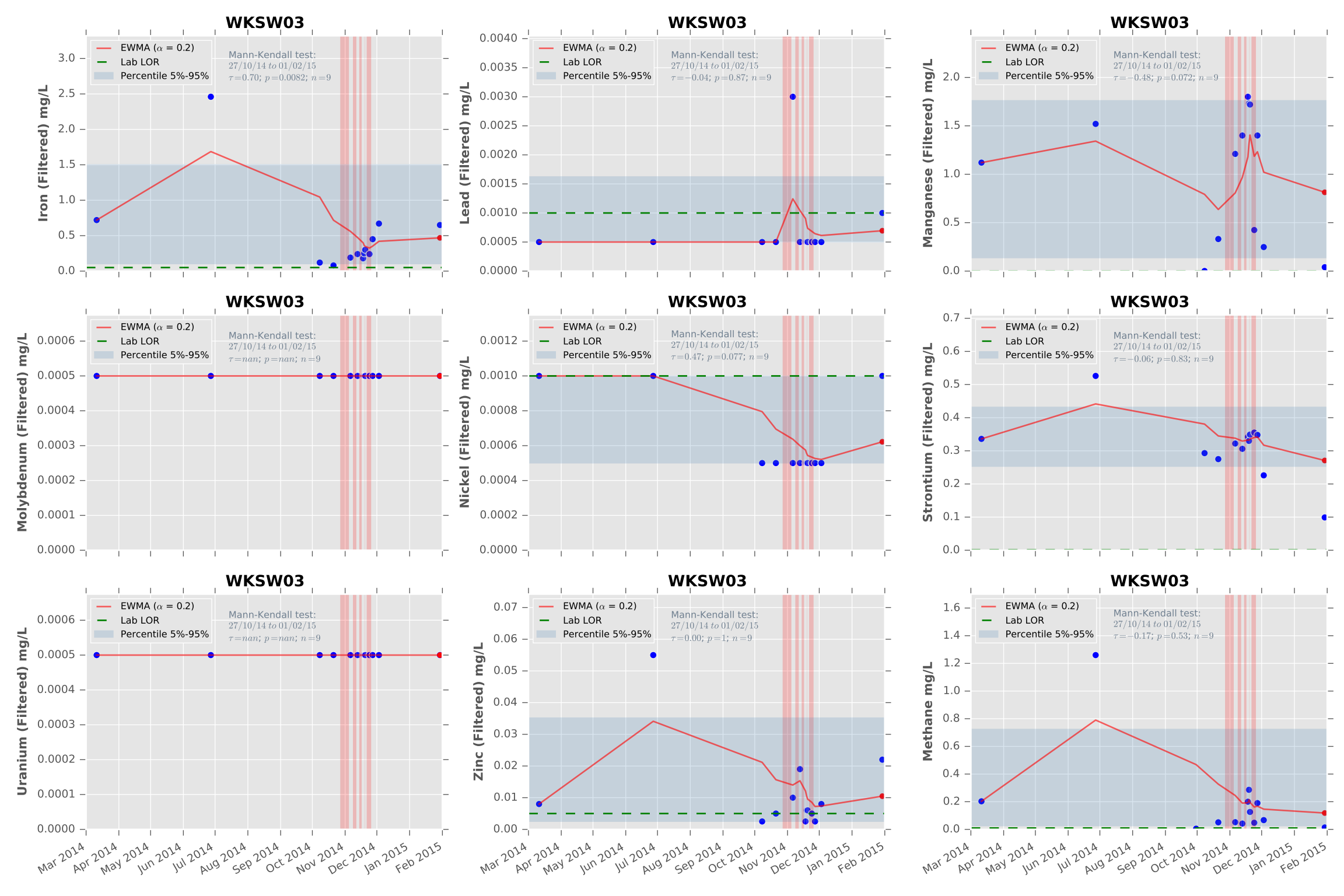
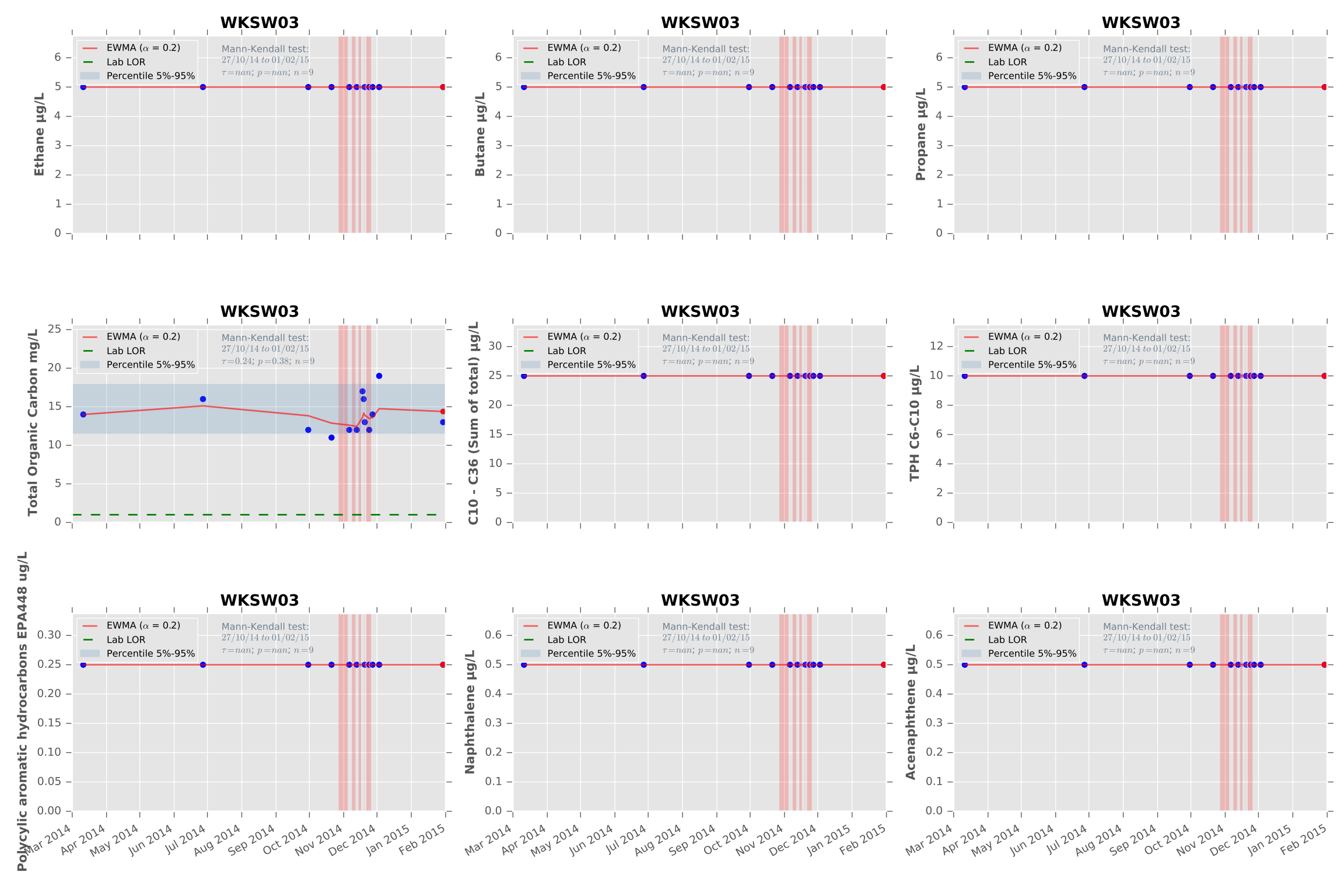
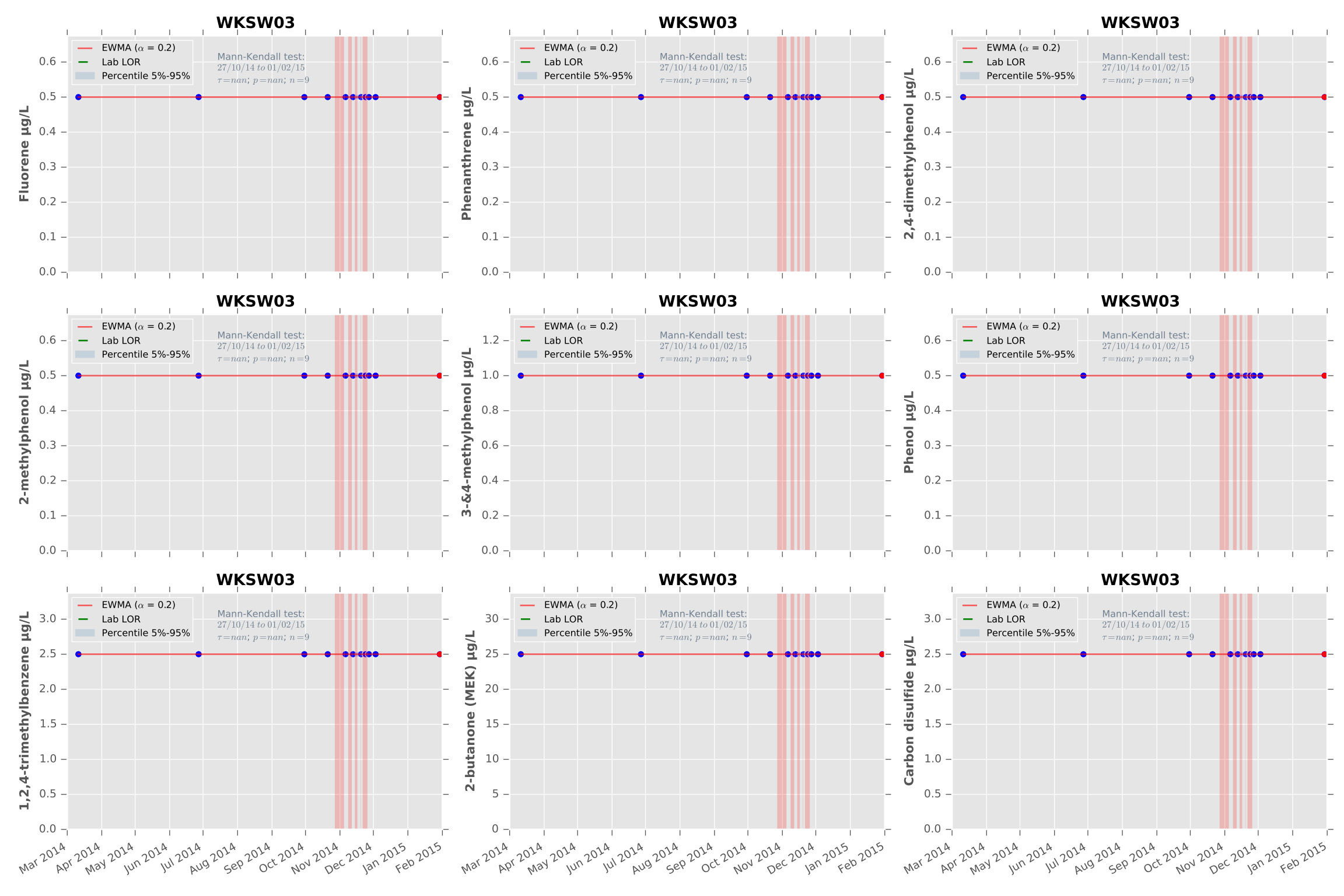
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015


WKSW03
Chromium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015


WKSW03
Copper (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.03; p=0.9; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015


WKSW03
Iron (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.70; p=0.0082; n=9
WKSW03
Lead (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.04; p=0.87; n=9
WKSW03
Manganese (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.48; p=0.072; n=9
WKSW03
Molybdenum (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW03
Nickel (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.47; p=0.077; n=9
WKSW03
Strontium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.06; p=0.83; n=9
WKSW03
Uranium (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
WKSW03
Zinc (Filtered) mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=0.00; p=1; n=9
WKSW03
Methane mg/L
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=−0.17; p=0.53; n=9
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015


WKSW03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Ethane µg/L
Butane µg/L
Propane µg/L
Total Organic Carbon mg/L
τ=0.24; p=0.38; n=9
C10 - C36 (Sum of total) µg/L
TPH C6-C10 µg/L
Polycylic aromatic hydrocarbons EPA448 ug/L
Naphthalene µg/L
Acenaphthene µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Feb 2015


WKSW03
EWMA (α = 0.2)
Lab LOR
Percentile 5%-95%
Mann-Kendall test:
27/10/14 to 01/02/15
τ=nan; p=nan; n=9
Fluorene µg/L
Phenanthrene µg/L
2,4-dimethylphenol µg/L
2-methylphenol µg/L
3-&4-methylphenol µg/L
Phenol µg/L
1,2,4-trimethylbenzene µg/L
2-butanone (MEK) µg/L
Carbon disulfide µg/L
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
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Feb 2015