PERTH BASIN ENERGY

CERVANTES 1

2023

COMPLIANCE ASSESSMENT

REPORT

MINISTERIAL STATEMENT 1178

Revision Control

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Distribution

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Terms & Abbreviations

BKNR	Beekeepers Nature Reserve
C	Compliant
CAP	Compliance Assessment Plan
CAR	Compliance Assessment Report
CLD	Closed
DBCA	Department of Biodiversity, Conservation and Attractions
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
NA	Not Applicable
NC	Non-compliance / Non-conformance
NR	Not Required
PNC	Potential Non-compliance / Non-conformance
RCMA	RCMA Australia Pty Ltd

Related Documents

Document #	Document Name
RCMA-02-EM-PLN-011v3	Cervantes 1 Compliance Assessment Plan
RCMA-02-EM-PLN-004v3	Cervantes 1 Vegetation Management Plan
RCMA-02-EM-PLN-007v3	Cervantes 1 Fauna Management Plan
RCMA-02-EM-PLN-003v4	Cervantes 1 Weed and Dieback Hygiene Management Plan
RCMA-02-EM-PLN-008v4	Cervantes 1 Rehabilitation Plan

1. Introduction

This report addresses the status and compliance of the Cervantes 1 Conventional Oil Exploration Well Project with the conditions in Ministerial Statement 1178 (MS 1178). This report has been prepared for the purpose of meeting the requirements of condition 11 of MS 1178, which requires the submission of an annual Compliance Assessment Report (CAR). This document reports on compliance for the Cervantes 1 project for the period from 1st January to 31st December 2023.

1.1 Project Background

RCMA Australia Pty Ltd (RCMA), now Perth Basin Energy (PBE), drilled the Cervantes 1 exploration well 11 km south of Dongara/Port Denison within Production Licence L14. The site was located within the vegetated Beekeepers Nature Reserve (BKNR) in the northern Perth Basin.

The proposal was referred by RCMA to the EPA in July 2020. The EPA assessed the project on referral information and issued MS1178 on 14th December 2021. A Compliance Assessment Plan was submitted under condition 11-0 of MS1178 and under condition 11-5 a Compliance Assessment Report (CAR) will be submitted annually. The first CAR for the period 14th December to 31st December 2021 was submitted 29th March 2022.

2. Description of Activities

Documents approved by DWER in the reporting period included:

- Cervantes 1 Rehabilitation Plan [RCMA-02-EM-PLN-008v4]

Documents previously approved by DWER prior to the reporting period included:

- Cervantes 1 Compliance Assessment Plan [RCMA-02-EM-PLN-011v3]
- Cervantes 1 Vegetation Management Plan [RCMA-02-EM-PLN-004v3]
- Cervantes 1 Fauna Management Plan [RCMA-02-EM-PLN-007v3]
- Cervantes 1 Weed and Dieback Hygiene Management Plan [RCMA-02-EM-PLN-003v4]

Decommissioning and rehabilitation activities were undertaken in April 2023.

The wellsite has been under care and maintenance conducted by personnel from the nearby Jingemia Production Facility since demobilisation prior to and post rehabilitation.

3. Performance Bond

Condition 1178:M06.3 of Ministerial Statement states:

“Upon completion of appropriate decommissioning and rehabilitation works at the site as agreed by the CEO, the Performance Bond referred in condition 6-1 can be reduced to $93,000 as a contingency Performance Bond. Additional works would be required if completion criteria have not been achieved in a period of three (3) years following completion of decommissioning and rehabilitation works as determined by the CEO, on advice of DBCA.”

The decommissioning and rehabilitation works required to reduce the performance bond have been completed by PBE. PBE now request that the Performance Bond referred to in condition 6-1 is reduced to a contingency Performance Bond as per this condition 6-3.

4. Audit Methodology

4.1 Audit Plan

This CAR has been prepared for Perth Basin Energy (the proponent) to fulfil the requirements of condition 11 of MS 1178, issued for the Cervantes 1 proposal. Condition 11-4 requires the proponent to submit an annual CAR (on the previous twelve month period) to Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (DWER).

Condition 11-6 requires the CAR to:

(1) state whether each condition of this Statement has been complied with;

(2) provide evidence to substantiate statements of compliance, or details of where there has been a non-compliance and describe corrective and preventative actions taken; and

(3) be provided in a form suitable for publication on the EPA website.

4.2 Audit Methodology

The audit was undertaken in January and February 2024 and involved a desktop audit of evidence provided by key members of the project team.

- Greg Nolan, PIC (Perth Basin Energy)
- Sabrina Halliday, Operator (Perth Basin Energy)
- Steve Vlahos, Principal Ecologist (Umwelt)
- Allan Lenane, Site Rehabilitation Contractor (Lenane Holdings)

5. Details of Biological Monitoring

The monitoring undertaken since the last reporting period is included in Appendix G.

5.1 Soil and Groundwater Validation Assessment

Gemec was previously engaged to undertake a baseline soil and groundwater assessment (SGA) at the Cervantes 1 exploration well location in the Shire of Irwin, Western Australia.

Gemec was engaged to undertake a Soil and Groundwater Validation Assessment (SGVA) at the Cervantes-01 exploration well location.

The SGVA was undertaken on 05 and 13 April 2023. The purpose of the works was to assess whether site activities had impacted soils beneath former potential contamination sources, and to characterise waste soil stockpiles to determine their fate. The objective of the works was to collect sufficient soil chemical data and field observations in order to achieve the purpose.

The soil assessment involved the collection of 10 primary soil validation samples from the walls and base of the drilling mud retention pond, one primary soil validation sample from the well head area, two primary soil validation samples from the former chemical / fuel storage area and one primary soil validation sample from the unused flare pit area. Fifteen waste characterisation samples were collected from the drilling mud and cuttings stockpile destined for disposal.

One representative groundwater sample was collected from the groundwater monitoring bore.

Based on the results of the investigation it was concluded that:

- The 1771 tonne stabilised drilling mud and cuttings soil stockpile was characterised as Inert Waste Type 1, and was transported off-site for disposal at a licenced waste facility between 18 and 21 April 2023.
- Most analysed substances in soil and groundwater samples were consistent with ambient background concentrations that existed at the site prior to commencement of site activities.
- Nitrate concentrations within the two samples collected from the former fuel and chemical storage areas (V12 – 18 mg/kg, V13 – 5.6 mg/kg) were higher than the baseline concentrations (S5 – 0.4 mg/kg, S6 – 0.8 mg/kg). Based on field observations and the chemical signature of the remaining nutrients, the higher nitrate concentration is considered to be a function of natural variation rather than site activities. These elevated concentrations are within the range of naturally occurring surface soils.
- None of the soil validation sample concentrations exceeded the site assessment screening levels.
- A number of dissolved metals concentrations had decreased following the baseline assessment – a result of the dispersion or biodegradation of residual drilling fluids used to install the groundwater monitoring well.
- Naturally occurring exceedances of screening levels in groundwater included iron and chloride exceeding the NPUG screening levels for aesthetic considerations. Gemec has identified no risk associated with the exceedances due to the absence of exposure pathways.
- No complete source-pathway-receptor linkages were determined to have resulted from the former site use as an oil well exploration site, and therefore no unacceptable risk to potential nearby receptors has occurred.
- The exploration well was plugged and abandoned, limestone marl hardstand removed, the site recontoured and cutback topsoil reinstated following the completion of the SGVA.

Due to the absence of soil and groundwater impacts at the site, it is considered to be suitable for ongoing use for nature conservation.

Gemec strongly recommends that the conclusions stated here be reviewed in context to comments and information contained within the body of the report in Attachment A.

6. Statement of Compliance

A signed Statement of Compliance is provided in Appendix A.

The results of the audit for MS 1178 are presented in Appendix B.

6.1 Compliance with conditions of MS 1178

The MS 1178 audit in Appendix B addressed 52 conditions and the findings are presented in Table 1. There were no potential non-compliances.

Table 1: Compliance Summary Table

Code	Definition	#
C	Compliant	19
CLD	Closed	13

Code	Definition	#
NR	Not Required	19
PNC	Potential Non-Compliance	0

6.2 Conformance with Vegetation Management Plan

The Vegetation Management Plan audit in Appendix C addressed 51 conditions and was found:

- Conformant with 28 conditions, with two found conformant (complete)
- Potentially non-conformant with 0 conditions
- 23 conditions were not applicable at this stage.

6.3 Conformance with Fauna Management Plan

The Fauna Management Plan audit in Appendix D addressed 47 conditions and was found:

- Conformant with 32 conditions, with 13 found conformant (complete)
- Potentially non-conformant with 0 conditions
- 15 conditions were not applicable at this stage.

6.4 Conformance with Hygiene Management Plan

The Hygiene Management Plan audit in Appendix E addressed 30 conditions and was found:

- Conformant with 19 conditions, with three found conformant (complete)
- Potentially non-conformant with 0 conditions
- Eight conditions were not applicable at this stage.

One opportunity for improvement was identified for PBE to establish arrangements for a weed control program for July 2024 and September 2024.

6.5 Conformance with Rehabilitation Plan

The Rehabilitation Plan audit in Appendix F addressed 93 conditions and was found:

- Conformant with 47 conditions, with four found conformant (complete)
- Potentially non-conformant with 2 conditions
- 43 conditions were not applicable at this stage.

The potential non-conformances are listed in Table 3.

7. Action Status

The action status for all actions resulting from a potential non-compliance / non-conformance in Table 2 is summarised in Table 3. All actions from the previous compliance report (2022) were closed out in 2022.

Table 2: Cervantes 1 Potential Non-compliances / Potential Non-conformances

Non-compliance #	Condition #	Non-compliance	Action #	Corrective Action
1	CRP 1	Litter is left at rehabilitating sites (flagging tape and fibre debris).	1	Site personnel are undertaking scouting to retrieve any remaining flagging tape and fibre debris.
2	CRP 51	All foreign materials have not been removed from the rehabilitating site (flagging tape and fibre debris).		

Table 3: Cervantes 1 Corrective Action Summary

Corrective Action #	Corrective Action	Progress
1	Site personnel are undertaking scouting to retrieve any remaining flagging tape and fibre debris.	In progress

Appendix A Statement of Compliance

1. **Proposal and Proponent Details**

Proposal Title	*CERVANTES-01 CONVENTIONAL WELL DRILLING PROPOSAL*
Statement Number	*1178*
Proponent Name	*RCMA Australia Pty Ltd*
Proponent's Australian Company Number	612 244 827

2. **Statement of Compliance Details**

Reporting Period	*1/01/23* to *31/12/23*

Implementation phase(s) during reporting period (please tick ✓ relevant phase(s))							
Pre-construction		Construction		Operation		Decommissioning	X

Audit Table for Statement addressed in this Statement of Compliance is provided at Attachment:	Appendix B
An audit table for the Statement addressed in this Statement of Compliance must be provided as Attachment B to this Statement of Compliance. The audit table must be prepared and maintained in accordance with the Department of Water and Environmental Regulation (DWER) *Post Assessment Guideline for Preparing an Audit Table*, as amended from time to time. The 'Status Column' of the audit table must accurately describe the compliance status of each implementation condition and/or procedure for the reporting period of this Statement of Compliance. The terms that may be used by the proponent in the 'Status Column' of the audit table are limited to the Compliance Status Terms listed and defined in Table A1.	

Were all implementation conditions and/or procedures of the Statement complied with within the reporting period? (please tick ✓ the appropriate box)			
No (please proceed to Section 3)	✓	Yes (please proceed to Section 4)	

3. Details of Non-compliance(s) and/or Potential Non-compliance(s)

The information required Section 3 must be provided for each non-compliance or potential non-compliance identified during the reporting period covered by this Statement of Compliance.

Non-compliance/potential non-compliance 3-1

Which implementation condition or procedure was non-compliant or potentially non-compliant?
Was the implementation condition or procedure non-compliant or potentially non-compliant?
On what date(s) did the non-compliance or potential non-compliance occur (if applicable)?

Was this non-compliance or potential non-compliance reported to the Chief Executive Officer, DWER?	
	☐ No

What are the details of the non-compliance or potential non-compliance and where relevant, the extent of and impacts associated with the non-compliance or potential non-compliance?
What is the precise location where the non-compliance or potential non-compliance occurred (if applicable)? (please provide this information as a map or GIS co-ordinates)
What was the cause(s) of the non-compliance or potential non-compliance?
What remedial and/or corrective action(s), if any, were taken or are proposed to be taken in response to the non-compliance or potential non-compliance?
What measures, if any, were in place to prevent the non-compliance or potential non-compliance before it occurred? What, if any, amendments have been made to those measures to prevent re-occurrence?
Please provide information/documentation collected and recorded in relation to this implementation condition or procedure: • in the reporting period addressed in this Statement of Compliance; and • as outlined in the approved Compliance Assessment Plan for the Statement addressed in this Statement of Compliance. (the above information may be provided as an attachment to this Statement of Compliance)

For additional non-compliance or potential non-compliance, please duplicate pages of Section 3 as required.

4. Proponent Declaration

I, Chris Newport (Director), declare that I am authorised on behalf of RCMA Australia Pty Ltd (being the person responsible for the proposal) to submit this form and that the information contained in this form is true and not misleading.

Signature:..... Date:.....

Please note that:

- it is an offence under section 112 of the Environmental Protection Act 1986 for a person to give or cause to be given information that to his knowledge is false or misleading in a material particular; and
- the Chief Executive Officer of the DWER has powers under section 47(2) of the Environmental Protection Act 1986 to require reports and information about implementation of the proposal to which the statement relates and compliance with the implementation conditions.

5. Submission of Statement of Compliance

One hard copy and one electronic copy (preferably PDF on CD or thumb drive) of the Statement of Compliance are required to be submitted to the Chief Executive Officer, DWER, marked to the attention of Manager, Compliance (Ministerial Statements).

Please note, the DWER has adopted a procedure of providing written acknowledgment of receipt of all Statements of Compliance submitted by the proponent, however, the DWER does not approve Statements of Compliance.

6. Contact Information

Queries regarding Statements of Compliance, or other issues of compliance relevant to a Statement may be directed to Compliance (Ministerial Statements), DWER:

Manager, Compliance (Ministerial Statements)

Department of Water and Environmental Regulation

Postal Address: Locked Bag 10, Joondalup DC, WA 6919

Phone: (08) 6364 7000

Email: compliance@dwer.wa.gov.au

7. Post Assessment Guidelines and Forms

Post assessment documents can be found at www.epa.wa.gov.au

Table A1: Compliance Status Terms

Compliance Status Terms	Abbrev	Definition	Notes
Compliant	C	Implementation of the proposal has been carried out in accordance with the requirements of the audit element.	This term applies to audit elements with: • ongoing requirements that have been met during the reporting period; and • requirements with a finite period of application that have been met during the reporting period, but whose status has not yet been classified as 'completed'.
Completed	CLD	A requirement with a finite period of application has been satisfactorily completed.	This term may only be used where: • audit elements have a finite period of application (e.g. construction activities, development of a document); • the action has been satisfactorily completed; and • the DWER has provided written acceptance of 'completed' status for the audit element.
Not required at this stage	NR	The requirements of the audit element were not triggered during the reporting period.	This should be consistent with the 'Phase' column of the audit table.
Potentially Non-compliant	PNC	Possible or likely failure to meet the requirements of the audit element.	This term may apply where during the reporting period the proponent has identified a potential non-compliance and has not yet finalized its investigations to determine whether non-compliance has occurred.
Non-compliant	NC	Implementation of the proposal has not been carried out in accordance with the requirements of the audit element.	This term applies where the requirements of the audit element are not "complete" have not been met during the reporting period.
In Process	IP	Where an audit element requires a management or monitoring plan be submitted to the DWER or another government agency for approval, that submission has been made and no further information or changes have been requested by the DWER	**The term 'In Process' may not be used for any purpose other than that stated in the Definition Column.** The term 'In Process' may not be used to describe the compliance status of an implementation condition and/or procedure that requires implementation

		or the other government agency and assessment by the DWER or other government agency for approval is still pending.	throughout the life of the project (e.g. implementation of a management plan).

Appendix B Compliance with MS 1178

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
1178:M01.1	Limitation and Extent of Proposal (Physical element)	When implementing the proposal, the proponent shall ensure the proposal does not exceed the Development envelope (36.5 ha)	Survey will be undertaken prior to ground disturbing activities to ensure the proposal development envelope does not exceed 36.5 ha	R02_2022 CAR	Construction	Annual	NRATS	The proposal (5.4 ha) did not exceed the Development Envelope.
1178:M01.2	Limitation and Extent of Proposal (Physical element)	When implementing the proposal, the proponent shall ensure the proposal does not exceed the Disturbance footprint (Up to 7 ha)	Survey will be undertaken prior to ground disturbing activities to ensure the proposal disturbance footprint does not exceed 7 ha	R02_2022 CAR	Construction	Annual	NRATS	The proposal (5.4 ha) did not exceed the Disturbance Footprint.
1178:M01.3	Limitation and Extent of Proposal (Physical element)	When implementing the proposal, the proponent shall ensure the proposal does not exceed the following extent of direct disturbance of native vegetation (Up to 5.3 ha)	Survey will be undertaken prior to ground disturbing activities to ensure the proposal direct disturbance of native vegetation does not exceed 5.3 ha	R02_2022 CAR	Construction	Annual	NRATS	The proposal disturbed 3.3 ha of native vegetation (within the 5.3 ha allowance).
1178:M01.4	Limitation and Extent of Proposal (Physical element)	When implementing the proposal, the proponent shall ensure the proposal does not exceed the following extent of Direct disturbance of priority 1 'Coastal sands dominated by *Acacia rostellifera, Eucalyptus oraria* and *Eucalyptus obtusiflora'* Priority Ecological Community (PEC) (Up to 0.99 ha)	Survey will be undertaken prior to ground disturbing activities to ensure the proposal does not impact more than 0.99 ha PEC	R02_2022 CAR	Construction	Annual	NRATS	The proposal disturbed 0.56 ha of PEC (within the 0.99 ha allowance).
1178:M01.5	Limitation and Extent of Proposal (Operational elements)	When implementing the proposal, the proponent shall ensure the proposal uses conventional extraction methods	The Cervantes 1 well will be drilled by a conventional drilling rig with conventional drilling methods	R02_2022 CAR	Operation	Annual	CLD	Conventional drilling rig (Ensign Rig 970) utilising conventional drilling methods was utilised for drilling Cervantes.
1178:M01.6	Limitation and Extent of Proposal (Operational elements)	When implementing the proposal, the proponent shall ensure the proposal conducts rehabilitation consistent with an approved Rehabilitation Plan	RCMA will undertake rehabilitation in accordance with Cervantes 1 Rehabilitation Plan [RCMA-02-EM-PLN-008]	R03_Cervantes Well Post rehabilitation Inspection R05_Rehabilitation Audit Report	Decommissioning	Annual	CLD	Audit shows that Cervantes 1 rehabilitation is conducted in accordance with Cervantes 1 Rehabilitation Plan [RCMA-02-EM-PLN-008v4]
1178:M01.7	Limitation and Extent of Proposal (Operational elements)	When implementing the proposal, the proponent shall ensure the proposal is decommissioned to ensure that the Removal of all drilling and exploration related infrastructure and equipment not required to remain under the Petroleum and Geothermal Energy Resources Act 1967	There should be no infrastructure or permanent markers (other than the well abandonment plaque), steel pegs or litter left on the rehabilitated area at any time following rehabilitation	R03_Cervantes Well Post rehabilitation Inspection E01_2023 06 08 Cervantes Inspection E02_2023 06 26 Cervantes Inspection	Overall	Annual	C	Workplace inspections and Post-rehabilitation inspection show that there is no infrastructure or permanent markers remaining at the rehabilitating site.
1178:M01.8	Limitation and Extent of Proposal (Timing elements)	When implementing the proposal, the proponent shall ensure the proposal does not exceed the following extents: site preparation and drilling activities up to six (6) months from substantial commencement	RCMA has six months from substantial commencement to undertake site preparation and drilling	R02_2022 CAR	Overall	Annual	CLD	Site preparation activities substantially undertaken March and drilling undertaken March and April.

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
1178:M01.9	Limitation and Extent of Proposal (Timing elements)	When implementing the proposal, the proponent shall ensure the proposal does not exceed the following extents: rehabilitation up to three (3) years from plugging of the well	RCMA shall rehabilitate the wellsite within three years from plugging the well	R03_Cervantes Well Post rehabilitation Inspection	Decommissioning	Annual	CLD	The well was plugged April 2022 and rehabilitation was undertaken April 2023 as confirmed inspection July 2023 (R03).
1178:M02.1	Time Limit Authorisation	The proponent shall not commence implementation of the proposal after five (5) years from the date of this Statement, and any commencement, prior to this date, must be substantial.	RCMA shall not commence the proposal after 14 December 2026	Records show Cervantes 1 civils are commenced before 14 December 2026	Pre-construction	Annual	CLD	The proposal was commenced in February 2022.
1178:M02.2	Time Limit Authorisation	Any commencement of implementation of the proposal, on or before five (5) years from the date of this Statement, must be demonstrated as substantial by providing the CEO with written evidence, on or before the expiration of five (5) years from the date of this Statement.	RCMA shall notify the CEO on substantial commencement of the proposal (before 14 December 2026)	R02_2022 CAR	Pre-construction	Annual	CLD	The proposal was commenced in February 2022 as notified to DWER 09/02/2022.
1178:M03.1.1	Flora and Vegetation Outcomes	The proponent shall ensure the following outcomes are achieved: no more than 0.99 ha direct disturbance to Coastal sands dominated by *Acacia rostellifera*, *Eucalyptus oraria* and *Eucalyptus obtusiflora* PEC;	Survey will be undertaken prior to ground disturbing activities to ensure the proposal does not impact more than 0.99 ha PEC	R02_2022 CAR	Construction	Annual	NRATS	Proposal impacted no more than 0.56 ha of PEC.
1178:M03.1.2	Flora and Vegetation Outcomes	The proponent shall ensure the following outcomes are achieved: avoid impacts from the implementation of the proposal to flora and vegetation from changes to fire regime, dieback (Phytophthora spp) and weeds.	RCMA will avoid impacts from the implementation of the proposal to flora and vegetation from changes to fire regime, dieback (Phytophthora spp) and weeds	R02_2022 CAR R08_VMP Rev 3 R01_2022 CAR Appendix C Vegetation Management Plan Audit	Construction Decommissioning	Annual Annual	C	The Vegetation Management Plan has been implemented to ensure the outcomes are achieved. An audit (Appendix C) has been undertaken to determine if RCMA has avoided impacts from the implementation of the proposal to flora and vegetation from changes to fire regime, dieback and weeds (Appendix C). No non-conformances were identified.
1178:M04.1.1	Terrestrial Fauna Outcomes	The proponent shall ensure the following outcome is achieved: avoid impacts from the implementation of the proposal to terrestrial fauna from changes to fire regime, introduction of feral animals, spread of dieback and weeds, vehicle strikes, entrapment in excavation and artificial water bodies, light pollution, noise and dust.	RCMA will avoid impacts from the implementation of the proposal to terrestrial fauna from changes to fire regime, introduction of feral animals, spread of dieback and weeds, vehicle strikes, entrapment in excavation and artificial water bodies, light pollution, noise and dust.	R09_FMP Rev 3 Appendix D_Fauna Management Plan Audit	Overall	Annual	C	The Fauna Management Plan has been implemented to ensure the outcomes are achieved. An audit (Appendix D) has been undertaken to determine if RCMA has avoided impacts from the implementation of the proposal to terrestrial fauna from changes to fire regime, introduction of

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
								feral animals, spread of dieback and weeds, vehicle strikes, entrapment in excavation and artificial water bodies, light pollution, noise and dust (Appendix D). No non-conformances were identified.
1178:M05.1	Rehabilitation Plan	The proponent shall update and implement the Rehabilitation Management Plan (29 April 2021) for approval by the CEO, on advice from DBCA. The Rehabilitation Management Plan shall contain provisions for update and review.	RCMA will implement the Cervantes 1 Rehabilitation Plan [RCMA-02-EM-PLN-008v3 24/01/2022] under advice from DBCA (21/01/2022) and it will contain provisions for update and review	R06_Rehabilitation Plan C01_Rehab EMP - Letter to proponent - EMP Approved R01_2023 CAR Appendix F	Pre-construction	Annual	C	The Rehabilitation Plan has been implemented. The audit in Appendix F undertaken to determine if PBE has implemented the Rehabilitation Plan (R06) found: • Conformant with 47 conditions, with four found conformant (complete) • Potentially non-conformant with 2 conditions • 43 conditions were not applicable at this stage. The potentially non-conformant conditions related to litter left on site following rehabilitation.
1178:M05.2	Rehabilitation Plan	The proponent must not commence ground disturbing works until the CEO has endorsed the latest version of the Rehabilitation Management Plan (29 April 2021) in writing.	RCMA must not commence site preparation until the Rehabilitation Plan has been approved	R02_2022 CAR	Construction	Annual	CLD	Rehabilitation Plan (R06) was endorsed by EPA Services 04/02/2022 prior to ground disturbing activities commencing 09/02/2022.
1178:M05.3	Rehabilitation Plan	The proponent shall implement the Rehabilitation Management Plan referred to in condition 5-1 until such time as the CEO agrees that the proponent's rehabilitation completion criteria have been fulfilled.	RCMA must implement the Rehabilitation Plan until the approved completion criteria are achieved	Refer to 1178:M05.1. R01_2023 CAR C01_Rehab EMP - Letter to proponent - EMP Approved Appendix F_Rehabilitation Plan Audit	Decommissioning	Annual	C	Rehabilitation was undertaken in April 2023 in accordance with the Rehabilitation Plan. Refer to 1178:M05.1. Achievement of completion criteria is not anticipated until 2026.
1178:M06.1	Rehabilitation Performance Bond	As security for the due and punctual observance and performance by the proponent of the requirements of condition 5 to be observed, conformed and complied with, the proponent shall lodge with the CEO prior to commencement of site preparation activities, an irrevocable	RCMA must lodge a Rehabilitation Bond of $324,500 prior to commencing site preparation activities	R02_2022 CAR	Pre-construction	Q1 2022 (assessed once)	CLD	Bond received by DWER 21/02/2022.

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
		Performance Bond as nominated and approved by the CEO in his/her sole unfettered discretion to a cash value and in a form acceptable to the CEO ("the Security") which Security at the date hereof being $324,500.						
1178:M06.2	Rehabilitation Performance Bond	If the proponent encounters hydrocarbons that have the potential to lead to a commercial field development, as security for the due and punctual observance and performance by the proponent of the requirements of condition 5 to be observed, conformed and complied with, the proponent shall lodge with the CEO on demand within three (3) months of the casing and suspension of the proposal, an irrevocable Performance Bond as nominated and approved by the CEO in his/her sole unfettered discretion to a cash value and in a form acceptable to the CEO ("the Security") which Security at the date hereof being $275,000.	RCMA must lodge a Decommissioning Bond of $275,000 within three months following a commercial hydrocarbon discovery	R02_2022 CAR	Operations	Q3 2022 (assessed once)	CLD	Cervantes 1 did not encounter hydrocarbons. Cervantes 1 well was P&A.
1178:M06.3	Rehabilitation Performance Bond	Upon completion of appropriate decommissioning and rehabilitation works at the site as agreed by the CEO, the Performance Bond referred in condition 6-1 can be reduced to $93,000 as a contingency Performance Bond. Additional works would be required if completion criteria have not been achieved in a period of three (3) years following completion of decommissioning and rehabilitation works as determined by the CEO, on advice of DBCA.	Following rehabilitation activities, on approval of the CEO, the Rehabilitation Bond is reduced to a Contingency Rehabilitation Bond of $93,000	Letter from CEO notifying permission for bond reduction RCMA letter to CEO notifying them of Contingency Rehabilitation Bond	Decommissioning	Annual	NRATS	The decommissioning and rehabilitation works required to reduce the performance bond have been completed by PBE. PBE now request that the Performance Bond referred to in condition 6-1 is reduced to a contingency Performance Bond as per this condition 6-3.
1178:M06.4	Rehabilitation Performance Bond	Security required by conditions 6-1, 6-2 and 6-3 may be reviewed at any time under Part VA 'Financial assurances' of the *Environmental Protection Act 1986*.	Rehabilitation Bond, Decommissioning bond and Contingency Rehabilitation Bond may be reviewed at any time.	-	Overall	Annual	-	Taken condition is taken as information to note.
1178:M07.1	Offsets	If completion criteria have not been fulfilled after decommissioning and rehabilitation, and a further three (3) years following additional works, resulting in significant residual impacts on Beekeepers Nature Reserve, then the proponent shall implement offsets to counter-balance any residual impacts on the nature reserve as determined by the CEO, on advice of DBCA.	More works (re rehabilitation) must be undertaken if rehabilitation is unsuccessful after 3 years Offsets must be implemented 3 years after re rehabilitation if works are unsuccessful	Re rehabilitation completion report Rehabilitation Monitoring Report Year 6	Decommissioning	Annual Annual	NRATS NRATS	Rehabilitation was undertaken in April 2023. Achievement of completion criteria is not anticipated until 2026. Therefore requirement for re-rehabilitation is not yet required.
1178:M08.1	Environmental Management Plan(s): Monitoring and Adaptive Management Program	Prior to ground disturbance and for approval, the proponent must prepare and submit to the CEO Environmental Management Plan(s) to substantiate that the outcomes of conditions M3, M4 and M5 will be met. The Plans must include:	RCMA will prepare and submit and obtain approval from the CEO for Cervantes 1 Vegetation Management Plan [RCMA-02-EM-PLN-004], Cervantes 1 Fauna Management Plan [RCMA-02-EM-PLN-007], Cervantes 1 Weed and Dieback Hygiene	R02_2022 CAR	Pre-construction	Q1 2022 (assessed once)	CLD	Assessed complete in 2022 CAR.

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
		(1) threshold criteria that provide a limit beyond which the environmental outcomes are not achieved; (2) trigger criteria that will provide an early warning that the environmental outcomes are not likely to be met; (3) monitoring parameters, sites, control/reference sites, methodology, timing and frequencies which will be used to measure threshold and trigger criteria. Include methodology for determining alternate monitoring sites as a contingency if proposed sites are not suitable in the future; (4) baseline data; (5) data collection and analysis methodologies; (6) adaptive management methodology; and (7) contingency measures which will be implemented if threshold or trigger criteria are met.	Management Plan [RCMA-02-EM-PLN-003] and Cervantes 1 Rehabilitation Plan [RCMA-02-EM-PLN-008]					
1178:M08.2	Environmental Management Plan(s): Monitoring and Adaptive Management Program	The exceedance of a threshold criteria (regardless of whether threshold contingency measures have been or are being implemented), and / or failure to comply with the requirements of the Environmental Management Plan represents a non-compliance with these conditions.	The exceedance of a threshold criteria and / or failure to comply with the requirements of the Environmental Management Plans represents a non-compliance with these conditions	R01_2023 Compliance Assessment Report R04_C&M Audit Report R05_Rehabilitation Audit Report	Overall	Annual	C	No exceedance of a threshold criteria and / or failure to comply with the requirements of the Environmental Management Plans occurred during the reporting period.
1178:M08.3	Environmental Management Plan(s): Monitoring and Adaptive Management Program	The proponent must not commence operations until the CEO, on advice from DBCA, has confirmed in writing that the Environmental Management Plan(s) satisfies the requirements of this condition.	RCMA must have CEO approval for Environmental Management Plans prior to site preparation	R02_2022 CAR	Pre-construction	Q1 2022 (assessed once)	CLD	Assessed complete in 2022 CAR.
1178:M09.1.1	Environmental Management Plan(s): General Provisions	After receiving notice in writing from the CEO that the management plan(s) for conditions 3, 4 and 5 of this Statement satisfy the requirements of condition 8 respectively, the proponent shall implement the proposal in accordance with the management plans	RCMA must implement the Cervantes 1 proposal in accordance with the Cervantes 1 Vegetation Management Plan [RCMA-02-EM-PLN-004], Cervantes 1 Fauna Management Plan [RCMA-02-EM-PLN-007], Cervantes 1 Weed and Dieback Hygiene Management Plan [RCMA-02-EM-PLN-003] and Cervantes 1 Rehabilitation Plan [RCMA-02-EM-PLN-008]	R04_C&M Audit Report R05_Rehabilitation Audit Report Appendix C_VMP Audit Appendix D_FMP Audit Appendix E_HMP Audit Appendix F_Rehabilitation Plan Audit	Overall	Annual	C	Cervantes has been implemented in accordance with the Management Plans. There were two potential non conformances with the implementation of the Management Plans.
1178:M09.1.2	Environmental Management	After receiving notice in writing from the CEO that the management plan(s) for conditions 3, 4 and 5 of this Statement satisfy the requirements of condition 8 respectively, the proponent shall	RCMA must continue to implement the Cervantes 1 proposal in accordance with the Cervantes 1 Vegetation Management Plan	See M09.1.1	Overall	Annual	C	See M09.1.1

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
	Plan(s): General Provisions	continue to implement the approved plans and programs until the CEO has confirmed by notice in writing that it has been demonstrated that the condition requirements have been met and therefore the implementation of the actions is no longer required	[RCMA-02-EM-PLN-004], Cervantes 1 Fauna Management Plan [RCMA-02-EM-PLN-007], Cervantes 1 Weed and Dieback Hygiene Management Plan [RCMA-02-EM-PLN-003] and Cervantes 1 Rehabilitation Plan [RCMA-02-EM-PLN-008] until the CEO notifies RCMA					
1178:M09.2	Environmental Management Plan(s): General Provisions	The proponent may review and revise the management plan(s).	RCMA may review and revise the management plan(s)	R06_Cervantes 1 Rehabilitation Plan Rev 4 C01_Rehab EMP - Letter to proponent - EMP Approved	Overall	Annual	C	PBE submitted a revised Rehabilitation Plan (R06) to DWER in the reporting period which has been approved (C01).
1178:M09.3	Environmental Management Plan(s): General Provisions	The proponent shall review and revise the management plan(s) as and when directed by the CEO.	RCMA shall review and revise the management plan(s) as and when directed by the CEO	Management Advice 31/12/2023	Overall	Annual	NRATS	The CEO has not directed PBE to review and revise the management plan(s).
1178:M09.4	Environmental Management Plan(s): General Provisions	The proponent shall implement the latest version of the management plan(s), which the CEO has confirmed by notice in writing, satisfies the requirements of conditions M3, M4, M5 and M8 respectively.	RCMA shall implement the CEO approved version of the management plan(s)	C02_Vegetation EMP - Letter to proponent - EMP Approved C03_Fauna EMP - Letter to proponent - EMP Approved C04_Hygiene EMP - Letter to proponent - EMP Approved C01_Rehab EMP - Letter to proponent - EMP Approved R04_C&M Audit Report R05_Rehabilitation Audit Report	Overall	Annual	C	See M09.1.1
1178:M09.5	Environmental Management Plan(s): General Provisions	Despite condition M9.4, but subject to conditions M9.6 and M9.7, the proponent may implement minor revisions to a management plan(s) if the revisions will not result in any new or increased adverse impacts to the environment or result in a risk to the achievement of the management plan(s) limits, outcomes or objectives.	RCMA may implement minor revisions to a management plan(s) if the revisions will not result in any new or increased adverse impacts to the environment or result in a risk to the achievement of the management plan(s) limits, outcomes or objectives	Management Advice 31/12/2023	Overall	Annual	NRATS	The only revisions made to management plans in the reporting period were made under condition 9-2.

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
1178:M09.6	Environmental Management Plan(s): General Provisions	If the proponent is to implement minor revisions to a management plan(s) under condition 9-5, the proponent must provide the CEO with the following at least twenty (20) business days before it implements the revisions: (1) revised management plan(s) clearly showing the minor revisions; (2) explanation of reasons for the minor revisions; and (3) explanation of why the minor revisions will not result in a new or increased adverse impacts to the environment or result in a risk to the achievement of the management plan limits, outcomes or objectives.	RCMA must provide the CEO with the management plan(s) with minor revisions at least 20 days before implementation including: (1) revised management plan(s) clearly showing the minor revisions; (2) explanation of reasons for the minor revisions; and (3) explanation of why the minor revisions will not result in a new or increased adverse impacts to the environment or result in a risk to the achievement of the management plan limits, outcomes or objectives.	Management Advice 31/12/2023	Overall	Annual	NRATS	The only revisions made to management plans in the reporting period were made under condition 9-2.
1178:M09.7	Environmental Management Plan(s): General Provisions	The proponent must cease to implement any revisions which the CEO notifies the proponent in writing may not be implemented.	RCMA must implement the management plan(s) approved by the CEO and management plan(s) with minor changes unless notified by the CEO	Management Advice 31/12/2023	Overall	Annual	NRATS	The only revisions made to management plans in the reporting period were made under condition 9-2.
1178:M09.8	Environmental Management Plan(s): General Provisions	Management Plans must be provided in electronic form suitable for publication on the EPA website within ten (10) business days of endorsement, and also be provided on the proponent's website.	Management Plans must be sent to CEO in electronic format suitable for EPA website within ten (10) business days of endorsement, and also be posted on the RCMA website.	R01_2023 CAR E03_Website Screenshot	Overall	Annual	C	The plans are available within 10 business days of approval on the proponent's website at: https://perthbasinenergy.com/compliance-documents
1178:M10.1	Contact Details	The proponent shall notify the CEO of any change of its name, physical address or postal address for the serving of notices or other correspondence within twenty-eight (28) days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.	RCMA shall notify the CEO of any change of name, physical address or postal address for the serving of notices or other correspondence within twenty-eight (28) days of such change	Management Advice 31/12/2023	Overall	Annual	C	PBE details remain unchanged: PBE Operations Pty Ltd ABN 17 612 244 827 Registered Office: 210 Alice Street, Brisbane Qld 4000 Australia Office Postal: GPO Box 243, Brisbane QLD 4001
1178:M11.1	Compliance and Exceedance Reporting	The proponent shall prepare and maintain a Compliance Assessment Plan which is submitted to the CEO at least six (6) months prior to the first Compliance Assessment Report required by condition M11.5, or prior to implementation of the proposal, whichever is sooner.	RCMA will submit a Compliance Assessment Plan prior to Site Preparation	R02_2022 CAR	Pre-construction	Complete 16/12/2021	CLD	The compliance assessment plan was approved by the CEO 15/02/2022.
1178:M11.2	Compliance and Exceedance Reporting	The Compliance Assessment Plan shall indicate: (1) the frequency of compliance reporting; (2) the approach and timing of compliance assessments;	The Compliance Assessment Plan shall indicate: (1) the frequency of compliance reporting;	R02_2022 CAR	Overall	Q1 2022 (assessed once)	CLD	2022 CAR confirms that the Compliance Assessment Plan contains the required content

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
		(3) the retention of compliance assessments; (4) the method of reporting of potential non-compliances and corrective actions taken; (5) the table of contents of Compliance Assessment Reports; and (6) public availability of Compliance Assessment Reports.	(2) the approach and timing of compliance assessments; (3) the retention of compliance assessments; (4) the method of reporting of potential non-compliances and corrective actions taken; (5) the table of contents of Compliance Assessment Reports; and (6) public availability of Compliance Assessment Reports.					
1178:M11.3	Compliance and Exceedance Reporting	After receiving notice in writing from the CEO that the Compliance Assessment Plan satisfies the requirements of condition M11.2, the proponent shall assess compliance with conditions in accordance with the Compliance Assessment Plan required by condition M11.1.	RCMA shall assess compliance with conditions in accordance with the Compliance Assessment Plan	R01_2023 Compliance Assessment Report	Overall	Annual	C	This audit report for the period: 01/01/2023 to 31/12/2023
				Appendix C_VMP Audit Appendix D_FMP Audit Appendix E_HMP Audit Appendix F_Rehabilitation Plan Audit	Overall	Annual	C	This audit report for the period 1/01/2023 to 31/12/2023: • Appendix C • Appendix D • Appendix E • Appendix F
1178:M11.4	Compliance and Exceedance Reporting	The proponent must provide an annual Compliance Assessment Report to the CEO for the purpose of determining whether the implementation conditions are being complied with.	RCMA must provide an annual Compliance Assessment Report	R02_2022 Compliance Assessment Report E03_Website Screenshot	Overall	Annual	C	The 2022 CAR dated 17/03/2022 for the period: 01/01/2022 to 31/12/2022 was submitted 22/03/2023 (due date 31/03/2023). The report was published on the website at https://perthbasinenergy.com/compliance-documents
1178:M11.5	Compliance and Exceedance Reporting	The first annual Compliance Assessment Report must be submitted within twelve months of the issuing of this statement commencing on the first 31 March after the date of this Statement, and subsequent Compliance Assessment Reports must be submitted annually from that date, unless a different date is approved by the CEO.	RCMA must provide first annual Compliance Assessment Report by 31 March 2022	R02_2022 Compliance Assessment Report E03_Website Screenshot	-	31 Mar 2022 (assessed annually)	C	The first CAR (2021) for the period: 14/12/2021 to 31/12/2021 was submitted 28/03/2022.
1178:M11.6	Compliance and Exceedance Reporting	Each annual Compliance Assessment Report must be endorsed by the proponent's Chief Executive Officer and must: (1) state whether each condition of this Statement has been complied with; (2) provide evidence to substantiate statements of compliance, or details of where there has been a non-	RCMA CEO must endorse the annual Compliance Assessment Report which must: (1) state whether each condition of this Statement has been complied with; (2) provide evidence to substantiate statements of compliance, or	R07_Compliance Assessment Plan Rev v3 R02_2022 Compliance Assessment Report	Overall	Annual	C	Annual 2022 CAR for the period: 01/01/2022 to 31/12/2022 was endorsed by Chris Newport (RCMA CEO) and completed in accordance with the Compliance Assessment Plan and endorsed. The

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
		compliance and describe corrective and preventative actions taken; and (3) be provided in a form suitable for publication on the EPA website.	details of where there has been a non-compliance and describe corrective and preventative actions taken; and (3) be provided in a form suitable for publication on the EPA website.					CAR had a statement in the audit table of whether each condition was complied with and a description of the evidence of compliance. It was provided as a pdf so that it could be loaded on the EPA website.
1178:M11.7.1	Compliance and Exceedance Reporting	If the proponent becomes aware a limit, outcome or threshold criteria contained in these conditions, or a management plan required in these conditions, has, or is likely to be exceeded, the proponent must report this to the CEO within seven (7) days	RCMA must report within 7 days to the CEO where they become aware of a non-compliance (a limit, outcome or threshold criteria contained in these conditions, or a management plan required in these conditions, has, or is likely to be exceeded)	Management Advice 31/12/2023	Overall	Annual	C	The proponent is not aware of a limit, outcome or threshold criteria that was or was likely to become exceeded in the reporting period.
1178:M11.7.2	Compliance and Exceedance Reporting	If the proponent becomes aware a limit, outcome or threshold criteria contained in these conditions, or a management plan required in these conditions, has, or is likely to be exceeded, the proponent must implement contingency measures	RCMA must implement contingency measures if they become aware of a non-compliance	Non-compliance report Notification to DWER: compliance@dwer.wa.go.au	Overall	Annual	NRATS	See M11.7.1
1178:M11.7.3	Compliance and Exceedance Reporting	If the proponent becomes aware a limit, outcome or threshold criteria contained in these conditions, or a management plan required in these conditions, has, or is likely to be exceeded, the proponent must investigate the cause of the exceedance	RCMA must investigate the cause of the exceedance if they become aware of a non-compliance	Non-compliance report CEO Report (21 day): compliance@dwer.wa.go.au	Overall	Annual	NRATS	See M11.7.1
1178:M11.7.4	Compliance and Exceedance Reporting	If the proponent becomes aware a limit, outcome or threshold criteria contained in these conditions, or a management plan required in these conditions, has, or is likely to be exceeded, the proponent must investigate environmental impacts of the exceedance	RCMA must investigate the environmental impacts of the exceedance if they become aware of a non-compliance	Non-compliance report CEO Report (21 day): compliance@dwer.wa.go.au	Overall	Annual	NRATS	See M11.7.1
1178:M11.7.5	Compliance and Exceedance Reporting	If the proponent becomes aware a limit, outcome or threshold criteria contained in these conditions, or a management plan required in these conditions, has, or is likely to be exceeded, the proponent must propose rectification measures	RCMA must propose rectification measures if they become aware of a non-compliance	Non-compliance report CEO Report (21 day): compliance@dwer.wa.go.au	Overall	Annual	NRATS	See M11.7.1
1178:M11.7.6		If the proponent becomes aware a limit, outcome or threshold criteria contained in these conditions, or a management plan required in	RCMA must propose measures to ensure no further impact as a result	Non-compliance report	Overall	Annual	NRATS	See M11.7.1

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
	Compliance and Exceedance Reporting	these conditions, has, or is likely to be exceeded, the proponent must propose measures to ensure no further impact as a result of the exceedance	of the exceedance if they become aware of a non-compliance	CEO Report (21 day): compliance@dwer.wa.go.au				
1178:M11.7.7	Compliance and Exceedance Reporting	If the proponent becomes aware a limit, outcome or threshold criteria contained in these conditions, or a management plan required in these conditions, has, or is likely to be exceeded, the proponent must provide a further report to the CEO within twenty-one (21) days of the original report, detailing the measures required under this condition	RCMA must provide a further report on the incident to the CEO within 21 days of the original report	CEO Report (21 day): compliance@dwer.wa.go.au	Overall	Annual	NRATS	See M11.7.1
1178:M12.1	Public Availability of Data	Subject to condition M12.2, within a reasonable time period approved by the CEO of the issue of this Statement and for the remainder of the life of the proposal, the proponent shall make publicly available, in a manner approved by the CEO, all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g. maps)), management plans and reports relevant to the assessment of this proposal and implementation of this Statement.	RCMA must upload the following to (www.rcma.com): all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g. maps)), management plans and reports relevant to the assessment of this proposal and implementation of this Statement	Audit confirms all required information is available at https://perthbasinenergy.com/compliance-documents	Overall	Annual	C	All data is available at: https://perthbasinenergy.com/compliance-documents
1178:M12.2	Public Availability of Data	If any data referred to in condition 12-1 contains particulars of: (1) a secret formula or process; or (2) confidential commercially sensitive information, the proponent may submit a request for approval from the CEO to not make these data publicly available. In making such a request the proponent shall provide the CEO with an explanation and reasons why the data should not be made publicly available.	RCMA may submit a request to the CEO not to make data publicly available with justification	Letter to the CEO requesting data remain confidential	Overall	Annual	NRATS	No request has been made to keep data from being made publicly available.

Compliance Status: C = Compliant, CLD = Completed, NC = Non – compliant, NR = Not Required at this stage. Please note the terms NA = Not Audited and VR = Verification Required are only for OEPA use. IP = In Process may only be used by the proponent in circumstances outlined in Section 2.8 of the Post Assessment Guideline for Preparing an Audit Table

Appendix C Compliance with Vegetation Management Plan

Reference	Action	Timing	Status	Evidence	Further Information
VMP 1-1	Disturb no more than 5.3 ha of native vegetation	At all stages of the Cervantes 1 Project	C		There was no additional ground disturbance in the reporting period.
VMP 1-2	Disturb no more than 0.99 ha of Priority Ecological Community 'Coastal sands dominated by *Acacia rostellifera, Eucalyptus oraria* and *Eucalyptus obtusiflora'* (PEC)	At all stages of the Cervantes 1 Project	C		There was no additional ground disturbance in the reporting period.
VMP 1-3	No fire originating from Cervantes 1 activities at any time	At all stages of the Cervantes 1 Project	C	Management Advice 31/12/2023	There were no fires originating from Cervantes 1 activities.
VMP1-4	No introduction of dieback disease to the Cervantes 1 Development Envelope at any time	At all stages of the Cervantes 1 Project	C	R03_Cervantes Well Post Rehabilitation Inspection	There were no observations of suspicious tree deaths when the project area was inspected by an environmental specialist in July 2023.
VMP 1-5	Foliage cover of weeds in rehabilitated areas is not greater than adjacent undisturbed remnant vegetation (Note 1) after 3 years. Note 1-Tracks are affected by the weed load on the opposite side of the track. The "edge effect" in comparison with adjacent track edge will be considered for the application of this outcome.	At all stages of the Cervantes 1 Project	NA		Weed assessment is to commence 2024.
VMP 2-1	All personnel and contractors undertake the Cervantes 1 Induction [RCMA-07-TM-FM-004] and the records are included in the training log	At all stages of the Cervantes 1 Project	C	R04_C&M Audit Report R05_Rehabilitation Audit Report	Induction records show all personnel on site during audit have completed inductions
VMP 2-2	The area of land disturbance for the Cervantes 1 Project will be kept to the practicable minimum (including the drilling of a directional well)	Land Clearing	C(C)	R02_2022 CAR	Clearing was kept to 3.3 ha which was below the allowed 5.3 ha as a result of choosing a well pad accessible by existing access tracks (drilling a directional well).
VMP 2-3	Cleared areas no longer required for the project will be progressively rehabilitated	At all stages of the Cervantes 1 Project	C	R01_2023 CAR	Rehabilitation was commenced in 2023 of all areas in discussion with DBCA.
VMP 2-4	A Site Preparation Plan is prepared and approved by the Project Manager to specify all details of site preparation requirements: • Areas to be cleared are clearly demarcated • Sensitivities identified in the flora and vegetation survey are avoided where possible • Site preparation activities occur during daylight hours only • Cleared vegetation is stockpiled in windrows less than 2 m high and separately stockpiled topsoil is lightly compacted in windrows to a height of no more than 2 m • All Crew have undertaken the site preparation induction [RCMA-07-TM-FM-004] • Vehicles and equipment to be used only within approved project footprint (specify areas) • Vehicles must be inspected and cleaned down (off site prior to mobilisation) • Construction refuelling vehicle to have refuelling drip tray, spill kit and contaminated soil bunding tarp (for segregation of material if a spill occurs prior to disposal) • Construction refuelling vehicle is on site during daylight hours only • Construction vehicles are left locked when unattended • Construction light vehicles preferentially refuel offsite	Prior to Site Preparation	C(C)	R02_2022 CAR	Cervantes-1 Civil Works Program (CWP) [RCMA-05-DCW-PLN-012] was issued 06/02/2022.

Reference	Action	Timing	Status	Evidence	Further Information
	Sheeting materials are from Pearson (ex-Grice) marl borrow pit only with all borrow pit topsoil excluded				
VMP 2-5	No clearing will be undertaken until the Project Manager has approved and issued the Site Preparation Plan	Prior to Clearing Activity	NA	Not applicable	This commitment is not applicable to the activities undertaken in the reporting period.
VMP2-6	The Site Preparation Plan cannot be issued until Department of Mines, Industry Regulation and Safety (DMIRS) has accepted the Cervantes 1 Conventional Well Environment Plan [RCMA-02-EM-PLN-001]	Prior to Clearing Activity	NA	Not applicable	This commitment is not applicable to the activities undertaken in the reporting period.
VMP2-7	All site preparation personnel will receive instructions on the areas approved for clearing in the form of the Cervantes 1 Induction [RCMA-07-TM-FM-004] and toolbox meetings	Prior to Clearing Activity	NA	Not applicable	This commitment is not applicable to the activities undertaken in the reporting period.
VMP 2-8	All vegetation clearing is to occur in daylight hours only	During Clearing Activity	C	R05_Rehabilitation Audit Report	All rehabilitation activities occurred during daylight hours.
VMP 2-9	Clearing is undertaken to the extent necessary for the activity only	At all stages of the Cervantes 1 Project	NA	Not applicable	This commitment is not applicable to the activities undertaken in the reporting period.
VMP 2-10	Sensitivities identified in the flora and vegetation survey are avoided where possible	Clearing Activities	C	R03_Cervantes Well Post Rehabilitation Inspection	Post rehabilitation site inspection identified the *Thryptomene* sp. Lancelin (M.E. Trudgen 14000) individual. The botanist was unable to identify the *Eucalyptus zopherophloia* individual (notoriously difficult to distinguish from the other Eucalyptus). The rehabilitation works were not in the vicinity of the *Eucalyptus zopherophloia* as such impact was avoided.
VMP 2-11	Areas to be cleared are clearly demarcated	Clearing Activities	NA	Not applicable	This commitment is not applicable to the activities undertaken in the reporting period.
VMP 2-12	Cleared vegetation is stockpiled in windrows less than 2 m high and separately stockpiled topsoil is lightly compacted in windrows to a height of no more than 2 m and covered in brush	Clearing Activities	NA	Not applicable	This commitment is not applicable to the activities undertaken in the reporting period.
VMP 2-13	All Crew have undertaken the site preparation induction [RCMA-07-TM-FM-004]	Clearing Activities	C	See VMP 2-1	See VMP 2-1
VMP 2-14	Vehicles and equipment to be used only within approved project footprint (specify areas)	Clearing Activities	C	R04_C&M Audit Report R05_Rehabilitation Audit Report Site inspection 22/05/2023	Vehicles and equipment use during audit was confined to the specified areas.
VMP 2-15	The person undertaking clearing is required to fill in a Clearing Vegetation Record Form [RCMA-02-EM-FM-002] (Appendix B) for clearing activities to provide a record of all clearing undertaken for the Project	Post Clearing Activities	NA	Not applicable	This commitment is not applicable to the activities undertaken in the reporting period.
VMP 2-16	The Earthmoving Supervisor is required to submit completed Clearing Vegetation Record Forms [RCMA-02-EM-FM-002] (Appendix B) for all clearing activities undertaken for the Project	Post Clearing Activities	NA	Not applicable	This commitment is not applicable to the activities undertaken in the reporting period.
VMP 2-17	If there were to be any additional vegetation clearing required, the VMP would require review and the identification of the requirement for any additional flora survey made well in advance of operations	Prior to Clearing Activities	NA	-	No additional clearing required.
VMP 2-18	Induction of personnel [RCMA-07-TM-FM-004] outlines the Project hygiene requirements	Prior to Clearing Activities	C	E04_Cervantes-1 Civil Works Induction	Slide 22 of the induction covers project hygiene requirements.
VMP 2-19	Sheeting materials are from Pearson (ex-Grice) marl borrow pit only	Site Preparation	NA	Not applicable	This commitment is not applicable to the activities undertaken in the reporting period, no sheeting materials were imported.

Reference	Action	Timing	Status	Evidence	Further Information
VMP 2-20	Borrow pit is managed to minimise the risk of weed transfer (topsoil exclusion during out loading)	Site Preparation	NA	Not applicable	This commitment is not applicable to the activities undertaken in the reporting period.
VMP 2-21	Vehicles must be inspected and cleaned down (off site prior to mobilisation). Offsite clean down must ensure vehicle is free of all soil and plant matter as per requirements of Cervantes 1 Hygiene Procedure [RCMA-02-EM-PRO-001] Section 6	Prior to Mobilisation to Site	C	E06_L28 E07_E9	Hygiene certificates for all earthmoving equipment on site was sighted during the audit.
VMP 2-22	A hygiene station is established at Jingemia Production Facility (JPF) during site preparation activities (including lined pad with drainage sump, brushes/brooms and weatherproof container for hygiene inspection log)	Site Preparation	C	Site inspection 22/05/2023 E05_Vehicle bio security register	Inspection confirmed the hygiene station was in place at JPF (including lined pad with drainage sump, brushes/brooms and weatherproof container for hygiene inspection log)
VMP 2-23	Vehicles and equipment are to arrive on site in a clean state and conduct inspection on site at JPF hygiene station in accordance with the Hygiene Procedure [RCMA-02-EM-PRO-001] including sign off on the hygiene inspection log	At all stages of the Cervantes 1 Project	C	Site inspection 22/05/2023 E05_Vehicle bio security register	Vehicles were observed checking their vehicles on entry to the site with the biosecurity register indicating where clean downs have been undertaken.
VMP 2-24	Personnel are required to complete the induction which outlines weed and dieback hygiene requirements	Prior to Mobilisation to Site	C	See VMP 2-18	See VMP 2-18
VMP 2-25	Firebreaks shall be maintained and constructed in compliance with statutory requirements to provide protection to adjacent undisturbed remnant vegetation from a potential fire from the Project ie vegetation cleared to 100 mm: • 1m on either side of access tracks • 10 m around the well site	At all stages of the Cervantes 1 Project	NA	Not applicable	Firebreaks were removed and rehabilitated during rehabilitation activities.
VMP 2-26	Smoking is permitted in designated areas only	At all stages of the Cervantes 1 Project	C	Management Advice	Most personnel do not smoke however the office was nominated as the designated smoking area.
VMP 2-27	All site vehicles have serviceable fire extinguishers	At all stages of the Cervantes 1 Project	C	Site inspection 22/05/2023 R04_C&M Audit Report R05_Rehabilitation Audit Report	All vehicles observed on site had fire extinguishers.
VMP 2-28	Serviceable fire extinguishers are in place in accordance with the (ERP) rig diagram	During Drilling	NA	Not applicable	The rig was not on site in the reporting period.
VMP 2-29	A mobile water cart is on site at the times specified in the ERP	At all stages of the Cervantes 1 Project	NA	Not applicable	Activities undertaken outside restricted period.
VMP 2-30	To prevent impact on native vegetation outside the project footprint, all personnel shall only drive on existing tracks, access roads, firebreaks, and service corridors. No travel outside designated access routes shall occur without the approval of the Project Manager	At all stages of the Cervantes 1 Project	C	Site inspection 22/05/2023 R04_C&M Audit Report R05_Rehabilitation Audit Report	All vehicles during audit drove on existing tracks, access roads, firebreaks, and service corridors.
VMP 2-31	All personnel shall adhere to vehicle speed limits as sign posted and outlined in the induction to prevent dust from accumulating on vegetation	At all stages of the Cervantes 1 Project	C	Site inspection 22/05/2023 R04_C&M Audit Report R05_Rehabilitation Audit Report	All vehicles sighted during the audit were travelling at low speed (<40km/h).
VMP 2-32	Should concerns of dust be raised, suppression measures will be investigated	At all stages of the Cervantes 1 Project	C	Management Advice 31/12/2023	No concerns of dust were raised in the reporting period.
VMP 2-33	Where surface water drainage requires diversion away from operational areas, roads and other areas, the diversion shall be managed such that adjacent undisturbed remnant vegetation is protected from long-term inundation	At all stages of the Cervantes 1 Project	NA	Management Advice 31/12/2023	No diversion of surface water drainage required.

<table>
<tr><th>Reference</th><th>Action</th><th>Timing</th><th>Status</th><th>Evidence</th><th>Further Information</th></tr>
<tr><td>VMP 2-34</td><td>Completion criteria monitoring is to continue annually until all completion criteria have been achieved.</td><td>Post Rehabilitation</td><td>NA</td><td></td><td></td></tr>
<tr><td>VMP 3-1</td><td>Undertake routine inspections in accordance with Table 11.
<table>
<tr><th>Stage</th><th>Frequency</th><th>Inspection Descriptor</th></tr>
<tr><td>Site Preparation</td><td>Daily</td><td>Ground Condition Checks as part of Daily Vehicle Checks</td></tr>
<tr><td>End of Site Preparation</td><td>Once</td><td>Site Preparation Plan Check</td></tr>
<tr><td>Drilling</td><td>Daily</td><td>Site Visual Inspection</td></tr>
<tr><td>Well Testing</td><td>Daily</td><td>Site Visual Inspection</td></tr>
<tr><td>Care & Maintenance</td><td>Weekly</td><td>Visual Site Inspection (Security) noted on Daily Logbook</td></tr>
<tr><td>Decommissioning / Rehabilitation</td><td>Daily</td><td>Ground Condition Checks as part of Daily Vehicle Checks</td></tr>
<tr><td>Post Decommissioning / Rehabilitation Activity</td><td>On Activity</td><td>Decommissioning / Rehabilitation Plan Check</td></tr>
<tr><td>Post Rehabilitation</td><td>Monthly</td><td>Visual Site Inspection [Workplace Inspection Checklist]</td></tr>
</table></td><td>At all stages of the Cervantes 1 Project</td><td>C</td><td>E01_2023 06 08 Cervantes Inspection
E02_2023 06 26 Cervantes Inspection
R03_Cervantes Well Post rehabilitation Inspection</td><td>Routine inspections were undertaken in accordance with Table 11 for the stages of Cervantes 1 operations undertaken in the reporting period:
Ground condition checks as part of Daily Vehicle Check
Visual Site Inspection (E01, E02)
Rehabilitation Plan Check (R03)</td></tr>
<tr><td>VMP 3-2</td><td>Undertake environmental auditing in accordance with Table 12.
<table>
<tr><th>Timing</th></tr>
<tr><td>During or immediately post site preparation</td></tr>
<tr><td>During drilling activities</td></tr>
<tr><td>During well testing activities</td></tr>
<tr><td>During remediation / rehabilitation activities</td></tr>
<tr><td>Annual internal environmental audit (AIEA) - To continue annually where no activities are being undertaken on site until completion criteria has been achieved</td></tr>
</table></td><td>At all stages of the Cervantes 1 Project</td><td>C</td><td>R04_C&M Audit Report
R05_Rehabilitation Audit Report</td><td>Environmental auditing was undertaken during activities undertaken in the reporting period; care and maintenance and remediation / rehabilitation activities.</td></tr>
<tr><td>VMP 3-3</td><td>Contingency measures are to be implemented where the threshold criteria “Disturbance of <5.3 ha of native vegetation” is met:
Reporting clearing outside of permitted area to DWER, DBCA and DMIRS
Rehabilitation of non-permitted cleared area immediately</td><td>At all stages of the Cervantes 1 Project</td><td>NA</td><td>See VMP 1-1</td><td>See VMP 1-1</td></tr>
</table>

Reference	Action	Timing	Status	Evidence	Further Information
VMP 3-4	Contingency measures are to be implemented where the threshold criteria "Disturbance of ≤0.99 ha of Priority Ecological Community 'Coastal sands dominated by *Acacia rostellifera, Eucalyptus oraria* and *Eucalyptus obtusiflora*' (PEC)" is met: • Reporting clearing outside of permitted area to DWER, DBCA and DMIRS • Rehabilitation of non-permitted cleared area immediately	At all stages of the Cervantes 1 Project	NA	See VMP 1-2	See VMP 1-2
VMP 3-5	Contingency measures are to be implemented where the threshold criteria "No fire entering native vegetation originating from Cervantes 1 Activity" is met: • Implement Emergency Response Plan • Contact Emergency Services and DBCA • All fires are reported as per Section 11.3 of the Cervantes 1 EP	At all stages of the Cervantes 1 Project	NA	See VMP 1-3	See VMP 1-3
VMP 3-6	Contingency measures are to be implemented where the threshold criteria "No introduction of dieback" is met: • Hygiene procedure review • Dieback interpreter engaged • Consultation with DBCA • Reporting as per Section 11.3 of the Cervantes 1 EP	At all stages of the Cervantes 1 Project	NA	See VMP 1-4	See VMP 1-4
VMP 3-7	Contingency measures are to be implemented where the threshold criteria "The foliage cover of weeds in rehabilitation areas should not be greater than adjacent undisturbed remnant vegetation (Note 1)" is met: • Review of weed control program and implement revised program • Review of hygiene procedures • Consultation with DBCA • Reporting as per Section 11.3 of the Cervantes 1 EP Note 1-Tracks are affected by the weed load on the opposite side of the track. The "edge effect" in comparison with adjacent track edge will be considered for the application of this completion criteria on tracks	At all stages of the Cervantes 1 Project	NA	See VMP 1-5	See VMP 1-5
VMP 3-8	Environmental incidents shall be reported and investigated as soon as practicable following identification, enabling effective actions to be implemented without delay. Environmental incidents are defined as events that cause or could potentially cause harm to the environment.	At all stages of the Cervantes 1 Project	C	R12_Cervantes 1 Recordable Incident Report Apr 2023 R13_Cervantes 1 Recordable Incident Report May 2023	There were no incidents reported in the reporting year.
VMP 3-9	The person undertaking clearing is required to submit completed Clearing Vegetation Record Form/s [RCMA-02-EM-FM-002] (Appendix B) for clearing activities to provide a record of all clearing undertaken for the Project.	At all stages of the Cervantes 1 Project	NA	Not applicable	There was no clearing in the reporting period.
VMP 3-10	An AER is submitted to DMIRS annually under Regulation 16 of the Petroleum and Geothermal Energy Resources (Environment) Regulations 2012. The AER requires details of: • Activities that have been undertaken • Clearing or rehabilitation that has been undertaken	At all stages of the Cervantes 1 Project	C	C05_Perth Basin Energy Cervantes 1 DMIRS AER R11_C100-202310-007v0 DMIRS AER	AER submitted to DEMIRS 24/10/2023.

Reference	Action	Timing	Status	Evidence	Further Information
	• Compliance for each objective and standard in the EP (includes compliance with VMP) • Audits undertaken • Incidents that have occurred • Monitoring results				
VMP 3-11	A compliance assessment report will be submitted to EPA as per the requirements of the Compliance Assessment Plan [RCMA-02-EM-PLN-011] under the conditions of the Ministerial Statement. The report will contain evidence to substantiate statements of compliance against the requirements of this Vegetation Management Plan.	At all stages of the Cervantes 1 Project	C	R02_2022 Compliance Assessment Report	CAR submitted to DWER 22/03/2023.
VMP 3-12	This VMP is to be reviewed by RCMA: • When the need for adaptive management not covered in this VMP is recognised • Every second year from the commencement of operations until the achievement of rehabilitation completion criteria, to ensure it remains current • As and when directed by the EPA	At all stages of the Cervantes 1 Project	C	Management Advice 31/12/2022	Management advised that there is no need for VMP review based on: • Adaptive management not covered in this VMP • 2 yearly review requirements (EMP is dated 24/01/2022) • Direction from EPA has not been given

Appendix D Compliance with Fauna Management Plan

Reference	Action	Timing	Status	Evidence	Further Information
FMP 1-1	No fire originating from Cervantes 1 activities at any time	At all stages of the Cervantes 1 Project	C	Site Inspection 22/05/2023 Management Advice R04_C&M Audit Report R05_Rehabilitation Audit Report R12_Cervantes 1 Recordable Incident Report Apr 2023 R13_Cervantes 1 Recordable Incident Report May 2023	There were no fires originating from Cervantes 1 activities.
FMP 1-2	No introduction of dieback disease to the Cervantes 1 Development Envelope at any time	At all stages of the Cervantes 1 Project	C	R03_Cervantes Well Post-rehabilitation Inspection	No suspicious tree deaths were observed during post-rehabilitation site inspection.
FMP 1-3	Foliage cover of weeds in rehabilitated areas is not greater than adjacent undisturbed remnant vegetation (Note 1) after 3 years. Note 1-Tracks are affected by the weed load on the opposite side of the track. The “edge effect” in comparison with adjacent track edge will be considered for the application of this outcome.	At all stages of the Cervantes 1 Project	NA		Rehabilitation was undertaken April 2023 (criteria to be assessed in 2028).
FMP 1-4	No terrestrial fauna strike in the development envelope due to Cervantes 1 activities	At all stages of the Cervantes 1 Project	C	Site Inspection 22/05/2023 Management Advice R04_C&M Audit Report R05_Rehabilitation Audit Report R12_Cervantes 1 Recordable Incident Report Apr 2023 R13_Cervantes 1 Recordable Incident Report May 2023	No reports of fauna strike in the development envelope in the reporting period.
FMP 1-5	No entrapment of terrestrial fauna in the mud pit, well cellar or VSP pit at any time	At all stages of the Cervantes 1 Project	C		No reports of entrapment of terrestrial fauna in the mud pit, well cellar or VSP in the reporting period.
FMP 1-6	No terrestrial fauna found in waste receptacles	At all stages of the Cervantes 1 Project	C		No reports of fauna found in waste receptacles in the reporting period.
FMP 2-1	All personnel and contractors undertake the Cervantes 1 Induction [RCMA-07-TM-FM-004] and the records are included in the training log. Specific items covered include RCMA travel procedures, Vehicle speed limits, Staying on access tracks, Requirement for personnel to be alert for wildlife while driving and Waste management requirements	At all stages of the Cervantes 1 Project	C	E04_Cervantes-1 Civil Works Induction R04_C&M Audit Report R05_Rehabilitation Audit Report	Induction records show all personnel on site during audit have completed inductions. Induction contains all required details; travel procedures, speed limits, staying on access tracks, waste management and being alert for wildlife.
FMP 2-2	The area of land disturbance for the Cervantes 1 Project will be kept to the practicable minimum	Land Clearing	C(C)	R02_2022 CAR	Clearing was kept to 3.3 ha which was below the allowed 5.3 ha as a result of choosing a well pad accessible by existing access tracks (drilling a directional well).
FMP 2-3	Cleared areas no longer required for the project will be progressively rehabilitated	At all stages of the Cervantes 1 Project	C	R01_2023 CAR	Rehabilitation of areas no longer required for the project was undertaken in April 2023.
FMP 2-4	A Site Preparation Plan is prepared and approved by the Project Manager to specify all details of site preparation requirements: • Areas to be cleared are clearly demarcated • Sensitivities identified in the flora and vegetation survey are avoided where possible • Site preparation activities occur during daylight hours only • A walk through with a loud sound to flush fauna is conducted prior to clearing of native vegetation • All Crew have undertaken the site preparation induction [RCMA-07-TM-FM-004]	Prior to Site Preparation	C(C)	R02_2022 CAR	Cervantes-1 Civil Works Program (CWP) [RCMA-05-DCW-PLN-012] was issued 06/02/2022.

Reference	Action	Timing	Status	Evidence	Further Information
	• Vehicles and equipment to be used only within approved project footprint (specify areas) All waste is to be taken offsite for disposal				
FMP 2-5	No clearing will be undertaken until the Project Manager has approved and issued the Site Preparation Plan	Prior to Clearing Activity	C(C)	R02_2022 CAR	The CWP was issued 06/02/2022 and clearing commenced 09/02/2022.
FMP 2-6	The Site Preparation Plan cannot be issued until Department of Mines, Industry Regulation and Safety (DMIRS) has accepted the Cervantes 1 Conventional Well Environment Plan [RCMA-02-EM-PLN-001]	Prior to Clearing Activity	C(C)	R02_2022 CAR	The Environment Plan was approved 04/02/2022 and the CWP was issued 06/02/2022.
FMP 2-7	All site preparation personnel will receive instructions on the areas approved for clearing in the form of the Cervantes 1 Induction [RCMA-07-TM-FM-004] and toolbox meetings	Prior to Clearing Activity	C(C)	R02_2022 CAR	The induction contains a figure of the project foot print and personnel were instructed on areas approved for clearing during toolbox meetings.
FMP 2-8	All vegetation clearing is to occur in daylight hours only	During Clearing Activity	C(C)	R02_2022 CAR	Clearing activities commenced and were completed in daylight hours on 10/02/2022.
FMP 2-9	Clearing is undertaken to the extent necessary for the activity only	At all stages of the Cervantes 1 Project	C(C)	R02_2022 CAR	Clearing was kept to 3.3 ha well below the allowed foot print of 5.5 ha.
FMP 2-10	Sensitivities identified in the flora and vegetation survey are avoided where possible	Clearing Activities	C(C)	R02_2022 CAR	Audit confirmed that the *Eucalyptus zopherophloia* (P05) and *Thryptomene* sp. Lancelin (M.E. Trudgen 14000) (P06) individuals identified during field survey were avoided.
FMP 2-11	Areas to be cleared are clearly demarcated	Clearing Activities	C(C)	R02_2022 CAR	HTD surveyed and physically marked out the footprint with survey tape prior to site preparation activities. The firebreak from Jingemia to the railway that was missed was pegged on a second visit.
FMP 2-12	Site preparation activities occur during daylight hours only	Clearing Activities	C(C)	R02_2022 CAR	Site preparation activities were undertaken in daylight hours.
FMP 2-13	A walk through with a loud sound to flush fauna is conducted prior to clearing of native vegetation	Clearing Activities	C(C)	R02_2022 CAR	Personnel were observed during clearing making loud sounds in front of the dozer during site preparation.
FMP 2-14	All Crew have undertaken the site preparation induction [RCMA-07-TM-FM-004]	Clearing Activities	C(C)	R02_2022 CAR	See FMP 2-1
FMP 2-15	Vehicles and equipment to be used only within approved project footprint (specify areas)	Clearing Activities	C(C)	R02_2022 CAR	Vehicles and equipment use during audit was confined to the specified areas.
FMP 2-16	The person undertaking clearing is required to fill in a Clearing Vegetation Record Form [RCMA-02-EM-FM-002] for clearing activities to provide a record of all clearing undertaken for the Project	Post Clearing Activities	NA	Not applicable	This commitment is not applicable to the activities undertaken in the reporting period.
FMP 2-17	The Earthmoving Supervisor is required to submit completed Clearing Vegetation Record Forms [RCMA-02-EM-FM-002] for all clearing activities undertaken for the Project	Post Clearing Activities	NA	Not applicable	This commitment is not applicable to the activities undertaken in the reporting period.
FMP 2-18	If there were to be any additional vegetation clearing required, the FMP would require review and the identification of the requirement for any additional fauna survey made well in advance of operations	Prior to Clearing Activities	NA	-	No additional clearing required.
FMP 2-19	To prevent impact on stygofauna, there will be no groundwater abstraction or dewatering at the Cervantes 1 drill site.	At all stages of the Cervantes 1 Project	NA	R04_C&M Audit Report R05_Rehabilitation Audit Report	All water for the project was sourced from the Jingemia Production Facility.
FMP 2-20	To prevent impact on native vegetation outside the project footprint, all personnel shall only drive on existing tracks, access roads,	At all stages of the Cervantes 1 Project	C	Site inspection 22/05/2023 R04_C&M Audit Report R05_Rehabilitation Audit Report	All vehicles during audit drove on existing tracks, access roads, firebreaks, and service corridors.

<table>
<tr><th>Reference</th><th>Action</th><th>Timing</th><th>Status</th><th>Evidence</th><th>Further Information</th></tr>
<tr><td></td><td>firebreaks, and service corridors. No travel outside designated access routes shall occur without the approval of the Project Manager.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>FMP 2-21</td><td>All vehicles are to drive within the speed limits outlined in the Cervantes 1 Induction [RCMA-07-TM-FM-004] or as posted.</td><td>At all stages of the Cervantes 1 Project</td><td>C</td><td>Site inspection 22/05/2023
R04_C&M Audit Report
R05_Rehabilitation Audit Report</td><td>All vehicles sighted during the audit were travelling at low speed (<40km/h).</td></tr>
<tr><td>FMP 2-22</td><td>Personnel will report injured wildlife to the Project Supervisor to follow up with a fauna response agency listed in Section 10.1</td><td>At all stages of the Cervantes 1 Project</td><td>NA</td><td>R12_Cervantes 1 Recordable Incident Report Apr 2023
R13_Cervantes 1 Recordable Incident Report May 2023</td><td>No injured wildlife reported during Cervantes 1 activities.</td></tr>
<tr><td>FMP 2-23</td><td>All personnel shall adhere to vehicle speed limits as sign posted and outlined in the induction to prevent dust issues for fauna. Should concerns of dust be raised, suppression measures will be investigated.</td><td>At all stages of the Cervantes 1 Project</td><td>C</td><td>Site inspection 22/05/2023
E04_Cervantes-1 Civil Works Induction</td><td>All vehicles sighted during the audit were travelling at low speed (<40km/h).</td></tr>
<tr><td>FMP 2-24</td><td>Lighting during all phases of the proposal will be directed on operational areas only to minimise fauna attraction to light spill</td><td>At all stages of the Cervantes 1 Project</td><td>NA</td><td>Site inspection 22/05/2023
R04_C&M Audit Report
R05_Rehabilitation Audit Report</td><td>All activities in the reporting period were undertaken during daylight hours. No lighting was required.</td></tr>
<tr><td>FMP 2-25</td><td>All waste will be stored in appropriately covered receptacles to exclude fauna before being removed from site</td><td>At all stages of the Cervantes 1 Project</td><td>C</td><td>Site inspection 22/05/2023
R04_C&M Audit Report
R05_Rehabilitation Audit Report</td><td>No waste was stored on site during C&M and rehabilitation activities.</td></tr>
<tr><td>FMP 2-26</td><td>Good housekeeping practices are enforced on site throughout Project including site inspections at all stages of Project</td><td>At all stages of the Cervantes 1 Project</td><td>C</td><td>E01_2023 06 08 Cervantes Inspection
E02_2023 06 26 Cervantes Inspection</td><td>Site inspections documented good housekeeping at Cervantes 1.</td></tr>
<tr><td>FMP 2-27</td><td>All drill pipe stored on the ground (i.e. not in use) will have the ends capped to prevent fauna ingress</td><td>At all stages of the Cervantes 1 Project</td><td>NA</td><td>Site inspection 22/05/2023
R04_C&M Audit Report
R05_Rehabilitation Audit Report</td><td>No drill pipe was stored at Cervantes in the reporting period.</td></tr>
<tr><td>FMP 2-28</td><td>Excavations such as the mud sump and Turkey’s Nest will have fauna exclusion fencing and fauna escape mechanisms</td><td>At all stages of the Cervantes 1 Project</td><td>C</td><td>R04_C&M Audit Report</td><td>Prior to rehabilitation excavations had fauna exclusion fencing and fauna escape mechanisms (mud sump, VSP, JPF Turkey Nest). The fencing and escape mechanisms were removed from site when the excavations were rehabilitated in April 2023.</td></tr>
<tr><td>FMP 2-29</td><td>Fenced excavations will be inspected:
Daily – during drilling
Weekly – during Care and Maintenance</td><td>At all stages of the Cervantes 1 Project</td><td>C</td><td>R04_C&M Audit Report</td><td>Fenced Excavations were inspected weekly during C&M.</td></tr>
<tr><td>FMP 3-1</td><td>Undertake routine inspections in accordance with Table 11.
<table>
<tr><th>Stage</th><th>Frequency</th><th>Inspection Descriptor</th></tr>
<tr><td>Site Preparation</td><td>Daily</td><td>Ground Condition Checks as part of Daily Vehicle Checks</td></tr>
<tr><td>End of Site Preparation</td><td>Once</td><td>Site Preparation Plan Check</td></tr>
<tr><td>Drilling</td><td>Daily</td><td>Site Visual Inspection</td></tr>
<tr><td>Well Testing</td><td>Daily</td><td>Site Visual Inspection</td></tr>
</table></td><td>At all stages of the Cervantes 1 Project</td><td>C</td><td>E01_2023 06 08 Cervantes Inspection
E02_2023 06 26 Cervantes Inspection
R03_Cervantes Well Post-rehabilitation Inspection</td><td>Routine inspections were undertaken in accordance with Table 11 for the stages of Cervantes 1 operations undertaken in the reporting period (C&M, Decommissioning/Rehabilitation).</td></tr>
</table>

Reference	Action	Timing	Status	Evidence	Further Information
	Care & Maintenance — Weekly — Visual Site Inspection (Security) noted on Daily Logbook Decommissioning / Rehabilitation — Daily — Ground Condition Checks as part of Daily Vehicle Checks Post Decommissioning / Rehabilitation Activity — On Activity — Decommissioning / Rehabilitation Plan Check				
FMP 3-2	Undertake environmental auditing in accordance with Table 12. **Timing** During or immediately post site preparation During drilling activities During well testing activities During remediation / rehabilitation activities To continue annually where no activities are being undertaken on site until completion criteria has been achieved - AIEA	At all stages of the Cervantes 1 Project	C	R04_C&M Audit Report R05_Rehabilitation Audit Report	Environmental auditing was undertaken during and following rehabilitation activities and AIEA during care and maintenance activities. No other activities were undertaken in the reporting period.
FMP 3-3	Contingency measures are to be implemented where the threshold criteria "Disturbance of <5.3 ha of native vegetation" is met: • Reporting clearing outside of permitted area to DWER, DBCA and DMIRS • Rehabilitation of non-permitted cleared area immediately	At all stages of the Cervantes 1 Project	NA	R02_2022 CAR	The threshold for disturbance of 5.3 ha has not been met.
FMP 3-4	Contingency measures are to be implemented where the threshold criteria "No fire entering native vegetation originating from Cervantes 1 Activity" is met: • Implement Emergency Response Plan • Contact Emergency Services and DBCA • All fires are reported as per Section 10.2	At all stages of the Cervantes 1 Project	NA	See FMP 1-1	See FMP 1-1
FMP 3-5	Contingency measures are to be implemented where the threshold criteria "No introduction of dieback" is met: • Hygiene procedure review • Dieback interpreter engaged • Consultation with DBCA • Reporting as per Section 10.2	At all stages of the Cervantes 1 Project	NA	See FMP 1-2	See FMP 1-2
FMP 3-6	Contingency measures are to be implemented where the threshold criteria "The foliage cover of weeds in rehabilitated areas is not greater than adjacent undisturbed remnant vegetation (Note 1)" is met: • Review of weed control program and implement revised program • Review of hygiene procedures	At all stages of the Cervantes 1 Project	NA	See FMP 1-3	See FMP 1-3

Reference	Action	Timing	Status	Evidence	Further Information
	• Consultation with DBCA • Reporting as per Section 10.2 Note 1-Tracks are affected by the weed load on the opposite side of the track. The "edge effect" in comparison with adjacent track edge will be considered for the application of this completion criteria on tracks				
FMP 3-7	Contingency measures are to be implemented where the threshold criteria "No direct terrestrial native fauna deaths" is met: • Vehicle fauna strike • Entrapment of terrestrial fauna in an excavation • Entrapment of terrestrial fauna in an artificial water body • Terrestrial fauna are attracted to light • Dust suppression required more than twice per day • Terrestrial fauna found in waste receptacle	At all stages of the Cervantes 1 Project	NA	See FMP 1-4, FMP 1-5 and FMP 1-6	See FMP 1-4, FMP 1-5 and FMP 1-6
FMP 3-8	Environmental incidents shall be reported and investigated as soon as practicable following identification, enabling effective actions to be implemented without delay. Environmental incidents are defined as events that cause or could potentially cause harm to the environment.	At all stages of the Cervantes 1 Project	C	R12_Cervantes 1 Recordable Incident Report Apr 2023 R13_Cervantes 1 Recordable Incident Report May 2023	There were no incidents reported in the reporting year.
FMP 3-9	The person undertaking clearing is required to submit completed Clearing Vegetation Record Form/s [RCMA-02-EM-FM-002] for clearing activities to provide a record of all clearing undertaken for the Project.	At all stages of the Cervantes 1 Project	NA	Not applicable	This commitment is not applicable to the activities undertaken in the reporting period.
FMP 3-10	An AER is submitted to DMIRS annually under Regulation 16 of the Petroleum and Geothermal Energy Resources (Environment) Regulations 2012. The AER requires details of: • Activities that have been undertaken • Clearing or rehabilitation that has been undertaken • Compliance for each objective and standard in the EP (includes compliance with FMP) • Audits undertaken • Incidents that have occurred • Monitoring results	At all stages of the Cervantes 1 Project	C	C05_Perth Basin Energy Cervantes 1 DMIRS AER	AER submitted to DEMIRS 24/10/2023.
FMP 3-11	A compliance assessment report will be submitted to EPA as per the requirements of the Compliance Assessment Plan [RCMA-02-EM-PLN-011] under the conditions of Ministerial Statement 1178. The report will contain evidence to substantiate statements of compliance against the requirements of this Fauna Management Plan.	At all stages of the Cervantes 1 Project	C	C06_Cervantes - Annual DWER CAR - MS1178	CAR submitted to DWER 22/03/2023.
FMP 3-12	This FMP is to be reviewed by RCMA: • When the need for adaptive management not covered in this FMP is recognised • Every second year from the commencement of operations until the achievement of rehabilitation completion criteria, to ensure it remains current • As and when directed by the EPA	At all stages of the Cervantes 1 Project	NA	Management Advice 31/12/2023	Management advised that there is no need for FMP review based on: • Adaptive management not covered in this FMP • 2 yearly review requirements (EMP is dated 24/01/2022). EMP is to be reviewed in 2024. • Direction from EPA has not been given

Appendix E Compliance with Hygiene Management Plan

Reference	Action	Timing	Status	Evidence	Further Information
HMP 1-1	No introduction of dieback disease to the Cervantes 1 Development Envelope at any time	At all stages of the Cervantes 1 Project	C	R03_Cervantes Well Post-rehabilitation Inspection	No suspicious tree deaths were observed during post-rehabilitation site inspection.
HMP 1-2	Foliage cover of weeds in rehabilitated areas is not greater than adjacent undisturbed remnant vegetation (Note 1) after 3 years. Note 1-Tracks are affected by the weed load on the opposite side of the track. The "edge effect" in comparison with adjacent track edge will be considered for the application of this outcome.	At all stages of the Cervantes 1 Project	NA		Rehabilitation was undertaken April 2023 (criteria to be assessed in 2028).
HMP 2-1	All personnel and contractors undertake the Cervantes 1 Induction [RCMA-07-TM-FM-004] and the records are included in the training log	At all stages of the Cervantes 1 Project	C	E04_Cervantes-1 Civil Works Induction R04_C&M Audit Report R05_Rehabilitation Audit Report	Induction records show all personnel on site during audit have completed inductions
HMP 2-2	The area of land disturbance for the Cervantes 1 Project will be kept to the practicable minimum	Land Clearing	C(C)	R02_2022 CAR	Clearing was kept to 3.3 ha which was below the allowed 5.3 ha as a result of choosing a well pad accessible by existing access tracks (drilling a directional well).
HMP 2-3	Cleared areas no longer required for the project will be progressively rehabilitated	At all stages of the Cervantes 1 Project	C	R01_2023 CAR	Rehabilitation of areas no longer required for the project was undertaken in April 2023.
HMP 2-4	A Site Preparation Plan will be prepared to specify all details of site preparation requirements, including: • Earthmoving equipment inspection and clean down prior to mobilisation to site • Establishment of a hygiene station during site preparation activities (including lined pad with drainage sump, brushes/brooms and weatherproof container for inspection register) • Requirement for a Hygiene Procedure [RCMA-02-EM-PRO-001] (Appendix E) and Hygiene Inspection Log [RCMA-02-EM-FM-002] (Appendix F) available at the hygiene station • Sheeting materials are from the Pearson (ex-Grice) marl borrow pit only • Requirements for borrow pit management to exclude topsoil (minimise risk of weeds) • Areas to be cleared are clearly demarcated • Vehicles and equipment to be used only within approved project footprint (specify areas) • All Crew have undertaken the induction [RCMA-07-TM-FM-004] Weed inspections will be undertaken 1-2 weeks following rainfall	Prior to Site Preparation	C(C)	R02_2022 CAR	Cervantes-1 Civil Works Program (CWP) [RCMA-05-DCW-PLN-012] was issued 06/02/2022.
HMP 2-5	Induction of personnel [RCMA-07-TM-FM-004] outlines the Project hygiene requirements. And includes images of the weeds in Figure 4	At all stages of the Cervantes 1 Project	C	E04_Cervantes-1 Civil Works Induction	Slide 22 of the induction covers project hygiene requirements.
HMP 2-6	Sheeting materials (marl to minimise dieback risk) are from Pearson (ex-Grice) marl borrow pit only	Site Preparation	NA		No sheeting material was brought onto the site into the reporting period.
HMP 2-7	Borrow pit is managed to minimise the risk of weed transfer (topsoil exclusion during out loading and stockpiled with sufficient controls to	Site Preparation	NA	Refer to HMP 2-6	Refer to HMP 2-6

Reference	Action	Timing	Status	Evidence	Further Information
	ensure that it does not contaminate materials being imported into the reserve (e.g. a sufficient distance away and not down-wind from material being loaded))				
HMP 2-8	All earthmoving equipment must be inspected and cleaned down off site prior to mobilisation. Offsite clean down must ensure vehicle is free of all soil and plant matter as per requirements of Cervantes 1 Hygiene Procedure [RCMA-02-EM-PRO-001] Section 6 (Appendix E)	Prior to Mobilisation to Site	C	E06_L28 E07_E9	Hygiene certificates for all earthmoving equipment on site was sighted during the audit.
HMP 2-9	A hygiene station is established at Jingemia Production Facility (JPF) (Figure 5) during site preparation activities (including lined pad with drainage sump, brushes/brooms and weatherproof container for hygiene inspection log) *Images of example hygiene station presented in Appendix G	Site Preparation	C	Site inspection 22/05/2023 E05_Vehicle bio security register	Inspection confirmed the hygiene station was in place at JPF (including lined pad with drainage sump, brushes/brooms and weatherproof container for hygiene inspection log)
HMP 2-10	Vehicles and equipment are to arrive on site in a clean state and all vehicles conduct inspection on site at JPF hygiene station in accordance with the Hygiene Procedure (Appendix E) including driver sign off on the hygiene inspection log (Appendix F) * *unless issued with a permit from the RCMA Operations Manager All soil moving machinery will be cleaned on leaving site to ensure plant pathogens are not exported from the site.	At all stages of the Cervantes 1 Project	C	Site inspection 22/05/2023 E05_Vehicle bio security register	Vehicles were observed checking their vehicles on entry to the site with the biosecurity register indicating where clean downs have been undertaken.
HMP 2-11	A permit may be granted for vehicles travelling on well maintained, hygienic, sealed roads to the Cervantes 1 site frequently to reduce the number of inspections required if the conditions on the permit are met	At all stages of the Cervantes 1 Project	C	Site inspection 22/05/2023 E05_Vehicle bio security register	Vehicles were observed during auditor inspection entering the Cervantes 1 site not requiring inspection having recorded inspections previously (E05). Inspection of vehicle showed compliance with hygiene standard.
HMP 2-12	Only drive on existing tracks, access roads, firebreaks, and service corridors to prevent impact on native vegetation outside the project footprint	At all stages of the Cervantes 1 Project	C	Site inspection 22/05/2023 R04_C&M Audit Report R05_Rehabilitation Audit Report	All vehicles during audit drove on existing tracks, access roads, firebreaks, and service corridors.
HMP 2-13	Personnel are required to complete the induction which outlines weed and dieback hygiene requirements including reiteration of the importance of staying within the project footprint	Prior to Mobilisation to Site	C	See HMP 2-5	See HMP 2-5
HMP 2-14	Following importation and spread of sheeting material at BKNR, a weed inspection will be carried out 1-2 weeks following rainfall	Immediately following rainfall	C(C)	R02_2022 CAR	This action was completed in the 2022 reporting period.
HMP 2-15	Any identified weeds will be removed by hand pulling immediately on detection and DBCA notified as soon as possible	At all stages of the Cervantes 1 Project	C	R03_Cervantes Well Post-rehabilitation Inspection E10_2023 08 10 Cervantes Weekly Inspection	Potential small weeds were identified during the rehabilitation site inspection (R03) however they were not of a size that would enable hand pulling or require notification to DBCA. Recommendation from monitoring personnel was to monitor in August. August site inspection (E10) did not detect weeds requiring hand pulling.
HMP 2-16	All removed weeds will be disposed of appropriately off-site	At all stages of the Cervantes 1 Project	NA	Refer to HMP 2-15	Refer to HMP 2-15
HMP 2-17	Following detection, ongoing monitoring for new germination will continue 1-2 weeks after rainfall events in consultation with DBCA	At all stages of the Cervantes 1 Project	C	C07_Cervantes CAR Information Request Response	Monitoring was undertaken throughout winter on a weekly basis.
HMP 2-18	A rehabilitation plan is to be submitted to DMIRS and will outline measures during rehabilitation and over following periods to manage and control the spread of weed species and remediation actions to be implemented if required	Within two years of well P&A	C	R14_RCMA-02-EM-PLN-001v6 EP	The rehabilitation plan has been submitted to DEMIRS. The Environment Plan contains Performance Objectives and Standards in Section 7.8 to manage and control the spread of weed species and remediation actions to be implemented. The DEMIRS EP is to be updated in 2024 in line with amendments made to the DWER accepted Rev 4 of the Rehabilitation Plan.

Reference	Action	Timing	Status	Evidence	Further Information
HMP 2-19	Should any weed infestation remain present on cessation of the Cervantes 1 drilling activity, on-going control and monitoring will continue until the infestation is considered controlled in consultation with DBCA	Until Cervantes 1 completion criteria have been met	C	R03_Cervantes Well Post-rehabilitation Inspection E10_2023 08 10 Cervantes Weekly Inspection C07_Cervantes CAR Information Request Response	There is currently an ongoing monitoring program for weeds. The rehabilitation inspection identified small weeds on site and addressing these before seed set in Spring 2024 will be critical. OFI Establish arrangements for a weed control program for July 2024 and September 2024.
HMP 3-1	Inspections are conducted 1-2 weeks after rainfall events during care and maintenance and rehabilitation phases of the project.	During C&M and Rehabilitation Phases	C	E01_2023 06 08 Cervantes Inspection E02_2023 06 26 Cervantes Inspection	Workplace inspections are undertaken weekly during care and maintenance and fortnightly after rehabilitation.
HMP 3-2	Weed and dieback monitoring is conducted on an annual basis commencing one year following the cessation of the Cervantes 1 drilling activity. The requirements of the monitoring are presented in Table 2.	At all stages of the Cervantes 1 Project	NA	Refer to HMP 1-1	Cervantes activity ceased in April 2023. Weed and dieback monitoring will commence on an annual basis in 2024.
HMP 3-4	Contingency measures are to be implemented where the threshold criteria “No introduction of dieback” is met: • Hygiene procedure review • Dieback interpreter engaged • Consultation with DBCA • Reporting as per Section 11.3 of the Cervantes 1 EP	At all stages of the Cervantes 1 Project	NA	R03_Cervantes Well Post-rehabilitation Inspection	The threshold criteria “No introduction of dieback” has not been met.
HMP 3-5	Contingency measures are to be implemented where the threshold criteria “The foliage cover of weeds in rehabilitation areas should not be greater than adjacent undisturbed remnant vegetation (Note 1)” is met: • Review of weed control program and implement revised program • Review of hygiene procedures • Consultation with DBCA • Reporting as per Section 11.3 of the Cervantes 1 EP Note 1-Tracks are affected by the weed load on the opposite side of the track. The “edge effect” in comparison with adjacent track edge will be considered for the application of this completion criteria on tracks	At all stages of the Cervantes 1 Project	NA	R03_Cervantes Well Post-rehabilitation Inspection	The rehabilitation inspection report documents observations of small weeds in the project area and recommends that monitoring is undertaken late August / early September with control implemented as required. No threshold criteria were met.
HMP 3-6	RCMA will continue to engage with stakeholders for the life of the Cervantes 1 Project.	At all stages of the Cervantes 1 Project	C	C05_Perth Basin Energy Cervantes 1 DMIRS AER	Ongoing stakeholder consultation is documented in the DEMIRS Annual Environmental Report (C05).
HMP 3-7	Environmental incidents shall be reported and investigated as soon as practicable following identification, enabling effective actions to be implemented without delay. Environmental incidents are defined as events that cause or could potentially cause harm to the environment.	At all stages of the Cervantes 1 Project	C	R12_Cervantes 1 Recordable Incident Report Apr 2023 R13_Cervantes 1 Recordable Incident Report May 2023	There were no incidents reported in the reporting year.
HMP 3-8	An AER is submitted to DMIRS annually under Regulation 16 of the Petroleum and Geothermal Energy Resources (Environment) Regulations 2012. The AER requires details of: • Activities that have been undertaken • Clearing or rehabilitation that has been undertaken	At all stages of the Cervantes 1 Project	C	C05_Perth Basin Energy Cervantes 1 DMIRS AER	AER submitted to DEMIRS 24/10/2023.

Reference	Action	Timing	Status	Evidence	Further Information
	• Compliance for each objective and standard in the EP (includes compliance with HMP) • Audits undertaken • Incidents that have occurred • Monitoring results				
HMP 3-9	A compliance assessment report will be submitted to EPA as per the requirements of the Compliance Assessment Plan [RCMA-02-EM-PLN-011] under the conditions of the Ministerial Statement. The report will contain evidence to substantiate statements of compliance against the requirements of this Hygiene Management Plan.	At all stages of the Cervantes 1 Project	C	C06_Cervantes - Annual DWER CAR - MS1178	CAR submitted to DWER 22/03/2023.
HMP 3-10	This HMP is to be reviewed by RCMA: • When the need for adaptive management not covered in this FMP is recognised • Every second year from the commencement of operations until the achievement of rehabilitation completion criteria, to ensure it remains current • As and when directed by the EPA	At all stages of the Cervantes 1 Project	NA	Management Advice 31/12/2023	Management advised that there is no need for HMP review in 2023 based on: • Adaptive management not covered in this HMP • 2 yearly review requirements (EMP is dated 24/01/2022). EMP will be reviewed in 2024. • Direction from EPA has not been given

Appendix F Compliance with Rehabilitation Plan

Reference	Action	Timing	Status	Evidence	Further Information
CRP 1	Outcome: No permanent markers, infrastructure or litter are left at rehabilitating sites	Immediately following rehabilitation	PNC	R03_Cervantes Well Post-rehabilitation Inspection C07_Cervantes CAR Information Request Response	Rehabilitation was undertaken in April 2023. Site inspection July 2023 made observations of flagging tape and fibre debris. These items are being followed up.
CRP 2	Outcome: Natural contours are re-instated to pre-disturbance conditions upon rehabilitation as per pre-project survey	Immediately following rehabilitation	C	R03_Cervantes Well Post-rehabilitation Inspection	Rehabilitation was undertaken in April 2023. Site inspection July 2023 documents natural contours have been reinstated to pre-disturbance conditions.
CRP 3	Outcome: No bare patches larger than 10 m2 after 3 years	3 years following rehabilitation	NA	Not applicable	This criteria is applicable in 2026.
CRP 4	Outcome: Foliage cover of weeds in rehabilitated areas is not greater than adjacent undisturbed remnant vegetation after 3 years	3 years following rehabilitation	NA	Not applicable	This criteria is applicable in 2026.
CRP 5	Outcome: Total native vegetation percentage cover of perennials should reach at least 50% of the control after 3 years for VTs	3 years following rehabilitation	NA	Not applicable	This criteria is applicable in 2026.
CRP 6	Outcome: Native vegetation cover shows a pattern of increasing over time	Following rehabilitation	NA	R03_Cervantes Well Post-rehabilitation Inspection	First vegetation cover monitoring to occur in 2024. Monitoring personnel will be able to determine if there is a qualitative pattern of increasing vegetation cover relative to 2023 and a baseline for quantitative assessment.
CRP 7	Outcome: The species richness of keystone species per monitoring plot is at least 50% of the control monitoring plot within 3 years	3 years following rehabilitation	NA	Not applicable	This criteria is applicable in 2026.
CRP 8	Outcome: Keystone species richness in >90% of rehabilitating monitoring quadrats is not less than control monitoring quadrats within each vegetation type after three years	3 years following rehabilitation	NA	Not applicable	This criteria is applicable in 2026.
CRP 9	Outcome: Species richness of the rehabilitation is greater than 50% of monitoring transects within each VT within 3 years	3 years following rehabilitation	NA	Not applicable	This criteria is applicable in 2026.
CRP 10	Outcome: No introduction of dieback disease to the Cervantes 1 Development Envelope at any time	At all stages of the Cervantes 1 Project	C	R03_Cervantes Well Post-rehabilitation Inspection	No suspicious tree deaths were observed during post-rehabilitation site inspection.
CRP 11	Goal: An agreement is in place for the proposed future of Cervantes 1 infrastructure	Prior to rehabilitation	C	R06_Rehabilitation Plan Rev 4 C01_Rehab EMP - Letter to proponent - EMP Approved	Current Rehabilitation Plan approved 18/09/2023 in place.
CRP 12	Goal: Each area to be rehabilitated is included in the rehabilitation planning prior to the commencement of rehabilitation	Prior to rehabilitation	C	R06_Rehabilitation Plan Rev 4	Section 2.2 of the Rehabilitation Plan includes each area to be rehabilitated.
CRP 13	Goal: All areas are rehabilitated in accordance with the Rehabilitation Plan and documented in the “Supervision of Rehabilitation Report”	During rehabilitation	C	E08_RCMA-02-EM-TRG-003v0 End of Decommissioning Report	The Rehabilitation was undertaken in accordance with the Rehabilitation Plan as documented in the Supervision of Rehabilitation Report.
CRP 14	Goal: All areas achieve identified completion criteria or receive remedial actions that bring them into compliance	3 years following rehabilitation	NA	Not applicable	This criteria is applicable in 2026.
CRP 15	Goal: The DBCA are satisfied with each area rehabilitated and progressively accept responsibility for ongoing management of rehabilitated areas following achievement of completion criteria	3 years following rehabilitation	NA	Not applicable	This criteria is applicable in 2026.
CRP 16	Goal: The DMIRS accept RCMA have met all requirements of the Cervantes 1 Environment Plan under the Petroleum and Geothermal Energy Resources (Environment) Regulations 2012.	3 years following rehabilitation	C	C05_Perth Basin Energy Cervantes 1 DMIRS AER DEMIRS Consultation 02/02/2024	PBE submitted the Cervantes 1 Annual Environment Report 24/10/2024. DEMIRS advised during initial consultation regarding a proposed update of the Environment Plan to include details of the revised Rehabilitation Plan that there were no issues to raise.

Reference	Action	Timing	Status	Evidence	Further Information
CRP 17	Fire Breaks Retain track as strategic firebreak. Vegetation and topsoil retained during development to remain in-situ.	During rehabilitation	C	R03_Cervantes Well Post-rehabilitation Inspection	The post-rehabilitation site inspection documents that the track has been retained as a strategic firebreak. The track is gated and three bulky bags are in place.
CRP 18	Access Tracks – existing The access track (where it has maintained its running surface width) to be retained for future use. Where the access track is wider, rehabilitation works will be undertaken on the widened portion of the access track; Remove marl, cultivate/rip soil to relieve any induced compaction and rehabilitate to native vegetation of the adjacent vegetation type (VT).	During rehabilitation	C	R03_Cervantes Well Post-rehabilitation Inspection	The post-rehabilitation site inspection documents that the track where its original running width was maintained has been retained. Where it was wider (at the north and south ends of the track) the track has been rehabilitated.
CRP 19	Access Track – new Remove marl, cultivate/rip soil to relieve any induced compaction and rehabilitate the entire area to native vegetation of the adjacent VT. . At the railway junction, make track over the railway crossing sweep into existing northern track, blocking the rehabilitating track. Scarify soft sand track to nowhere from well pad running south 200m.	During rehabilitation	C	R03_Cervantes Well Post-rehabilitation Inspection	The post-rehabilitation site inspection documents that the track starting from the railway crossing has been rehabilitated.
CRP 20	Well pad Remove soil material (different from the topsoil) from the topsoil windrow on the northern side of the well pad from site with the mud sump materials. Remove marl, cultivate/rip soil to relieve any induced compaction and rehabilitate the entire area to native vegetation	During rehabilitation	C	R03_Cervantes Well Post-rehabilitation Inspection	The post-rehabilitation site inspection documents that the marl had been removed, soil mounding wasd indicative of ripping to reduce compacting, topsoil had been spread, soil scarified and retained vegetation had been spread over the soil surface.
CRP 21	Mud Sump Remove muds and liner from site and recontour	During rehabilitation	C	E09_Rehabilitation Waste MWRS Inv 202111	The muds and liner were removed from site and taken to MWRS (E09).
CRP 22	Flare pit Remove liner material for offsite disposal and recontour.	During rehabilitation	C	E09_Rehabilitation Waste MWRS Inv 202111	The flare pit liner material was removed from site with the drilling muds and taken to MWRS (E09).
CRP 23	Groundwater Monitoring bore The groundwater monitoring bore will be decommissioned in accordance with Chapter 18 “Bore Decommissioning” of the Minimum Construction Requirements for Water Bores in Australia	During rehabilitation	C	E08_RCMA-02-EM-TRG-003v0 End of Decommissioning Report	The groundwater monitoring bore was decommissioned in April 2023 in accordance with Chapter 18 “Bore Decommissioning” of the Minimum Construction Requirements for Water Bores in Australia
CRP 24	Abandonment Plaque Leave in situ as per DMIRS requirement	Following P&A of the Cervantes 1 well	C	R03_Cervantes Well Post-rehabilitation Inspection	Abandonment plaque is in place.
CRP 25	Baseline soil samples will be taken during construction prior to commencement of drilling operations from selected areas around the site, including but not limited to: • Base of the mud sump • Refuelling areas • Chemical and hydrocarbon storage areas • Flare pit The analytical suite will depend on the potential contaminating material in the area of sampling but in particular tests would include physical parameters, petroleum hydrocarbons and dissolved metals	Prior to drilling the Cervantes 1 well	C(C)	R02_2022 CAR	This was undertaken in the 2022 reporting year.

Reference	Action	Timing	Status	Evidence	Further Information
	(eg. pH, salinity, total recoverable hydrocarbons, BTEX and heavy metals).				
CRP 26	Once the exploration activities have ceased and during rehabilitation of the site, the specified areas will be resampled to characterise and validate the soil condition post exploration to ensure that activities have not impacted the native soils.	During rehabilitation	C	R15_GEMEC SGVA Report-Cervantes-01, Apr 2023 Rev0	Soil and groundwater validation assessment was completed during rehabilitation to ensure that all muds were removed from site.
CRP 27	Contaminated soils will be removed from site prior to the completion of rehabilitation activities and further validation will be required until the site is clean.	During rehabilitation	C	Refer to CRP 26	Refer to CRP 26
CRP 28	A groundwater monitoring bore will be installed down gradient (west) of the mud sump on the perimeter of the drill site.	Prior to drilling the Cervantes 1 well	C(C)	R02_2022 CAR	This was undertaken in the 2022 reporting year.
CRP 29	Water sample analysis for the analytes listed in Table 5 will be initially conducted prior to the commencement of drilling operations.	Prior to drilling the Cervantes 1 well	C(C)	R02_2022 CAR	This was undertaken in the 2022 reporting year.
CRP 30	The sampling will be conducted by a suitably qualified environmental technician with samples analysed by a NATA accredited laboratory and results provided to DMIRS and DBCA in AERs as per Sections 11.4.1 and 11.4.4 of the Cervantes 1 Conventional Oil Exploration Well Environment Plan [RCMA-02-EM-PLN-001].	Prior to drilling the Cervantes 1 well	C(C)	R02_2022 CAR	This was undertaken in the 2022 reporting year.
CRP 31	The monitoring bore will be monitored within 3 months of the completion of drilling and 6-monthly thereafter until a final monitoring event following the later of decommissioning of the mud sump or P&A of the well.	Following drilling of the Cervantes 1 well	C	R15_GEMEC SGVA Report-Cervantes-01, Apr 2023 Rev0	The final soil and groundwater validation assessment report summarises all surveillance and validation monitoring that was conducted.
CRP 32	Anomalous results will be investigated and any requirement for remedial action addressed in the form of a remediation plan.	At all stages of the Cervantes 1 Project	NA	R15_GEMEC SGVA Report-Cervantes-01, Apr 2023 Rev0	No anomalous results reported (R15).
CRP 33	Earthmoving equipment inspection and clean down prior to mobilisation to site	Prior to rehabilitation activities	C	E06_L28 E07_E9 E05_Vehicle bio security register	All earthmoving equipment was inspected and cleaned down prior to mobilisation.
CRP 34	Establishment of a hygiene station (including lined pad, brushes/brooms and weatherproof container for inspection register)	Site Preparation	C	E05_Vehicle bio security register R05_Rehabilitation Audit Report	The hygiene station was maintained ready for rehabilitation works.
CRP 35	Hygiene Procedure [RCMA-02-EM-PRO-001] in place and Hygiene Inspection Log [RCMA-02-EM-FM-003] available at the hygiene station	At all stages of the Cervantes 1 Project	C	E05_Vehicle bio security register R05_Rehabilitation Audit Report	Hygiene Procedure in place and Hygiene Inspection Log is available at the hygiene station.
CRP 36	Commitment removed from Rev 4 of Rehabilitation Plan				
CRP 37	Vehicles and equipment to be used only within approved project footprint (areas specified in this Rehabilitation Plan)	At all stages of the Cervantes 1 Project	C	R03_Cervantes Well Post-rehabilitation Inspection Management Advice 31/12/2023	Vehicles and equipment use during reporting period was confined to the specified areas.
CRP 38	All Crew have undertaken the induction [RCMA-07-TM-FM-004]	At all stages of the Cervantes 1 Project	C	E04_Cervantes-1 Civil Works Induction R05_Rehabilitation Audit Report	All rehabilitation crew undertook the Cervantes Induction.
CRP 39	To minimise the introduction of weeds into the rehabilitation vegetation, the access tracks and well-pad, and the topsoil and mulch stockpiles will be visually inspected for weeds and control implemented as required. Weed control will involve both ‘hand pulling’ and spot/target application of a general nonselective herbicide or in	At all stages of the Cervantes 1 Project	NA	R04_C&M Audit Report	Topsoil and mulch stockpiles were visually inspected for weeds. Personnel determined that no weed control was required.

Reference	Action	Timing	Status	Evidence	Further Information
	the case of grass weeds the application of a grass selective herbicide (Fusilade®).				
CRP 40	All muds will be taken from site.	During rehabilitation	C	E09_Rehabilitation Waste MWRS Inv 202111	All muds were taken to MWRS.
CRP 41	Validation sampling will be undertaken from the base of the sump, refuelling areas, chemical and hydrocarbon storage areas and the flare pit.	During rehabilitation	C	R15_GEMEC SGVA Report-Cervantes-01, Apr 2023 Rev0	Validation sampling was conducted from the drilling mud retention pond, the well head area, the former chemical / fuel storage area and the unused flare pit area.
CRP 42	Any contaminated material will be removed from site in accordance with the Cervantes 1 Conventional Well Oil Spill Contingency Plan [RCMA-02-EM-PLN-002].	During rehabilitation	NA	R15_GEMEC SGVA Report-Cervantes-01, Apr 2023 Rev0	There was no contaminated material at the Cervantes 1 location. The muds were graded as Class I landfill and taken to MWRS.
CRP 43	The limestone marl from the well pad and decommissioned access tracks will be removed from BKNR utilising a front-end-loader and taken for re-use outside the conservation estate.	During rehabilitation	C	P01_Marl Stockpile P02_Marl Stockpile	The limestone marl was taken to Jingemia Production Facility where it is stockpiled in windrows for reuse.
CRP 44	The well pad, flare pit and mud sump will be recontoured to achieve final landform.	During rehabilitation	C	Refer to CRP 20	Refer to CRP 20
CRP 45	The area to be rehabilitated will be ripped to a depth of approximately 50 cm to relieve induced compaction.	During rehabilitation	C	Refer to CRP 20	Refer to CRP 20
CRP 46	The existing topsoil stockpiles will be spread evenly over the area to be rehabilitated.	During rehabilitation	C	Refer to CRP 20	Refer to CRP 20
CRP 47	Topsoil will be spread back into areas with the same Vegetation Types to maximise the similarity with adjacent vegetation.	During rehabilitation	C	Refer to CRP 20	Refer to CRP 20
CRP 48	The final surface will be lightly scarified to 20cm depth on contour to provide a friable seedbed and mitigate surface erosion.	During rehabilitation	C	Refer to CRP 20	Refer to CRP 20
CRP 49	The stockpiled vegetation will be spread over the surface of the scarified topsoil. The vegetation will be spread back into areas with the same Vegetation Types to maximise the similarity with adjacent vegetation.	During rehabilitation	C	Refer to CRP 20	Refer to CRP 20
CRP 50	Monthly inspections of rehabilitating sites confirm no foreign materials	Following rehabilitation	C	E01_2023 06 08 Cervantes Inspection E02_2023 06 26 Cervantes Inspection E10_2023 08 10 Cervantes Weekly Inspection	Monthly inspections (E01, E02, E10) confirm no foreign materials.
CRP 51	Foreign materials are removed from the rehabilitating site if permanent markers, infrastructure or litter is left at the site at any time.	Following rehabilitation	PNC	Refer to CRP 1	Refer to CRP 1
CRP 52	Natural contours are re-instated to pre-disturbance conditions upon rehabilitation as per pre-project survey	During rehabilitation	C	Refer to CRP 20	Refer to CRP 20
CRP 53	Land survey confirms earthmoving equipment has achieved natural contours to pre-disturbance conditions	During rehabilitation	NA	Not applicable	The site is the bottom of a swale (flat) with no contour interface with surrounding landscape.
CRP 54	If contours do not appear to be pre-disturbance condition, earthworks will be undertaken again before proceeding with ripping and spreading of topsoil and vegetation	During rehabilitation	NA	Refer to CRP 53	Refer to CRP 53

Reference	Action	Timing	Status	Evidence	Further Information
CRP 55	Annual rehabilitation monitoring confirms no bare patches larger than 10 m^2 after 12 months	Annually	NA	Not applicable	Rehabilitation monitoring transects were set up in 2023and monitoring will commence in 2024.
CRP 56	Re-rehabilitation options will be investigated where there are bare patches larger than 10 m^2 after 12 months. Re-rehabilitation will be implemented where there are bare patches larger than 10 m^2 after 3 years.	3 years following rehabilitation	NA	Refer to CRP 55	Refer to CRP 55
CRP 57	Annual rehabilitation monitoring confirms weeds in rehabilitation areas are not greater than on adjacent undisturbed remnant vegetation (Note 1) Note 1-Tracks are affected by the weed load on the opposite side of the track. The "edge effect" in comparison with adjacent track edge will be considered for the application of this completion criteria on tracks	Annually	NA	Refer to CRP 55	Refer to CRP 55
CRP 58	Additional weed control to be implemented where weed control program is not managing weeds in rehabilitation areas to foliage cover less than 80% of adjacent undisturbed remnant vegetation (Note 1).	Where required	NA	Refer to CRP 55	Refer to CRP 55
CRP 59	Annual rehabilitation monitoring confirms total native vegetation percentage cover of perennials is at least 50% of the control	Annually	NA	Refer to CRP 55	Refer to CRP 55
CRP 60	Re-rehabilitation options will be investigated where Total native vegetation percentage cover of perennials is less than 40%. Re-rehabilitation will be implemented where Total native vegetation percentage cover of perennials has not reached at least 50% of the control after 3 years for VTs	Where required	NA	Refer to CRP 55	Refer to CRP 55
CRP 61	Annual rehabilitation monitoring confirms native vegetation cover is increasing over time	Annually	NA	Refer to CRP 55	Refer to CRP 55
CRP 62	Re-rehabilitation options will be investigated where Native vegetation cover is not increasing over time	Where required	NA	Refer to CRP 55	Refer to CRP 55
CRP 63	Annual rehabilitation monitoring confirms species richness of keystone species is at least 50% of the control monitoring plot	Annually	NA	Refer to CRP 55	Refer to CRP 55
CRP 64	Re-rehabilitation options will be investigated where Species richness of keystone species is less than 40% of the control monitoring plots. Re-rehabilitation will be implemented where the species richness of keystone species per monitoring plot is not at least 50% of the control monitoring plot within 3 years	Where required	NA	Refer to CRP 55	Refer to CRP 55
CRP 65	Annual rehabilitation monitoring confirms at least one of the keystone species is represented (as % cover) in >90% of monitoring quadrats within each VT	Annually	NA	Refer to CRP 55	Refer to CRP 55
CRP 66	Re-rehabilitation options will be investigated where there are no keystone species represented (as % cover) in >25% of monitoring quadrats within each VT. Re-rehabilitation will be implemented where Keystone species richness has not achieved in >90% of rehabilitating monitoring quadrats is not less than control monitoring quadrats within each vegetation type after three years	Where required	NA	Refer to CRP 55	Refer to CRP 55
CRP 67	Annual rehabilitation monitoring confirms species richness of the rehabilitation is greater than 50% of monitoring transects within each VT	Annually	NA	Refer to CRP 55	Refer to CRP 55

Reference	Action	Timing	Status	Evidence	Further Information
CRP 68	Re-rehabilitation options will be investigated where species richness of the rehabilitation is not greater than 50% of monitoring transects within each VT within 3 years.	Where required	NA	Refer to CRP 55	Refer to CRP 55
CRP 69	Monthly inspections of project area vegetation confirm no suspect deaths	At all stages of the Cervantes 1 Project	C	E01_2023 06 08 Cervantes Inspection E02_2023 06 26 Cervantes Inspection R03_Cervantes Well Post-rehabilitation Inspection	No suspect deaths have been identified during inspections.
CRP 70	Annual rehabilitation monitoring checks for visual signs of dieback	Annually	NA	Refer to CRP 55	Refer to CRP 55
CRP 71	Triennial dieback interpretation of vulnerable areas in project area	Triennial	C	R16_Dieback Assessment	The previous dieback assessment was undertaken in June 2021.It did not identify any vulnerable areas in the project area. The threshold criteria requirement is “The occurrence of dieback within the project is no greater than prior to the project within 3 years of initiating rehabilitation). As such interpretation is required in 2026.
CRP 72	Hygiene measures to protect susceptible areas will be implemented where suspect susceptible dieback flora deaths have occurred.	As required	NA	Not applicable	Hygiene measures have been implemented prior to site entry. No hygiene measures are required within the site as there are no internal dieback risks or susceptible dieback flora deaths.
CRP 73	Training on relevant sections of this Rehabilitation Plan will be incorporated into the Cervantes 1 Induction [RCMA-07-TM-FM-004]. Upon completion, trained personnel will be signed off and recorded in the training log along with the date and the specific induction for which training was conducted. All personnel and contractors are required to undertake the induction.	Prior to rehabilitation	C	Refer to CRP 38	Refer to CRP 38
CRP 74	Undertake environmental auditing in accordance with Table 12. **Timing** During remediation / rehabilitation activities To continue annually where no activities are being undertaken on site until completion criteria has been achieved - AIEA	At all stages of the Cervantes 1 Project	C	R05_Rehabilitation Audit Report	An audit was undertaken during rehabilitation activities. No non-conformances were raised and six opportunities for improvement were identified.
CRP 75	A program of rehabilitation monitoring will be conducted by a suitably qualified environmental professional initially 2 to 3 months following rehabilitation and then on an annual basis.	Annually	C	R03_Cervantes Well Post-rehabilitation Inspection	Monitoring transects and quadrats were set up during a rehabilitation inspection in July 2023 following rehabilitation activities in April 2023. Rehabilitation monitoring is to commence in 2024.
CRP 76	The locations of monitoring sites are presented in Figure 11: • 2 permanent transects 48m long comprising 12 2m x 2m quadrats across access track • 2 paired permanent transects 48m long comprising 12 2m x 2m quadrats adjacent to the rehabilitated areas of access track • 1 permanent transect 100m long comprising 25 2m x 2m quadrats across access track north of the drill site • 1 control transect 100m long comprising 25 2m x 2m quadrats as control for the access track running immediately parallel	Annually	C	R03_Cervantes Well Post-rehabilitation Inspection	Refer to CRP 75

Reference	Action	Timing	Status	Evidence	Further Information
	• 2 permanent transects 100m long comprising 25 2m x 2m quadrats running north south over the rehabilitating drill site • 1 control transect 100m long comprising 25 2m x 2m quadrats immediately north of the drill site				
CRP 77	Additional survey of rehabilitation areas outside of quantitative monitoring transects will occur and will focus on ensuring that the rehabilitation performance is consistent across the area (plant cover and species richness) and that any potential constraints such as weeds or bare areas receive appropriate remediation.	Annually	NA	Refer to CRP 75	Refer to CRP 75
CRP 78	A visual inspection of rehabilitation areas will be undertaken to identify any areas of erosion, weeds and bares areas. Identification of areas with inadequate establishment of vegetation enables early intervention with rectification work to return the rehabilitation to a trajectory for meeting the completion criteria.	Annually	NA	Refer to CRP 75	Refer to CRP 75
CRP 79	Assess vegetation within permanent monitoring transects • Total cover of each native plant species, and • Total cover of weed species. • Cover of Keystone species	Annually	NA	Refer to CRP 75	Refer to CRP 75
CRP 80	Photograph of each transect	Annually	NA	Refer to CRP 75	Refer to CRP 75
CRP 81	Walk through rehabilitation and along tracks will be undertaken to provide an assessment over the entire rehabilitated area. Areas with inadequate establishment of vegetation will be recorded with GPS locations for follow up rectification work to return the rehabilitation to a trajectory for meeting the completion criteria. The rehabilitation will be visually assessed for: • bare areas • weeds • signs of dieback disease • additional taxa not recorded within plots and transects.	Annually	NA	Refer to CRP 75	Refer to CRP 75
CRP 82	Visual inspection over the site with GPS record of locations and physical measurement (regular monitoring) of any points of erosion	Annually	NA	Refer to CRP 75	Refer to CRP 75
CRP 83	Should the monitoring results indicate the rehabilitation is not progressing towards completion criteria, an assessment will be made to determine rectification requirements	Annually	NA	Refer to CRP 75	Refer to CRP 75
CRP 84	The rehabilitation monitoring program will cease after 3 years when the rehabilitation objectives and completion criteria have been achieved in consultation with DMIRS and DBCA.	3 years following rehabilitation	NA	Refer to CRP 75	Refer to CRP 75
CRP 85	Should the rehabilitation not meet the criteria, a rectification plan will be developed and implemented, with monitoring continuing until the rehabilitation objectives and completion criteria have been achieved.	3 years following rehabilitation	NA	Refer to CRP 75	Refer to CRP 75
CRP 86	The results of these management and monitoring activities will be detailed in the Annual Environmental Report (AER).	Annually	NA	Refer to CRP 75	Refer to CRP 75
CRP 87	The monitoring program will be reviewed in consultation with DBCA and DMIRS on an annual basis.	Annually	NA	Refer to CRP 75	Refer to CRP 75

Reference	Action	Timing	Status	Evidence	Further Information
CRP 88	The annual monitoring program will identify any maintenance or rectification work required (such as erosion control, weed control, reseeding etc). This information will be used to develop and implement the rectification work plan.	Annually	NA	Refer to CRP 75	Refer to CRP 75
CRP 89	Where rehabilitation efforts have been unsuccessful after a period of three years, options will be investigated including but not limited to: • Seeding • Planting • Mulching • Ripping • Irrigating	3 years after rehabilitation	NA	Not applicable	This criteria is applicable in 2026
CRP 90	RCMA will continue to engage with stakeholders for the life of the Cervantes 1 Project.	At all stages of the Cervantes 1 Project	C	C05_Perth Basin Energy Cervantes 1 DMIRS AER	Ongoing stakeholder consultation is documented in the DEMIRS Annual Environmental Report (C05).
CRP 91	Environmental incidents shall be reported and investigated as soon as practicable following identification, enabling effective actions to be implemented without delay. Environmental incidents are defined as events that cause or could potentially cause harm to the environment.	At all stages of the Cervantes 1 Project	C	R12_Cervantes 1 Recordable Incident Report Apr 2023 R13_Cervantes 1 Recordable Incident Report May 2023	There were no incidents reported in the reporting year.
CRP 92	On completion of any rehabilitation activities, an End of Rehabilitation Report [RCMA-02-EM-TRG-002] (Appendix D) will be submitted by the Rehabilitation Supervisor to the Project Manager. This report will be included in the AER submitted to DMIRS.	Following rehabilitation activities	C	E08_RCMA-02-EM-TRG-003v0 End of Decommissioning Report	The information contained in the End of Rehabilitation Report was included in the AER submitted to DEMIRS.
CRP 93	An AER is submitted to DMIRS annually under Regulation 16 of the Petroleum and Geothermal Energy Resources (Environment) Regulations 2012. The AER requires details of: • Activities that have been undertaken • Clearing or rehabilitation that has been undertaken • Compliance for each objective and standard in the EP (includes compliance with Rehabilitation Plan) • Audits undertaken • Incidents that have occurred • Monitoring results The AER will also be provided to the DBCA and Environmental Protection Authority.	At all stages of the Cervantes 1 Project	C	C05_Perth Basin Energy Cervantes 1 DMIRS AER	AER submitted to DEMIRS 24/10/2023.
CRP 94	The Rehabilitation Plan is to be reviewed and revised and approved by the EPA in consultation with the EPA, DBCA and DMIRS: • When there is a change in the details of the Rehabilitation Plan, or • When the need for adaptive management not covered in this plan is recognised • When there is a change in rehabilitation circumstances, or • As and when directed by the EPA.	At all stages of the Cervantes 1 Project	C	Management Advice 31/12/2023	Revision 4 (revised in 2023) is the current approved version of the Rehabilitation Plan. There are no plans for further review of the Rehabilitation Plan. The DEMIRS EP is to be updated in 2024 in line with amendments made to the DWER accepted Rev 4 of the Rehabilitation Plan.

Appendix G Soil and Groundwater Validation Assessment

Gemec
ENVIRONMENTAL CONSULTANTS

SOIL & GROUNDWATER VALIDATION ASSESSMENT

PBE Operations Pty Ltd – Cervantes-01 Location

April 2023

PROVIDING ENVIRONMENTAL SOLUTIONS

Report Information

Project:

Soil & Groundwater Validation Assessment
April 2023

Location:

Cervantes-01 Location
Lot 12174 Plan 39607, Mount Adams, Western Australia 6525

Prepared for:

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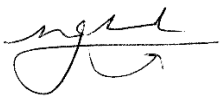

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Revision List

Review Date	Revision	Description of Revision	Reviewer
05.09.2023	A	Internal review	N. Jelovsek (Gemec)
27.09.2023	B	Client review	A. Wills (Environnivate)
03.10.2023	0	Final report	N. Jelovsek (Gemec)

Executive Summary

Gemec was engaged by PBE Operations Pty Ltd (PBE) to undertake a Soil and Groundwater Validation Assessment (SGVA) at the Cervantes-01 exploration well location in the Shire of Irwin, Western Australia 6525 ('the site').

The SGVA was undertaken on 05 and 13 April 2023. The purpose of the works was to assess whether site activities had impacted soils beneath former potential contamination sources, and to characterise waste soil stockpiles to determine their fate. The objective of the works was to collect sufficient soil chemical data and field observations in order to achieve the purpose.

The soil assessment involved the collection of 10 primary soil validation samples from the walls and base of the drilling mud retention pond, one primary soil validation sample from the well head area, two primary soil validation samples from the former chemical / fuel storage area and one primary soil validation sample from the unused flare pit area. Fifteen waste characterisation samples were collected from the drilling mud and cuttings stockpile destined for disposal.

One representative groundwater sample was collected from the groundwater monitoring bore.

Based on the results of the investigation it was concluded that:

- The 1771 tonne stabilised drilling mud and cuttings soil stockpile was characterised as Inert Waste Type 1, and was transported off-site for disposal at a licenced waste facility between 18 and 21 April 2023.
- Most analysed substances in soil and groundwater samples were consistent with ambient background concentrations that existed at the site prior to commencement of site activities.
- Nitrate concentrations within the two samples collected from the former fuel and chemical storage areas (V12 – 18 mg/kg, V13 – 5.6 mg/kg) were higher than the baseline concentrations (S5 – 0.4 mg/kg, S6 – 0.8 mg/kg). Based on field observations and the chemical signature of the remaining nutrients, the higher nitrate concentration is considered to be a function of natural variation rather than site activities. These elevated concentrations are within the range of naturally occurring surface soils.
- None of the soil validation sample concentrations exceeded the site assessment screening levels.
- A number of dissolved metals concentrations had decreased following the baseline assessment – a result of the dispersion or biodegradation of residual drilling fluids used to install the groundwater monitoring well.
- Naturally occurring exceedances of screening levels in groundwater included iron and chloride exceeding the NPUG screening levels for aesthetic considerations. Gemec has identified no risk associated with the exceedances due to the absence of exposure pathways.
- No complete source-pathway-receptor linkages were determined to have resulted from the former site use as an oil well exploration site, and therefore no unacceptable risk to potential nearby receptors has occurred.
- The exploration well was plugged and abandoned, limestone marl hardstand removed, the site recontoured and cutback topsoil reinstated following the completion of the SGVA.

Due to the absence of soil and groundwater impacts at the site, it is considered to be suitable for ongoing use for nature conservation.

Gemec strongly recommends that the conclusions stated here be reviewed in context to comments and information contained within the body of the report.

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Abbreviations and Acronyms

ABC	Ambient Background Concentration
ACL	Added Contaminant Limits
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
AoPC	area(s) of potential concern
AS	Australian Standard
ASC NEPM	National Environmental Protection (Assessment of Site Contamination) Measure
BoM	Australian Government Bureau of Meteorology
BTEXN	benzene, toluene, ethylbenzene, xylenes and naphthalene
CEC	cation exchange capacity
CoC	chain of custody
CoPC	chemicals of potential concern
CoT	certificate of title
CRC CARE	Co-operative Research Centre for Contamination Assessment and Remediation of the Environment
CSM	Conceptual Site Model
DMIRS	Western Australian Department of Mines, Industry Regulation and Safety
DMP	Western Australian Department of Mines and Petroleum (now DMIRS)
DoW	Western Australian Department of Water (now DWER)
DPIRD	Department of Primary Industries and Regional Development
DQO	data quality objective
DWER	Western Australian Department of Water and Environmental Regulation
EC	electrical conductivity
Eco-SSLs	Ecological Soil Screening Levels (US EPA, 2005)
EIL	Ecological Investigation Level
EP	Environment Plan
ESL	Ecological Screening Level
ha	hectare(s)
HIL	Health Investigation Level
HSL	Health Screening Level
LoR	limit of reporting
m bgs	metres below ground surface
m^2 / m^3	square metres / cubic metres
meq	milliequivalents
mg/kg	milligrams per kilogram
MGA	Map Grid of Australia
ML	Management Limit
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NHMRC	National Health and Medical Research Council
NL	not limiting
NORM	naturally occurring radioactive materials
NPUG	Non-Potable Use Guidelines (DoH)
OC	organochlorine pesticide
OH&S	occupational health and safety
OP	organophosphorus pesticide
PAH	polynuclear aromatic hydrocarbon
PFAS	perfluoroalkyl and polyfluoroalkyl substances
PID	photo-ionisation detector
ppm_v	parts per million by volume
QA/QC	quality assurance / quality control
RPD	relative percentage difference
SAQP	Sampling Analysis and Quality Plan
SGVA	Soil and Groundwater Validation Assessment
SL	screening level
SRC_{eco}	Ecotoxicological Serious Risk Concentrations (RIVM, 2001)
SVOC	semi-volatile organic compound
TKN	total Kjeldahl nitrogen
TOC	total organic carbon
TRH	total recoverable hydrocarbons
µg/L	micrograms per litre
UR&POS	urban residential and public open space
US EPA	United States Environmental Protection Agency
VOC	volatile organic compound
WIR	Water Information Reporting (DWER)

1. Introduction

Gemec was engaged by PBE Operations Pty Ltd (PBE) to undertake a Soil and Groundwater Validation assessment (SGVA) at the Cervantes-01 oil exploration well location in the Shire of Irwin, Western Australia 6525 ('the site'). The SGVA was undertaken on 05 and 13 April 2023.

Detailed background information, identification of sensitive receptors, geology and hydrogeology for the site are documented in the Cervantes-01 *Baseline Soil and Groundwater Assessment, March 2022* (Gemec, 2022) [Baseline SGA] and are only referenced or summarised in this report.

1.1 Purpose and Objectives

The purpose of the works was to assess whether site activities had impacted the soil and/or groundwater in the location the drilling mud retention pond, flare pit, well head and chemical / fuel storage area, and to characterise waste soil stockpiles to determine their fate.

The objective of the works was to collect sufficient soil and groundwater chemical data and field observations from the site in order to achieve the purpose.

1.2 Scope of Work

The following activities were undertaken as part of the scope of work:

- developed a Sampling and Analysis Quality Plan (SAQP) that encompassed the Conceptual Site Model (CSM), Data Quality Objectives (DQOs) in collaboration with PBE;
- completed an occupational health and safety (OH&S) plan for the proposed works;
- collected 15 waste characterisation samples from the drilling mud stockpile;
- collected 14 primary soil samples targeting areas where potentially contaminating activities had been conducted;
- gauged, purged and collected one representative groundwater sample from the on-site groundwater monitoring bore (MW1);
- undertook sufficient quality assurance (QA) processes and quality control (QC) procedures to achieve the DQOs;
- chilled and transported the samples under chain of custody (CoC) protocols to National Association of Testing Authorities (NATA) accredited laboratories for analysis of the chemicals of potential concern (CoPC); and
- prepared this report detailing the field activities, analytical results, conclusions and recommendations.

1.3 Stakeholder Consultation

All on-site soil and groundwater investigation works were conducted during normal business hours. The SAQP, OH&S plan and DQOs were developed in consultation with the client and works were conducted in cooperation with site operators. Wider community consultation was not considered necessary to conduct the soil and groundwater investigation works.

2. Site Identification and Background

A summary of site identification details for the Cervantes-01 location are provided in the following Table 2-1.

Table 2-1: Site identification details

Site name	Cervantes-01
Site address	Lot 12174, Plan 39607, Mount Adams, Western Australia, 6525
Land title details (CoT attached in Appendix B)	Lot 12174 on Deposited Plan 39607, Volume LR3110, Folio 928 Primary interest holder: National Parks and Nature Conservation Authority
Map / site plan	Provided in the Figures section
Local Government	Shire of Irwin
Zoning	'Conservation' – under Shire of Irwin Local Planning Scheme No. 5 (DPLH, 2018)
Cervantes-01 Well Head Co-ordinates MGA 2020, Zone 50	303298 m E, 6749757 m N

The Cervantes-01 wellsite is located ~300 km north-northwest of Perth and ~13 km south-southeast of Dongara. The location is within the Beekeepers Nature Reserve, and ~1.5 km east of the nearest surface water receptor – the Indian Ocean. At the time of the SGVA the reinstatement and rehabilitation of the site was being undertaken.

2.1 Site History

The site was established as a joint venture between Metgasco Limited, Vintage Energy and RCMA Australia Pty Ltd within the L14 Production Licence area. RCMA later changed their name to PBE Operations Pty Ltd.

The oil exploration well was spudded on 26 March 2022 reaching total depth on 06 April 2022, and was plugged and abandoned on 12 April 2022. The well was not tested and the flare pit therefore not used. Activities at the site since this time were limited to site inspections, care and maintenance, reinstatement and rehabilitation.

3. Criteria and Screening Levels

Screening levels applied for the assessment of human and ecological risks associated with CoPC at the site are based on the DWER Contaminated Sites Guidelines (CSGs) – *Assessment and management of contaminated sites* (2021) and the National Environment Protection Council's (NEPC) *National Environment Protection (Assessment of Site Contamination) Measure* (2013) (ASC NEPM). Waste characterisation screening levels applied for the disposal of waste stockpiles and liners from the site are based on the DWER *Landfill waste classification and waste definitions (2019)*. Further references for CoPC screening levels are presented in the References section (s. 8).

The criteria and their respective screening levels that Gemec have deemed appropriate for the site are considered suitable for the protection of the environment, environmental values and human health, with due cognisance of any identified CoPC, potential contaminant pathways, identified receptors, the current, and as far as is known, future land use and the nearby surrounding environment.

Exceedance of the screening levels as presented within the adopted criteria does not necessarily infer that the substance presents a hazard or risk to human health, the environment or environmental values but that further investigation, assessment and / or risk mitigation measures are required. CoPC concentrations in soil and groundwater were also assessed against the ambient background soil and groundwater concentrations (ABCs) established during the Baseline SGA undertaken in 2022 (Gemec, 2022). The adopted screening levels applied for the protection of the respective receptors, and a brief justification of their selection are listed below.

Table 3-1: Screening levels – environment and environmental values

	Screening Level	Reference	Justification
Soil	Ecological Screening Levels (ESL) and Ecological Investigation Levels (EIL) for Areas of Ecological Significance (AES) [1,2]	DWER CSGs, 2021; ASC NEPM, 2013	Surrounding conservation land use
	Ecological Soil Screening Levels (Eco-SSLs)	US EPA, 2005; RIVM, 2001	Applied to analytes that do not have an established DWER referenced screening level (Ba, Cd, CrVI, Mn, Hg)
Groundwater	Marine Waters 95% protection level for slightly / moderately disturbed ecosystems (MW 95%) [1] – applied to water quality at the point of discharge.	ANZECC & ARMCANZ, 2018	Application is conservative in the absence of other criteria – the nearest down-gradient water body is the Indian Ocean, ~1.5 km to the east of the site.

1: Applies to coarse (sand) soil types
2: ESLs and EILs apply to the upper two metres of the soil profile

Table 3-2: Screening levels – human health

	Screening Level	Reference	Justification
Soil	Health Screening Levels for Recreational / Open Space (HSL C) [1] – Vapour Intrusion	DWER CSGs, 2021; ASC NEPM, 2013	Surrounding and future site land use for conservation purposes; no occupied slab-on-ground structures exist on-site or likely to exist in future; any potential future exposure to soil-based contaminants will be in the context of conservation land use.
	HSL C – Direct Contact		
	Management Limits (ML) for Residential, Parkland & Public Open Space		
	Health Investigation Levels for Recreational / Open Space (HIL C)		
Groundwater	Domestic Non-Potable Groundwater Use Guidelines (NPUG)	DoH, 2014	Application is conservative in the absence of other criteria – no down-gradient bores, no groundwater abstraction from site for well site construction.
	HSL C – Vapour Intrusion [1]	DWER CSGs, 2021; ASC NEPM, 2013	No occupied structures exist in the near vicinity of the site.

1: Applies to coarse (sand) soil types

Table 3-3: Screening levels – waste classification

	Screening Level	Reference	Justification
Soil	Contaminant threshold values for waste not requiring a leach test (CT).	DWER, 2019	The CT values are initially applied to soil CoPC concentrations to determine leachate analysis requirements.
	Leachable concentration (ASLP) and Concentration Limit (CL) values for waste classification.		CL and ALSP values are subsequently applied to total and, where applicable, leachable concentrations to determine the waste classification.

3.1 Exclusions and Adjustments

Groundwater has not been screened against drinking water or fresh waters screening levels due to the saline nature of the groundwater in the surficial aquifer and the absence of applicable receptors in the vicinity of the site.

Soil EILs for chromium, copper, nickel and zinc were derived for the site using background soil data obtained during previous investigations. To determine the applicable EILs, background soil characteristics (pH, cation exchange capacity [CEC] and clay content) and ABCs for metals were entered into the ASC NEPM Toolbox EIL Calculation Spreadsheet. Soil characteristics used for the calculations included an average clay content of 9.5%, pH of 7.4 ($CaCl_2$ extraction) and CEC of 25.5 $cmol_c/kg$.

No other exclusions or adjustments were made.

4. Sampling and Analysis Quality Plan

The SAQP was established based on the CSM and the DQOs. Several components of the SAQP and DQOs were initially developed by Metgasco in their Environment Plan (EP) for the site, which also defines the potential contaminant sources, pathways and receptors that comprise the CSM.

Results of soil and groundwater analyses have been assessed against ABCs obtained during the 2022 soil and groundwater baseline assessment, and the adopted site screening levels (s. 3) to identify source→pathway→receptor linkages (if present). The SAQP was developed to meet the purpose and objectives of the SGVA (s. 1.1), as agreed upon with the client.

The SAQP was intended to capture changes in soil and groundwater chemical conditions encountered on-site due to site activities, and to compare results to historical baseline values recorded at the site. The resultant SAQP was therefore dynamic, as some locations were determined on-site via observations of the various soil types encountered. Sample locations are outlined in the Results (s. 6) and are presented in the attached Figures.

The SAQP is understood to be in conformance with obligations presented in the site's EP, and the groundwater SAQP is considered to also be in general conformance with the DWER/DMIRS *Guideline for Groundwater Monitoring in the Onshore Petroleum and Geothermal Industry* (2016).

Field work was undertaken 05 and 13 April 2023 by an experienced Contaminated Land Consultant from Gemec's Perth office in accordance with the various standards and guidelines referenced in s. 3, s. 8 (References) and Gemec's Protocols.

4.1 Areas of Potential Concern

Site uses considered to represent the main potential sources of contamination at the site surface included the former drilling mud retention pond, former fuel and chemical storage area, and the well head. Proposed controls for the reporting of incidents involving contaminant losses are outlined in the EP, therefore a predominantly judgemental and targeted sampling programme was considered appropriate for decommissioning validation at the site.

Potential contaminant sources at the site include:

- exploration well drilling fluids;
- well construction related materials such as cement and grease;
- formation derived cuttings and fluids;
- thermal alteration of existing soils and imported materials due to flaring;
- leaks from machinery operating at the site; and
- temporary fuel storage and distribution.

4.2 Chemicals of Potential Concern

The CoPC selected for assessment of the site are those associated with the historical contaminant sources outlined above:

- petroleum hydrocarbon compounds including benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN);
- total recoverable hydrocarbon (TRH) fractions: C6-C10, >C10-C16, >C16-C34 and >C34-C40;
- methane and ethane;
- metals and metalloids including aluminium, arsenic, barium, beryllium, boron, cadmium, chromium, hexavalent chromium, cobalt, copper, iron, lead, lithium, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, titanium, uranium, vanadium and zinc;
- nutrients including total nitrogen, total Kjeldahl nitrogen (TKN), ammonia, nitrate, nitrite, total phosphorous and phosphate; and

Selected waste characterisation samples were analysed for leachable metals (barium, copper, lead, manganese, nickel and zinc), and aromatic / aliphatic TRH speciation.

Additional soil analyses included moisture content, pH and electrical conductivity (EC) – used for screening purposes. Additional groundwater analyses included major anions and cations, hardness, total alkalinity, ionic balance, pH, EC and TDS.

Naturally occurring radioactive materials (NORM), perfluoroalkyl and polyfluoroalkyl substances (PFAS), polynuclear aromatic hydrocarbons (PAHs), phenolic compounds (phenols), organochlorine pesticides (OCs) and organophosphorus pesticides (OPs) were not included in the soil and groundwater analytical suites. PFAS, phenols, OCs and OPs are not considered CoPC associated with the site operations, based on recent investigations conducted at similar wellsites. BTEXN and TRH analyses were used as a screening tool to determine whether further analyses such as PAHs or phenols were necessary.

4.3 Soil Sample Collection Method

Following removal and stockpiling of the drilling mud and the retention pond liner, 15 primary waste characterisation samples (W1-W15) were collected from the excavated drilling mud and cuttings stockpiles, after stabilisation with surrounding limestone marl roadbase material.

14 primary soil validation samples (V1-V14) were collected from the site to validate the in-situ soils. Soil samples V1-V10 were collected from the location of the former drilling mud retention pond, V11 from the well head area, V12 and V13 from the former chemical / fuel storage areas and V14 from the unused flare pit. The maximum height of the drilling mud within the retention pond was observable on the lining, as such wall samples were collected at or below this point. Sample depths were measured from the top of the retention pond walls.

Validation sample depths were considered sufficient for investigation purposes, as potential impacts within each investigation area were expected to be highest at the underlying soil surface. The adopted validation sampling density was considered sufficient to define soil conditions at these locations. Both systematic and judgemental sampling methodologies were employed for validation sampling, whereby a sample grid was applied to each area, and areas of visible impact were targeted within the grid.

Validation sample depths were measured down from the estimated surrounding ground surface in metres below ground surface (m bgs), and stockpile sample depths measured up from the surrounding ground surface. Soil samples were collected from >0.2 m beneath the soil surfaces, to ensure that samples were representative of remnant in-situ conditions. Sampling directly from excavation surfaces can result in a false negative result due to the volatilisation of VOCs in surfaces soils exposed to ambient air.

Soil samples were collected from the various locations using a stainless-steel hand trowel. A fresh pair of disposable nitrile gloves was worn for each sample collection and the hand trowel was decontaminated between sampling locations by washing with a laboratory grade phosphate free detergent solution (Quantumclean®) and rinsing with tap water. The soil samples were collected in laboratory supplied sample

containers, placed on ice following collection and sent under CoC documentation to NATA accredited laboratories for testing. The sample containers were marked with an identifying number, depth and date.

For each validation and stockpile sample collection, a portion of the sample was placed within a laboratory prepared jar, whilst the remainder was placed into a clean zip lock bag. The zip lock bag was sealed and left to rest for five minutes to allow for any volatile organic compounds (VOCs) to accumulate in the headspace of the bag, before being field tested for the presence of VOCs using a calibrated photo-ionisation detector (PID). PID values for each sample are provided in the attached Tables 1 and 3.

4.4 Groundwater Sample Collection Method

Prior to sample collection, the monitor well was gauged using a Heron oil/water interface probe to determine the depth to groundwater (SWL) relative to top of casing (toc). Samples were collected from the screened interval of the monitor well using the low flow method, using a 12v single stage, variable speed, stainless steel low flow submersible pump and inert low-density polyethylene (LDPE) tubing connected to a flow through cell.

Groundwater field chemical parameters were obtained using a calibrated YSI Pro Plus field chemistry meter and flow cell. The field chemical properties and gauging data were recorded on the field data sheet attached in Appendix B. Once the field chemical properties had stabilised a representative sample was collected.

Fresh disposable nitrile gloves and HDPE sample tubing were used during the purging of the well and the collection of each sample. The pump, flow cell and interface probe were decontaminated between sample locations by washing with a Quantumclean® detergent solution and rinsing with tap water. Following collection, each sample was immediately placed on ice in a cool box and transferred under CoC protocols to the laboratory.

4.5 Quality Assurance and Quality Control

Refer to s. 5 for a summary of QC samples and a discussion of QC sample results. Field equipment calibration certificates are provided in the attached Appendix B.

4.6 Analytical Methods

Laboratory analytical methodology undertaken by both primary (ALS Environmental Perth and MPL Laboratories Perth) and secondary (ALS Environmental Melbourne and Envirolab Services NSW) laboratories are summarised within laboratory certificates of analysis (provided within Appendix A). The analytical procedures used by the laboratories undertake determinations in accordance with the following internationally recognised procedures – NEPM, US EPA, APHA and AS.

5. Quality Control

5.1 Field QC Sample Results and Discussion

QC samples were collected in the field in conformance with regulatory guidelines and the relevant Australian Standards. These included three blind field duplicate samples (Dup), three blind field triplicate samples (Split) and three equipment rinsate samples (Rinsate).

5.1.1 Equipment Rinsate Samples

Two rinsate samples (one per day) were collected from the stainless-steel sampling trowel used to collect the soil samples on 05 and 13 April 2023 (Rinsate 1, Rinsate 2), whilst one rinsate sample was collected from the low flow pump head following completion of sampling on 13 April 2023 (Rinsate) to enable QC of decontamination procedures. Both soil rinsate samples were analysed for a basic suite of eight metals, with Rinsate 2 also analysed for BTEXN and TRH. A trace of barium (0.004 mg/L) was detected in Rinsate 1, with no other BTEXN, TRH or metals detected above the laboratory limit of reporting (LoR) in either of the two soil rinsate samples. The low concentration of barium suggests that the level of any possible cross-contamination between samples was insufficient to affect the outcome of the assessment – the average barium concentration in the primary samples was 2720 mg/kg, more than five orders of magnitude higher than the rinsate

concentration. Manganese and zinc were detected above the laboratory LoR in the groundwater rinsate sample collected on 13 April 2023. This was interpreted as representative of laboratory supplied rinsate water, as boron, iron and strontium – reported as higher concentrations in the primary / replicate samples, were not detected in the rinsate sample, and no iron was detected, suggesting that the manganese is unlikely to have originated from steel components of the pump. As such, the detection of trace concentrations of manganese and zinc in the rinsate sample was interpreted as having no material effect on the outcomes of this investigation.

5.1.2 Field Trip Blank Samples

Four laboratory supplied sterile trip blank (Trip Blank) samples accompanied the soil and groundwater samples to the laboratory to assess for potential cross-contamination during storage and transport. The samples were analysed for the presence of BTEXN and TRH (C6-C10) (with the groundwater trip blank also analysed for the presence of MTBE), which were not detected in any of the samples, suggesting that no cross contamination occurred during transport, or that no external sources of these compounds have impacted sample concentrations.

5.1.3 Field Duplicate and Split Samples

As per regulatory guidelines and the relevant Australian Standards, blind field duplicate (Dup) and triplicate (Split) QC samples were obtained in the field to identify variations in analyte concentrations and / or the repeatability of laboratory analysis and proficiency. Soil 'Dup1' / 'Dup2' and 'Split 1' / 'Split 2' samples were aggregated from the W4-1.2m and V6-3.0m soil samples respectively, with groundwater 'Dup' and 'Split' samples aggregated from the MW1 groundwater sample.

Evaluation of the duplicate and triplicate samples was undertaken by determining the relative percentage difference (RPD) of analyte concentrations in the QC samples compared to the primary sample. Gemec adopt an RPD acceptance criterion up to 50% for organics and inorganics in soil and groundwater. However, it is noted that RPDs may be higher due to low concentrations, heterogeneity of the samples and / or nature and age of the contaminant. Generally, an RPD failure is considered significant if the results are 10 times or greater than the LoR.

The following RPD exceedances were reported during the soil assessment:

- 'Split 1' sample: zinc (56%).
- 'Split 2' sample: zinc (95%).

The following RPD exceedances were reported during the groundwater assessment:

- 'Dup' sample: zinc (107%).
- 'Split' sample: zinc (67%).

5.2 Laboratory QC Results and Discussion

<u>Soil 05.04.2023</u>

EP2304467 (primary laboratory) outliers:

- Matrix spike recovery outliers in the W1 0.4 m sample for barium and hexavalent chromium.
- The frequency of matrix spike quality control samples was below the ASC NEPM B3 and ALS QC standard for total metals and semi-volatile TRH.

EM2306430 (secondary laboratory) outliers:

- pH analysis was outside of the holding times.
- The frequency of matrix spike quality control samples was below the ASC NEPM B3 and ALS QC standard for total metals, BTEXN and TRH.

Soil 13.04.2023

EP2304853 (primary laboratory) outliers:

- A laboratory control spike recovery outlier was reported for titanium in an anonymous sample.
- The frequency of matrix spike quality control samples was below the ASC NEPM B3 and ALS QC standard for total metals.

EM2306716 (secondary laboratory) outliers:

- The frequency of matrix spike quality control samples was below the ASC NEPM B3 and ALS QC standard for total metals and hexavalent chromium.

Groundwater 13.04.2023

PED0782 (primary laboratory) outliers:

- pH, nitrite and phosphate analysis were outside of the holding times;
- duplicate percentage recovery outliers existed for manganese, zinc and TRH C29-C36;
- matrix spike recovery outliers existed for sodium, strontium and iron; and
- the frequency of matrix spike quality control samples for volatile TRH and BTEX were below.

The duplicate percentage recovery outlier wasn't considered significant as the result was <10 x the LoR. The spike recoveries were due either to a high analyte background concentration, non-homogeneity or matrix interference. The LCS recovery was within acceptance criteria for each of the matrix spike outliers.

No laboratory outliers were reported by the secondary laboratory for the groundwater assessment.

5.3 Summary

The soil and groundwater RPD exceedances for zinc are attributed to the low level of analytes detected in the samples, not due to the sampling technique. This is supported by low RPDs for the other metals analysed. The RPD exceedance concentrations did not exceed the adopted screening levels for the protection of the environment, environmental values or human health; however, the highest concentrations will be used for reporting purposes to maintain a conservative bias.

The laboratory outliers are not considered significant given the following:

- outliers corresponded with analytes that were either below LoRs, or site screening levels; and
- concentrations were consistent with other samples, or expected chemical conditions for the area.

By signing the laboratory reports the laboratories acknowledge that the results satisfy their NATA accreditation.

Based on the results of the QC programme, it is concluded that the SAQP adopted was acceptable and the results obtained are of reliable quality for interpretative purposes to meet the purpose and objectives.

6. Results and Discussion

The SGVA works involved the collection of twenty-nine primary soil samples over two site visits and the gauging, purging and sampling of groundwater from one monitoring well. Results are discussed in context of the following attachments:

- Soil analytical results: Tables 1-5.
- Groundwater analytical results: Tables 6-9.
- Groundwater field parameters: Table 10.
- Laboratory analytical reports: Appendix A.
- Soil and groundwater sample locations: Figure 2.

6.1 Waste Characterisation Soil Sample Results

6.1.1 Sample Distribution and Field Observations

Fifteen primary waste characterisation samples (W1-W15) were obtained from two temporary drilling mud and cuttings stockpile at the site. The total volume was estimated to be 1200 m^3.

The drilling mud and cuttings excavated from the retention pond were stabilised using surrounding limestone marl roadbase, to ensure that the waste material was spadeable for transport. The waste material was mostly brown, moist, had a high clay content, and moderate sulfidic or acrid odours.

6.1.2 CoPC Analytical Results

Petroleum Hydrocarbons

No BTEXN or TRH analytes were detected above the laboratory LoR in any of the soil samples collected.

Metals, Metalloids and Non-Metals

Concentrations of the following metals were reported:

- aluminium (1,190-2,160 mg/kg), barium (1,680-3,600 mg/kg), chromium (14-24 mg/kg), cobalt (2-4 mg/kg), copper (6-15 mg/kg), iron (2150-5500 mg/kg), lead (3.4-6.7 mg/kg), lithium (2-3.4 mg/kg), manganese (62-160 mg/kg), nickel (2-6 mg/kg), strontium (914-1,600 mg/kg), titanium (30-70 mg/mg), uranium (0.4-0.6 mg/kg), and zinc (5-21 mg/kg) were detected in all samples;
- vanadium (5-10 mg/kg) in W4-W10 and W12-W15 only.

Arsenic, beryllium, boron, cadmium, hexavalent chromium, mercury, molybdenum, selenium and silver were not detected above the laboratory LoR.

Leachable Metals

ASLP leachate analyses were undertaken for six samples for barium, copper, lead, manganese, nickel and zinc. The leachable percentage was highest for nickel, which was on average of 0.35% leachable, while barium exhibited the lowest leachability at 0.01%.

6.1.3 Waste Characterisation and Disposal

None of the total or leachable metals concentrations exceeded any of the waste classification criteria, and as such the waste was transported off-site to Mid West Remediation Services' Pye Road Waste Facility as Inert Waste Type 1, together with the plastic pond liner as Inert Waste Type 2. The total of 1771 tonnes of waste material was transported between 18 and 21 April 2023.

6.2 Validation Soil Sample Results

6.2.1 Sample Distribution and Field Observations

Fourteen primary soil samples were obtained from across the site at the following locations:

- V1_3.0m through V10_3.0m: base and walls of the mud sump.
- V11_1.0m: former well head area.
- V12_0-0.1m and V13_0-0.1m: former fuel and chemical storage areas.
- V14_2.0m: base of the unused flare pit.

Soil features at each location were observed to be consistent with those observed during the baseline assessment – predominantly as fine to medium grained brown-grey sand, tending paler with depth. Topsoil at the V12 and V13 locations was observed to contain a higher naturally occurring organic content than surrounding areas and also higher than the corresponding baseline samples collected from this location (S5

and S6). Groundwater was observed to be expressing from the base of the drilling mud retention pond void, where naturally occurring sulphurous odours and orange-brown tannins were observed.

6.2.2 CoPC Analytical Results

Analytical results from the validation samples obtained are summarised as follows:

- No BTEXN or TRH C6-C40 fractions were detected above the laboratory LoR.
- Metals, metalloids, nutrient concentrations and pH values were generally consistent with baseline concentrations.
  - These included aluminium (150-380 mg/kg), barium (<10-50 mg/kg), chromium (10-13 mg/kg), iron (260-460 mg/kg), lead (0.4-0.6 mg/kg), lithium (1.0-1.5 mg/kg), manganese (15-24 mg/kg), strontium (1850-2350 mg/kg), titanium (<10-10 mg/kg) and uranium (0.6-1.0 mg/kg).
  - Cobalt, copper, nickel, vanadium and zinc were detected in the drilling mud and cuttings waste but not in any validation samples.
- Nitrate concentrations within the two samples collected from the former fuel and chemical storage areas (V12 – 18 mg/kg, V13 – 5.6 mg/kg) were higher than the baseline concentrations (S5 – 0.4 mg/kg, S6 – 0.8 mg/kg). The validation samples V12 and V13 contained a visibly higher organic content (darker, richer brown) than the baseline samples. The chemical signature (presence and concentration) of the remaining nutrients (total nitrogen, Kjeldahl nitrogen, ammonia, nitrite, phosphorus) was otherwise consistent with those collected during the baseline assessment. The higher nitrate concentration is therefore considered to be a function of natural variation rather than site activities. These elevated concentrations are within the range of naturally occurring surface soils.
- Electrical conductivity and pH were consistent with those obtained during the baseline SGA for their respective depths.
- No concentrations of any CoPC were detected above the adopted screening levels.

No screening levels exist for nutrients, pH or electrical conductivity within the ASC NEPM guidelines.

6.2.3 Site Reinstatement

The oil exploration well was plugged and abandoned, limestone marl hardstand removed, the site recontoured and cutback topsoil reinstated following the completion of the SGVA.

6.3 Groundwater Assessment

6.3.1 Sample Distribution and Field Observations

One primary groundwater sample was obtained from the MW1 monitor well. MW1 is located to the west (inferred down-hydraulic gradient) of the proposed site infrastructure outside of the western site boundary.

Groundwater purged from the bore was clear with no odour. Hydraulic conductivity was consistent, with a good recharge rate and no drawdown observed.

6.3.2 Standing Water Level

The SWL was recorded as being 3.425 metres below top of casing (m btoc), equivalent to ~2.8 m bgs (~0.6 m stick-up). This was consistent with field observations, such as groundwater observed at the base of the drilling mud retention pond.

6.3.3 General Field & Laboratory Hydrochemical Parameters

The DO, redox, EC, pH and temperature groundwater chemical data represented stabilised conditions prior to sample collection:

- DO was recorded as 0.3 mg/L, indicating aerobic conditions in shallow groundwater.

- Redox was recorded as being -133 mV, indicating that reducing conditions are present.
- EC was recorded in the field at 7867 µS/cm, corresponding to a TDS value of 5273 mg/L. Laboratory measured EC was reported at 8200 µS/cm with a corresponding TDS value of 5300. TDS values indicate saline groundwater quality.
- The pH value was recorded as 7.1 in the field, with lab measured pH reported as 7.3 indicating the groundwater in the area is generally neutral.
- Temperature was 24.1°C.

6.3.4 Groundwater CoPC Analytical Results

Petroleum Hydrocarbons, MTBE, Ethane and Methane

Concentrations of BTEXN, TRH, methane and ethane were not reported above the laboratory LoR in the sample collected from MW1. TRH has been historically detected in the groundwater monitoring bore, inferred as residual drilling fluid which has since dispersed or biodegraded since July 2022.

Dissolved Metals, Metalloids and Non-metals

The dissolved metals barium (57 µg/L), boron (330 µg/L), iron (310 µg/L), lithium (69 µg/L), manganese (13 µg/L) and strontium (7,800 µg/L) were detected in the sample collected from MW1. The iron concentration exceeded the MW screening levels.

Aluminium, arsenic, beryllium, cadmium, chromium, hexavalent chromium, copper, lead, mercury, molybdenum, nickel, selenium, titanium, uranium, vanadium and zinc were not detected above the laboratory LoR in the groundwater samples.

The decrease in a number of dissolved metals concentrations is likely associated with stabilisation of the surrounding aquifer following installation of the bore and subsequent dispersion or biodegradation of the residual drilling fluid.

Major Cations and Major Anions

Concentrations of the major cations and anions in the groundwater were dominated by sodium and chloride as expected. Chloride exceeded the adopted NPUG screening levels. Bicarbonate was detected at 460 mg/L, with carbonate not detected above the laboratory LoR in the groundwater. Bicarbonate dominated alkalinity is expected in the natural environment. Total hardness was 1200 mg/L, indicating groundwater is 'extremely hard'.

Nutrients

Total nitrogen was reported at 0.44 mg/L and was dominantly comprised of total Kjeldahl nitrogen, reflecting an organic source with a trace concentration of ammonia (0.067 mg/L) present. A trace of phosphate (0.017 mg/L) was also detected. Nitrate, nitrite and total phosphorus were not detected above the laboratory LoR. As a whole, nutrient concentrations have decreased since the baseline SGA.

7. Conclusions and Recommendations

7.1 Summary of Conclusions

Gemec has achieved the purpose of the works (s. 1.1) by assessing whether site activities had impacted the soil and/or groundwater in the location of former potential contamination sources, characterising waste soil stockpiles to determine their fate. No significant data gaps were identified.

> The soil and groundwater samples were analysed for a comprehensive range of substances to assess soil and groundwater chemical conditions (summarised in s. 6).

- The 1771 tonne stabilised drilling mud and cuttings soil stockpile was characterised as Inert Waste Type 1, and was transported off-site for disposal at a licenced waste facility between 18 and 21 April 2023.
- Most analysed substances in soil and groundwater samples were consistent with ambient background concentrations that existed at the site prior to commencement of site activities.
- Nitrate concentrations within the two samples collected from the former fuel and chemical storage areas (V12 – 18 mg/kg, V13 – 5.6 mg/kg) were higher than the baseline concentrations (S5 – 0.4 mg/kg, S6 – 0.8 mg/kg). Based on field observations and the chemical signature of the remaining nutrients, the higher nitrate concentration is considered to be a function of natural variation rather than site activities. These elevated concentrations are within the range of naturally occurring surface soils.
- None of the soil validation sample concentrations exceeded the site assessment screening levels.
- A number of dissolved metals concentrations had decreased following the baseline assessment – a result of the dispersion or biodegradation of residual drilling fluids used to install the groundwater monitoring well.
- Naturally occurring exceedances of screening levels in groundwater included iron and chloride exceeding the NPUG screening levels for aesthetic considerations. Gemec has identified no risk associated with the exceedances due to the absence of exposure pathways.
- No complete source-pathway-receptor linkages were determined to have resulted from the former site use as an oil well exploration site, and therefore no unacceptable risk to potential nearby receptors has occurred.
- The exploration well was plugged and abandoned, limestone marl hardstand removed, the site recontoured and cutback topsoil reinstated following the completion of the SGVA.

7.2 Summary of Recommendations

Due to the absence of soil and groundwater impacts at the site, it is considered to be suitable for ongoing use for nature conservation.

Gemec strongly recommends that the conclusions stated here be reviewed in context to comments and information contained within the body of the report.

8. References

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9. Limitations of Report

This report pertains to the Cervantes-01 location only, as identified herein.

The findings and conclusions given in this report are based on the site conditions and those applicable Government regulations that existed at the time the environmental investigation was conducted, and this report prepared. This report was prepared in accordance with accepted environmental practices used by environmental professionals undertaking projects of a similar nature.

Environmental investigation identifies subsurface conditions only at those locations where samples are taken and at the time they are taken. Decisions should not be made on the basis of this report if adequacy of the report has been affected by time as the report is based on conditions that existed at the time the site was investigated.

Gemec warrant that the environmental investigation and the assessments presented in this report identifies actual subsurface conditions at the location investigated and at the time the investigation was undertaken. No other warranty as to the accuracy and completeness, express or implied, is made as to any advice included in this report. While every effort has been made to ensure accuracy, no liability is accepted for errors of fact or opinion herein.

This report was prepared for use by the client, PBE Operations Pty Ltd, and shall only be used by the client for the purpose or purposes that this report was bought into existence. All third parties rely on this report at their own risk. This report is not intended as a substitute for legal advice which can be given only by a qualified legal practitioner.

Tables

Table 1: Waste Characterisation Soil Analytical Results - BTEXN, TRH, pH & EC

Sample ID	Depth (m)	Date	Time	PID (ppm_V)	BTEXN						TRH								Soil Characteristics		
					Benzene	Toluene	Ethylbenzene	m+p Xylenes	o- Xylenes	Naphthalene [1]	C6-C10	C6-C10 (less BTEX)	>C10-C16	>C10-C16 (less naphthalene)	>C16-C34 (total)	>C16-C35 (aromatic)	>C16-C35 (aliphatid)	>C34-C40	pH	Electrical Conductivity (µS/cm)	Moisture Content (%)
Waste Characterisation Samples - Drilling Mud & Cuttings																					
W1	0.4	05.04.23	09:38	0.8	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	-	-	<100	**10.8**	**13100**	**23.8**
W2	0.6	05.04.23	09:44	2.7	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	-	-	<100	**10.9**	**10600**	**21.7**
W3	0.4	05.04.23	09:47	2.5	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	<100	<90	<100	**10.3**	**8290**	**16.8**
W4	1.2	05.04.23	10:29	7.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	-	-	<100	**11.6**	**10900**	**22.7**
W5	0.5	05.04.23	10:35	9.8	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	<100	<90	<100	**11.7**	**9760**	**23.5**
W6	1.0	05.04.23	10:44	5.7	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	-	-	<100	**11.5**	**8820**	**18.9**
W7	0.2	05.04.23	10:54	6.7	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	-	-	<100	**11.5**	**7790**	**21.3**
W8	1.5	05.04.23	11:03	7.8	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	-	-	<100	**11.6**	**8690**	**18.9**
W9	0.5	05.04.23	11:10	8.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	<100	<90	<100	**11.5**	**9050**	**19.0**
W10	0.1	05.04.23	11:22	4.6	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	-	-	<100	**11.7**	**12300**	**24.0**
W11	1.7	05.04.23	11:34	6.2	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	-	-	<100	**11.3**	**8410**	**18.6**
W12	0.6	05.04.23	11:42	6.3	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	-	-	<100	**11.5**	**9240**	**19.3**
W13	0.3	05.04.23	11:50	4.6	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	-	-	<100	**11.7**	**9220**	**21.8**
W14	1.4	05.04.23	11:56	5.8	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	-	-	<100	**11.5**	**6860**	**16.0**
W15	0.6	05.04.23	12:03	9.7	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	-	-	<100	**11.7**	**10900**	**23.6**
Average + Standard Deviation					<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	<100	<90	<100	**11.8**	**11283**	**23.3**
Quality Control Samples																					
W4	1.2	05.04.23	10:29	7.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<50	<50	<100	-	-	<100	**11.6**	**10900**	**22.7**
		Dup 1			*<0.2*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<1*	*<10*	*<10*	*<50*	*<50*	*<100*	*-*	*-*	*<100*	***11.6***	***10000***	***21.9***
		RPD			*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*-*	*-*	*NA*	*0*	*9*	*4*
		Split 1			*<0.2*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<1*	*<10*	*<10*	*<50*	*<50*	*<100*	-	-	*<100*	***11.8***	***-***	***20.3***
		RPD			*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*-*	*-*	*NA*	*2*	*-*	*11*
Trip Blank 1	-	05.04.23	09:00	-	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	-	-	-	-	-	-	-	-	**3.2**
Trip Blank 2	-	05.04.23	09:00	-	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	-	-	-	-	-	-	-	-	**18.9**
Rinsate 1	-	05.04.23	12:25	-	<1	<2	<2	<2	<2	<5	<20	<20	<100	<100	<100	-	-	<100	-	-	-
Concentration Limit - CL1/CL2					18	518	1080	1800		100 [4]	NE	2800 [5]	NE	NE	NE	450	28000	NE	NE	NE	NE
Leachable Concentration - ASLP1/2					0.01	8	3	6		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Table 1: Waste Characterisation Soil Analytical Results - BTEXN, TRH, pH & EC

Sample ID	Depth (m)	Date	Time	PID (ppm_V)	BTEXN						TRH								Soil Characteristics		
					Benzene	Toluene	Ethylbenzene	m+p Xylenes	o- Xylenes	Naphthalene [1]	C6-C10	C6-C10 (less BTEX)	>C10-C16	>C10-C16 (less naphthalene)	>C16-C34 (total)	>C16-C35 (aromatic)	>C16-C35 (aliphatid)	>C34-C40	pH	Electrical Conductivity (µS/cm)	Moisture Content (%)
Laboratory Limit of Reporting - Soil (mg/kg)					0.2	0.5	0.5	0.5	0.5	1	10	10	50	50	100	100	90	100	0.1	1	1
Laboratory Limit of Reporting - Rinsate (µg/L)					1	2	2	2	2	5	20	20	100	100	100	-	-	100	-	-	-

Notes

Soil concentrations reported in milligrams per kilogram (mg/kg) on a dry weight basis; water (rinsate) concentrations reported in micrograms per litre (µg/L)
'NA' denotes not applicable - primary and QC sample concentration below laboratory LoR
'NE' denotes screening level not established or is under review
'RPD' denotes relative percentage difference
'-' denotes analyte not tested / parameter not obtained

1. volatile extraction method
2. CL for total PAHs
3. CL for C6-C9 fraction

Table 2: Waste Characterisation Soil Analytical Results - Metals, Metalloids & Non-Metals (total & leachable)

Sample ID	Depth (m)	Date	Aluminium (Al)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Boron (B)	Cadmium (Cd)	Chromium (Cr)	Hexavalent Chromium (CrVI)	Cobalt (Co)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Lithium (Li)	Manganese (Mn)	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Strontium (Sr)	Titanium (Ti)	Uranium (U)	Vanadium (V)	Zinc (Zn)
Waste Characterisation Samples - Drilling Mud & Cuttings																										
W1	0.4	05.04.23	**1400**	<5	**3260**	<1	<50	<0.1	**16**	<2.5	**3**	**9**	**2940**	**4.7**	**2.0**	**81**	<0.1	<2	**3**	<1	<2	**1380**	**40**	**0.5**	<5	**7**
	Leachable (ASLP) [1]		-	-	**0.687**	-	-	-	-	-	-	**0.020**	-	**0.006**	-	**0.080**	-	-	**0.012**	-	-	-	-	-	-	**0.012**
W2	0.6	05.04.23	**1470**	<5	**2910**	<1	<50	<0.1	**16**	<0.5	**3**	**8**	**3080**	**5.4**	**2.3**	**82**	<0.1	<2	**3**	<1	<2	**1410**	**40**	**0.5**	<5	**8**
W3	0.4	05.04.23	**1190**	<5	**2400**	<1	<50	<0.1	**14**	<0.5	**2**	**6**	**2150**	**3.4**	**2.1**	**62**	<0.1	<2	**2**	<1	<2	**1600**	**30**	**0.6**	<5	<5
W4	1.2	05.04.23	**1820**	<5	**3150**	<1	<50	<0.1	**22**	<0.5	**3**	**14**	**4120**	**6.7**	**3.3**	**118**	<0.1	<2	**5**	<1	<2	**1220**	**60**	**0.5**	**6**	**9**
	Leachable (ASLP) [1]		-	-	**0.271**	-	-	-	-	-	-	**0.033**	-	**0.003**	-	**0.028**	-	-	**0.023**	-	-	-	-	-	-	**0.006**
W5	0.5	05.04.23	**2160**	<5	**2990**	<1	<50	<0.1	**24**	<0.5	**4**	**14**	**5140**	**6.1**	**2.9**	**124**	<0.1	<2	**6**	<1	<2	**1050**	**70**	**0.4**	**8**	**10**
W6	1.0	05.04.23	**1560**	<5	**3060**	<1	<50	<0.1	**18**	<0.5	**3**	**9**	**3270**	**5.1**	**2.3**	**87**	<0.1	<2	**4**	<1	<2	**1240**	**50**	**0.4**	**5**	**6**
W7	0.2	05.04.23	**1900**	<5	**2840**	<1	<50	<0.1	**20**	<0.5	**3**	**10**	**4110**	**4.7**	**2.7**	**101**	<0.1	<2	**5**	<1	<2	**1170**	**60**	**0.4**	**6**	**8**
	Leachable (ASLP) [1]		-	-	**0.364**	-	-	-	-	-	-	**0.027**	-	**0.003**	-	**0.038**	-	-	**0.014**	-	-	-	-	-	-	<0.005
W8	1.5	05.04.24	**1590**	<5	**2510**	<1	<50	<0.1	**18**	<0.5	**2**	**7**	**3060**	**3.8**	**2.2**	**85**	<0.1	<2	**4**	<1	<2	**1220**	**50**	**0.4**	**5**	**6**
W9	0.5	05.04.24	**1770**	<5	**2210**	<1	<50	<0.1	**21**	<0.5	**3**	**15**	**4620**	**5.6**	**2.6**	**98**	<0.1	<2	**6**	<1	<2	**1130**	**60**	**0.4**	**7**	**11**
W10	0.1	05.04.25	**1740**	<5	**3600**	<1	<50	<0.1	**24**	<0.5	**4**	**11**	**3780**	**6.0**	**2.5**	**105**	<0.1	<2	**5**	<1	<2	**1230**	**60**	**0.4**	**6**	**8**
	Leachable (ASLP) [1]		-	-	**0.500**	-	-	-	-	-	-	**0.022**	-	**0.003**	-	**0.037**	-	-	**0.016**	-	-	-	-	-	-	**0.005**
W11	1.7	05.04.26	**1490**	<5	**2800**	<1	<50	<0.1	**17**	<0.5	**3**	**7**	**2830**	**3.6**	**2.2**	**76**	<0.1	<2	**3**	<1	<2	**1320**	**40**	**0.4**	<5	**5**
W12	0.6	05.04.27	**1680**	<5	**2990**	<1	<50	<0.1	**20**	<0.5	**3**	**10**	**4320**	**6.1**	**2.6**	**111**	<0.1	<2	**4**	<1	<2	**1080**	**50**	**0.4**	**6**	**8**
W13	0.3	05.04.28	**2090**	<5	**1680**	<1	<50	<0.1	**19**	<0.5	**3**	**11**	**5180**	**5.1**	**2.9**	**160**	<0.1	<2	**6**	<1	<2	**914**	**70**	**0.5**	**10**	**21**
	Leachable (ASLP) [1]		-	-	**0.198**	-	-	-	-	-	-	**0.027**	-	**0.002**	-	**0.026**	-	-	**0.016**	-	-	-	-	-	-	<0.005
W14	1.4	05.04.29	**1550**	<5	**1900**	<1	<50	<0.1	**16**	<0.5	**2**	**10**	**3840**	**4.6**	**3.0**	**95**	<0.1	<2	**4**	<1	<2	**1080**	**40**	**0.5**	**5**	**7**
W15	0.6	05.04.30	**2130**	<5	**2430**	<1	<50	<0.1	**20**	<0.5	**4**	**12**	**5500**	**6.1**	**3.4**	**122**	<0.1	<2	**6**	<1	<2	**1010**	**70**	**0.5**	**8**	**11**
Average + standard deviation [2]			**1984**	<5	**3237**	<1	<50	<0.1	**22**	<0.5	**4**	**13**	**4842**	**6.1**	**3.0**	**125**	<0.1	<2	**6**	<1	<2	**1379**	**65**	**0.5**	**8**	**13**
Average + st. dev. leachable [3]			-	-	**0.578**	-	-	-	-	-	-	**0.030**	-	**0.005**	-	**0.061**	-	-	**0.020**	-	-	-	-	-	-	**0.011**
Quality Control Samples																										
W4	1.2	05.04.23	**1820**	<5	**3150**	<1	<50	<0.1	**22**	<0.5	**3**	**14**	**4120**	**6.7**	**3.3**	**118**	<0.1	<2	**5**	<1	<2	**1220**	**60**	**0.5**	**6**	**9**
		Dup 1	***1590***	*<5*	***2700***	*<1*	*<50*	*<0.1*	***21***	*<0.5*	***3***	***11***	***3570***	***5.4***	***2.8***	***95***	*<0.1*	*<2*	***4***	*<1*	*<2*	***1190***	***50***	***0.5***	***6***	***8***
		RPD	*13*	*NA*	*15*	*NA*	*NA*	*NA*	*5*	*NA*	*0*	*24*	*14*	*21*	*16*	*22*	*NA*	*NA*	*22*	*NA*	*NA*	*2*	*18*	*0*	*0*	*12*
		Split 1	***2420***	*<5*	***3000***	*<1*	*<50*	*<0.1*	***22***	*<0.5*	*<2*	***10***	***3490***	***6.1***	***3.1***	***78***	*<0.1*	*<2*	***5***	*<1*	*<2*	***1170***	***60***	***0.5***	***6***	***16***
		RPD	*28*	*NA*	*5*	*NA*	*NA*	*NA*	*0*	*NA*	*40*	*33*	*17*	*9*	*6*	*41*	*NA*	*NA*	*0*	*NA*	*NA*	*4*	*0*	*0*	*0*	*56*
Rinsate 1	-	05.04.23	-	<0.001	**0.004**	-	-	<0.0001	<0.001	-	-	<0.001	-	<0.001	-	<0.001	-	-	<0.001	-	-	-	-	-	-	<0.005
Concentration Limit - CL1/CL2			50000	500	50000	100	50000	100	NE	500	50000	50000	NE	1500	NE	50000	75	1000	3000	50	180	NE	NE	NE	50000	50000
Leachable Concentration - ASLP1/2			NE	0.5	NE	0.1	NE	0.1	NE	0.5	NE	NE	NE	0.1	NE	NE	0.01	0.5	0.2	0.5	1	NE	NE	NE	NE	NE

Table 2: Waste Characterisation Soil Analytical Results - Metals, Metalloids & Non-Metals (total & leachable)

Sample ID	Depth (m)	Date	Aluminium (Al)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Boron (B)	Cadmium (Cd)	Chromium (Cr)	Hexavalent Chromium (CrVI)	Cobalt (Co)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Lithium (Li)	Manganese (Mn)	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Strontium (Sr)	Titanium (Ti)	Uranium (U)	Vanadium (V)	Zinc (Zn)
Laboratory LoR - Soil (mg/kg)			50	5	10	1	50	0.1	2	0.5	2	5	50	0.1	0.1	5	0.1	2	2	1	2	2	10	0.1	5	5
Laboratory LoR - Rinsate (mg/L)			-	0.001	-	-	-	0.0001	0.001	-	-	0.001	-	0.001	-	-	0.0001	-	0.001	-	-	-	-	-	-	0.005
Laboratory LoR - Leachate (mg/L)			-	0.001	0.001	-	-	-	-	-	-	0.001	-	0.001	-	0.001	-	0.001	0.001	-	-	-	-	-	-	-

Notes

Soil concentrations reported in milligrams per kilogram (mg/kg) on a dry weight basis; water (rinsate / leachate) concentrations reported in milligrams per litre (mg/L)

'LoR' denotes limit of reporting

'NA' denotes not applicable - primary and QC sample concentration below laboratory LoR

'NE' denotes screening level not established or is under review

'RPD' denotes relative percentage difference

'-' denotes analyte not tested / parameter not obtained

1. leachate analyses conducted using ASLP with water reagent (pH 7.0), leachate concentrations and ASLP1 reported in mg/L

Table 3: Validation Soil Analytical Results - BTEXN & TRH

Sample ID	Depth (m)	Date	Time	Wall / Base	PID	BTEXN						TRH					
						Benzene	Toluene	Ethylbenzene	m+p Xylenes	o- Xylenes	Naphthalene [1]	C6-C10	C6-C10 (less BTEX)	>C10-C16	>C10-C16 (less naphthalene)	>C16-C34	>C34-C40
Validation Soil Samples																	
V1	3.0	13.04.23	13:37	Wall	0.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<20	<20	<100	<100
V2	3.0	13.04.23	14:20	Wall	0.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<20	<20	<100	<100
V3	3.5	13.04.23	13:42	Base	0.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<20	<20	<100	<100
V4	3.5	13.04.23	14:16	Base	0.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<20	<20	<100	<100
V5	3.0	13.04.23	13:46	Wall	0.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<20	<20	<100	<100
V6	3.0	13.04.23	14:11	Wall	0.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<20	<20	<100	<100
V7	3.5	13.04.23	13:50	Base	0.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<20	<20	<100	<100
V8	3.5	13.04.23	14:07	Base	3.1	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<20	<20	<100	<100
V9	3.0	13.04.23	13:55	Wall	0.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<20	<20	<100	<100
V10	3.0	13.04.23	14:01	Wall	0.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<20	<20	<100	<100
V11	1.0	13.04.23	14:35	Wall	0.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<20	<20	<100	<100
V12	0-0.1	13.04.23	14:44	-	0.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<20	<20	<100	<100
V13	0-0.1	13.04.23	14:52	-	0.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<20	<20	<100	<100
V14	2.0	13.04.23	15:04	Wall	0.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<20	<20	<100	<100
Quality Control Samples																	
Trip Blank 3	-	13.04.23	12:00	-	-	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	-	-	-	-
V6	3.0	13.04.23	14:11	Wall	0.0	<0.2	<0.5	<0.5	<0.5	<0.5	<1	<10	<10	<20	<20	<100	<100
		Dup 2				*<0.2*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<1*	*<10*	*<10*	*<20*	*<20*	*<100*	*<100*
		RPD				*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
		Split 2				*<0.2*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<1*	*<10*	*<10*	*<50*	*<50*	*<100*	*<100*
		RPD				*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
ESL - Areas of Ecological Signficance [2]						8	10	1.5	10		10 [3]	NE	125	25	NE	300 [4]	2800 [4]
HSL C (Vapour Intrusion) - Recreational / Open Space						NL	NL	NL	NL		NL	NE	NL	NE	NL	NE	NE
HSL C (Direct Contact) - Recreational / Open Space						120	18000	5300	15000		1900	5100	NE	3800	NE	5300	7400
ML - Residential, Parkland & Public Open Space						NE	NE	NE	NE		NE	700	NE	1000	NE	2500	10000

Table 3: Validation Soil Analytical Results - BTEXN & TRH

Sample ID	Depth (m)	Date	Time	Wall / Base	PID	BTEXN						TRH					
						Benzene	Toluene	Ethylbenzene	m+p Xylenes	o- Xylenes	Naphthalene [1]	C6-C10	C6-C10 (less BTEX)	>C10-C16	>C10-C16 (less naphthalene)	>C16-C34	>C34-C40
Laboratory Limit of Reporting (mg/kg)						0.2	0.5	0.5	0.5	0.5	1	10	10	20	20	100	100

Notes

All concentrations reported in milligrams per kilogram (mg/kg) on a dry weight basis
ESL, HSL and ML screening levels are for coarse / sandy soils
'NA' denotes not applicable - primary and QC sample concentration below laboratory LoR
'NE' denotes screening level not established or is under review
'NL' denotes screening level not limiting
'RPD' denotes relative percentage difference
'-' denotes not tested / parameter not obtained

1. volatile extraction method
2. ESLs apply to top 2 m of soil profile
3. EIL for fresh naphthalene
4. value for Urban Residential and Public Open Space applied for comparison only, in the absence of AES ESL

Table 4: Validation Soil Analytical Results - Metals, Metalloids & Non-Metals

Sample ID	Depth (m)	Date	Aluminium (Al)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Boron (B)	Cadmium (Cd)	Chromium (Cr)	Hexavalent Chromium (CrVI)	Cobalt (Co)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Lithium (Li)	Manganese (Mn)	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Strontium (Sr)	Titanium (Ti)	Uranium (U)	Vanadium (V)	Zinc (Zn)
Validation Soil Samples																										
V1	3.0	13.04.23	**160**	<5	**10**	<1	<50	<0.1	**11**	<0.5	<2	<5	**290**	**0.5**	**1.0**	**16**	<0.1	<2	<2	<1	<2	**2300**	**10**	**1.0**	<5	<5
V2	3.0	13.04.23	**170**	<5	<10	<1	<50	<0.1	**11**	<0.5	<2	<5	**260**	**0.4**	**1.2**	**17**	<0.1	<2	<2	<1	<2	**2250**	**10**	**1.0**	<5	<5
V3	3.5	13.04.23	**170**	<5	**10**	<1	<50	<0.1	**11**	<0.5	<2	<5	**290**	**0.4**	**1.2**	**17**	<0.1	<2	<2	<1	<2	**2310**	**10**	**1.0**	<5	<5
V4	3.5	13.04.23	**160**	<5	**10**	<1	<50	<0.1	**11**	<0.5	<2	<5	**310**	**0.4**	**1.2**	**17**	<0.1	<2	<2	<1	<2	**2240**	**10**	**1.0**	<5	<5
V5	3.0	13.04.23	**170**	<5	**10**	<1	<50	<0.1	**12**	<0.5	<2	<5	**290**	**0.4**	**1.3**	**18**	<0.1	<2	<2	<1	<2	**2350**	**10**	**1.0**	<5	<5
V6	3.0	13.04.23	**160**	<5	<10	<1	<50	<0.1	**10**	<0.5	<2	<5	**290**	**0.4**	**1.2**	**16**	<0.1	<2	<2	<1	<2	**2150**	**10**	**0.9**	<5	<5
V7	3.5	13.04.23	**180**	<5	**50**	<1	<50	<0.1	**11**	<0.5	<2	<5	**290**	**0.4**	**1.3**	**17**	<0.1	<2	<2	<1	<2	**2270**	<10	**1.0**	<5	<5
V8	3.5	13.04.23	**150**	<5	**10**	<1	<50	<0.1	**11**	<0.5	<2	<5	**270**	**0.4**	**1.3**	**16**	<0.1	<2	<2	<1	<2	**2350**	**10**	**1.0**	<5	<5
V9	3.0	13.04.23	**150**	<5	**10**	<1	<50	<0.1	**11**	<0.5	<2	<5	**280**	**0.4**	**1.4**	**15**	<0.1	<2	<2	<1	<2	**2210**	**10**	**1.0**	<5	<5
V10	3.0	13.04.23	**150**	<5	**10**	<1	<50	<0.1	**11**	<0.5	<2	<5	**260**	**0.4**	**1.4**	**16**	<0.1	<2	<2	<1	<2	**2260**	<10	**1.0**	<5	<5
V11	1.0	13.04.23	**230**	<5	**20**	<1	<50	<0.1	**11**	<0.5	<2	<5	**340**	**0.4**	**1.4**	**19**	<0.1	<2	<2	<1	<2	**2240**	**10**	**0.9**	<5	<5
V12	0-0.1	13.04.23	**380**	<5	**10**	<1	<50	<0.1	**12**	<0.5	<2	<5	**460**	**0.6**	**1.0**	**24**	<0.1	<2	<2	<1	<2	**1850**	<10	**0.6**	<5	<5
V13	0-0.1	13.04.23	**310**	<5	**10**	<1	<50	<0.1	**13**	<0.5	<2	<5	**400**	**0.6**	**1.3**	**20**	<0.1	<2	<2	<1	<2	**2250**	**10**	**0.7**	<5	<5
V14	2.0	13.04.23	**240**	<5	**10**	<1	<50	<0.1	**11**	<0.5	<2	<5	**360**	**0.4**	**1.5**	**18**	<0.1	<2	<2	<1	<2	**2130**	**10**	**0.8**	<5	<5
Quality Control Samples																										
Rinsate 2	-	05.04.23	<10	<1	-	-	-	<0.1	<1	-	-	<1	<50	<1	-	-	-	-	<1	-	-	-	-	-	-	<5
V6	3.0	13.04.23	**160**	<5	<10	<1	<50	<0.1	**10**	<0.5	<2	<5	**290**	**0.4**	**1.2**	**16**	<0.1	<2	<2	<1	<2	**2150**	**10**	**0.9**	<5	<5
		Dup 2	***140***	*<5*	*<10*	*<1*	*<50*	*<0.1*	***10***	*<0.5*	*<2*	*<5*	***270***	***0.3***	***1.5***	***15***	*<0.1*	*<2*	*<2*	*<1*	*<2*	***2120***	*<10*	***0.9***	*<5*	*<5*
		RPD	*13*	*NA*	*NA*	*NA*	*NA*	*NA*	*0*	*NA*	*NA*	*NA*	*7*	*29*	*22*	*6*	*NA*	*NA*	*NA*	*NA*	*NA*	*1*	*0*	*0*	*NA*	*NA*
		Split 2	***170***	*<5*	*<10*	*<1*	*<50*	*<0.1*	***10***	*<0.5*	*<2*	*<6*	***260***	***0.5***	***1.6***	***10***	*<0.1*	*<2*	*<6*	*<1*	*<2*	***1620***	*<10*	***1.1***	*<5*	***14***
		RPD	*6*	*NA*	*NA*	*NA*	*NA*	*NA*	*0*	*NA*	*NA*	*NA*	*11*	*22*	*29*	*46*	*NA*	*NA*	*NA*	*NA*	*NA*	*28*	*0*	*20*	*NA*	*95*
EIL - Areas of Ecological Significance [1]			NE	40	790 [2]	21 [3]	NE	13 [2]	140 [4,5]	130 [3]	13 [3]	75 [5]	NE	470	NE	220 [3]	36 [2,6]	190 [2]	55 [5]	0.52 [3]	560 [3]	NE	NE	NE	NE	190 [5]
HIL C - Recreational			NE	300	NE	90	20000	90	NE	300	300	17000	NE	600	19000	80 [7]	NE	1200	700	NE	NE	NE	NE	NE	NE	30000
Laboratory LoR - Soil (mg/kg)			50	5	10	1	50	0.1	2	0.5	2	5	50	0.1	0.1	5	0.1	2	2	1	2	2	10	0.1	5	5
Laboratory LoR - Rinsate (µg/L)			10	1	-	-	-	0.1	1	-	-	1	50	1	-	-	-	-	1	-	-	-	-	-	-	5

Notes

All soil concentrations reported in milligrams per kilogram (mg/kg) on a dry weight basis, rinsate concentrations reported in micrograms per litre (µg
'LoR' denotes limit of reporting
'NA' denotes not applicable - primary and QC sample concentration below laboratory LoR
'NE' denotes screening level not established or is under review
'RPD' denotes relative percentage difference
'-' denotes not tested / parameter not obtained

1. EILs apply to top 2 m of soil profile
2. Dutch SRCeco value based on ABC, 9.5% clay content, 3.6% TOM
3. USEPA Eco SSL for plants or soil invertebrates
4. screening level for trivalent chromium Cr(III)
5. screening level derived using ABC, 9.5% clay content, pH 7.4, 25.5 meq/100g CEC (Gemec, 2022)
6. value for inorganic mercury

Table 5: Validation Soil Analytical Results - Nutrients & Soil Characteristics

Sample ID	Depth (m)	Date	Time	Nutrients						Soil Characteristics		
				Total Nitrogen (as N)	Total Kjeldahl Nitrogen (as N)	Ammonia (as N)	Nitrate (as N)	Nitrite (as N)	Total Phosphorus (as P)	Moisture Content (%)	pH	Electrical Conductivity (µS/cm)
Validation Soil Samples												
V1	3.0	13.04.23	13:37	-	-	-	-	-	-	**16.1**	**9.3**	**1990**
V2	3.0	13.04.23	14:20	-	-	-	-	-	-	**16.1**	**9.4**	**2350**
V3	3.5	13.04.23	13:42	-	-	-	-	-	-	**18.8**	**9.3**	**3160**
V4	3.5	13.04.23	14:16	-	-	-	-	-	-	**17.2**	**9.3**	**3040**
V5	3.0	13.04.23	13:46	-	-	-	-	-	-	**15.5**	**9.4**	**2320**
V6	3.0	13.04.23	14:11	-	-	-	-	-	-	**9.3**	**9.5**	**1270**
V7	3.5	13.04.23	13:50	-	-	-	-	-	-	**21.7**	**9.2**	**4160**
V8	3.5	13.04.23	14:07	-	-	-	-	-	-	**18.6**	**9.3**	**4150**
V9	3.0	13.04.23	13:55	-	-	-	-	-	-	**18.5**	**9.4**	**1790**
V10	3.0	13.04.23	14:01	-	-	-	-	-	-	**8.2**	**9.5**	**1070**
V11	1.0	13.04.23	14:35	-	-	-	-	-	-	**4.6**	**9.3**	**419**
V12	0-0.1	13.04.23	14:44	**1700**	**1680**	<20	**18**	<0.1	**369**	**8.2**	**8.8**	**146**
V13	0-0.1	13.04.23	14:52	**1300**	**1290**	<20	**5.6**	<0.1	**362**	**12.9**	**9.2**	**383**
V14	2.0	13.04.23	15:04	-	-	-	-	-	-	**5.9**	**9.5**	**118**
EIL - Areas of Ecological Significance [1]				NE	NE	NE	NE	NE	NE	NE	NE	NE
HIL C - Recreational				NE	NE	NE	NE	NE	NE	NE	NE	NE
Laboratory Limit of Reporting				20	20	20	0.1	0.1	2	0.1	1	5

Notes

All concentrations reported on a dry weight basis

'EIL' denotes Ecological Investigation Level

'HIL' denotes Health Investigation Level

'NE' denotes screening level not established or is under review

'-' denotes not tested / parameter not obtained

1. EILs apply to top 2 m of soil profile

Table 6: Groundwater Analytical Results - BTEXN, TRH, MTBE, Methane & Ethane

Sample ID	Date	Time	BTEXN						TRH				MTBE	Methane	Ethane
			Benzene	Toluene	Ethylbenzene	m+p- Xylene	o- Xylene	Naphthalene	F1 - C6-C10 less BTEX	F2 - >C10-C16 less naphthalene	F3 - >C16-C34	F4 - >C34-C40			
MW1	15.03.22	14:05	<1	<1	<1	<2	<1	<1	<10	**3400**	**380**	<100	<1	<5	<5
	08.07.22	09:01	<1	<1	<1	<2	<1	<1	<10	**930**	**670**	<100	<1	**25**	<5
	07.02.23	14:08	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<50	<100	<100	<1.0	<5.0	<5.0
	13.04.23	13:16	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<50	<100	<100	<1.0	<5.0	<5.0
Quality Control Samples															
Trip Blank	13.04.23	12:00	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	-	-	-	<1.0	-	-
MW1	13.04.23	13:16	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<50	<100	<100	<1.0	<5.0	<5.0
	Dup		*<1.0*	*<1.0*	*<1.0*	*<2.0*	*<1.0*	*<1.0*	*<10*	*<50*	*<100*	*<100*	*<1.0*	-	-
	RPD		*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	-	-
	Split		*<1*	*<1*	*<1*	*<2*	*<1*	*<1*	*<10*	*<50*	*<100*	*<100*	*<1*	-	-
	RPD		*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	-	-
Non-Potable Groundwater Use (NPUG)			10	25 [1]	3 [1]	20 [1]		NE	NE	NE	NE	NE	20 [1]	NE	NE
Marine Waters 95% (MW)			500	NE	NE	NE	NE	50	NE	NE	NE	NE	NE	NE	NE
HSL C for vapour intrusion (sand)			NL	NL	NL	NL	NL	NL	NL	NL	NE	NE	NE	NE	NE
Laboratory Limit of Reporting			1	1	1	2	1	1	10	50	100	100	1	5	5

Notes

All concentrations reported in micrograms per litre (µg/L)
'NA' denotes not applicable - primary and QC sample concentrations below laboratory LoR
'NE' denotes screening level not established or is under review
'NL' denotes screening level not limiting
'RPD' denotes relative percentage difference
'-' denotes not tested / parameter not obtained

1. aesthetic value (taste / odour)
2. para xylene screening level only
3. drinking water value (health) as per ANZECC (2000)

Table 7: Groundwater Analytical Results - Dissolved Metals, Metalloids & Non-Metals

Sample ID	Date	Aluminium (Al)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Boron (B)	Cadmium(Cd)	Chromium (Cr)	Hexavalent Chromium (CrVI)	Cobalt (Co)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Lithium (Li)	Manganese (Mn)	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Selenium (Se)	Strontium (Sr)	Titanium (Ti)	Uranium (U)	Vanadium (V)	Zinc (Zn)
MW1	15.03.22	<10	**2**	**130**	<0.5	**390**	<0.1	<1	<1	**4**	**3**	**850**	<1	**64**	**370**	<0.05	**1**	**4**	<1	**6600**	<1	**2.7**	<1	**1**
	08.07.22	**20**	**3**	**190**	<0.5	**320**	<0.1	<1	<1	**2**	**1**	**1800**	<1	**60**	**660**	<0.05	<1	**2**	<1	**6200**	<1	**1.0**	<1	**2**
	07.02.23	**38**	**1.7**	**47**	<0.50	**310**	<0.10	<1.0	<10	<1.0	<1.0	**280**	<1.0	**67**	**26**	<0.050	<1.0	<1.0	<1.0	**9200**	<1.0	<1.0	<1.0	<1.0
	13.04.23	<10	<1.0	**57**	<0.50	**330**	<0.10	<1.0	<1.0	<1.0	<1.0	**310**	<1.0	**69**	**13**	<0.050	<1.0	<1.0	<1.0	**7800**	<1.0	<1.0	<1.0	<1.0
Quality Control Samples																								
Rinsate	13.04.23	-	<1.0	<1.0	-	<20	-	-	-	-	-	<10	-	<1.0	**1.3**	-	-	-	-	<1.0	-	-	-	**3.3**
MW1	13.04.23	<10	<1.0	**57**	<0.50	**330**	<0.10	<1.0	<1.0	<1.0	<1.0	**310**	<1.0	**69**	**13**	<0.050	<1.0	<1.0	<1.0	**7800**	<1.0	<1.0	<1.0	<1.0
	Dup	*<10*	*<1.0*	***61***	*<0.50*	***310***	*<0.10*	*<1.0*	*-*	*<1.0*	*<1.0*	***350***	*<1.0*	***72***	***14***	*<0.050*	*<1.0*	*<1.0*	*<1.0*	***7700***	*<1.0*	*<1.0*	*<1.0*	***3.3***
	RPD	*NA*	*NA*	*7*	*NA*	*6*	*NA*	*NA*	*-*	*NA*	*NA*	*12*	*NA*	*4*	*7*	*NA*	*NA*	*NA*	*NA*	*1*	*NA*	*NA*	*NA*	*107*
	Split	*<1*	*<10*	***55***	*<0.5*	***250***	*<0.1*	***1***	*-*	*<1*	*<1*	***340***	*<1*	***67***	***17***	*<0.05*	*<1*	*<1*	*<1*	***7500***	*<1*	***0.7***	*<1*	***2***
	RPD	*NA*	*NA*	*4*	*NA*	*28*	*NA*	*NA*	*-*	*NA*	*NA*	*9*	*NA*	*3*	*27*	*NA*	*NA*	*NA*	*NA*	*4*	*NA*	*35*	*NA*	*67*
Non-Potable Groundwater Use		200 [1]	100	20000	600	40000	20	NE	500	NE	20000	300 [1]	100	NE	5000	10	500	200	100	NE	NE	170	NE	3000 [1]
Marine Waters 95% (MW)		NE	NE	NE	NE	NE	0.7	27	4.4	1	1.3	NE	4.4	NE	NE	0.1	NE	7	NE	NE	NE	NE	100	15
Laboratory Limit of Reporting		10	1.0	1.0	0.50	20	0.10	1.0	1.0	1.0	1.0	10	1.0	1.0	1.0	0.050	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Notes

All concentrations reported in micrograms per litre (µg/L)

1. aesthetic value (taste / odour)

850 shading indicates concentration exceeds the NPUG screening level

4 shading indicates concentration exceeds the MW screening level

'NA' denotes not applicable - primary and QC sample concentrations below laboratory LoR

'NE' denotes screening level not established or is under review

'RPD' denotes relative percentage difference

'-' denotes analysis not conducted / parameter not obtained

Table 8: Groundwater Analytical Results - Cations, Anions, Alkalinity & Hardness

Sample ID	Date	Time	Cations				Anions					Hardness as $CaCO_3$	Total Alkalinity as $CaCO_3$	Ionic Balance %
			Calcium (Ca^{2+})	Magnesium (Mg^{2+})	Sodium (Na^{+})	Potassium (K^{+})	Chloride (Cl^{-})	Sulphate (SO_4^{2-})	Carbonate (CO_3^{2-})	Bicarbonate (HCO_3^{-})	Hydroxide (OH^{-}) as $CaCO_3$			
MW1	15.03.22	14:05	**140**	**190**	**1200**	**45**	**2700**	**300**	<5	**470**	<5	**1100**	**470**	**-9.0**
	08.07.22	09:01	**130**	**200**	**1300**	**48**	**2500**	**310**	<5	**440**	<5	**1100**	**440**	**-3.2**
	07.02.23	14:08	**120**	**230**	**1500**	**54**	**2700**	**300**	<5.0	**450**	<5.0	**1200**	**450**	**-0.64**
	13.04.23	13:16	**130**	**220**	**1400**	**53**	**2700**	**270**	<5.0	**460**	<5.0	**1200**	**460**	**-2.4**
Non-Potable Groundwater Use (NPUG)			NE	NE	NE	NE	250 [1]	1000	NE	NE	NE	NE	NE	NE
Marine Waters 95% (MW)			NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Laboratory Limit of Reporting			0.50	0.50	0.50	0.50	1.0	1.0	5.0	5.0	5.0	3.0	5.0	5.0

Notes

All concentrations reported in milligrams per litre (mg/L)

2700 shading indicates concentration exceeds NPGU screening levels

'NE' denotes screeng level not established or is under review

1. aesthetic value
2. value for moderately sensitive crops

Table 9: Groundwater Analytical Results - Nutrients

Sample ID	Date	Time	Total Nitrogen	Total Kjeldahl Nitrogen	Ammonia (as N)	Nitrate (as N)	Nitrite (as N)	Total Phosphorus	Phosphate (as P)
MW1	15.03.22	14:05	**2.4**	**2.3**	<0.005	**0.015**	<0.005	**0.06**	**0.024**
	08.07.22	09:01	**1.0**	**1.0**	**0.025**	<0.005	<0.005	**0.10**	**0.035**
	07.02.23	14:08	**0.17**	**0.17**	**0.039**	<0.0050	<0.0050	<0.050	**0.021**
	13.04.23	13:16	**0.44**	**0.44**	**0.067**	<0.0050	<0.0050	<0.050	**0.017**
Non-Potable Groundwater Use (NPUG)			NE	NE	0.4 [1]	110	9	NE	NE
Marine Waters 95% (MW)			NE	NE	NE	NE	NE	NE	NE
Laboratory Limit of Reporting			0.10	0.10	0.0050	0.0050	0.0050	0.050	0.0050

Notes
All concentrations reported in milligrams per litre (mg/L)
'NE' denotes screening level not established or is under review

1. aesthetic value

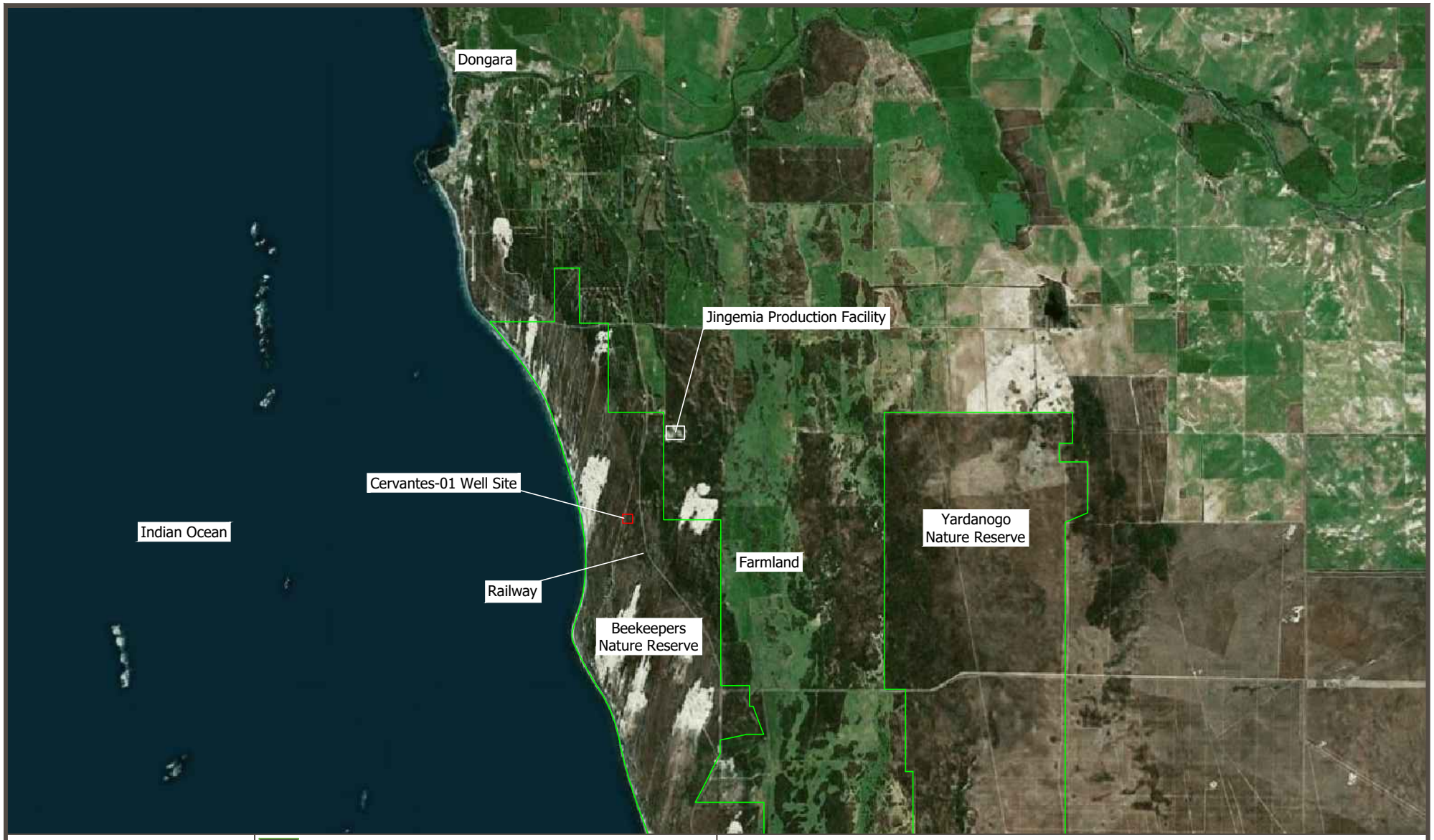
Table 10: Groundwater Physical & Chemical Parameters

Sample ID	Date	Time	Depth of Well (m btoc)	SWL (m btoc)	Top of Screen (m btoc)	Purged Volume (L)	Temperature (°C)	Electrical conductivity - field (µS/cm)	Electrical conductivity - lab (µS/cm)	Total Dissolved Solids - field (mg/L)	Total Dissolved Solids - lab (mg/L)	Dissolved Oxygen (mg/L)	pH - field	pH - lab	Redox (mV)
MW1	15.03.22	14:05	13.83	4.004	4.9	54.0	24.1	7652	8500	5259	5300	0.4	6.9	7.3	-198
	08.07.22	09:01	13.83	3.263	4.9	12.0	22.9	8107	8300	5457	5500	0.9	7.0	7.3	-255
	07.02.23	14:08	13.81	3.453	4.9	44.0	22.9	8984	8900	6016	5900	0.3	6.6	7.5	-229
	13.04.23	13:16	13.82	3.425	4.9	24.5	23.4	7867	8200	5273	5300	0.3	7.1	7.3	-133
Laboratory Limit of Reporting							-	-	2.0	-	5.0	-	-	-	-

Notes
All field measured parameters obtained using a calibrated YSI Pro Plus multi probe meter
Total Dissolved Solids is calculated by multiplying EC by 0.67 (ANZECC 2000)
-' denotes not applicable / analysis not conducted / parameter not obtained

Abbreviations & Acronyms
btoc - below top of casing
µS/cm - microSiemens per centimetre
mg/L - milligrams per litre
mV - millivolts
SWL - standing water level

Figures



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W: www.gemec.com.au

Wellsite / lease boundary
Nature reserve

N

0 5
Scale (km), approx.

Regional groundwater flow direction (DoW, 2017)

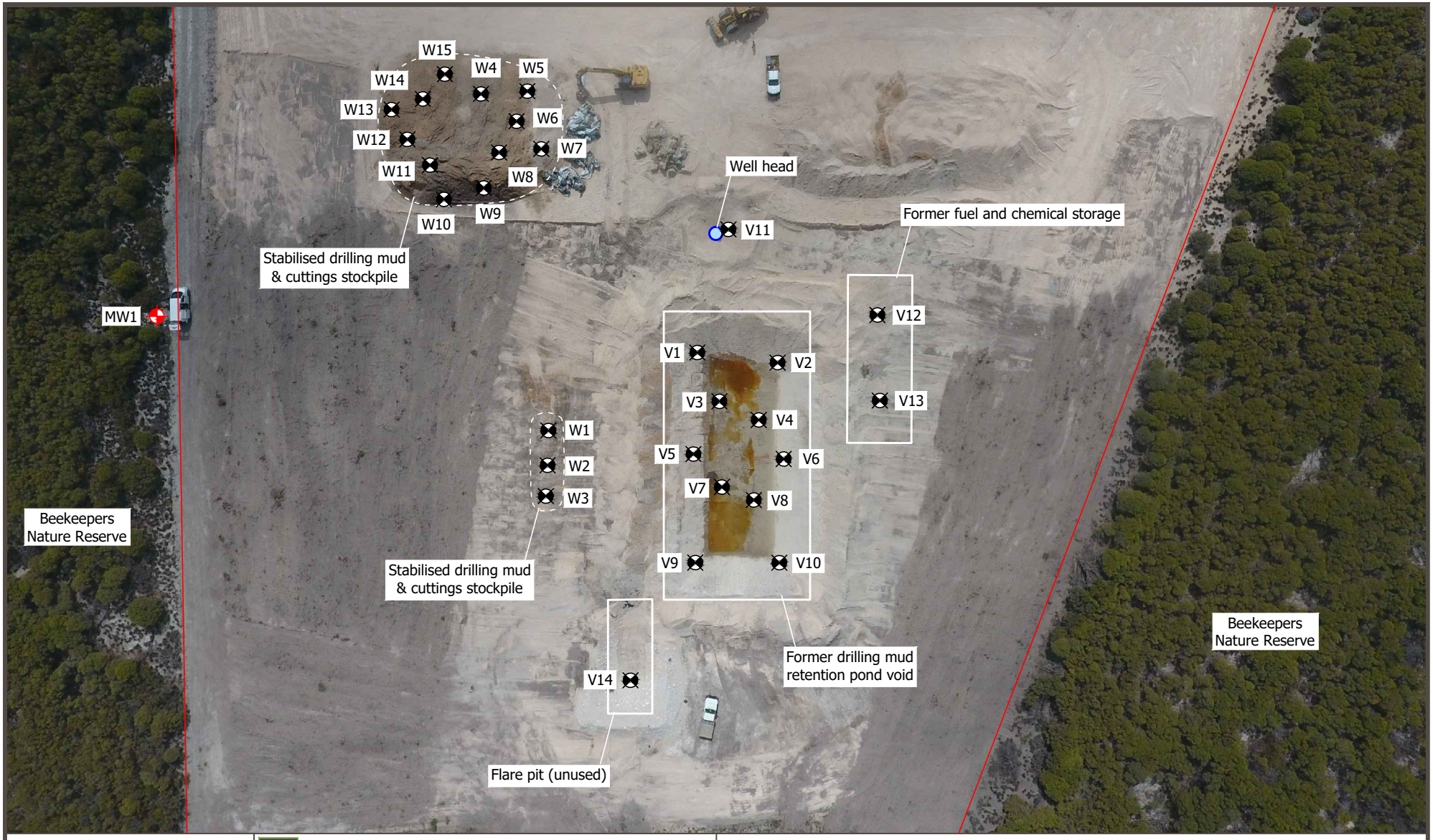
W

Regional Site Setting, 2022

Cervantes-01 Well Site

Lot 12174 Plan 39607, Mount Adams, Western Australia

Drawn: GP	Date: 29.03.2022	Checked	Approved	Dwg No.	**Figure**	**1**
Source: National Map, Mar 2022		NJ	NJ			



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Site Perimeter
Former site infrastructure / use (approx.)
Exploration well
Groundwater sampling location
Surface soil sampling location

N

0 20
Scale (m), approx.

Regional groundwater flow direction (DoW, 2017)

W

Soil & Groundwater Sample Locations, April 2023

Cervantes-01 Well Site

Lot 12174 Plan 39607, Mount Adams, Western Australia

Drawn: DB	Date: 15.06.2022	Checked	Approved	Dwg No.	**Figure**	**2**
Source: Gemec, 13 April 2023		NJ	NJ			

Appendix A – Analytical Results

Chain of Custody Forms and Laboratory Reports

- Soil Samples
- Groundwater Samples

Soil, 05 April 2023

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

PERTH 26 Rigali Way Wangara WA 6065
Ph: 08 9406 1301 E: samples.perth@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

CLIENT: Gemec Environmental Consultants	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE: 1/25 Foss St, Palmyra, WA 6157		☒ Non Standard or urgent TAT (List due date): 13.04.2023 (72 hr)	Custody Seal Intact? Yes No N/A
PROJECT: Cervantes-01 Waste	ALS QUOTE NO.: EP/978/21_V7	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7	Free ice / frozen ice packs present upon receipt? Yes No N/A
ORDER NUMBER: -		OF: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt °C
PROJECT MANAGER: Nicolo Jelovsek	CONTACT PH: 08 9339 8449		Other comment:
SAMPLER: Nicolo Jelovsek	SAMPLER MOBILE: 0439093980	RELINQUISHED BY: Nicolo Jelovsek	RECEIVED BY: SP
COC emailed to ALS? (YES ~~NO~~)	EDD FORMAT (or default):	DATE/TIME: 06.04.2023 / 10:30	DATE/TIME: 1740 6/4
Email Reports to: nicolo@gemec.com.au		RELINQUISHED BY:	RECEIVED BY:
Email Invoice to: marise@gemec.com.au		DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Jars labelled C1. Please hold 2nd jar from each sample for potential rebatch analyses. Samples expected to be alkaline, saline and have high barium content.

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)				CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).														Additional Information
LAB ID	SAMPLE ID	DATE	TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	S-04: TRH / BTEXN	EP058A: Organochlorine Pesticides	P-19/2: Al, As, B, Ba, Be, Cd, Co, CrVI, Cu, Hg, Mn, Mo, Ni, Pb, Se, V, Zn + pH	EG005T: Cr, Fe, Sr, Ti	EG020T: Li, U	EN34: 1:5 leach	EA010: Electrical conductivity (1:5)	S-18: TRH (C6-C10) / BTEXN	EP070: TRH Speciation - aromatic & aliphatic	EG035T: Water leachable As, Ba, Hg, Mo, Ni, Pb, Se	W-4: TRH / BTEXN	W-01T: 7 Metals (total): As, Cd, Cr, Cu, Ni, Pb, Zn	EG020T: Ba, Mn	P-22: NEPM Screen for Soil Classification: Fe, CEC, pH(CaCl2), TOC, Clay Content	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	W1 0.4m	05.04.23	09:38	S	2 x glass unpreserved	2	1		1	1	1	1	1			1					
2	W2 0.6m	05.04.23	09:44	S	2 x glass unpreserved	2	1		1	1	1	1	1								
3	W3 0.4m	05.04.23	09:47	S	2 x glass unpreserved	2	1		1	1	1	1	1		1						
4	W4 1.2m	05.04.23	10:29	S	2 x glass unpreserved	2	1		1	1	1	1	1			1					
5	W5 0.8m	05.04.23	10:35	S	2 x glass unpreserved	2	1		1	1	1	1	1		1						
6	W6 1.0m	05.04.23	10:44	S	2 x glass unpreserved	2	1		1	1	1	1	1								
7	W7 0.2m	05.04.23	10:54	S	2 x glass unpreserved	2	1		1	1	1	1	1			1					
8	W8 1.5m	05.04.23	11:03	S	2 x glass unpreserved	2	1		1	1	1	1	1								
9	W9 0.5m	05.04.23	11:10	S	2 x glass unpreserved	2	1		1	1	1	1	1		1						
10	W10 0.1m	05.04.23	11:22	S	2 x glass unpreserved	2	1		1	1	1	1	1			1					
11	W11 1.7m	05.04.23	11:34	S	2 x glass unpreserved	2	1		1	1	1	1	1								
12	W12 0.6m	05.04.23	11:42	S	2 x glass unpreserved	2	1		1	1	1	1	1								
13	W13 0.3m	05.04.23	11:50	S	2 x glass unpreserved	2	1		1	1	1	1	1			1					
14	W14 1.4m	05.04.23	11:56	S	2 x glass unpreserved	2	1		1	1	1	1	1								
15	W15 0.6m	05.04.23	12:03	S	2 x glass unpreserved	2	1		1	1	1	1	1								
16	Dup 1	05.04.23	-	S	1 x glass unpreserved	1	1		1	1	1	1	1								
17	Trip Blank 1	05.04.23	09:00	S	1 x glass unpreserved	1								1							
18	Trip Blank 2	05.04.23	09:00	S	1 x glass unpreserved	1								1							
19	Rinsate 1	05.04.23	12:25	W	1 x N, 2 x V, 1 x AG	4											1	1	1		
20																					
TOTAL						37	16		16	16	16	16	16	2	3	5	1	1	1		

Environmental Division Perth
Work Order Reference
EP2304467

Telephone : +61-8-9406 1301

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EP2304467**

Client	: **GEMEC**	Laboratory	: Environmental Division Perth
Contact	: MR NICOLO JELOVSEK	Contact	: Genevieve De Souza
Address	: UNIT 1/25 FOSS STREET PALMYRA WA, AUSTRALIA	Address	: 26 Rigali Way Wangara WA Australia 6065
E-mail	: nicolo@gemec.com.au	E-mail	: genevieve.desouza@alsglobal.com
Telephone	: 9339 8449	Telephone	: +61-8-9406 1301
Facsimile	: ----	Facsimile	: +61-8-9406 1399
Project	: Cervantes-01 Waste	Page	: 1 of 3
Order number	: ----	Quote number	: EP2021GEMEC0009_V7 (EP/978/21_V7)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: NICOLO JELOVSEK		

Dates

Date Samples Received	: 06-Apr-2023 17:40	Issue Date	: 11-Apr-2023
Client Requested Due Date	: 19-Apr-2023	Scheduled Reporting Date	: **19-Apr-2023**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 2	Temperature	: 9.0 - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 19 / 19

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Please see scanned COC for sample discrepencies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA010 (solids): Electrical Conductivity (1:5)	SOIL - EA055-103 Moisture Content	SOIL - EG005T (solids) Total Metals by ICP-AES	SOIL - EG020T Total Metals by ICPMS	SOIL - EN60-D1a-G Deionised Water Leach - Glass Leaching Vessel	SOIL - P-19/2 WA Waste Classification (Metals Suite)	SOIL - S-04 TRH/BTEXN
EP2304467-001	05-Apr-2023 09:38	W1 0.4m	✓	✓	✓	✓	✓	✓	✓
EP2304467-002	05-Apr-2023 09:44	W2 0.6m	✓	✓	✓	✓		✓	✓
EP2304467-003	05-Apr-2023 09:47	W3 0.4m	✓	✓	✓	✓		✓	✓
EP2304467-004	05-Apr-2023 10:29	W4 1.2m	✓	✓	✓	✓	✓	✓	✓
EP2304467-005	05-Apr-2023 10:35	W5 0.5m	✓	✓	✓	✓		✓	✓
EP2304467-006	05-Apr-2023 10:44	W6 1.0m	✓	✓	✓	✓		✓	✓
EP2304467-007	05-Apr-2023 10:54	W7 0.2m	✓	✓	✓	✓	✓	✓	✓
EP2304467-008	05-Apr-2023 11:03	W8 1.5m	✓	✓	✓	✓		✓	✓
EP2304467-009	05-Apr-2023 11:10	W9 0.5m	✓	✓	✓	✓		✓	✓
EP2304467-010	05-Apr-2023 11:22	W10 0.1m	✓	✓	✓	✓	✓	✓	✓
EP2304467-011	05-Apr-2023 11:34	W11 1.7m	✓	✓	✓	✓		✓	✓
EP2304467-012	05-Apr-2023 11:42	W12 0.6m	✓	✓	✓	✓		✓	✓
EP2304467-013	05-Apr-2023 11:50	W13 0.3m	✓	✓	✓	✓	✓	✓	✓
EP2304467-014	05-Apr-2023 11:56	W14 1.4m	✓	✓	✓	✓		✓	✓
EP2304467-015	05-Apr-2023 12:03	W15 0.6m	✓	✓	✓	✓		✓	✓
EP2304467-016	05-Apr-2023 00:00	Dup 1	✓	✓	✓	✓		✓	✓
EP2304467-017	05-Apr-2023 09:00	Trip Blank 1		✓					
EP2304467-018	05-Apr-2023 09:00	Trip Blank 2		✓					

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EG020W Water Leachable Metals by ICPMS	SOIL - EP070 (solids) TRH Speciation - Aliphatic & Aromatic	SOIL - S-18 TRH(C6-C9)/BTEXN
EP2304467-001	05-Apr-2023 09:38	W1 0.4m	✓		
EP2304467-003	05-Apr-2023 09:47	W3 0.4m		✓	
EP2304467-004	05-Apr-2023 10:29	W4 1.2m	✓		
EP2304467-005	05-Apr-2023 10:35	W5 0.5m		✓	
EP2304467-007	05-Apr-2023 10:54	W7 0.2m	✓		
EP2304467-009	05-Apr-2023 11:10	W9 0.5m		✓	

			SOIL - EG020W Water Leachable Metals by ICPMS	SOIL - EP070 (solids) TRH Speciation - Aliphatic & Aromatic	SOIL - S-18 TRH(C6-C9)/BTEXN
EP2304467-010	05-Apr-2023 11:22	W10 0.1m	✓		
EP2304467-013	05-Apr-2023 11:50	W13 0.3m	✓		
EP2304467-017	05-Apr-2023 09:00	Trip Blank 1			✓
EP2304467-018	05-Apr-2023 09:00	Trip Blank 2			✓

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - W-01T 7 metals (Total)	WATER - W-04 TRH/BTEXN
EP2304467-019	05-Apr-2023 12:25	Rinsate 1	✓	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ACCOUNTS PAYABLE (WA)

- A4 - AU Tax Invoice (INV)	Email	marise@gemec.com.au

NICOLO JELOVSEK

- *AU Certificate of Analysis - NATA (COA)	Email	nicolo@gemec.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	nicolo@gemec.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	nicolo@gemec.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	nicolo@gemec.com.au
- AU Guideline Report - Generic (GL_Generic_Test)	Email	nicolo@gemec.com.au
- Chain of Custody (CoC) (COC)	Email	nicolo@gemec.com.au
- EDI Format - ESDAT (ESDAT)	Email	nicolo@gemec.com.au
- EDI Format - XTab (XTAB)	Email	nicolo@gemec.com.au

CERTIFICATE OF ANALYSIS

Work Order	: **EP2304467**	Page	: 1 of 16
Client	: **GEMEC**	Laboratory	: Environmental Division Perth
Contact	: MR NICOLO JELOVSEK	Contact	: Genevieve De Souza
Address	: UNIT 1/25 FOSS STREET PALMYRA WA, AUSTRALIA	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: 9339 8449	Telephone	: +61-8-9406 1301
Project	: Cervantes-01 Waste	Date Samples Received	: 06-Apr-2023 17:40
Order number	: ----	Date Analysis Commenced	: 11-Apr-2023
C-O-C number	: ----	Issue Date	: 14-Apr-2023 21:09
Sampler	: NICOLO JELOVSEK		
Site	: ----		
Quote number	: EP/978/21_V7		
No. of samples received	: 19		
No. of samples analysed	: 19		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Wangara, WA
Thomas Donovan	Senior Organic Chemist	Perth Organics, Wangara, WA

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 Contract 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
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EG020: Positive Ba result for sample EP2304467-019 has been confirmed by re-preparation and re-analysis.
- EG048G (Hexavalent Chromium): LOR raised for sample #1 due to possible sample matrix interference.
- EG048G (Hexavalent Chromium): Poor spike recovery due to possible sample matrix interference. Confirmed by re-preparation and re-analysis.

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Sample ID	W1 0.4m	W4 1.2m	W7 0.2m	W10 0.1m	W13 0.3m
				Sampling date / time	05-Apr-2023 09:38	05-Apr-2023 10:29	05-Apr-2023 10:54	05-Apr-2023 11:22	05-Apr-2023 11:50
Compound	CAS Number	LOR	Unit		EP2304467-001	EP2304467-004	EP2304467-007	EP2304467-010	EP2304467-013
					Result	Result	Result	Result	Result
EG020W: Water Leachable Metals by ICP-MS									
Barium	7440-39-3	0.001	mg/L		**0.687**	**0.271**	**0.364**	**0.500**	**0.198**
Copper	7440-50-8	0.001	mg/L		**0.020**	**0.033**	**0.027**	**0.022**	**0.027**
Lead	7439-92-1	0.001	mg/L		**0.006**	**0.003**	**0.003**	**0.003**	**0.002**
Manganese	7439-96-5	0.001	mg/L		**0.080**	**0.028**	**0.038**	**0.037**	**0.026**
Nickel	7440-02-0	0.001	mg/L		**0.012**	**0.023**	**0.014**	**0.016**	**0.016**
Zinc	7440-66-6	0.005	mg/L		**0.012**	**0.006**	<0.005	**0.005**	<0.005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	W1 0.4m	W2 0.6m	W3 0.4m	W4 1.2m	W5 0.5m
			Sampling date / time	05-Apr-2023 09:38	05-Apr-2023 09:44	05-Apr-2023 09:47	05-Apr-2023 10:29	05-Apr-2023 10:35
Compound	CAS Number	LOR	Unit	EP2304467-001	EP2304467-002	EP2304467-003	EP2304467-004	EP2304467-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	10.8	10.9	10.3	11.6	11.7
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	13100	10600	8290	10900	9760
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	23.8	21.7	16.8	22.7	23.5
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	1400	1470	1190	1820	2160
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Barium	7440-39-3	10	mg/kg	3260	2910	2400	3150	2990
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Chromium	7440-47-3	2	mg/kg	16	16	14	22	24
Cobalt	7440-48-4	2	mg/kg	3	3	2	3	4
Copper	7440-50-8	5	mg/kg	9	8	6	14	14
Iron	7439-89-6	50	mg/kg	2940	3080	2150	4120	5140
Manganese	7439-96-5	5	mg/kg	81	82	62	118	124
Molybdenum	7439-98-7	2	mg/kg	<2	<2	<2	<2	<2
Nickel	7440-02-0	2	mg/kg	3	3	2	5	6
Silver	7440-22-4	2	mg/kg	<2	<2	<2	<2	<2
Strontium	7440-24-6	2	mg/kg	1380	1410	1600	1220	1050
Vanadium	7440-62-2	5	mg/kg	<5	<5	<5	6	8
Zinc	7440-66-6	5	mg/kg	7	8	<5	9	10
Titanium	7440-32-6	10	mg/kg	40	40	30	60	70
EG020T: Total Metals by ICP-MS								
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Uranium	7440-61-1	0.1	mg/kg	0.5	0.5	0.6	0.5	0.4
Lithium	7439-93-2	0.1	mg/kg	2.0	2.3	2.1	3.3	2.9
Lead	7439-92-1	0.1	mg/kg	4.7	5.4	3.4	6.7	6.1
Selenium	7782-49-2	1	mg/kg	<1	<1	<1	<1	<1
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<2.5	<0.5	<0.5	<0.5	<0.5
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	W1 0.4m	W2 0.6m	W3 0.4m	W4 1.2m	W5 0.5m
			Sampling date / time	05-Apr-2023 09:38	05-Apr-2023 09:44	05-Apr-2023 09:47	05-Apr-2023 10:29	05-Apr-2023 10:35
Compound	CAS Number	LOR	Unit	EP2304467-001	EP2304467-002	EP2304467-003	EP2304467-004	EP2304467-005
				Result	Result	Result	Result	Result
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel) - Continued								
Final pH	----	0.1	pH Unit	**10.6**	**----**	**----**	**11.2**	**----**
EP070: Total Petroleum Hydrocarbons - Speciation								
Aliphatic C16-C35	----	100	mg/kg	**----**	**----**	<100	**----**	<100
Aliphatic > C35	----	100	mg/kg	**----**	**----**	<100	**----**	<100
Aromatic C16-C35	----	90	mg/kg	**----**	**----**	<90	**----**	<90
Aromatic > C35	----	100	mg/kg	**----**	**----**	<100	**----**	<100
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP070: Total Petroleum Hydrocarbons - Speciation								
2-Bromonaphthalene	580-13-2	1	%	**----**	**----**	**122**	**----**	**122**
2-Fluorobiphenyl	321-60-8	1	%	**----**	**----**	**96.8**	**----**	**81.8**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	W1 0.4m	W2 0.6m	W3 0.4m	W4 1.2m	W5 0.5m
				Sampling date / time	05-Apr-2023 09:38	05-Apr-2023 09:44	05-Apr-2023 09:47	05-Apr-2023 10:29	05-Apr-2023 10:35
Compound	CAS Number	LOR	Unit		EP2304467-001	EP2304467-002	EP2304467-003	EP2304467-004	EP2304467-005
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**73.4**	**69.4**	**90.2**	**69.9**	**91.1**
Toluene-D8	2037-26-5	0.2	%		**72.0**	**68.6**	**92.2**	**70.1**	**91.6**
4-Bromofluorobenzene	460-00-4	0.2	%		**75.7**	**74.7**	**87.6**	**75.9**	**89.5**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	W6 1.0m	W7 0.2m	W8 1.5m	W9 0.5m	W10 0.1m
			Sampling date / time	05-Apr-2023 10:44	05-Apr-2023 10:54	05-Apr-2023 11:03	05-Apr-2023 11:10	05-Apr-2023 11:22
Compound	CAS Number	LOR	Unit	EP2304467-006	EP2304467-007	EP2304467-008	EP2304467-009	EP2304467-010
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	11.5	11.5	11.6	11.5	11.7
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	8820	7790	8690	9050	12300
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	18.9	21.3	18.9	19.0	24.0
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	1560	1900	1590	1770	1740
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Barium	7440-39-3	10	mg/kg	3060	2840	2510	2210	3600
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Chromium	7440-47-3	2	mg/kg	18	20	18	21	24
Cobalt	7440-48-4	2	mg/kg	3	3	2	3	4
Copper	7440-50-8	5	mg/kg	9	10	7	15	11
Iron	7439-89-6	50	mg/kg	3270	4110	3060	4620	3780
Manganese	7439-96-5	5	mg/kg	87	101	85	98	105
Molybdenum	7439-98-7	2	mg/kg	<2	<2	<2	<2	<2
Nickel	7440-02-0	2	mg/kg	4	5	4	6	5
Silver	7440-22-4	2	mg/kg	<2	<2	<2	<2	<2
Strontium	7440-24-6	2	mg/kg	1240	1170	1220	1130	1230
Vanadium	7440-62-2	5	mg/kg	5	6	5	7	6
Zinc	7440-66-6	5	mg/kg	6	8	6	11	8
Titanium	7440-32-6	10	mg/kg	50	60	50	60	60
EG020T: Total Metals by ICP-MS								
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Uranium	7440-61-1	0.1	mg/kg	0.4	0.4	0.4	0.4	0.4
Lithium	7439-93-2	0.1	mg/kg	2.3	2.7	2.2	2.6	2.5
Lead	7439-92-1	0.1	mg/kg	5.1	4.7	3.8	5.6	6.0
Selenium	7782-49-2	1	mg/kg	<1	<1	<1	<1	<1
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	W6 1.0m	W7 0.2m	W8 1.5m	W9 0.5m	W10 0.1m
			Sampling date / time	05-Apr-2023 10:44	05-Apr-2023 10:54	05-Apr-2023 11:03	05-Apr-2023 11:10	05-Apr-2023 11:22
Compound	CAS Number	LOR	Unit	EP2304467-006	EP2304467-007	EP2304467-008	EP2304467-009	EP2304467-010
				Result	Result	Result	Result	Result
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel) - Continued								
Final pH	----	0.1	pH Unit	----	11.2	----	----	11.2
EP070: Total Petroleum Hydrocarbons - Speciation								
Aliphatic C16-C35	----	100	mg/kg	----	----	----	<100	----
Aliphatic > C35	----	100	mg/kg	----	----	----	<100	----
Aromatic C16-C35	----	90	mg/kg	----	----	----	<90	----
Aromatic > C35	----	100	mg/kg	----	----	----	<100	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP070: Total Petroleum Hydrocarbons - Speciation								
2-Bromonaphthalene	580-13-2	1	%	----	----	----	122	----
2-Fluorobiphenyl	321-60-8	1	%	----	----	----	111	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	W6 1.0m	W7 0.2m	W8 1.5m	W9 0.5m	W10 0.1m
				Sampling date / time	05-Apr-2023 10:44	05-Apr-2023 10:54	05-Apr-2023 11:03	05-Apr-2023 11:10	05-Apr-2023 11:22
Compound	CAS Number	LOR	Unit		EP2304467-006	EP2304467-007	EP2304467-008	EP2304467-009	EP2304467-010
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**72.0**	**74.3**	**75.9**	**86.3**	**80.1**
Toluene-D8	2037-26-5	0.2	%		**69.9**	**71.3**	**70.1**	**86.4**	**73.6**
4-Bromofluorobenzene	460-00-4	0.2	%		**77.9**	**78.3**	**77.3**	**82.5**	**80.8**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	W11 1.7m	W12 0.6m	W13 0.3m	W14 1.4m	W15 0.6m
			Sampling date / time	05-Apr-2023 11:34	05-Apr-2023 11:42	05-Apr-2023 11:50	05-Apr-2023 11:56	05-Apr-2023 12:03
Compound	CAS Number	LOR	Unit	EP2304467-011	EP2304467-012	EP2304467-013	EP2304467-014	EP2304467-015
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	11.3	11.5	11.7	11.5	11.7
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	8410	9240	9220	6860	10900
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	18.6	19.3	21.8	16.0	23.6
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	1490	1680	2090	1550	2130
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Barium	7440-39-3	10	mg/kg	2800	2990	1680	1900	2430
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Chromium	7440-47-3	2	mg/kg	17	20	19	16	20
Cobalt	7440-48-4	2	mg/kg	3	3	3	2	4
Copper	7440-50-8	5	mg/kg	7	10	11	10	12
Iron	7439-89-6	50	mg/kg	2830	4320	5180	3840	5500
Manganese	7439-96-5	5	mg/kg	76	111	160	95	122
Molybdenum	7439-98-7	2	mg/kg	<2	<2	<2	<2	<2
Nickel	7440-02-0	2	mg/kg	3	4	6	4	6
Silver	7440-22-4	2	mg/kg	<2	<2	<2	<2	<2
Strontium	7440-24-6	2	mg/kg	1320	1080	914	1080	1010
Vanadium	7440-62-2	5	mg/kg	<5	6	10	5	8
Zinc	7440-66-6	5	mg/kg	5	8	21	7	11
Titanium	7440-32-6	10	mg/kg	40	50	70	40	70
EG020T: Total Metals by ICP-MS								
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Uranium	7440-61-1	0.1	mg/kg	0.4	0.4	0.5	0.5	0.5
Lithium	7439-93-2	0.1	mg/kg	2.2	2.6	2.9	3.0	3.4
Lead	7439-92-1	0.1	mg/kg	3.6	6.1	5.1	4.6	6.1
Selenium	7782-49-2	1	mg/kg	<1	<1	<1	<1	<1
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	W11 1.7m	W12 0.6m	W13 0.3m	W14 1.4m	W15 0.6m
				Sampling date / time	05-Apr-2023 11:34	05-Apr-2023 11:42	05-Apr-2023 11:50	05-Apr-2023 11:56	05-Apr-2023 12:03
Compound	CAS Number	LOR	Unit		EP2304467-011	EP2304467-012	EP2304467-013	EP2304467-014	EP2304467-015
					Result	Result	Result	Result	Result
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel) - Continued									
Final pH	----	0.1	pH Unit		----	----	11.4	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		78.1	72.7	72.4	80.9	74.5
Toluene-D8	2037-26-5	0.2	%		69.8	71.7	72.5	73.5	67.9
4-Bromofluorobenzene	460-00-4	0.2	%		77.8	76.7	76.6	80.9	73.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	Dup 1	Trip Blank 1	Trip Blank 2	----	----
			Sampling date / time	05-Apr-2023 00:00	05-Apr-2023 09:00	05-Apr-2023 09:00	----	----
Compound	CAS Number	LOR	Unit	EP2304467-016	EP2304467-017	EP2304467-018	--------	--------
				Result	Result	Result	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**11.6**	----	----	----	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**10000**	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**21.9**	**3.2**	**18.9**	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	**1590**	----	----	----	----
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	----
Barium	7440-39-3	10	mg/kg	**2700**	----	----	----	----
Beryllium	7440-41-7	1	mg/kg	<1	----	----	----	----
Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**21**	----	----	----	----
Cobalt	7440-48-4	2	mg/kg	**3**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**11**	----	----	----	----
Iron	7439-89-6	50	mg/kg	**3570**	----	----	----	----
Manganese	7439-96-5	5	mg/kg	**95**	----	----	----	----
Molybdenum	7439-98-7	2	mg/kg	<2	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**4**	----	----	----	----
Silver	7440-22-4	2	mg/kg	<2	----	----	----	----
Strontium	7440-24-6	2	mg/kg	**1190**	----	----	----	----
Vanadium	7440-62-2	5	mg/kg	**6**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**8**	----	----	----	----
Titanium	7440-32-6	10	mg/kg	**50**	----	----	----	----
EG020T: Total Metals by ICP-MS								
Cadmium	7440-43-9	0.1	mg/kg	<0.1	----	----	----	----
Uranium	7440-61-1	0.1	mg/kg	**0.5**	----	----	----	----
Lithium	7439-93-2	0.1	mg/kg	**2.8**	----	----	----	----
Lead	7439-92-1	0.1	mg/kg	**5.4**	----	----	----	----
Selenium	7782-49-2	1	mg/kg	<1	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	Dup 1	Trip Blank 1	Trip Blank 2	----	----
				Sampling date / time	05-Apr-2023 00:00	05-Apr-2023 09:00	05-Apr-2023 09:00	----	----
Compound	CAS Number	LOR	Unit		EP2304467-016	EP2304467-017	EP2304467-018	--------	--------
					Result	Result	Result	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**83.9**	**78.4**	**73.6**	----	----
Toluene-D8	2037-26-5	0.2	%		**72.4**	**90.0**	**84.2**	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		**77.0**	**88.2**	**83.8**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Rinsate 1	----	----	----	----
				Sampling date / time	05-Apr-2023 12:25	----	----	----	----
Compound	CAS Number	LOR	Unit		EP2304467-019	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
Barium	7440-39-3	0.001	mg/L		**0.004**	----	----	----	----
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	----	----	----	----
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		<0.005	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		<0.001	----	----	----	----
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	----	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	----	----	----	----
^ **>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**	----	2	µg/L		<2	----	----	----	----
^ **Sum of BTEX**	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Rinsate 1	----	----	----	----
				Sampling date / time	05-Apr-2023 12:25	----	----	----	----
Compound	CAS Number	LOR	Unit		EP2304467-019	--------	--------	--------	--------
					Result	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**97.8**	**----**	**----**	**----**	**----**
Toluene-D8	2037-26-5	2	%		**106**	**----**	**----**	**----**	**----**
4-Bromofluorobenzene	460-00-4	2	%		**114**	**----**	**----**	**----**	**----**

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP070: Total Petroleum Hydrocarbons - Speciation			
2-Bromonaphthalene	580-13-2	70	130
2-Fluorobiphenyl	321-60-8	70	130
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	63	132
Toluene-D8	2037-26-5	66	125
4-Bromofluorobenzene	460-00-4	60	124

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EP2304467**	Page	: 1 of 12
Client	: **GEMEC**	Laboratory	: Environmental Division Perth
Contact	: MR NICOLO JELOVSEK	Telephone	: +61-8-9406 1301
Project	: Cervantes-01 Waste	Date Samples Received	: 06-Apr-2023
Site	: ----	Issue Date	: 14-Apr-2023
Sampler	: NICOLO JELOVSEK	No. of samples received	: 19
Order number	: ----	No. of samples analysed	: 19

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG005(ED093)T: Total Metals by ICP-AES	EP2304467--001	W1 0.4m	**Barium**	7440-39-3	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG048: Hexavalent Chromium (Alkaline Digest)	EP2304467--001	W1 0.4m	**Hexavalent Chromium**	18540-29-9	53.7 %	70.0-130%	**Recovery less than lower data quality objective**

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
	0				
Matrix Spikes (MS)					
Total Metals by ICP-MS - Suite X	0	16	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
	0				
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	6	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing 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: **SOIL**

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

Method	***Sample Date***	*Extraction / Preparation*			*Analysis*		
Container / *Client Sample ID(s)*		***Date extracted***	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*

Matrix: **SOIL**

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
EA002: pH 1:5 (Soils)							
Soil Glass Jar - Unpreserved (EA002)							
W1 0.4m, W2 0.6m, W3 0.4m, W4 1.2m, W5 0.5m, W6 1.0m, W7 0.2m, W8 1.5m, W9 0.5m, W10 0.1m, W11 1.7m, W12 0.6m, W13 0.3m, W14 1.4m, W15 0.6m, Dup 1	**05-Apr-2023**	**12-Apr-2023**	12-Apr-2023	✓	**12-Apr-2023**	12-Apr-2023	✓
EA010: Conductivity (1:5)							
Soil Glass Jar - Unpreserved (EA010)							
W1 0.4m, W2 0.6m, W3 0.4m, W4 1.2m, W5 0.5m, W6 1.0m, W7 0.2m, W8 1.5m, W9 0.5m, W10 0.1m, W11 1.7m, W12 0.6m, W13 0.3m, W14 1.4m, W15 0.6m, Dup 1	**05-Apr-2023**	**12-Apr-2023**	12-Apr-2023	✓	**12-Apr-2023**	10-May-2023	✓
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
W3 0.4m, W5 0.5m, W9 0.5m	**05-Apr-2023**	**----**	----	----	**11-Apr-2023**	19-Apr-2023	✓
Soil Glass Jar - Unpreserved (EA055)							
W1 0.4m, W2 0.6m, W4 1.2m, W6 1.0m, W7 0.2m, W8 1.5m, W10 0.1m, W11 1.7m, W12 0.6m, W13 0.3m, W14 1.4m, W15 0.6m, Dup 1, Trip Blank 1, Trip Blank 2	**05-Apr-2023**	**----**	----	----	**12-Apr-2023**	19-Apr-2023	✓

Matrix: **SOIL**

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
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
W1 0.4m, W2 0.6m, W3 0.4m, W4 1.2m, W5 0.5m, W6 1.0m, W7 0.2m, W8 1.5m, W9 0.5m, W10 0.1m, W11 1.7m, W12 0.6m, W13 0.3m, W14 1.4m, W15 0.6m, Dup 1	**05-Apr-2023**	**12-Apr-2023**	02-Oct-2023	✓	**14-Apr-2023**	02-Oct-2023	✓
EG020T: Total Metals by ICP-MS							
Soil Glass Jar - Unpreserved (EG020T)							
W1 0.4m, W2 0.6m, W3 0.4m, W4 1.2m, W5 0.5m, W6 1.0m, W7 0.2m, W8 1.5m, W9 0.5m, W10 0.1m, W11 1.7m, W12 0.6m, W13 0.3m, W14 1.4m, W15 0.6m, Dup 1	**05-Apr-2023**	**12-Apr-2023**	02-Oct-2023	✓	**13-Apr-2023**	02-Oct-2023	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
W14 1.4m, W15 0.6m, Dup 1	**05-Apr-2023**	**12-Apr-2023**	03-May-2023	✓	**13-Apr-2023**	03-May-2023	✓
Soil Glass Jar - Unpreserved (EG035T)							
W1 0.4m, W2 0.6m, W3 0.4m, W4 1.2m, W5 0.5m, W6 1.0m, W7 0.2m, W8 1.5m, W9 0.5m, W10 0.1m, W11 1.7m, W12 0.6m, W13 0.3m	**05-Apr-2023**	**12-Apr-2023**	03-May-2023	✓	**14-Apr-2023**	03-May-2023	✓
EG048: Hexavalent Chromium (Alkaline Digest)							
Soil Glass Jar - Unpreserved (EG048G)							
W1 0.4m, W2 0.6m, W3 0.4m, W4 1.2m, W5 0.5m, W6 1.0m, W7 0.2m, W8 1.5m, W9 0.5m, W10 0.1m, W11 1.7m, W12 0.6m, W13 0.3m, W14 1.4m, W15 0.6m, Dup 1	**05-Apr-2023**	**13-Apr-2023**	03-May-2023	✓	**14-Apr-2023**	20-Apr-2023	✓

Matrix: **SOIL**

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
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)							
Non-Volatile Leach: 28 day HT(e.g. Hg, CrVI) (EN60-DIa-G) W1 0.4m, W4 1.2m, W7 0.2m, W10 0.1m, W13 0.3m	**05-Apr-2023**	**12-Apr-2023**	03-May-2023	✓	**----**	----	----
EP070: Total Petroleum Hydrocarbons - Speciation							
Soil Glass Jar - Unpreserved (EP070) W3 0.4m, W5 0.5m, W9 0.5m	**05-Apr-2023**	**12-Apr-2023**	19-Apr-2023	✓	**13-Apr-2023**	22-May-2023	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080) W1 0.4m, W2 0.6m, W4 1.2m, W6 1.0m, W7 0.2m, W8 1.5m, W10 0.1m, W11 1.7m, W12 0.6m, W13 0.3m, W14 1.4m, W15 0.6m, Dup 1	**05-Apr-2023**	**11-Apr-2023**	19-Apr-2023	✓	**13-Apr-2023**	19-Apr-2023	✓
Soil Glass Jar - Unpreserved (EP080) W3 0.4m, W5 0.5m	**05-Apr-2023**	**12-Apr-2023**	19-Apr-2023	✓	**12-Apr-2023**	19-Apr-2023	✓
Soil Glass Jar - Unpreserved (EP080) W9 0.5m, Trip Blank 1, Trip Blank 2	**05-Apr-2023**	**12-Apr-2023**	19-Apr-2023	✓	**13-Apr-2023**	19-Apr-2023	✓
Soil Glass Jar - Unpreserved (EP071) W1 0.4m, W2 0.6m, W3 0.4m, W4 1.2m, W5 0.5m, W6 1.0m, W7 0.2m, W8 1.5m, W9 0.5m, W10 0.1m, W11 1.7m, W12 0.6m, W13 0.3m, W14 1.4m, W15 0.6m, Dup 1	**05-Apr-2023**	**12-Apr-2023**	19-Apr-2023	✓	**14-Apr-2023**	22-May-2023	✓

Matrix: **SOIL**

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 Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080) W1 0.4m, W2 0.6m, W4 1.2m, W6 1.0m, W7 0.2m, W8 1.5m, W10 0.1m, W11 1.7m, W12 0.6m, W13 0.3m, W14 1.4m, W15 0.6m, Dup 1	**05-Apr-2023**	**11-Apr-2023**	19-Apr-2023	✓	**13-Apr-2023**	19-Apr-2023	✓
Soil Glass Jar - Unpreserved (EP080) W3 0.4m, W5 0.5m	**05-Apr-2023**	**12-Apr-2023**	19-Apr-2023	✓	**12-Apr-2023**	19-Apr-2023	✓
Soil Glass Jar - Unpreserved (EP080) W9 0.5m, Trip Blank 1, Trip Blank 2	**05-Apr-2023**	**12-Apr-2023**	19-Apr-2023	✓	**13-Apr-2023**	19-Apr-2023	✓
Soil Glass Jar - Unpreserved (EP071) W1 0.4m, W2 0.6m, W3 0.4m, W4 1.2m, W5 0.5m, W6 1.0m, W7 0.2m, W8 1.5m, W9 0.5m, W10 0.1m, W11 1.7m, W12 0.6m, W13 0.3m, W14 1.4m, W15 0.6m, Dup 1	**05-Apr-2023**	**12-Apr-2023**	19-Apr-2023	✓	**14-Apr-2023**	22-May-2023	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) W1 0.4m, W2 0.6m, W4 1.2m, W6 1.0m, W7 0.2m, W8 1.5m, W10 0.1m, W11 1.7m, W12 0.6m, W13 0.3m, W14 1.4m, W15 0.6m, Dup 1	**05-Apr-2023**	**11-Apr-2023**	19-Apr-2023	✓	**13-Apr-2023**	19-Apr-2023	✓
Soil Glass Jar - Unpreserved (EP080) W3 0.4m, W5 0.5m	**05-Apr-2023**	**12-Apr-2023**	19-Apr-2023	✓	**12-Apr-2023**	19-Apr-2023	✓
Soil Glass Jar - Unpreserved (EP080) W9 0.5m, Trip Blank 1, Trip Blank 2	**05-Apr-2023**	**12-Apr-2023**	19-Apr-2023	✓	**13-Apr-2023**	19-Apr-2023	✓

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

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
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
Rinsate 1	**05-Apr-2023**	**13-Apr-2023**	02-Oct-2023	✓	**13-Apr-2023**	02-Oct-2023	✓
EG020W: Water Leachable Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-W)							
W1 0.4m, W4 1.2m, W7 0.2m, W10 0.1m, W13 0.3m	**12-Apr-2023**	**13-Apr-2023**	09-Oct-2023	✓	**13-Apr-2023**	09-Oct-2023	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
Rinsate 1	**05-Apr-2023**	**12-Apr-2023**	12-Apr-2023	✓	**13-Apr-2023**	22-May-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Rinsate 1	**05-Apr-2023**	**12-Apr-2023**	19-Apr-2023	✓	**13-Apr-2023**	19-Apr-2023	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
Rinsate 1	**05-Apr-2023**	**12-Apr-2023**	12-Apr-2023	✓	**13-Apr-2023**	22-May-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Rinsate 1	**05-Apr-2023**	**12-Apr-2023**	19-Apr-2023	✓	**13-Apr-2023**	19-Apr-2023	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
Rinsate 1	**05-Apr-2023**	**12-Apr-2023**	19-Apr-2023	✓	**13-Apr-2023**	19-Apr-2023	✓

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: **SOIL**

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)							
Electrical Conductivity (1:5)	EA010	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	4	23	**17.39**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS	EG020T	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TPH - Speciation	EP070	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	3	20	**15.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	4	25	**16.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Electrical Conductivity (1:5)	EA010	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS	EG020T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TPH - Speciation	EP070	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	20	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	25	**12.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Electrical Conductivity (1:5)	EA010	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS	EG020T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TPH - Speciation	EP070	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	20	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	25	**12.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **SOIL**

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*	
Matrix Spikes (MS) - Continued							
Total Metals by ICP-MS	EG020T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	0	16	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TPH - Speciation	EP070	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	20	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	25	**12.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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)							
Total Metals by ICP-MS - Suite A	EG020A-T	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Water Leachable Metals by ICP-MS - Suite A	EG020A-W	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Total Metals by ICP-MS - Suite A	EG020A-T	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Water Leachable Metals by ICP-MS - Suite A	EG020A-W	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Total Metals by ICP-MS - Suite A	EG020A-T	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Water Leachable Metals by ICP-MS - Suite A	EG020A-W	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Total Metals by ICP-MS - Suite A	EG020A-T	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	6	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Water Leachable Metals by ICP-MS - Suite A	EG020A-W	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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 (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM Schedule B(3).
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to Rayment and Lyons 3A1 and APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM Schedule B(3).
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Water Leachable Metals by ICP-MS - Suite A	EG020A-W	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, AS 4439.3, ALS QWI-EN/EG020. 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.
Total Metals by ICP-MS	EG020T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020. Metals in solids are determined following an appropriate acid digestion. The ICPMS technique ionizes selected elements. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass / charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite X	EG020X-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. 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.
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. 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 Schedule B(3)
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	SOIL	In house: Referenced to USEPA SW846, Method 3060. Hexavalent chromium is extracted by alkaline digestion. The digest is determined by photometrically by automatic discrete analyser, following pH adjustment. The instrument uses colour development using dephenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM Schedule B(3)
TPH - Speciation	EP070	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with the QC requirements of NEPM Schedule B(3).
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).

Analytical Methods	Method	Matrix	Method Descriptions
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. 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.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 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 Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 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 Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Alkaline digestion for Hexavalent Chromium	EG048PR	SOIL	In house: Referenced to USEPA SW846, Method 3060A.
Digestion for Total Recoverable Metals in DI Water Leachate	EN25W	SOIL	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Deionised Water Leach - Glass Leaching Vessel	EN60-Dla-G	SOIL	In house QWI-EN/60 referenced to AS4439.3 Preparation of Leachates
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to 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.
Tumbler Extraction of Solids (Option B - Non-concentrating)	ORG17-SP	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM 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 purging.

QUALITY CONTROL REPORT

Work Order	: **EP2304467**	Page	: 1 of 14
Client	: **GEMEC**	Laboratory	: Environmental Division Perth
Contact	: MR NICOLO JELOVSEK	Contact	: Genevieve De Souza
Address	: UNIT 1/25 FOSS STREET PALMYRA WA, AUSTRALIA	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: 9339 8449	Telephone	: +61-8-9406 1301
Project	: Cervantes-01 Waste	Date Samples Received	: 06-Apr-2023
Order number	: ----	Date Analysis Commenced	: 11-Apr-2023
C-O-C number	: ----	Issue Date	: 14-Apr-2023
Sampler	: NICOLO JELOVSEK		
Site	: ----		
Quote number	: EP/978/21_V7		
No. of samples received	: 19		
No. of samples analysed	: 19		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Wangara, WA
Thomas Donovan	Senior Organic Chemist	Perth Organics, Wangara, WA

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4984488)									
EP2304467-001	W1 0.4m	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	3260	3340	2.4	0% - 20%
		EG005T: Chromium	7440-47-3	2	mg/kg	16	15	0.0	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	3	3	0.0	No Limit
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	3	3	0.0	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Strontium	7440-24-6	2	mg/kg	1380	1380	0.1	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	9	9	0.0	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	81	80	1.8	0% - 50%
		EG005T: Vanadium	7440-62-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	7	7	0.0	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	1400	1440	3.0	0% - 20%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	2940	2930	0.0	0% - 20%
EP2304467-011	W11 1.7m	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	2800	2800	0.0	0% - 20%
		EG005T: Chromium	7440-47-3	2	mg/kg	17	16	0.0	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	3	3	0.0	No Limit
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	3	3	0.0	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Strontium	7440-24-6	2	mg/kg	1320	1260	4.8	0% - 20%

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4984488) - continued									
EP2304467-011	W11 1.7m	EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	7	8	0.0	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	76	84	8.9	0% - 50%
		EG005T: Vanadium	7440-62-2	5	mg/kg	<5	5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	5	6	0.0	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	1490	1510	1.8	0% - 20%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	2830	3040	7.3	0% - 20%
EA002: pH 1:5 (Soils) (QC Lot: 4984871)									
EP2304467-001	W1 0.4m	EA002: pH Value	----	0.1	pH Unit	10.8	11.0	2.6	0% - 20%
EP2304467-010	W10 0.1m	EA002: pH Value	----	0.1	pH Unit	11.7	11.6	0.0	0% - 20%
EA010: Conductivity (1:5) (QC Lot: 4984872)									
EP2304467-001	W1 0.4m	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	13100	13000	0.2	0% - 20%
EP2304467-010	W10 0.1m	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	12300	11900	4.0	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4983314)									
EP2304467-003	W3 0.4m	EA055: Moisture Content	----	0.1	%	16.8	17.1	1.5	0% - 50%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4983468)									
EP2304459-043	Anonymous	EA055: Moisture Content	----	0.1	%	2.9	2.8	5.0	0% - 20%
EP2304467-007	W7 0.2m	EA055: Moisture Content	----	0.1	%	21.3	20.3	4.9	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4983473)									
EP2304467-017	Trip Blank 1	EA055: Moisture Content	----	0.1	%	3.2	3.0	4.9	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 4984489)									
EP2304467-001	W1 0.4m	EG020X-T: Uranium	7440-61-1	0.1	mg/kg	0.5	0.4	0.0	No Limit
		EG020X-T: Lithium	7439-93-2	0.1	mg/kg	2.0	2.0	0.0	0% - 20%
EP2304467-011	W11 1.7m	EG020X-T: Uranium	7440-61-1	0.1	mg/kg	0.4	0.4	0.0	No Limit
		EG020X-T: Lithium	7439-93-2	0.1	mg/kg	2.2	2.4	10.2	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 4984490)									
EP2304467-001	W1 0.4m	EG020T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020T: Lead	7439-92-1	0.1	mg/kg	4.7	4.3	9.6	0% - 20%
		EG020T: Selenium	7782-49-2	1	mg/kg	<1	<1	0.0	No Limit
EP2304467-011	W11 1.7m	EG020T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020T: Lead	7439-92-1	0.1	mg/kg	3.6	4.2	15.7	0% - 20%
		EG020T: Selenium	7782-49-2	1	mg/kg	<1	<1	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4984491)									
EP2304467-001	W1 0.4m	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP2304467-011	W11 1.7m	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG048: Hexavalent Chromium (Alkaline Digest) (QC Lot: 4987605)									
EP2304467-001	W1 0.4m	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<2.5	<2.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG048: Hexavalent Chromium (Alkaline Digest) (QC Lot: 4987605) - continued									
EP2304467-011	W11 1.7m	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP070: Total Petroleum Hydrocarbons - Speciation (QC Lot: 4983189)									
EP2304467-003	W3 0.4m	EP070: Aliphatic C16-C35	----	100	mg/kg	<100	<100	0.0	No Limit
		EP070: Aliphatic > C35	----	100	mg/kg	<100	<100	0.0	No Limit
		EP070: Aromatic > C35	----	100	mg/kg	<100	<100	0.0	No Limit
		EP070: Aromatic C16-C35	----	90	mg/kg	<90	<90	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4983188)									
EP2304467-003	W3 0.4m	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4983313)									
EP2304467-003	W3 0.4m	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4983466)									
EP2304459-041	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP2304467-006	W6 1.0m	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4983467)									
EP2304459-041	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP2304467-010	W10 0.1m	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4983472)									
EP2304467-017	Trip Blank 1	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4983188)									
EP2304467-003	W3 0.4m	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4983313)									
EP2304467-003	W3 0.4m	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4983466)									
EP2304459-041	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP2304467-006	W6 1.0m	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4983467)									
EP2304459-041	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP2304467-010	W10 0.1m	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4983467) - continued									
EP2304467-010	W10 0.1m	EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4983472)									
EP2304467-017	Trip Blank 1	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080: BTEXN (QC Lot: 4983313)									
EP2304467-003	W3 0.4m	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EP080: BTEXN (QC Lot: 4983466)									
EP2304459-041	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EP2304467-006	W6 1.0m	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EP080: BTEXN (QC Lot: 4983472)									
EP2304467-017	Trip Blank 1	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020T: Total Metals by ICP-MS (QC Lot: 4983155)									
EP2304271-004	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 4983155) - continued									
EP2304271-004	Anonymous	EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.005	0.005	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.015	0.014	0.0	0% - 50%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.006	19.6	No Limit
EP2304419-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.116	0.117	1.4	0% - 20%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.002	<0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.193	0.196	1.2	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.016	0.014	12.6	0% - 50%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.072	0.069	4.7	0% - 50%
EG020W: Water Leachable Metals by ICP-MS (QC Lot: 4988308)									
EP2304294-001	Anonymous	EG020A-W: Barium	7440-39-3	0.001	mg/L	0.095	0.101	5.7	0% - 20%
		EG020A-W: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-W: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-W: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-W: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-W: Zinc	7440-66-6	0.005	mg/L	0.012	0.014	14.9	No Limit
EP2304467-001	W1 0.4m	EG020A-W: Barium	7440-39-3	0.001	mg/L	0.687	0.682	0.7	0% - 20%
		EG020A-W: Copper	7440-50-8	0.001	mg/L	0.020	0.021	0.0	0% - 50%
		EG020A-W: Lead	7439-92-1	0.001	mg/L	0.006	0.007	0.0	No Limit
		EG020A-W: Manganese	7439-96-5	0.001	mg/L	0.080	0.079	1.3	0% - 20%
		EG020A-W: Nickel	7440-02-0	0.001	mg/L	0.012	0.013	0.0	0% - 50%
		EG020A-W: Zinc	7440-66-6	0.005	mg/L	0.012	0.012	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4983682)									
EP2304399-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	2.20 mg/L	2190	0.0	0% - 20%
EP2304472-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	20	30	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4984288)									
EP2304457-001	Anonymous	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: 4983682)									
EP2304399-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	2.89 mg/L	2860	0.9	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4983682) - continued									
EP2304472-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	20	20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4984288)									
EP2304457-001	Anonymous	EP071: >C10 - C16 Fraction	----	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: 4983682)									
EP2304399-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	0.015 mg/L	16	0.0	0% - 50%
		EP080: Toluene	108-88-3	2	µg/L	0.122 mg/L	117	4.2	0% - 20%
		EP080: Ethylbenzene	100-41-4	2	µg/L	0.123 mg/L	118	4.7	0% - 20%
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	0.498 mg/L	477	4.4	0% - 20%
		EP080: ortho-Xylene	95-47-6	2	µg/L	0.200 mg/L	193	3.6	0% - 20%
		EP080: Naphthalene	91-20-3	5	µg/L	0.152 mg/L	167	9.0	0% - 20%
EP2304472-001	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

Method Blank (MB) and Laboratory Control Sample (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 Sample (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: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4984488)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	6134 mg/kg	93.6	76.8	112
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	92.8	87.2	114
EG005T: Barium	7440-39-3	10	mg/kg	<10	143 mg/kg	101	82.4	112
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	5.63 mg/kg	106	91.3	121
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	80.1	70.0	100
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	16 mg/kg	97.5	79.6	112
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	98.6	81.0	112
EG005T: Iron	7439-89-6	50	mg/kg	<50	6655 mg/kg	86.4	70.0	114
EG005T: Manganese	7439-96-5	5	mg/kg	<5	130 mg/kg	103	70.5	128
EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	7.9 mg/kg	86.7	75.0	105
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	93.3	78.7	106
EG005T: Silver	7440-22-4	2	mg/kg	<2	2.1 mg/kg	90.5	71.2	106
EG005T: Strontium	7440-24-6	2	mg/kg	<2	58.3 mg/kg	102	86.4	111
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	29.6 mg/kg	98.0	82.6	108
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	98.8	79.4	110
EG005T: Titanium	7440-32-6	----	mg/kg	----	20 mg/kg	91.5	70.0	110
EA002: pH 1:5 (Soils) (QCLot: 4984871)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	101	98.6	102
				----	7 pH Unit	100	98.6	102
EA010: Conductivity (1:5) (QCLot: 4984872)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	12890 µS/cm	97.4	95.9	104
EG020T: Total Metals by ICP-MS (QCLot: 4984489)								
EG020X-T: Uranium	7440-61-1	0.1	mg/kg	<0.1	7.3 mg/kg	95.8	80.1	109
EG020X-T: Lithium	7439-93-2	0.1	mg/kg	<0.1	16.1 mg/kg	90.3	70.0	103
EG020T: Total Metals by ICP-MS (QCLot: 4984490)								
EG020T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	4.64 mg/kg	99.4	87.0	116
EG020T: Lead	7439-92-1	0.1	mg/kg	<0.1	40 mg/kg	103	84.2	119
EG020T: Selenium	7782-49-2	1	mg/kg	<1	5.37 mg/kg	122	94.1	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4984491)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4984491) - continued								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.154 mg/kg	95.3	84.3	124
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 4987605)								
EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	40 mg/kg	79.9	70.0	120
				<0.5	20 mg/kg	99.2	70.0	120
EP070: Total Petroleum Hydrocarbons - Speciation (QCLot: 4983189)								
EP070: Aliphatic C16-C35	----	100	mg/kg	<100	1885 mg/kg	86.6	70.0	130
EP070: Aliphatic > C35	----	100	mg/kg	<100	----	----	----	----
EP070: Aromatic C16-C35	----	90	mg/kg	<90	603 mg/kg	78.4	70.0	130
EP070: Aromatic > C35	----	100	mg/kg	<100	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4983188)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	1161 mg/kg	89.2	70.0	111
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	2802 mg/kg	98.8	71.9	109
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	414 mg/kg	83.9	63.8	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4983313)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	35 mg/kg	91.9	66.0	122
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4983466)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	35 mg/kg	90.0	66.0	122
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4983467)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	1161 mg/kg	83.6	70.0	111
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	2802 mg/kg	86.9	71.9	109
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	414 mg/kg	79.1	63.8	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4983472)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	35 mg/kg	90.1	66.0	122
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4983188)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1839 mg/kg	90.2	72.8	110
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	2358 mg/kg	98.9	67.8	114
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	129 mg/kg	85.7	50.3	123
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4983313)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	89.9	66.0	122
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4983466)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	87.4	66.0	122
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4983467)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1839 mg/kg	86.0	72.8	110
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	2358 mg/kg	88.6	67.8	114

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4983467) - continued								
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	129 mg/kg	77.6	50.3	123
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4983472)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	88.2	66.0	122
EP080: BTEXN (QCLot: 4983313)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	83.8	72.0	122
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	91.2	75.0	119
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	89.2	73.0	121
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	92.1	74.0	122
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	93.7	75.0	121
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	84.7	64.0	126
EP080: BTEXN (QCLot: 4983466)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	85.7	72.0	122
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	86.2	75.0	119
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	91.2	73.0	121
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	91.4	74.0	122
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	90.1	75.0	121
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	99.2	64.0	126
EP080: BTEXN (QCLot: 4983472)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	98.4	72.0	122
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	111	75.0	119
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	104	73.0	121
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	99.7	74.0	122
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	100	75.0	121
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	93.5	64.0	126

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG020T: Total Metals by ICP-MS (QCLot: 4983155)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	105	92.6	113
EG020A-T: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	98.6	91.0	112
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.3	91.8	111
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.3	90.9	109

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG020T: Total Metals by ICP-MS (QCLot: 4983155) - continued								
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	99.3	90.8	110
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	99.9	92.3	108
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	101	90.3	109
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	100	89.3	110
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	102	90.7	113
EG020W: Water Leachable Metals by ICP-MS (QCLot: 4988308)								
EG020A-W: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	98.6	89.8	116
EG020A-W: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	96.6	90.7	110
EG020A-W: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	100	90.8	110
EG020A-W: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	97.1	88.1	111
EG020A-W: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	97.7	90.6	109
EG020A-W: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	102	88.8	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4983682)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	360 µg/L	100	73.6	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4984288)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	341 µg/L	54.1	39.3	103
EP071: C15 - C28 Fraction	----	100	µg/L	<100	343 µg/L	85.2	47.2	122
EP071: C29 - C36 Fraction	----	50	µg/L	<50	257 µg/L	71.5	42.5	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4983682)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	100	73.9	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4984288)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	346 µg/L	59.6	47.0	100
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	430 µg/L	81.6	46.2	116
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	161 µg/L	68.3	24.7	137
EP080: BTEXN (QCLot: 4983682)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	104	84.1	114
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	102	81.0	115
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	104	84.4	113
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	106	84.3	114
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	104	86.5	111
EP080: Naphthalene	91-20-3	5	µg/L	<5	5 µg/L	110	77.0	118

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: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4984488)							
EP2304467-001	W1 0.4m	EG005T: Arsenic	7440-38-2	50 mg/kg	97.5	70.0	130
		EG005T: Barium	7440-39-3	50 mg/kg	# Not Determined	70.0	130
		EG005T: Beryllium	7440-41-7	50 mg/kg	100	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	93.8	70.0	130
		EG005T: Cobalt	7440-48-4	50 mg/kg	93.6	70.0	130
		EG005T: Copper	7440-50-8	50 mg/kg	100	70.0	130
		EG005T: Manganese	7439-96-5	50 mg/kg	95.0	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	90.4	70.0	130
		EG005T: Vanadium	7440-62-2	50 mg/kg	96.8	70.0	130
		EG005T: Zinc	7440-66-6	50 mg/kg	88.1	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 4984490)							
EP2304467-001	W1 0.4m	EG020T: Cadmium	7440-43-9	12.5 mg/kg	92.8	70.0	130
		EG020T: Lead	7439-92-1	50 mg/kg	92.6	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4984491)							
EP2304467-001	W1 0.4m	EG035T: Mercury	7439-97-6	1 mg/kg	89.5	70.0	130
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 4987605)							
EP2304467-001	W1 0.4m	EG048G: Hexavalent Chromium	18540-29-9	40 mg/kg	70.5	70.0	130
EP2304467-001	W1 0.4m	EG048G: Hexavalent Chromium	18540-29-9	20 mg/kg	# 53.7	70.0	130
EP070: Total Petroleum Hydrocarbons - Speciation (QCLot: 4983189)							
EP2304467-005	W5 0.5m	EP070: Aliphatic C16-C35	----	1885 mg/kg	92.0	70.0	130
		EP070: Aromatic C16-C35	----	603 mg/kg	87.2	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4983188)							
EP2304467-005	W5 0.5m	EP071: C10 - C14 Fraction	----	1161 mg/kg	93.2	64.7	126
		EP071: C15 - C28 Fraction	----	2802 mg/kg	102	61.7	124
		EP071: C29 - C36 Fraction	----	414 mg/kg	86.0	64.6	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4983313)							
EP2304467-005	W5 0.5m	EP080: C6 - C9 Fraction	----	24 mg/kg	87.1	69.1	135
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4983466)							
EP2304459-042	Anonymous	EP080: C6 - C9 Fraction	----	24 mg/kg	76.7	69.1	135
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4983467)							
EP2304459-042	Anonymous	EP071: C10 - C14 Fraction	----	1161 mg/kg	84.5	64.7	126
		EP071: C15 - C28 Fraction	----	2802 mg/kg	86.8	61.7	124
		EP071: C29 - C36 Fraction	----	414 mg/kg	80.9	64.6	131

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Matrix Spike (MS) Report: Acceptable Limits (%) Low	Matrix Spike (MS) Report: Acceptable Limits (%) High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4983472)							
EP2304467-018	Trip Blank 2	EP080: C6 - C9 Fraction	----	24 mg/kg	72.2	69.1	135
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4983188)							
EP2304467-005	W5 0.5m	EP071: >C10 - C16 Fraction	----	1839 mg/kg	93.5	64.7	126
		EP071: >C16 - C34 Fraction	----	2358 mg/kg	102	61.7	124
		EP071: >C34 - C40 Fraction	----	129 mg/kg	89.7	64.6	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4983313)							
EP2304467-005	W5 0.5m	EP080: C6 - C10 Fraction	C6_C10	29 mg/kg	85.2	69.1	135
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4983466)							
EP2304459-042	Anonymous	EP080: C6 - C10 Fraction	C6_C10	29 mg/kg	76.6	69.1	135
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4983467)							
EP2304459-042	Anonymous	EP071: >C10 - C16 Fraction	----	1839 mg/kg	86.7	64.7	126
		EP071: >C16 - C34 Fraction	----	2358 mg/kg	88.4	61.7	124
		EP071: >C34 - C40 Fraction	----	129 mg/kg	87.1	64.6	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4983472)							
EP2304467-018	Trip Blank 2	EP080: C6 - C10 Fraction	C6_C10	29 mg/kg	70.8	69.1	135
EP080: BTEXN (QCLot: 4983313)							
EP2304467-005	W5 0.5m	EP080: Benzene	71-43-2	2 mg/kg	80.5	76.4	118
		EP080: Toluene	108-88-3	2 mg/kg	90.0	67.4	112
EP080: BTEXN (QCLot: 4983466)							
EP2304459-042	Anonymous	EP080: Benzene	71-43-2	2 mg/kg	78.6	76.4	118
		EP080: Toluene	108-88-3	2 mg/kg	81.8	67.4	112
EP080: BTEXN (QCLot: 4983472)							
EP2304467-018	Trip Blank 2	EP080: Benzene	71-43-2	2 mg/kg	92.1	76.4	118
		EP080: Toluene	108-88-3	2 mg/kg	106	67.4	112

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Matrix Spike (MS) Report: Acceptable Limits (%) Low	Matrix Spike (MS) Report: Acceptable Limits (%) High
EG020T: Total Metals by ICP-MS (QCLot: 4983155)							
EP2304271-005	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	106	70.0	130
		EG020A-T: Barium	7440-39-3	1 mg/L	101	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	100	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	99.2	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	101	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	96.8	70.0	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	101	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG020T: Total Metals by ICP-MS (QCLot: 4983155) - continued							
EP2304271-005	Anonymous	EG020A-T: Nickel	7440-02-0	1 mg/L	102	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	103	70.0	130
EG020W: Water Leachable Metals by ICP-MS (QCLot: 4988308)							
EP2304294-002	Anonymous	EG020A-W: Barium	7440-39-3	1 mg/L	101	70.0	130
		EG020A-W: Copper	7440-50-8	1 mg/L	97.1	70.0	130
		EG020A-W: Lead	7439-92-1	1 mg/L	96.5	70.0	130
		EG020A-W: Manganese	7439-96-5	1 mg/L	98.5	70.0	130
		EG020A-W: Nickel	7440-02-0	1 mg/L	97.6	70.0	130
		EG020A-W: Zinc	7440-66-6	1 mg/L	101	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4983682)							
EP2304429-010	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	94.6	77.0	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4983682)							
EP2304429-010	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	94.1	77.0	137

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

@PERTH 36 Rigali Way Wangara WA 6065
Ph: 08 9406 1501 E: samples.perth@alsglobal.com

@MELBOURNE 2-4 Westall Road Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

URGENT

CLIENT: Gemec Environmental Consultants	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE: 1/25 Foss St, Palmyra, WA 6157		☒ Non Standard or urgent TAT (List due date): 13.04.2023 (72 hr)	Custody Seal Intact? Yes No N/A
PROJECT: Cervantes-01 Waste	ALS QUOTE NO.: EP/978/21_V7	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: -		COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Nicolo Jelovsek	CONTACT PH: 08 9339 8449	OF: 1 2 3 4 5 6 7	Other comment:
SAMPLER: Nicolo Jelovsek	SAMPLER MOBILE: 0439093980	RELINQUISHED BY:	RECEIVED BY:
COC emailed to ALS? (~~YES~~ / NO)	EDD FORMAT (or default):	Nicolo Jelovsek	
Email Reports to: nicolo@gemec.com.au		DATE/TIME: 06.04.2023 / 10:30	DATE/TIME:
Email Invoice to: marise@gemec.com.au		RELINQUISHED BY:	RECEIVED BY:
		DATE/TIME:	DATE/TIME: 6 Apr 2023

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Please send split sample to ALS Melbourne; jars labelled C1.

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)				CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).													Additional Information
LAB ID	SAMPLE ID	DATE	TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	S-04: TRH / BTEXN	EP068A: Organochlorine Pesticides	P-19/2: Al, As, B, Ba, Be, Cd, Co, CrVI, Cu, Hg, Mn, Mo, Ni, Pb, Se, V, Zn + pH	EG005T: Cr, Fe, Sr, Ti	EG020T: Li, U	EN34: 1:5 leach	EA010: Electrical conductivity (1:5)	S-18: TRH (C6-C10) / BTEXN			W-4: TRH / BTEXN	W-01T: 7 Metals (total): As, Cd, Cr, Cu, Ni, Pb, Zn	EG020T: Ba, Mn	P-22: NEPM Screen for Soil Classification: Fe, CEC, pH(CaCl2), TOC, Clay Content	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	Split 1	05.04.23	-	S	1 x glass unpreserved	1	1		1	1	1										
			-																		
TOTAL						1	1		1	1	1										

Environmental Division
Melbourne
Work Order Reference
EM2306430

Telephone : +61-3 8549 9600

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag

Sara Perkov

From: ALS Enviro Perth
Sent: Thursday, 6 April 2023 12:38 PM
To: Samples Perth; ALS Enviro Perth
Subject: RE: [EXTERNAL] - Incoming soil samples chain of custody forms

Follow Up Flag: Follow up
Flag Status: Flagged

Categories: Fast tat requests

No probs,

Can you just make a note on both for a 72hr PC and get whoever logs them to send an IM with the WO#s

*ALS Environmental will be closed for the nominated national public holidays in **April: Good Friday 7th April, Easter Monday 10th April, and ANZAC Day Tuesday 25th April.***
Please contact your local client service team/ regional office if you have special requirements during this period.

Kind Regards,

right solutions. right partner.

Rhiannon Steere
Project Manager, Environmental
Australia

Reception: 08 9406 1301
Direct line Ph: 08 9406 1306
alsenviro.perth@alsglobal.com
26 Rigali Way
Wangara WA 6065 .

alsglobal.com

From: Samples Perth <Samples.Perth@ALSGlobal.com>
Sent: Thursday, 6 April 2023 12:07 PM
To: ALS Enviro Perth <ALSEnviro.Perth@ALSGlobal.com>
Subject: RE: [EXTERNAL] - Incoming soil samples chain of custody forms

@ALS Enviro Perth these wont get logged today FYI

right solutions.
right partner.

Kind Regards,
Lewis Duffy

Sample Receipt Supervisor, Environmental
Australia

T: +61 8 9406 1301
D: +61 8 9406 1352
lewis.duffy@alsglobal.com
26 Rigali Way, (Access via Advantage Way)
Wangara WA 6065

alsglobal.com

From: Nicolo Jelovsek <nicolo@gemec.com.au>
Sent: Thursday, 6 April 2023 12:01 PM
To: ALS Enviro Perth <ALSEnviro.Perth@ALSGlobal.com>
Cc: Samples Perth <Samples.Perth@ALSGlobal.com>
Subject: [EXTERNAL] - Incoming soil samples chain of custody forms

Hi Rhiannon,

Please see attached chain of custody forms for primary and split samples for the two separate jobs with references WDA and C1.

Note the updated TAT request for C1 at 72 hrs (instead of the previous 24 hrs), and 24 hr TAT request for WDA (if possible).

Kind regards,

Nicolo Jelovsek
BSc (Chemistry, Environmental Science)
Director, Contaminated Land Consultant

Gemec
ENVIRONMENTAL CONSULTANTS

1/25 FOSS ST, PALMYRA WA 6157 | PO BOX 89, MELVILLE WA 6956 | ABN 53 627 147 380 | gemec.com.au
M 0439 093 980 | T (08) 9339 8449 | nicolo@gemec.com.au

From: ALS Enviro Perth <ALSEnviro.Perth@ALSGlobal.com>
Sent: Thursday, April 6, 2023 8:04 AM
To: Nicolo Jelovsek <nicolo@gemec.com.au>
Cc: Samples Perth <Samples.Perth@ALSGlobal.com>
Subject: RE: [EXTERNAL] - Incoming soil samples chain of custody forms

Thanks Nicolo!

The team will be in contact if there are any issues.
Have a great day.

ALS Environmental will be closed for the nominated national public holidays in ***April: Good Friday 7th April, Easter Monday 10th April, and ANZAC Day Tuesday 25th April.***
Please contact your local client service team/ regional office if you have special requirements during this period.

Kind Regards,

right solutions. right partner.

Rhiannon Steere
Project Manager, Environmental Australia

Reception: 08 9406 1301
Direct line Ph: 08 9406 1306
alsenviro.perth@alsglobal.com
26 Rigali Way
Wangara WA 6065

alsglobal.com

From: Nicolo Jelovsek <nicolo@gemec.com.au>
Sent: Wednesday, 5 April 2023 11:56 PM
To: Samples Perth <Samples.Perth@ALSGlobal.com>
Cc: ALS Enviro Perth <ALSEnviro.Perth@ALSGlobal.com>
Subject: [EXTERNAL] - Incoming soil samples chain of custody forms

Hi ALS,

Please see attached chain of custody forms (two tabs – primary and split) for incoming soil samples due into the lab tomorrow morning. Note the requested short turnaround time, although we acknowledge that it may not be achievable given your current workload.

We have another chain of custody form for a separate batch that we'll also send through tonight or tomorrow morning.

Kind regards,

Nicolo Jelovsek
BSc (Chemistry, Environmental Science)
Director, Contaminated Land Consultant

Gemec
ENVIRONMENTAL CONSULTANTS

1/25 FOSS ST, PALMYRA WA 6157 | PO BOX 89, MELVILLE WA 6956 | ABN 53 627 147 380 | gemec.com.au
M 0439 093 980 | T (08) 9339 8449 | nicolo@gemec.com.au

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EM2306430**

Client	: **GEMEC**	Laboratory	: Environmental Division Melbourne
Contact	: MR NICOLO JELOVSEK	Contact	: Customer Services EM
Address	: UNIT 1/25 FOSS STREET PALMYRA WA, AUSTRALIA	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: nicolo@gemec.com.au	E-mail	: ALSEnviro.Melbourne@alsglobal.com
Telephone	: 9339 8449	Telephone	: +61-3-8549 9600
Facsimile	: ----	Facsimile	: +61-3-8549 9626
Project	: Cervantes-01 Waste	Page	: 1 of 2
Order number	: ----	Quote number	: EP2021GEMEC0009_V7 (EP/978/21_V7)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: NICOLO JELOVSEK		

Dates

Date Samples Received	: 13-Apr-2023 08:30	Issue Date	: 13-Apr-2023
Client Requested Due Date	: 19-Apr-2023	Scheduled Reporting Date	: **18-Apr-2023**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 12.7°C - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	SOIL - EA055-103 Moisture Content	SOIL - EG005T (solids) Total Metals by ICP-AES	SOIL - EG020T Total Metals by ICPMS	SOIL - P-19/2 WA Waste Classification (Metals Suite)	SOIL - S-04 TRH/BTEXN
EM2306430-001	05-Apr-2023 00:00	Split 1	✓	✓	✓	✓	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

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

Method / Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received		Instructions Received	
				Date	Evaluation	Date	Evaluation
EA002: pH (1:5)							
Split 1	Soil Glass Jar - Unpreserved	12-Apr-2023	12-Apr-2023	13-Apr-2023	×	----	----

Requested Deliverables

ACCOUNTS PAYABLE (WA)

- A4 - AU Tax Invoice (INV)	Email	marise@gemec.com.au

NICOLO JELOVSEK

- *AU Certificate of Analysis - NATA (COA)	Email	nicolo@gemec.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	nicolo@gemec.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	nicolo@gemec.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	nicolo@gemec.com.au
- AU Guideline Report - Generic (GL_Generic_Test)	Email	nicolo@gemec.com.au
- Chain of Custody (CoC) (COC)	Email	nicolo@gemec.com.au
- EDI Format - ESDAT (ESDAT)	Email	nicolo@gemec.com.au
- EDI Format - XTab (XTAB)	Email	nicolo@gemec.com.au

CERTIFICATE OF ANALYSIS

Work Order	: **EM2306430**	Page	: 1 of 5
Client	: **GEMEC**	Laboratory	: Environmental Division Melbourne
Contact	: MR NICOLO JELOVSEK	Contact	: Customer Services EM
Address	: UNIT 1/25 FOSS STREET PALMYRA WA, AUSTRALIA	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: 9339 8449	Telephone	: +61-3-8549 9600
Project	: Cervantes-01 Waste	Date Samples Received	: 13-Apr-2023 08:30
Order number	: ----	Date Analysis Commenced	: 14-Apr-2023
C-O-C number	: ----	Issue Date	: 19-Apr-2023 14:15
Sampler	: NICOLO JELOVSEK		
Site	: ----		
Quote number	: EP/978/21_V7		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 Contract 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
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- This guideline comparison report only provides evaluation data where chemical parameters specifically listed within the DEC Waste Classification and Waste Definitions 1996 (as amended December 2019) guideline are analysed by ALS using <P-19/1> <P-19/2> <P-19/3> package.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- This Automated Guideline Comparison report assesses potential chemical 'contaminants' versus guideline criteria. Other parameters may impact classification and 95% upper control limits may also be applied - refer to EPA Regulations.
- This guideline comparison report only provides evaluation of total concentration data against upper limit thresholds for Classes I to IV.
- For the 'Summary of Thresholds Reached or Exceeded' to accurately function, all samples must be analysed and included in the 'Analytical Results' section of the following report. Please verify that all required sample IDs are listed and analysed.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	Split 1	----	----	----	----
				Sampling date / time	05-Apr-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EM2306430-001	--------	--------	--------	--------
					Result	----	----	----	----
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**11.8**	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		**20.3**	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		**2420**	----	----	----	----
Arsenic	7440-38-2	5	mg/kg		<5	----	----	----	----
Barium	7440-39-3	10	mg/kg		**3000**	----	----	----	----
Beryllium	7440-41-7	1	mg/kg		<1	----	----	----	----
Boron	7440-42-8	50	mg/kg		<50	----	----	----	----
Chromium	7440-47-3	2	mg/kg		**22**	----	----	----	----
Cobalt	7440-48-4	2	mg/kg		<2	----	----	----	----
Copper	7440-50-8	5	mg/kg		**10**	----	----	----	----
Iron	7439-89-6	50	mg/kg		**3490**	----	----	----	----
Manganese	7439-96-5	5	mg/kg		**78**	----	----	----	----
Molybdenum	7439-98-7	2	mg/kg		<2	----	----	----	----
Nickel	7440-02-0	2	mg/kg		**5**	----	----	----	----
Silver	7440-22-4	2	mg/kg		<2	----	----	----	----
Strontium	7440-24-6	2	mg/kg		**1170**	----	----	----	----
Vanadium	7440-62-2	5	mg/kg		**6**	----	----	----	----
Zinc	7440-66-6	5	mg/kg		**16**	----	----	----	----
Titanium	7440-32-6	10	mg/kg		**60**	----	----	----	----
EG020T: Total Metals by ICP-MS									
Selenium	7782-49-2	1	mg/kg		<1	----	----	----	----
Cadmium	7440-43-9	0.1	mg/kg		<0.1	----	----	----	----
Lead	7439-92-1	0.1	mg/kg		**6.1**	----	----	----	----
Uranium	7440-61-1	0.1	mg/kg		**0.5**	----	----	----	----
Lithium	7439-93-2	0.1	mg/kg		**3.1**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	----	----	----
EG048: Hexavalent Chromium (Alkaline Digest)									
Hexavalent Chromium	18540-29-9	0.5	mg/kg		<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	Split 1	----	----	----	----
				Sampling date / time	05-Apr-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EM2306430-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	----	----	----	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**87.3**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**85.9**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		**86.9**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	56	124

QUALITY CONTROL REPORT

Work Order	: **EM2306430**	Page	: 1 of 6
Client	: **GEMEC**	Laboratory	: Environmental Division Melbourne
Contact	: MR NICOLO JELOVSEK	Contact	: Customer Services EM
Address	: UNIT 1/25 FOSS STREET PALMYRA WA, AUSTRALIA	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: 9339 8449	Telephone	: +61-3-8549 9600
Project	: Cervantes-01 Waste	Date Samples Received	: 13-Apr-2023
Order number	: ----	Date Analysis Commenced	: 14-Apr-2023
C-O-C number	: ----	Issue Date	: 19-Apr-2023
Sampler	: NICOLO JELOVSEK		
Site	: ----		
Quote number	: EP/978/21_V7		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC

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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: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4989454)									
EM2306430-001	Split 1	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	3000	2800	6.9	0% - 20%
		EG005T: Titanium	7440-32-6	10	mg/kg	60	50	17.5	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	22	19	15.1	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	5	6	0.0	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Strontium	7440-24-6	2	mg/kg	1170	1190	1.1	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	10	21	72.2	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	78	89	12.5	0% - 50%
		EG005T: Vanadium	7440-62-2	5	mg/kg	6	6	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	16	18	10.6	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	2420	2870	16.9	0% - 20%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	3490	3840	9.5	0% - 20%
EA002: pH 1:5 (Soils) (QC Lot: 4989442)									
EM2306430-001	Split 1	EA002: pH Value	----	0.1	pH Unit	11.8	11.9	0.0	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4990099)									
EM2306430-001	Split 1	EA055: Moisture Content	----	0.1	%	20.3	21.0	3.3	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 4989456)									
EM2306430-001	Split 1	EG020X-T: Lead	7439-92-1	0.1	mg/kg	6.1	6.6	8.0	0% - 20%

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 4989456) - continued									
EM2306430-001	Split 1	EG020X-T: Uranium	7440-61-1	0.1	mg/kg	0.5	0.5	0.0	No Limit
		EG020X-T: Lithium	7439-93-2	0.1	mg/kg	3.1	3.1	0.0	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 4997420)									
EM2306430-001	Split 1	EG020Y-T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020Y-T: Selenium	7782-49-2	1	mg/kg	<1	<1	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4989455)									
EM2306430-001	Split 1	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG048: Hexavalent Chromium (Alkaline Digest) (QC Lot: 4990108)									
EM2306377-017	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4989434)									
EM2306430-001	Split 1	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4989440)									
EM2306430-001	Split 1	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4989434)									
EM2306430-001	Split 1	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4989440)									
EM2306430-001	Split 1	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 4989434)									
EM2306430-001	Split 1	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (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 Sample (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: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4989454)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	15910 mg/kg	106	70.0	130
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	123 mg/kg	103	70.0	130
EG005T: Barium	7440-39-3	10	mg/kg	<10	99.3 mg/kg	89.1	70.0	130
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	0.67 mg/kg	103	70.0	130
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
EG005T: Chromium	7440-47-3	2	mg/kg	<2	20.2 mg/kg	102	70.0	130
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	11.2 mg/kg	89.9	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	55.9 mg/kg	91.1	70.0	130
EG005T: Iron	7439-89-6	50	mg/kg	<50	33227 mg/kg	109	70.0	130
EG005T: Manganese	7439-96-5	5	mg/kg	<5	590 mg/kg	91.1	70.0	130
EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	2.19 mg/kg	74.1	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.4 mg/kg	101	70.0	130
EG005T: Silver	7440-22-4	2	mg/kg	<2	2.9 mg/kg	71.2	70.0	130
EG005T: Strontium	7440-24-6	2	mg/kg	<2	67.2 mg/kg	106	70.0	130
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	61.3 mg/kg	102	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	162 mg/kg	73.4	70.0	130
EG005T: Titanium	7440-32-6	10	mg/kg	<10	958 mg/kg	112	70.0	130
EA002: pH 1:5 (Soils) (QCLot: 4989442)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	100	98.8	101
				----	7 pH Unit	99.7	99.3	101
EG020T: Total Metals by ICP-MS (QCLot: 4989456)								
EG020X-T: Lead	7439-92-1	0.1	mg/kg	<0.1	72.1 mg/kg	98.6	80.0	120
EG020X-T: Uranium	7440-61-1	0.1	mg/kg	<0.1	0.58 mg/kg	104	80.0	120
EG020X-T: Lithium	7439-93-2	0.1	mg/kg	<0.1	14.83 mg/kg	87.1	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 4997420)								
EG020Y-T: Selenium	7782-49-2	1	mg/kg	<1	----	----	----	----
EG020Y-T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	1.23 mg/kg	78.6	50.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4989455)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.64 mg/kg	101	70.0	130
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 4990108)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 4990108) - continued								
EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	20 mg/kg	97.6	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4989434)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	101	58.6	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4989440)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	770 mg/kg	104	75.0	128
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	2860 mg/kg	92.6	82.0	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1540 mg/kg	105	82.4	121
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4989434)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	107	59.3	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4989440)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1170 mg/kg	85.1	77.0	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	3830 mg/kg	97.0	81.5	120
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	290 mg/kg	124	73.3	137
EP080: BTEXN (QCLot: 4989434)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	104	61.6	117
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	105	65.8	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	105	65.8	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	106	64.8	134
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	106	68.7	132
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	94.0	61.8	123

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: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4989454)							
EM2306430-001	Split 1	EG005T: Arsenic	7440-38-2	50 mg/kg	114	78.0	124
		EG005T: Chromium	7440-47-3	50 mg/kg	95.1	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	109	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	94.6	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	85.2	80.0	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4989455)							

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4989455) - continued							
EM2306430-001	Split 1	EG035T: Mercury	7439-97-6	0.5 mg/kg	99.2	76.0	116
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 4990108)							
EM2306430-001	Split 1	EG048G: Hexavalent Chromium	18540-29-9	20 mg/kg	65.9	58.0	114
EM2306430-001	Split 1	EG048G: Hexavalent Chromium	18540-29-9	20 mg/kg	61.4	58.0	114

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2306430**	Page	: 1 of 6
Client	: **GEMEC**	Laboratory	: Environmental Division Melbourne
Contact	: MR NICOLO JELOVSEK	Telephone	: +61-3-8549 9600
Project	: Cervantes-01 Waste	Date Samples Received	: 13-Apr-2023
Site	: ----	Issue Date	: 19-Apr-2023
Sampler	: NICOLO JELOVSEK	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002: pH 1:5 (Soils)						
Soil Glass Jar - Unpreserved						
Split 1	14-Apr-2023	12-Apr-2023	**2**	----	----	----

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type / Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Matrix Spikes (MS)	0				
Total Metals by ICP-MS - Suite X	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing 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: **SOIL**

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
EA002: pH 1:5 (Soils)							
Soil Glass Jar - Unpreserved (EA002)							
Split 1	**05-Apr-2023**	**14-Apr-2023**	12-Apr-2023	×	**14-Apr-2023**	14-Apr-2023	✓
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
Split 1	**05-Apr-2023**	**----**	----	----	**14-Apr-2023**	19-Apr-2023	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
Split 1	**05-Apr-2023**	**14-Apr-2023**	02-Oct-2023	✓	**14-Apr-2023**	02-Oct-2023	✓
EG020T: Total Metals by ICP-MS							
Soil Glass Jar - Unpreserved (EG020X-T)							
Split 1	**05-Apr-2023**	**14-Apr-2023**	02-Oct-2023	✓	**15-Apr-2023**	02-Oct-2023	✓
Soil Glass Jar - Unpreserved (EG020Y-T)							
Split 1	**05-Apr-2023**	**18-Apr-2023**	02-Oct-2023	✓	**18-Apr-2023**	02-Oct-2023	✓

Matrix: **SOIL**

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
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) Split 1	**05-Apr-2023**	**14-Apr-2023**	03-May-2023	✓	**14-Apr-2023**	03-May-2023	✓
EG048: Hexavalent Chromium (Alkaline Digest)							
Soil Glass Jar - Unpreserved (EG048G) Split 1	**05-Apr-2023**	**14-Apr-2023**	03-May-2023	✓	**15-Apr-2023**	21-Apr-2023	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080) Split 1	**05-Apr-2023**	**14-Apr-2023**	19-Apr-2023	✓	**14-Apr-2023**	19-Apr-2023	✓
Soil Glass Jar - Unpreserved (EP071) Split 1	**05-Apr-2023**	**14-Apr-2023**	19-Apr-2023	✓	**15-Apr-2023**	24-May-2023	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080) Split 1	**05-Apr-2023**	**14-Apr-2023**	19-Apr-2023	✓	**14-Apr-2023**	19-Apr-2023	✓
Soil Glass Jar - Unpreserved (EP071) Split 1	**05-Apr-2023**	**14-Apr-2023**	19-Apr-2023	✓	**15-Apr-2023**	24-May-2023	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) Split 1	**05-Apr-2023**	**14-Apr-2023**	19-Apr-2023	✓	**14-Apr-2023**	19-Apr-2023	✓

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: **SOIL**

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)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	2	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	1	**200.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	2	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard

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 (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM Schedule B(3).
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite X	EG020X-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. 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.
Total Metals by ICP-MS - Suite Y	EG020Y-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. 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.
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. 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 Schedule B(3)
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	SOIL	In house: Referenced to USEPA SW846, Method 3060. Hexavalent chromium is extracted by alkaline digestion. The digest is determined by photometrically by automatic discrete analyser, following pH adjustment. The instrument uses colour development using dephenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.

Preparation Methods	Method	Matrix	Method Descriptions
Alkaline digestion for Hexavalent Chromium	EG048PR	SOIL	In house: Referenced to USEPA SW846, Method 3060A.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to 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.

Soil, 13 April 2023

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

PERTH 26 Rigali Way Wangara WA 6065
Ph: 08 9406 1301 E: samples.perth@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

CLIENT: Gemec Environmental Consultants	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☐ Standard TAT (List due date): ☒ ~~Non-Standard or urgent TAT (List due date): 18:04 2023 (23 hr)~~ Normal TAT
OFFICE: 1/25 Foss St, Palmyra, WA 6157		
PROJECT: Cervantes-01 Validation	ALS QUOTE NO.: EP/978/21_V7	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
ORDER NUMBER: -		
PROJECT MANAGER: Nicolo Jelovsek	CONTACT PH: 08 9339 8449	
SAMPLER: Nicolo Jelovsek	SAMPLER MOBILE: 0439093980	
COC emailed to ALS? (YES ~~/ NO~~)	EDD FORMAT (or default):	
Email Reports to: nicolo@gemec.com.au, ben@gemec.com.au		
Email Invoice to: marise@gemec.com.au		

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: °C
Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Dan Baldwin			
DATE/TIME: 14.04.2023 / 08:00	DATE/TIME: 14/4 1200	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Jars labelled C1.

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)				CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).															Additional Information
LAB ID	SAMPLE ID	DATE	TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	S-04ESL: TRH / BTEXN	EP068A: Organochlorine Pesticides	P-19/2: Al, As, B, Ba, Be, Cd, Co, CrVI, Cu, Hg, Mn, Mo, Ni, Pb, Se, V, Zn + pH	EG005T: Cr, Fe, Sr, Ti	EG020T: Li, U	EN34: 1:5 leach	EA010: Electrical conductivity (1:5)	S-18: TRH (C6-C10) / BTEXN	EP070: TRH Speciation - aromatic & aliphatic	NT9S: NH3, NO2, NO3, NOX, TKN, TN, TP	W-4: TRH / BTEXN	W-01T: ? Metals (total): As, Cd, Cr, Cu, Ni, Pb, Zn	EG020T: Ba, Mn	P-22: NEPM Screen for Soil Classification: Fe, CEC, pH(CaCl2), TOC, Clay Content	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	V1 3.0m	13.04.23	13:37	S	1 x glass unpreserved	1	1		1	1	1	1	1								
2	V2 3.0m	13.04.23	14:20	S	1 x glass unpreserved	1	1		1	1	1	1	1								
3	V3 3.5m	13.04.23	13:42	S	1 x glass unpreserved	1	1		1	1	1	1	1								
4	V4 3.5m	13.04.23	14:16	S	1 x glass unpreserved	1	1		1	1	1	1	1								
5	V5 3.0m	13.04.23	13:46	S	1 x glass unpreserved	1	1		1	1	1	1	1								
6	V6 3.0m	13.04.23	14:11	S	1 x glass unpreserved	1	1		1	1	1	1	1								
7	V7 3.5m	13.04.23	13:50	S	1 x glass unpreserved	1	1		1	1	1	1	1								
8	V8 3.5m	13.04.23	14:07	S	1 x glass unpreserved	1	1		1	1	1	1	1								
9	V9 3.0m	13.04.23	13:55	S	1 x glass unpreserved	1	1		1	1	1	1	1								
10	V10 3.0m	13.04.23	14:01	S	1 x glass unpreserved	1	1		1	1	1	1	1								
11	V11 1.0m	13.04.23	14:35	S	1 x glass unpreserved	1	1		1	1	1	1	1								
12	V12 0-0.1m	13.04.23	14:44	S	1 x glass unpreserved	1	1		1	1	1	1	1			1					
13	V13 0-0.1m	13.04.23	14:52	S	1 x glass unpreserved	1	1		1	1	1	1	1			1					
14	V14 2.0m	13.04.23	15:04	S	1 x glass unpreserved	1	1		1	1	1	1	1								
15	Dup 2	13.04.23	-	S	1 x glass unpreserved	1	1		1	1	1										
16	Trip Blank 3	13.04.23	12:00	S	1 x glass unpreserved	1								1							
17	Rinsate 2	13.04.23	15:15	W	1 x N, 2 x V, 1 x AG	1												1	1		
TOTAL						37	15		15	15	15	14	14	1		2		1	1		

Environmental Division Perth
Work Order Reference
EP2304853

Telephone : +61-8-9406 1301

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EP2304853**

Client	: **GEMEC**	Laboratory	: Environmental Division Perth
Contact	: MR NICOLO JELOVSEK	Contact	: Genevieve De Souza
Address	: UNIT 1/25 FOSS STREET PALMYRA WA, AUSTRALIA	Address	: 26 Rigali Way Wangara WA Australia 6065
E-mail	: nicolo@gemec.com.au	E-mail	: genevieve.desouza@alsglobal.com
Telephone	: 9339 8449	Telephone	: +61-8-9406 1301
Facsimile	: ----	Facsimile	: +61-8-9406 1399
Project	: Cervantes-01 Validation	Page	: 1 of 3
Order number	: ----	Quote number	: EP2021GEMEC0009_V7 (EP/978/21_V7)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: NICOLO JELOVSEK		

Dates

Date Samples Received	: 14-Apr-2023 12:00	Issue Date	: 17-Apr-2023
Client Requested Due Date	: 21-Apr-2023	Scheduled Reporting Date	: **21-Apr-2023**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 11.5 - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 17 / 17

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Please see scanned COC for sample discrepencies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA010 (solids): Electrical Conductivity (1:5)	SOIL - EA055-103 Moisture Content	SOIL - EG005T (solids) Total Metals by ICP-AES	SOIL - EG020T Total Metals by ICPMS	SOIL - NT-8S NH3, NO2, NO3, NOX, TKN, TN, TP	SOIL - P-19/2 WA Waste Classification (Metals Suite)	SOIL - S-04_ESL TRH/BTEXN_NEPM_ESL
EP2304853-001	13-Apr-2023 13:37	V1 3.0m	✓	✓	✓	✓		✓	✓
EP2304853-002	13-Apr-2023 14:20	V2 3.0m	✓	✓	✓	✓		✓	✓
EP2304853-003	13-Apr-2023 13:42	V3 3.5m	✓	✓	✓	✓		✓	✓
EP2304853-004	13-Apr-2023 14:16	V4 3.5m	✓	✓	✓	✓		✓	✓
EP2304853-005	13-Apr-2023 13:46	V5 3.0m	✓	✓	✓	✓		✓	✓
EP2304853-006	13-Apr-2023 14:11	V6 3.0m	✓	✓	✓	✓		✓	✓
EP2304853-007	13-Apr-2023 13:50	V7 3.5m	✓	✓	✓	✓		✓	✓
EP2304853-008	13-Apr-2023 14:07	V8 3.5m	✓	✓	✓	✓		✓	✓
EP2304853-009	13-Apr-2023 13:55	V9 3.0m	✓	✓	✓	✓		✓	✓
EP2304853-010	13-Apr-2023 14:01	V10 3.0m	✓	✓	✓	✓		✓	✓
EP2304853-011	13-Apr-2023 14:35	V11 1.0m	✓	✓	✓	✓		✓	✓
EP2304853-012	13-Apr-2023 14:44	V12 0-0.1m	✓	✓	✓	✓	✓	✓	✓
EP2304853-013	13-Apr-2023 14:52	V13 0-0.1m	✓	✓	✓	✓	✓	✓	✓
EP2304853-014	13-Apr-2023 15:04	V14 2.0m	✓	✓	✓	✓		✓	✓
EP2304853-015	13-Apr-2023 00:00	Dup 2		✓	✓	✓		✓	✓
EP2304853-016	13-Apr-2023 12:00	Trip Blank 3		✓					

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - S-18 TRH(C6-C9)/BTEXN
EP2304853-016	13-Apr-2023 12:00	Trip Blank 3	✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - W-01T 7 metals (Total)
EP2304853-017	13-Apr-2023 15:15	Rinsate 2	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ACCOUNTS PAYABLE (WA)

- A4 - AU Tax Invoice (INV)	Email	marise@gemec.com.au

Ben

- *AU Certificate of Analysis - NATA (COA)	Email	ben@gemec.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ben@gemec.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ben@gemec.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ben@gemec.com.au
- AU Guideline Report - Generic (GL_Generic_Test)	Email	ben@gemec.com.au
- Chain of Custody (CoC) (COC)	Email	ben@gemec.com.au
- EDI Format - ESDAT (ESDAT)	Email	ben@gemec.com.au
- EDI Format - XTab (XTAB)	Email	ben@gemec.com.au

NICOLO JELOVSEK

- *AU Certificate of Analysis - NATA (COA)	Email	nicolo@gemec.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	nicolo@gemec.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	nicolo@gemec.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	nicolo@gemec.com.au
- AU Guideline Report - Generic (GL_Generic_Test)	Email	nicolo@gemec.com.au
- Chain of Custody (CoC) (COC)	Email	nicolo@gemec.com.au
- EDI Format - ESDAT (ESDAT)	Email	nicolo@gemec.com.au
- EDI Format - XTab (XTAB)	Email	nicolo@gemec.com.au

CERTIFICATE OF ANALYSIS

Work Order	: **EP2304853**	Page	: 1 of 12
Client	: **GEMEC**	Laboratory	: Environmental Division Perth
Contact	: MR NICOLO JELOVSEK	Contact	: Genevieve De Souza
Address	: UNIT 1/25 FOSS STREET PALMYRA WA, AUSTRALIA	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: 9339 8449	Telephone	: +61-8-9406 1301
Project	: Cervantes-01 Validation	Date Samples Received	: 14-Apr-2023 12:00
Order number	: ----	Date Analysis Commenced	: 18-Apr-2023
C-O-C number	: ----	Issue Date	: 24-Apr-2023 17:31
Sampler	: NICOLO JELOVSEK		
Site	: ----		
Quote number	: EP/978/21_V7		
No. of samples received	: 17		
No. of samples analysed	: 17		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Wangara, WA
David Viner	SENIOR LAB TECH	Perth Organics, Wangara, WA

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 Contract 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
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- For the 'Summary of Thresholds Reached or Exceeded' to accurately function, all samples must be analysed and included in the 'Analytical Results' section of the following report. Please verify that all required sample IDs are listed and analysed.
- This Automated Guideline Comparison report assesses potential chemical 'contaminants' versus guideline criteria. Other parameters may impact classification and 95% upper control limits may also be applied - refer to EPA Regulations.
- This guideline comparison report only provides evaluation data where chemical parameters specifically listed within the DEC Waste Classification and Waste Definitions 1996 (as amended December 2019) guideline are analysed by ALS using P-19/2 package.
- This guideline comparison report only provides evaluation of total concentration data against upper limit thresholds for Classes I to IV.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EG005: LCS recovery for Ti falls outside ALS Dynamic Control Limit. However, it is within the acceptance criteria based on ALS DQO. No further action is required

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	V1 3.0m	V2 3.0m	V3 3.5m	V4 3.5m	V5 3.0m
			Sampling date / time	13-Apr-2023 13:37	13-Apr-2023 14:20	13-Apr-2023 13:42	13-Apr-2023 14:16	13-Apr-2023 13:46
Compound	CAS Number	LOR	Unit	EP2304853-001	EP2304853-002	EP2304853-003	EP2304853-004	EP2304853-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**9.3**	**9.4**	**9.3**	**9.3**	**9.4**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**1990**	**2350**	**3160**	**3040**	**2320**
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**16.1**	**16.1**	**18.8**	**17.2**	**15.5**
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	**160**	**170**	**170**	**160**	**170**
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Barium	7440-39-3	10	mg/kg	**10**	<10	**10**	**10**	**10**
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Chromium	7440-47-3	2	mg/kg	**11**	**11**	**11**	**11**	**12**
Cobalt	7440-48-4	2	mg/kg	<2	<2	<2	<2	<2
Copper	7440-50-8	5	mg/kg	<5	<5	<5	<5	<5
Iron	7439-89-6	50	mg/kg	**290**	**260**	**290**	**310**	**290**
Manganese	7439-96-5	5	mg/kg	**16**	**17**	**17**	**17**	**18**
Molybdenum	7439-98-7	2	mg/kg	<2	<2	<2	<2	<2
Nickel	7440-02-0	2	mg/kg	<2	<2	<2	<2	<2
Silver	7440-22-4	2	mg/kg	<2	<2	<2	<2	<2
Strontium	7440-24-6	2	mg/kg	**2300**	**2250**	**2310**	**2240**	**2350**
Vanadium	7440-62-2	5	mg/kg	<5	<5	<5	<5	<5
Zinc	7440-66-6	5	mg/kg	<5	<5	<5	<5	<5
Titanium	7440-32-6	10	mg/kg	**10**	**10**	**10**	**10**	**10**
EG020T: Total Metals by ICP-MS								
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Uranium	7440-61-1	0.1	mg/kg	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**
Lithium	7439-93-2	0.1	mg/kg	**1.0**	**1.2**	**1.2**	**1.2**	**1.3**
Lead	7439-92-1	0.1	mg/kg	**0.5**	**0.4**	**0.4**	**0.4**	**0.4**
Selenium	7782-49-2	1	mg/kg	<1	<1	<1	<1	<1
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	V1 3.0m	V2 3.0m	V3 3.5m	V4 3.5m	V5 3.0m
			Sampling date / time	13-Apr-2023 13:37	13-Apr-2023 14:20	13-Apr-2023 13:42	13-Apr-2023 14:16	13-Apr-2023 13:46
Compound	CAS Number	LOR	Unit	EP2304853-001	EP2304853-002	EP2304853-003	EP2304853-004	EP2304853-005
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 - C14 Fraction	----	20	mg/kg	<20	<20	<20	<20	<20
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	20	mg/kg	<20	<20	<20	<20	<20
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	20	mg/kg	<20	<20	<20	<20	<20
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	20	mg/kg	<20	<20	<20	<20	<20
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	20	mg/kg	<20	<20	<20	<20	<20
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**86.4**	**83.4**	**83.6**	**88.0**	**86.8**
Toluene-D8	2037-26-5	0.2	%	**81.3**	**76.4**	**78.3**	**75.2**	**77.7**
4-Bromofluorobenzene	460-00-4	0.2	%	**87.1**	**84.4**	**85.4**	**84.5**	**82.9**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	V6 3.0m	V7 3.5m	V8 3.5m	V9 3.0m	V10 3.0m
			Sampling date / time	13-Apr-2023 14:11	13-Apr-2023 13:50	13-Apr-2023 14:07	13-Apr-2023 13:55	13-Apr-2023 14:01
Compound	CAS Number	LOR	Unit	EP2304853-006	EP2304853-007	EP2304853-008	EP2304853-009	EP2304853-010
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.5	9.2	9.3	9.4	9.5
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	1270	4160	4150	1790	1070
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	9.3	21.7	18.6	18.5	8.2
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	160	180	150	150	150
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Barium	7440-39-3	10	mg/kg	<10	50	10	10	10
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Chromium	7440-47-3	2	mg/kg	10	11	11	11	11
Cobalt	7440-48-4	2	mg/kg	<2	<2	<2	<2	<2
Copper	7440-50-8	5	mg/kg	<5	<5	<5	<5	<5
Iron	7439-89-6	50	mg/kg	290	290	270	280	260
Manganese	7439-96-5	5	mg/kg	16	17	16	15	16
Molybdenum	7439-98-7	2	mg/kg	<2	<2	<2	<2	<2
Nickel	7440-02-0	2	mg/kg	<2	<2	<2	<2	<2
Silver	7440-22-4	2	mg/kg	<2	<2	<2	<2	<2
Strontium	7440-24-6	2	mg/kg	2150	2270	2350	2210	2260
Vanadium	7440-62-2	5	mg/kg	<5	<5	<5	<5	<5
Zinc	7440-66-6	5	mg/kg	<5	<5	<5	<5	<5
Titanium	7440-32-6	10	mg/kg	10	<10	10	10	<10
EG020T: Total Metals by ICP-MS								
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Uranium	7440-61-1	0.1	mg/kg	0.9	1.0	1.0	1.0	1.0
Lithium	7439-93-2	0.1	mg/kg	1.2	1.3	1.3	1.4	1.4
Lead	7439-92-1	0.1	mg/kg	0.4	0.4	0.4	0.4	0.4
Selenium	7782-49-2	1	mg/kg	<1	<1	<1	<1	<1
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	V6 3.0m	V7 3.5m	V8 3.5m	V9 3.0m	V10 3.0m
			Sampling date / time	13-Apr-2023 14:11	13-Apr-2023 13:50	13-Apr-2023 14:07	13-Apr-2023 13:55	13-Apr-2023 14:01
Compound	CAS Number	LOR	Unit	EP2304853-006	EP2304853-007	EP2304853-008	EP2304853-009	EP2304853-010
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 - C14 Fraction	----	20	mg/kg	<20	<20	<20	<20	<20
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	20	mg/kg	<20	<20	<20	<20	<20
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	20	mg/kg	<20	<20	<20	<20	<20
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	20	mg/kg	<20	<20	<20	<20	<20
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	20	mg/kg	<20	<20	<20	<20	<20
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**88.9**	**86.5**	**86.1**	**94.9**	**91.5**
Toluene-D8	2037-26-5	0.2	%	**80.5**	**74.2**	**75.1**	**81.9**	**79.4**
4-Bromofluorobenzene	460-00-4	0.2	%	**90.0**	**80.9**	**82.6**	**88.3**	**86.0**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	V11 1.0m	V12 0-0.1m	V13 0-0.1m	V14 2.0m	Dup 2
			Sampling date / time	13-Apr-2023 14:35	13-Apr-2023 14:44	13-Apr-2023 14:52	13-Apr-2023 15:04	13-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EP2304853-011	EP2304853-012	EP2304853-013	EP2304853-014	EP2304853-015
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.3	8.8	9.2	9.5	9.4
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	419	146	383	118	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	4.6	8.2	12.9	5.9	13.6
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	230	380	310	240	140
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Barium	7440-39-3	10	mg/kg	20	10	10	10	<10
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Chromium	7440-47-3	2	mg/kg	11	12	13	11	10
Cobalt	7440-48-4	2	mg/kg	<2	<2	<2	<2	<2
Copper	7440-50-8	5	mg/kg	<5	<5	<5	<5	<5
Iron	7439-89-6	50	mg/kg	340	460	400	360	270
Manganese	7439-96-5	5	mg/kg	19	24	20	18	15
Molybdenum	7439-98-7	2	mg/kg	<2	<2	<2	<2	<2
Nickel	7440-02-0	2	mg/kg	<2	<2	<2	<2	<2
Silver	7440-22-4	2	mg/kg	<2	<2	<2	<2	<2
Strontium	7440-24-6	2	mg/kg	2240	1850	2250	2130	2120
Vanadium	7440-62-2	5	mg/kg	<5	<5	<5	<5	<5
Zinc	7440-66-6	5	mg/kg	<5	<5	<5	<5	<5
Titanium	7440-32-6	10	mg/kg	10	<10	10	10	<10
EG020T: Total Metals by ICP-MS								
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Uranium	7440-61-1	0.1	mg/kg	0.9	0.6	0.7	0.8	0.9
Lithium	7439-93-2	0.1	mg/kg	1.4	1.0	1.3	1.5	1.5
Lead	7439-92-1	0.1	mg/kg	0.4	0.6	0.6	0.4	0.3
Selenium	7782-49-2	1	mg/kg	<1	<1	<1	<1	<1
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EK055: Ammonia as N								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	V11 1.0m	V12 0-0.1m	V13 0-0.1m	V14 2.0m	Dup 2
			Sampling date / time	13-Apr-2023 14:35	13-Apr-2023 14:44	13-Apr-2023 14:52	13-Apr-2023 15:04	13-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EP2304853-011	EP2304853-012	EP2304853-013	EP2304853-014	EP2304853-015
				Result	Result	Result	Result	Result
EK055: Ammonia as N - Continued								
Ammonia as N	7664-41-7	20	mg/kg	----	<20	<20	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	14797-65-0	0.1	mg/kg	----	<0.1	<0.1	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N (Sol.)	14797-55-8	0.1	mg/kg	----	**18.0**	**5.6**	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	----	**18.0**	**5.6**	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	----	**1680**	**1290**	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	----	**1700**	**1300**	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	----	**369**	**362**	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 - C14 Fraction	----	20	mg/kg	<20	<20	<20	<20	<20
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	20	mg/kg	<20	<20	<20	<20	<20
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	20	mg/kg	<20	<20	<20	<20	<20
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	20	mg/kg	<20	<20	<20	<20	<20
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	20	mg/kg	<20	<20	<20	<20	<20
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	V11 1.0m	V12 0-0.1m	V13 0-0.1m	V14 2.0m	Dup 2
				Sampling date / time	13-Apr-2023 14:35	13-Apr-2023 14:44	13-Apr-2023 14:52	13-Apr-2023 15:04	13-Apr-2023 00:00
Compound	CAS Number	LOR	Unit		EP2304853-011	EP2304853-012	EP2304853-013	EP2304853-014	EP2304853-015
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**91.1**	**82.1**	**87.8**	**91.6**	**84.3**
Toluene-D8	2037-26-5	0.2	%		**77.7**	**79.1**	**82.1**	**82.0**	**77.1**
4-Bromofluorobenzene	460-00-4	0.2	%		**84.9**	**78.1**	**87.3**	**88.0**	**87.2**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	Trip Blank 3	----	----	----	----
			Sampling date / time	13-Apr-2023 12:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EP2304853-016	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	<1.0	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	----	----	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**94.0**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	**85.3**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	**92.6**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Rinsate 2	----	----	----	----
				Sampling date / time	13-Apr-2023 15:15	----	----	----	----
Compound	CAS Number	LOR	Unit		EP2304853-017	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
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	----	----	----	----
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		<0.005	----	----	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	63	132
Toluene-D8	2037-26-5	66	125
4-Bromofluorobenzene	460-00-4	60	124

QUALITY CONTROL REPORT

Work Order	: **EP2304853**	Page	: 1 of 11
Client	: **GEMEC**	Laboratory	: Environmental Division Perth
Contact	: MR NICOLO JELOVSEK	Contact	: Genevieve De Souza
Address	: UNIT 1/25 FOSS STREET PALMYRA WA, AUSTRALIA	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: 9339 8449	Telephone	: +61-8-9406 1301
Project	: Cervantes-01 Validation	Date Samples Received	: 14-Apr-2023
Order number	: ----	Date Analysis Commenced	: 18-Apr-2023
C-O-C number	: ----	Issue Date	: 24-Apr-2023
Sampler	: NICOLO JELOVSEK		
Site	: ----		
Quote number	: EP/978/21_V7		
No. of samples received	: 17		
No. of samples analysed	: 17		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Wangara, WA
David Viner	SENIOR LAB TECH	Perth Organics, Wangara, WA

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4999941)									
EP2304798-001	Anonymous	EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Strontium	7440-24-6	2	mg/kg	64	59	8.2	0% - 20%
		EG005T: Aluminium	7429-90-5	50	mg/kg	1850	1910	3.4	0% - 20%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	3670	3470	5.6	0% - 20%
EP2304798-011	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	20	20	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	8	9	0.0	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	3	3	0.0	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Strontium	7440-24-6	2	mg/kg	72	73	1.7	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	25	24	0.0	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	29	32	8.9	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	10	8	29.5	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	164	151	7.7	0% - 20%
		EG005T: Aluminium	7429-90-5	50	mg/kg	2530	2290	9.9	0% - 20%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	4870	4350	11.3	0% - 20%
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4999945)									
EP2304853-009	V9 3.0m	EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4999945) - continued									
EP2304853-009	V9 3.0m	EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Strontium	7440-24-6	2	mg/kg	2210	2350	6.2	0% - 20%
		EG005T: Aluminium	7429-90-5	50	mg/kg	150	160	0.0	No Limit
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	280	290	0.0	No Limit
EA002: pH 1:5 (Soils) (QC Lot: 4999455)									
EP2304853-001	V1 3.0m	EA002: pH Value	----	0.1	pH Unit	9.3	9.4	1.1	0% - 20%
EP2304853-010	V10 3.0m	EA002: pH Value	----	0.1	pH Unit	9.5	9.6	0.0	0% - 20%
EA010: Conductivity (1:5) (QC Lot: 4999456)									
EP2304853-001	V1 3.0m	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	1990	2010	0.7	0% - 20%
EP2304853-010	V10 3.0m	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	1070	1080	0.4	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4996952)									
EP2304815-002	Anonymous	EA055: Moisture Content	----	0.1	%	5.1	5.0	2.4	No Limit
EP2304853-009	V9 3.0m	EA055: Moisture Content	----	0.1	%	18.5	19.3	4.0	0% - 50%
EG020T: Total Metals by ICP-MS (QC Lot: 4999943)									
EP2304853-001	V1 3.0m	EG020X-T: Uranium	7440-61-1	0.1	mg/kg	1.0	0.9	0.0	0% - 50%
		EG020X-T: Lithium	7439-93-2	0.1	mg/kg	1.0	1.1	0.0	0% - 50%
EP2304853-011	V11 1.0m	EG020X-T: Uranium	7440-61-1	0.1	mg/kg	0.9	1.0	0.0	No Limit
		EG020X-T: Lithium	7439-93-2	0.1	mg/kg	1.4	1.5	8.8	0% - 50%
EG020T: Total Metals by ICP-MS (QC Lot: 4999944)									
--------		EG020T: Cadmium	7440-43-9	0.1	mg/kg	----	<0.1	0.0	No Limit
		EG020T: Lead	7439-92-1	0.1	mg/kg	----	0.4	0.0	No Limit
		EG020T: Selenium	7782-49-2	1	mg/kg	<1	<1	0.0	No Limit
EP2304853-011	V11 1.0m	EG020T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020T: Lead	7439-92-1	0.1	mg/kg	0.4	0.5	0.0	No Limit
		EG020T: Selenium	7782-49-2	1	mg/kg	<1	<1	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4999942)									
EP2304798-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP2304798-011	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.7	148	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4999946)									
EP2304853-009	V9 3.0m	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG048: Hexavalent Chromium (Alkaline Digest) (QC Lot: 4998215)									
EP2304650-001	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP2304853-007	V7 3.5m	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EK055: Ammonia as N (QC Lot: 4996809)									
EP2304853-012	V12 0-0.1m	EK055: Ammonia as N	7664-41-7	20	mg/kg	<20	<20	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 4999458)									
EP2304853-012	V12 0-0.1m	EK057G: Nitrite as N (Sol.)	14797-65-0	0.1	mg/kg	<0.1	<0.1	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 4999457)									
EP2304853-012	V12 0-0.1m	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	18.0	19.2	6.0	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 4996656)									
EP2304853-012	V12 0-0.1m	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	1680	1490	12.2	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 4996657)									
EP2304853-012	V12 0-0.1m	EK067G: Total Phosphorus as P	----	2	mg/kg	369	326	12.3	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4996951)									
EP2304815-002	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP2304853-010	V10 3.0m	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4996956)									
EP2304853-001	V1 3.0m	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<20	<20	0.0	No Limit
EP2304853-011	V11 1.0m	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4996951)									
EP2304815-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP2304853-010	V10 3.0m	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4996956)									
EP2304853-001	V1 3.0m	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<20	<20	0.0	No Limit
EP2304853-011	V11 1.0m	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 4996951)									
EP2304815-002	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EP2304853-010	V10 3.0m	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080: BTEXN (QC Lot: 4996951) - continued									
EP2304853-010	V10 3.0m	EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 4998365)									
EP2304731-003	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EP2304787-003	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	0.0075	0.0071	5.4	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	7.52	7.49	0.5	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.637	0.626	1.7	0% - 20%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.127	0.122	3.9	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.10	<0.10	0.0	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	1.21	1.15	5.6	No Limit

Method Blank (MB) and Laboratory Control Sample (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 Sample (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: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4999941)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	6134 mg/kg	98.6	76.8	112
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	99.8	87.2	114
EG005T: Barium	7440-39-3	10	mg/kg	<10	143 mg/kg	100	82.4	112
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	5.63 mg/kg	106	91.3	121
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	83.8	70.0	100
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	16 mg/kg	99.1	79.6	112
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	97.5	81.0	112
EG005T: Iron	7439-89-6	50	mg/kg	<50	6655 mg/kg	90.2	70.0	114
EG005T: Manganese	7439-96-5	5	mg/kg	<5	130 mg/kg	106	70.5	128
EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	7.9 mg/kg	94.3	75.0	105
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	96.3	78.7	106
EG005T: Silver	7440-22-4	2	mg/kg	<2	2.1 mg/kg	95.2	71.2	106
EG005T: Strontium	7440-24-6	2	mg/kg	<2	58.3 mg/kg	105	86.4	111
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	29.6 mg/kg	102	82.6	108
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	99.8	79.4	110
EG005T: Titanium	7440-32-6	----	mg/kg	----	20 mg/kg	# 113	70.0	110
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4999945)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	6134 mg/kg	101	76.8	112
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	93.1	87.2	114
EG005T: Barium	7440-39-3	10	mg/kg	<10	143 mg/kg	101	82.4	112
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	5.63 mg/kg	106	91.3	121
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	84.4	70.0	100
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	16 mg/kg	97.2	79.6	112
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	96.7	81.0	112
EG005T: Iron	7439-89-6	50	mg/kg	<50	6655 mg/kg	92.4	70.0	114
EG005T: Manganese	7439-96-5	5	mg/kg	<5	130 mg/kg	104	70.5	128
EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	7.9 mg/kg	84.2	75.0	105
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	94.6	78.7	106

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4999945) - continued								
EG005T: Silver	7440-22-4	2	mg/kg	<2	2.1 mg/kg	90.5	71.2	106
EG005T: Strontium	7440-24-6	2	mg/kg	<2	58.3 mg/kg	103	86.4	111
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	29.6 mg/kg	98.6	82.6	108
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	97.0	79.4	110
EG005T: Titanium	7440-32-6	----	mg/kg	----	20 mg/kg	# 113	70.0	110
EA002: pH 1:5 (Soils) (QCLot: 4999455)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	100	98.6	102
				----	7 pH Unit	100	98.6	102
EA010: Conductivity (1:5) (QCLot: 4999456)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	100	95.9	104
EG020T: Total Metals by ICP-MS (QCLot: 4999943)								
EG020X-T: Uranium	7440-61-1	0.1	mg/kg	<0.1	7.3 mg/kg	105	80.1	109
EG020X-T: Lithium	7439-93-2	0.1	mg/kg	<0.1	16.1 mg/kg	70.1	70.0	103
EG020T: Total Metals by ICP-MS (QCLot: 4999944)								
EG020T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	4.64 mg/kg	113	87.0	116
EG020T: Lead	7439-92-1	0.1	mg/kg	<0.1	40 mg/kg	106	84.2	119
EG020T: Selenium	7782-49-2	1	mg/kg	<1	5.37 mg/kg	119	94.1	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4999942)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.154 mg/kg	92.9	84.3	124
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4999946)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.154 mg/kg	118	84.3	124
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 4998215)								
EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	40 mg/kg	88.1	70.0	120
				<0.5	20 mg/kg	99.8	70.0	120
EK055: Ammonia as N (QCLot: 4996809)								
EK055: Ammonia as N	7664-41-7	20	mg/kg	<20	50 mg/kg	81.6	76.1	110
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4999458)								
EK057G: Nitrite as N (Sol.)	14797-65-0	0.1	mg/kg	<0.1	2.5 mg/kg	99.1	94.1	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4999457)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	101	88.5	110
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4996656)								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	1000 mg/kg	98.4	78.0	128
				<20	100 mg/kg	116	70.0	128
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 4996657)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 4996657) - continued								
EK067G: Total Phosphorus as P	----	2	mg/kg	<2	440 mg/kg	90.1	90.0	125
				<2	44 mg/kg	101	90.0	125
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4996951)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	35 mg/kg	100	66.0	122
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4996956)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	1161 mg/kg	94.7	70.0	111
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	2802 mg/kg	102	71.9	109
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	414 mg/kg	86.0	63.8	118
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4996951)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	99.2	66.0	122
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4996956)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1839 mg/kg	97.8	72.8	110
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	2358 mg/kg	99.6	67.8	114
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	129 mg/kg	82.0	50.3	123
EP080: BTEXN (QCLot: 4996951)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	91.0	72.0	122
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	92.8	75.0	119
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	94.7	73.0	121
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	98.6	74.0	122
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	97.5	75.0	121
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	98.4	64.0	126

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG020T: Total Metals by ICP-MS (QCLot: 4998365)								
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	106	91.6	114
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	108	92.6	113
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	105	91.8	111
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	105	90.9	109
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	101	90.8	110
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	103	92.3	108
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.2	89.3	110
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	104	90.7	113

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG020T: Total Metals by ICP-MS (QCLot: 4998365) - continued								
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	114	95.0	132

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: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4999941)							
EP2304798-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	85.0	70.0	130
		EG005T: Barium	7440-39-3	50 mg/kg	103	70.0	130
		EG005T: Beryllium	7440-41-7	50 mg/kg	96.0	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	96.8	70.0	130
		EG005T: Cobalt	7440-48-4	50 mg/kg	98.0	70.0	130
		EG005T: Copper	7440-50-8	50 mg/kg	129	70.0	130
		EG005T: Manganese	7439-96-5	50 mg/kg	95.2	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	96.9	70.0	130
		EG005T: Vanadium	7440-62-2	50 mg/kg	96.4	70.0	130
		EG005T: Zinc	7440-66-6	50 mg/kg	126	70.0	130
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4999945)							
EP2304853-009	V9 3.0m	EG005T: Arsenic	7440-38-2	50 mg/kg	92.3	70.0	130
		EG005T: Barium	7440-39-3	50 mg/kg	108	70.0	130
		EG005T: Beryllium	7440-41-7	50 mg/kg	92.0	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	95.0	70.0	130
		EG005T: Cobalt	7440-48-4	50 mg/kg	92.3	70.0	130
		EG005T: Copper	7440-50-8	50 mg/kg	95.5	70.0	130
		EG005T: Manganese	7439-96-5	50 mg/kg	92.0	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	90.0	70.0	130
		EG005T: Vanadium	7440-62-2	50 mg/kg	96.7	70.0	130
		EG005T: Zinc	7440-66-6	50 mg/kg	90.4	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 4999944)							
EP2304853-001	V1 3.0m	EG020T: Cadmium	7440-43-9	12.5 mg/kg	99.7	70.0	130
		EG020T: Lead	7439-92-1	50 mg/kg	96.0	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4999942)							
EP2304798-001	Anonymous	EG035T: Mercury	7439-97-6	1 mg/kg	96.9	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4999946)							

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4999946) - continued							
EP2304853-009	V9 3.0m	EG035T: Mercury	7439-97-6	1 mg/kg	100	70.0	130
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 4998215)							
EP2304650-001	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	40 mg/kg	88.1	70.0	130
EP2304650-001	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	20 mg/kg	81.3	70.0	130
EK055: Ammonia as N (QCLot: 4996809)							
EP2304853-013	V13 0-0.1m	EK055: Ammonia as N	7664-41-7	50 mg/kg	85.9	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4999458)							
EP2304853-013	V13 0-0.1m	EK057G: Nitrite as N (Sol.)	14797-65-0	2.5 mg/kg	95.4	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4999457)							
EP2304853-013	V13 0-0.1m	EK059G: Nitrite + Nitrate as N (Sol.)	----	2.5 mg/kg	87.4	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4996656)							
EP2304853-013	V13 0-0.1m	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	70.3	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 4996657)							
EP2304853-013	V13 0-0.1m	EK067G: Total Phosphorus as P	----	100 mg/kg	75.5	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4996951)							
EP2304853-001	V1 3.0m	EP080: C6 - C9 Fraction	----	24 mg/kg	76.0	69.1	135
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4996956)							
EP2304853-002	V2 3.0m	EP071: C10 - C14 Fraction	----	1161 mg/kg	93.3	64.7	126
		EP071: C15 - C28 Fraction	----	2802 mg/kg	101	61.7	124
		EP071: C29 - C36 Fraction	----	414 mg/kg	85.0	64.6	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4996951)							
EP2304853-001	V1 3.0m	EP080: C6 - C10 Fraction	C6_C10	29 mg/kg	74.5	69.1	135
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4996956)							
EP2304853-002	V2 3.0m	EP071: >C10 - C16 Fraction	----	1839 mg/kg	96.6	64.7	126
		EP071: >C16 - C34 Fraction	----	2358 mg/kg	98.4	61.7	124
		EP071: >C34 - C40 Fraction	----	129 mg/kg	78.8	64.6	131
EP080: BTEXN (QCLot: 4996951)							
EP2304853-001	V1 3.0m	EP080: Benzene	71-43-2	2 mg/kg	81.2	76.4	118
		EP080: Toluene	108-88-3	2 mg/kg	82.7	67.4	112

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EG020T: Total Metals by ICP-MS (QCLot: 4998365)							
EP2304773-001	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	115	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG020T: Total Metals by ICP-MS (QCLot: 4998365) - continued							
EP2304773-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	109	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	102	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	102	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	104	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	106	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	110	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EP2304853**	Page	: 1 of 10
Client	: **GEMEC**	Laboratory	: Environmental Division Perth
Contact	: MR NICOLO JELOVSEK	Telephone	: +61-8-9406 1301
Project	: Cervantes-01 Validation	Date Samples Received	: 14-Apr-2023
Site	: ----	Issue Date	: 24-Apr-2023
Sampler	: NICOLO JELOVSEK	No. of samples received	: 17
Order number	: ----	No. of samples analysed	: 17

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Matrix Spike outliers occur.**
- **Laboratory Control outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EG005(ED093)T: Total Metals by ICP-AES	QC-4999945-003	----	**Titanium**	7440-32-6	113 %	70.0-110%	**Recovery greater than upper control limit**
EG005(ED093)T: Total Metals by ICP-AES	QC-MRG3-49999410	----	**Titanium**	7440-32-6	113 %	70.0-110%	**Recovery greater than upper control limit**

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Matrix Spikes (MS)	0				
Total Metals by ICP-MS - Suite X	0	15	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing 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: **SOIL**

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*
EA002: pH 1:5 (Soils)							
Soil Glass Jar - Unpreserved (EA002)							
V1 3.0m, V2 3.0m, V3 3.5m, V4 3.5m, V5 3.0m, V6 3.0m, V7 3.5m, V8 3.5m, V9 3.0m, V10 3.0m, V11 1.0m, V12 0-0.1m, V13 0-0.1m, V14 2.0m, Dup 2	**13-Apr-2023**	**20-Apr-2023**	20-Apr-2023	✓	**20-Apr-2023**	20-Apr-2023	✓

Matrix: **SOIL**

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
EA010: Conductivity (1:5)								
Soil Glass Jar - Unpreserved (EA010)								
V1 3.0m,	V2 3.0m,	**13-Apr-2023**	**20-Apr-2023**	20-Apr-2023	✓	**20-Apr-2023**	18-May-2023	✓
V3 3.5m,	V4 3.5m,							
V5 3.0m,	V6 3.0m,							
V7 3.5m,	V8 3.5m,							
V9 3.0m,	V10 3.0m,							
V11 1.0m,	V12 0-0.1m,							
V13 0-0.1m,	V14 2.0m							
EA055: Moisture Content (Dried @ 105-110°C)								
Soil Glass Jar - Unpreserved (EA055)								
V1 3.0m,	V2 3.0m,	**13-Apr-2023**	**----**	----	----	**18-Apr-2023**	27-Apr-2023	✓
V3 3.5m,	V4 3.5m,							
V5 3.0m,	V6 3.0m,							
V7 3.5m,	V8 3.5m,							
V9 3.0m,	V10 3.0m,							
V11 1.0m,	V12 0-0.1m,							
V13 0-0.1m,	V14 2.0m,							
Dup 2,	Trip Blank 3							
EG005(ED093)T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T)								
V1 3.0m,	V2 3.0m,	**13-Apr-2023**	**20-Apr-2023**	10-Oct-2023	✓	**21-Apr-2023**	10-Oct-2023	✓
V3 3.5m,	V4 3.5m,							
V5 3.0m,	V6 3.0m,							
V7 3.5m,	V8 3.5m,							
V9 3.0m,	V10 3.0m,							
V11 1.0m,	V12 0-0.1m,							
V13 0-0.1m,	V14 2.0m,							
Dup 2								
EG020T: Total Metals by ICP-MS								
Soil Glass Jar - Unpreserved (EG020X-T)								
V1 3.0m,	V2 3.0m,	**13-Apr-2023**	**20-Apr-2023**	10-Oct-2023	✓	**20-Apr-2023**	10-Oct-2023	✓
V3 3.5m,	V4 3.5m,							
V5 3.0m,	V6 3.0m,							
V7 3.5m,	V8 3.5m,							
V9 3.0m,	V10 3.0m,							
V11 1.0m,	V12 0-0.1m,							
V13 0-0.1m,	V14 2.0m,							
Dup 2								

Matrix: **SOIL**

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
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035T)								
V1 3.0m,	V2 3.0m,	**13-Apr-2023**	**20-Apr-2023**	11-May-2023	✓	**21-Apr-2023**	11-May-2023	✓
V3 3.5m,	V4 3.5m,							
V5 3.0m,	V6 3.0m,							
V7 3.5m,	V8 3.5m,							
V9 3.0m,	V10 3.0m,							
V11 1.0m,	V12 0-0.1m,							
V13 0-0.1m,	V14 2.0m,							
Dup 2								
EG048: Hexavalent Chromium (Alkaline Digest)								
Soil Glass Jar - Unpreserved (EG048G)								
V1 3.0m,	V2 3.0m,	**13-Apr-2023**	**19-Apr-2023**	11-May-2023	✓	**20-Apr-2023**	26-Apr-2023	✓
V3 3.5m,	V4 3.5m,							
V5 3.0m,	V6 3.0m,							
V7 3.5m,	V8 3.5m,							
V9 3.0m,	V10 3.0m,							
V11 1.0m,	V12 0-0.1m,							
V13 0-0.1m,	V14 2.0m,							
Dup 2								
EK055: Ammonia as N								
Soil Glass Jar - Unpreserved (EK055)								
V12 0-0.1m,	V13 0-0.1m	**13-Apr-2023**	**----**	----	**----**	**18-Apr-2023**	11-May-2023	✓
EK057G: Nitrite as N by Discrete Analyser								
Soil Glass Jar - Unpreserved (EK057G)								
V12 0-0.1m,	V13 0-0.1m	**13-Apr-2023**	**20-Apr-2023**	20-Apr-2023	✓	**20-Apr-2023**	22-Apr-2023	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Soil Glass Jar - Unpreserved (EK059G)								
V12 0-0.1m,	V13 0-0.1m	**13-Apr-2023**	**20-Apr-2023**	11-May-2023	✓	**20-Apr-2023**	22-Apr-2023	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Soil Glass Jar - Unpreserved (EK061G)								
V12 0-0.1m,	V13 0-0.1m	**13-Apr-2023**	**18-Apr-2023**	11-May-2023	✓	**20-Apr-2023**	16-May-2023	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Soil Glass Jar - Unpreserved (EK067G)								
V12 0-0.1m,	V13 0-0.1m	**13-Apr-2023**	**18-Apr-2023**	11-May-2023	✓	**20-Apr-2023**	16-May-2023	✓

Matrix: **SOIL**

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								
Soil Glass Jar - Unpreserved (EP080)								
V1 3.0m,	V12 0-0.1m	**13-Apr-2023**	**18-Apr-2023**	27-Apr-2023	✓	**18-Apr-2023**	27-Apr-2023	✓
Soil Glass Jar - Unpreserved (EP080)								
V2 3.0m,	V3 3.5m,	**13-Apr-2023**	**18-Apr-2023**	27-Apr-2023	✓	**19-Apr-2023**	27-Apr-2023	✓
V4 3.5m,	V5 3.0m,							
V6 3.0m,	V7 3.5m,							
V8 3.5m,	V9 3.0m,							
V10 3.0m,	V11 1.0m,							
V13 0-0.1m,	V14 2.0m,							
Dup 2,	Trip Blank 3							
Soil Glass Jar - Unpreserved (EP071)								
V7 3.5m,	V8 3.5m,	**13-Apr-2023**	**19-Apr-2023**	27-Apr-2023	✓	**20-Apr-2023**	29-May-2023	✓
V9 3.0m,	V10 3.0m,							
V11 1.0m,	V12 0-0.1m,							
V13 0-0.1m,	V14 2.0m,							
Dup 2								
Soil Glass Jar - Unpreserved (EP071)								
V1 3.0m,	V2 3.0m,	**13-Apr-2023**	**19-Apr-2023**	27-Apr-2023	✓	**21-Apr-2023**	29-May-2023	✓
V3 3.5m,	V4 3.5m,							
V5 3.0m,	V6 3.0m							
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Soil Glass Jar - Unpreserved (EP080)								
V1 3.0m,	V12 0-0.1m	**13-Apr-2023**	**18-Apr-2023**	27-Apr-2023	✓	**18-Apr-2023**	27-Apr-2023	✓
Soil Glass Jar - Unpreserved (EP080)								
V2 3.0m,	V3 3.5m,	**13-Apr-2023**	**18-Apr-2023**	27-Apr-2023	✓	**19-Apr-2023**	27-Apr-2023	✓
V4 3.5m,	V5 3.0m,							
V6 3.0m,	V7 3.5m,							
V8 3.5m,	V9 3.0m,							
V10 3.0m,	V11 1.0m,							
V13 0-0.1m,	V14 2.0m,							
Dup 2,	Trip Blank 3							
Soil Glass Jar - Unpreserved (EP071)								
V7 3.5m,	V8 3.5m,	**13-Apr-2023**	**19-Apr-2023**	27-Apr-2023	✓	**20-Apr-2023**	29-May-2023	✓
V9 3.0m,	V10 3.0m,							
V11 1.0m,	V12 0-0.1m,							
V13 0-0.1m,	V14 2.0m,							
Dup 2								
Soil Glass Jar - Unpreserved (EP071)								
V1 3.0m,	V2 3.0m,	**13-Apr-2023**	**19-Apr-2023**	27-Apr-2023	✓	**21-Apr-2023**	29-May-2023	✓
V3 3.5m,	V4 3.5m,							
V5 3.0m,	V6 3.0m							

Matrix: **SOIL**

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							
Soil Glass Jar - Unpreserved (EP080)							
V1 3.0m, V12 0-0.1m	**13-Apr-2023**	**18-Apr-2023**	27-Apr-2023	✓	**18-Apr-2023**	27-Apr-2023	✓
Soil Glass Jar - Unpreserved (EP080)							
V2 3.0m, V3 3.5m, V4 3.5m, V5 3.0m, V6 3.0m, V7 3.5m, V8 3.5m, V9 3.0m, V10 3.0m, V11 1.0m, V13 0-0.1m, V14 2.0m, Dup 2, Trip Blank 3	**13-Apr-2023**	**18-Apr-2023**	27-Apr-2023	✓	**19-Apr-2023**	27-Apr-2023	✓

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
EG020T: Total Metals by ICP-MS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG020A-T)							
Rinsate 2	**13-Apr-2023**	**19-Apr-2023**	10-Oct-2023	✓	**19-Apr-2023**	10-Oct-2023	✓

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: **SOIL**

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)							
Buchi Ammonia	EK055	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	27	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	27	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS	EG020T	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus By Discrete Analyser	EK067G	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Buchi Ammonia	EK055	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS	EG020T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus By Discrete Analyser	EK067G	2	4	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Buchi Ammonia	EK055	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **SOIL**

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							
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS	EG020T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus By Discrete Analyser	EK067G	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Buchi Ammonia	EK055	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS	EG020T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	0	15	**0.00**	**5.00**	✗	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus By Discrete Analyser	EK067G	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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)							
Total Metals by ICP-MS - Suite A	EG020A-T	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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 (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM Schedule B(3).
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to Rayment and Lyons 3A1 and APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM Schedule B(3).
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS	EG020T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020. Metals in solids are determined following an appropriate acid digestion. The ICPMS technique ionizes selected elements. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass / charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite X	EG020X-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. 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.
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. 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 Schedule B(3)
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	SOIL	In house: Referenced to USEPA SW846, Method 3060. Hexavalent chromium is extracted by alkaline digestion. The digest is determined by photometrically by automatic discrete analyser, following pH adjustment. The instrument uses colour development using dephenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM Schedule B(3)
Buchi Ammonia	EK055	SOIL	In house: Referenced to APHA 4500-NH3 B&G, H Samples are steam distilled (Buchi) prior to analysis and quantified using titration, FIA or Discrete Analyser.
Nitrite as N - Soluble by Discrete Analyser	EK057G	SOIL	In house: Referenced to APHA 4500-NO3- B. Nitrite in a water extract is determined by direct colourimetry by Discrete Analyser.
Nitrate as N - Soluble by Discrete Analyser	EK058G	SOIL	In house: Referenced to APHA 4500-NO3- F. Nitrate in the 1:5 soil:water extract 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.

Analytical Methods	Method	Matrix	Method Descriptions
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	SOIL	In house: Thermo Scientific Method D08727 and NEMI (National Environmental Method Index) Method ID: 9171. This method covers the determination of total oxidised nitrogen (NOx-N) and nitrate (NO3-N) by calculation, Combined oxidised Nitrogen (NO2+NO3) in a water extract is determined by direct colourimetry by Discrete Analyser.
TKN as N By Discrete Analyser	EK061G	SOIL	In house: Referenced to APHA 4500-Norg-D Soil samples are digested using Kjeldahl digestion followed by determination by Discrete Analyser.
Total Nitrogen as N (TKN + NOx) By Discrete Analyser	EK062G	SOIL	In house: Referenced to APHA 4500 Norg/NO3- Total Nitrogen is determined as the sum of TKN and Oxidised Nitrrogen, each determined seperately as N.
Total Phosphorus By Discrete Analyser	EK067G	SOIL	In house: Referenced to APHA 4500 P-B&F This procedure involves sulfuric acid digestion and quantification using Discrete Analyser.
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. 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.

Preparation Methods	Method	Matrix	Method Descriptions
Alkaline digestion for Hexavalent Chromium	EG048PR	SOIL	In house: Referenced to USEPA SW846, Method 3060A.
TKN/TP Digestion	EK061/EK067	SOIL	In house: Referenced to APHA 4500 Norg- D; APHA 4500 P - H. Macro Kjeldahl digestion.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to 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.
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

PERTH 26 Rigali Way Wangara WA 6065
Ph: 08 9406 1301 E: samples.perth@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

URGENT

CLIENT: Gemec Environmental Consultants	TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	☐ Standard TAT (List due date):
OFFICE: 1/25 Foss St, Palmyra, WA 6157		☒ Non Standard or urgent TAT (List due date): 19.04.2023 (72 hr) 1 days
PROJECT: Cervantes-01 Validation	ALS QUOTE NO.: EP/978/21_V7	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7
ORDER NUMBER: -		OF: 1 2 3 4 5 6 7
PROJECT MANAGER: Nicolo Jelovsek	CONTACT PH: 08 9339 8449	
SAMPLER: Nicolo Jelovsek	SAMPLER MOBILE: 0439093980	
COC emailed to ALS? (YES / ~~NO~~)	EDD FORMAT (or default):	
Email Reports to: nicolo@gemec.com.au, ben@gemec.com.au		
Email Invoice to: marise@gemec.com.au		

FOR LABORATORY USE ONLY (Circle)			
Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:		°C	
Other comment:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Dan Baldwin			
DATE/TIME: 14.04.2023 / 08:00	DATE/TIME:	DATE/TIME:	DATE/TIME: 14/4, 9:40

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: **Please send split sample to ALS Melbourne; jars labelled C1.**

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)				CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).														Additional Information
LAB ID	SAMPLE ID	DATE	TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	S-04: TRH / BTEXN	EP068A: Organochlorine Pesticides	P-19/2: Al, As, B, Ba, Be, Cd, Co, CrVI, Cu, Hg, Mn, Mo, Ni, Pb, Se, V, Zn + pH	EG005T: Cr, Fe, Sr, Ti	EG020T: Li, U	EN34: 1:5 leach	EA010: Electrical conductivity (1:5)	S-18: TRH (C6-C10) / BTEXN		NT8S: NH3, NO2, NO3, NOX, TKN, TN, TP	W-4: TRH / BTEXN	W-01T: 7 Metals (total): As, Cd, Cr, Cu, Ni, Pb, Zn	EG020T: Ba, Mn	P-22: NEPM Screen for Soil Classification: Fe, CEC, pH(CaCl2), TOC, Clay Content	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
(1)	Split 2	13.04.23	-	S	1 x glass unpreserved	1	1		1	1	1											
					TOTAL	1	1		1	1	1											

Environmental Division
Melbourne
Work Order Reference
EM2306716

Telephone : +61-3-8549 9600

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EM2306716**

Client	: **GEMEC**	Laboratory	: Environmental Division Melbourne
Contact	: MR NICOLO JELOVSEK	Contact	: Customer Services EM
Address	: UNIT 1/25 FOSS STREET PALMYRA WA, AUSTRALIA	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: nicolo@gemec.com.au	E-mail	: ALSEnviro.Melbourne@alsglobal.com
Telephone	: 9339 8449	Telephone	: +61-3-8549 9600
Facsimile	: ----	Facsimile	: +61-3-8549 9626
Project	: Cervantes-01 Validation	Page	: 1 of 2
Order number	: ----	Quote number	: EP2021GEMEC0009_V7 (EP/978/21_V7)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Nicolo Jelovsek		

Dates

Date Samples Received	: 18-Apr-2023 09:40	Issue Date	: 19-Apr-2023
Client Requested Due Date	: 21-Apr-2023	Scheduled Reporting Date	: **19-Apr-2023**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 10.4°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale and ALS Sydney.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - EG005T (solids) Total Metals by ICP-AES	SOIL - EG020T Total Metals by ICPMS	SOIL - P-19/2 WA Waste Classification (Metals Suite)	SOIL - S-04 TRH/BTEXN
EM2306716-001	13-Apr-2023 00:00	Split 2	✓	✓	✓	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ACCOUNTS PAYABLE (WA)

- A4 - AU Tax Invoice (INV)	Email	marise@gemec.com.au

Ben

- *AU Certificate of Analysis - NATA (COA)	Email	ben@gemec.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ben@gemec.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ben@gemec.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ben@gemec.com.au
- AU Certificate of Analysis - NATA (With Guidelines) (COA_GL)	Email	ben@gemec.com.au
- Chain of Custody (CoC) (COC)	Email	ben@gemec.com.au
- EDI Format - ESDAT (ESDAT)	Email	ben@gemec.com.au
- EDI Format - XTab (XTAB)	Email	ben@gemec.com.au

NICOLO JELOVSEK

- *AU Certificate of Analysis - NATA (COA)	Email	nicolo@gemec.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	nicolo@gemec.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	nicolo@gemec.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	nicolo@gemec.com.au
- AU Certificate of Analysis - NATA (With Guidelines) (COA_GL)	Email	nicolo@gemec.com.au
- Chain of Custody (CoC) (COC)	Email	nicolo@gemec.com.au
- EDI Format - ESDAT (ESDAT)	Email	nicolo@gemec.com.au
- EDI Format - XTab (XTAB)	Email	nicolo@gemec.com.au

CERTIFICATE OF ANALYSIS

Work Order	: **EM2306716**	Page	: 1 of 5
Client	: **GEMEC**	Laboratory	: Environmental Division Melbourne
Contact	: MR NICOLO JELOVSEK	Contact	: Customer Services EM
Address	: UNIT 1/25 FOSS STREET PALMYRA WA, AUSTRALIA	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: 9339 8449	Telephone	: +61-3-8549 9600
Project	: Cervantes-01 Validation	Date Samples Received	: 18-Apr-2023 09:40
Order number	: ----	Date Analysis Commenced	: 18-Apr-2023
C-O-C number	: ----	Issue Date	: 21-Apr-2023 13:05
Sampler	: Nicolo Jelovsek		
Site	: ----		
Quote number	: EP/978/21_V7		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 Contract 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
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EG005-T : EM2306691 #1 Poor duplicate precision for total Manganese due to sample matrix. Confirmed by re-digestion and re-analysis.
- EG005-T : EM2306716 #1 total metals required dilution prior analysis due to sample matrix. LORs have been adjusted accordingly.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	Split 2	----	----	----	----
			Sampling date / time	13-Apr-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2306716-001	--------	--------	--------	--------
				Result	----	----	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**9.2**	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**11.7**	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	**170**	----	----	----	----
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	----
Barium	7440-39-3	10	mg/kg	<10	----	----	----	----
Beryllium	7440-41-7	1	mg/kg	<1	----	----	----	----
Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**10**	----	----	----	----
Cobalt	7440-48-4	2	mg/kg	<2	----	----	----	----
Copper	7440-50-8	5	mg/kg	<6	----	----	----	----
Iron	7439-89-6	50	mg/kg	**260**	----	----	----	----
Manganese	7439-96-5	5	mg/kg	**10**	----	----	----	----
Molybdenum	7439-98-7	2	mg/kg	<2	----	----	----	----
Nickel	7440-02-0	2	mg/kg	<6	----	----	----	----
Silver	7440-22-4	2	mg/kg	<2	----	----	----	----
Strontium	7440-24-6	2	mg/kg	**1620**	----	----	----	----
Vanadium	7440-62-2	5	mg/kg	<5	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**14**	----	----	----	----
Titanium	7440-32-6	10	mg/kg	<10	----	----	----	----
EG020T: Total Metals by ICP-MS								
Selenium	7782-49-2	1	mg/kg	<1	----	----	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	----	----	----	----
Lead	7439-92-1	0.1	mg/kg	**0.5**	----	----	----	----
Uranium	7440-61-1	0.1	mg/kg	**1.1**	----	----	----	----
Lithium	7439-93-2	0.1	mg/kg	**1.6**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg	<50	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	Split 2	----	----	----	----
				Sampling date / time	13-Apr-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EM2306716-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	----	----	----	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**78.9**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**78.3**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		**83.5**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	56	124

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2306716**	Page	: 1 of 6
Client	: **GEMEC**	Laboratory	: Environmental Division Melbourne
Contact	: MR NICOLO JELOVSEK	Telephone	: +61-3-8549 9600
Project	: Cervantes-01 Validation	Date Samples Received	: 18-Apr-2023
Site	: ----	Issue Date	: 21-Apr-2023
Sampler	: Nicolo Jelovsek	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Matrix Spikes (MS)					
Hexavalent Chromium by Alkaline Digestion and DA Finish	0	1	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing 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: **SOIL**

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*
EA002: pH 1:5 (Soils)							
Soil Glass Jar - Unpreserved (EA002)							
Split 2	**13-Apr-2023**	**18-Apr-2023**	20-Apr-2023	✓	**18-Apr-2023**	19-Apr-2023	✓
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
Split 2	**13-Apr-2023**	**----**	----	----	**18-Apr-2023**	27-Apr-2023	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
Split 2	**13-Apr-2023**	**18-Apr-2023**	10-Oct-2023	✓	**19-Apr-2023**	10-Oct-2023	✓
EG020T: Total Metals by ICP-MS							
Soil Glass Jar - Unpreserved (EG020X-T)							
Split 2	**13-Apr-2023**	**18-Apr-2023**	10-Oct-2023	✓	**19-Apr-2023**	10-Oct-2023	✓
Soil Glass Jar - Unpreserved (EG020Y-T)							
Split 2	**13-Apr-2023**	**19-Apr-2023**	10-Oct-2023	✓	**19-Apr-2023**	10-Oct-2023	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
Split 2	**13-Apr-2023**	**18-Apr-2023**	11-May-2023	✓	**19-Apr-2023**	11-May-2023	✓
EG048: Hexavalent Chromium (Alkaline Digest)							
Soil Glass Jar - Unpreserved (EG048G)							
Split 2	**13-Apr-2023**	**18-Apr-2023**	11-May-2023	✓	**19-Apr-2023**	25-Apr-2023	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
Split 2	**13-Apr-2023**	**18-Apr-2023**	27-Apr-2023	✓	**19-Apr-2023**	27-Apr-2023	✓

Matrix: **SOIL**

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 Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080) Split 2	**13-Apr-2023**	**18-Apr-2023**	27-Apr-2023	✓	**19-Apr-2023**	27-Apr-2023	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) Split 2	**13-Apr-2023**	**18-Apr-2023**	27-Apr-2023	✓	**19-Apr-2023**	27-Apr-2023	✓

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: **SOIL**

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)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	1	**200.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	1	**200.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	0	1	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	2	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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 (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM Schedule B(3).
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite X	EG020X-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. 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.
Total Metals by ICP-MS - Suite Y	EG020Y-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. 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.
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. 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 Schedule B(3)
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	SOIL	In house: Referenced to USEPA SW846, Method 3060. Hexavalent chromium is extracted by alkaline digestion. The digest is determined by photometrically by automatic discrete analyser, following pH adjustment. The instrument uses colour development using dephenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.

Preparation Methods	Method	Matrix	Method Descriptions
Alkaline digestion for Hexavalent Chromium	EG048PR	SOIL	In house: Referenced to USEPA SW846, Method 3060A.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to 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.

QUALITY CONTROL REPORT

Work Order	: **EM2306716**	Page	: 1 of 6
Client	: **GEMEC**	Laboratory	: Environmental Division Melbourne
Contact	: MR NICOLO JELOVSEK	Contact	: Customer Services EM
Address	: UNIT 1/25 FOSS STREET PALMYRA WA, AUSTRALIA	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: 9339 8449	Telephone	: +61-3-8549 9600
Project	: Cervantes-01 Validation	Date Samples Received	: 18-Apr-2023
Order number	: ----	Date Analysis Commenced	: 18-Apr-2023
C-O-C number	: ----	Issue Date	: 21-Apr-2023
Sampler	: Nicolo Jelovsek		
Site	: ----		
Quote number	: EP/978/21_V7		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4998150)									
EM2306716-001	Split 2	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	<10	<10	0.0	No Limit
		EG005T: Titanium	7440-32-6	10	mg/kg	<10	<10	0.0	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	10	13	25.7	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	170	230	27.4	No Limit
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	260	300	14.5	No Limit
EA002: pH 1:5 (Soils) (QC Lot: 4998126)									
EM2306716-001	Split 2	EA002: pH Value	----	0.1	pH Unit	9.2	9.4	1.4	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4998142)									
EM2306716-001	Split 2	EA055: Moisture Content	----	0.1	%	11.7	11.5	1.7	0% - 50%
EG020T: Total Metals by ICP-MS (QC Lot: 4998152)									
EM2306716-001	Split 2	EG020X-T: Lead	7439-92-1	0.1	mg/kg	0.5	0.5	0.0	No Limit
		EG020X-T: Uranium	7440-61-1	0.1	mg/kg	1.1	1.1	0.0	0% - 50%
		EG020X-T: Lithium	7439-93-2	0.1	mg/kg	1.6	1.7	9.8	0% - 50%
EG020T: Total Metals by ICP-MS (QC Lot: 5000746)									
EM2306716-001	Split 2	EG020Y-T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	0.1	0.0	No Limit
		EG020Y-T: Selenium	7782-49-2	1	mg/kg	<1	<1	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4998151)									
EM2306716-001	Split 2	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG048: Hexavalent Chromium (Alkaline Digest) (QC Lot: 4998127)									
EM2306716-001	Split 2	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4998082)									
EM2306713-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4998086)									
EM2306713-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4998082)									
EM2306713-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4998086)									
EM2306713-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 4998082)									
EM2306713-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (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 Sample (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: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4998150)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	15910 mg/kg	91.1	70.0	130
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	123 mg/kg	90.9	70.0	130
EG005T: Barium	7440-39-3	10	mg/kg	<10	99.3 mg/kg	78.8	70.0	130
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	0.67 mg/kg	90.4	70.0	130
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
EG005T: Chromium	7440-47-3	2	mg/kg	<2	20.2 mg/kg	87.8	70.0	130
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	11.2 mg/kg	86.5	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	55.9 mg/kg	88.2	70.0	130
EG005T: Iron	7439-89-6	50	mg/kg	<50	33227 mg/kg	91.4	70.0	130
EG005T: Manganese	7439-96-5	5	mg/kg	<5	590 mg/kg	85.2	70.0	130
EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	2.19 mg/kg	72.7	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.4 mg/kg	89.3	70.0	130
EG005T: Silver	7440-22-4	2	mg/kg	<2	2.9 mg/kg	71.7	70.0	130
EG005T: Strontium	7440-24-6	2	mg/kg	<2	67.2 mg/kg	91.4	70.0	130
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	61.3 mg/kg	84.0	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	162 mg/kg	72.1	70.0	130
EG005T: Titanium	7440-32-6	10	mg/kg	<10	958 mg/kg	81.3	70.0	130
EA002: pH 1:5 (Soils) (QCLot: 4998126)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	99.8	98.8	101
				----	7 pH Unit	99.7	99.3	101
EG020T: Total Metals by ICP-MS (QCLot: 4998152)								
EG020X-T: Lead	7439-92-1	0.1	mg/kg	<0.1	72.1 mg/kg	93.0	80.0	120
EG020X-T: Uranium	7440-61-1	0.1	mg/kg	<0.1	0.58 mg/kg	101	80.0	120
EG020X-T: Lithium	7439-93-2	0.1	mg/kg	<0.1	14.83 mg/kg	77.0	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 5000746)								
EG020Y-T: Selenium	7782-49-2	1	mg/kg	<1	----	----	----	----
EG020Y-T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	1.23 mg/kg	76.2	50.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4998151)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.64 mg/kg	86.7	70.0	130
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 4998127)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 4998127) - continued								
EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	20 mg/kg	93.9	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4998082)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	88.7	58.6	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4998086)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	770 mg/kg	118	75.0	128
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	2860 mg/kg	105	82.0	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1540 mg/kg	105	82.4	121
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4998082)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	94.1	59.3	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4998086)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1170 mg/kg	110	77.0	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	3830 mg/kg	102	81.5	120
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	290 mg/kg	119	73.3	137
EP080: BTEXN (QCLot: 4998082)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	88.0	61.6	117
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	93.0	65.8	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	95.4	65.8	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	97.8	64.8	134
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	96.1	68.7	132
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	87.1	61.8	123

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: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4998150)							
EM2306716-001	Split 2	EG005T: Chromium	7440-47-3	50 mg/kg	99.7	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	99.4	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	98.0	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	96.2	80.0	120
EM2306716-001	Split 2	EG005T: Arsenic	7440-38-2	50 mg/kg	82.2	78.0	124
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4998151)							

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4998151) - continued							
EM2306716-001	Split 2	EG035T: Mercury	7439-97-6	0.5 mg/kg	92.8	76.0	116
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4998082)							
EM2306716-001	Split 2	EP080: C6 - C9 Fraction	----	28 mg/kg	68.6	33.4	124
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4998086)							
EM2306716-001	Split 2	EP071: C10 - C14 Fraction	----	770 mg/kg	114	71.2	125
		EP071: C15 - C28 Fraction	----	2860 mg/kg	102	75.6	122
		EP071: C29 - C36 Fraction	----	1540 mg/kg	101	78.0	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4998082)							
EM2306716-001	Split 2	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	65.6	30.8	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4998086)							
EM2306716-001	Split 2	EP071: >C10 - C16 Fraction	----	1170 mg/kg	106	72.2	128
		EP071: >C16 - C34 Fraction	----	3830 mg/kg	98.6	76.5	119
		EP071: >C34 - C40 Fraction	----	290 mg/kg	114	66.8	138
EP080: BTEXN (QCLot: 4998082)							
EM2306716-001	Split 2	EP080: Benzene	71-43-2	2 mg/kg	77.5	54.4	127
		EP080: Toluene	108-88-3	2 mg/kg	88.0	57.1	131

Groundwater, 13 April 2023

CHAIN OF CUSTODY - Client

Client: Gemec
Project Mgr: Nicolo Jelovsek
Sampler: Nicolo Jelovsek
Address: 1/25 Foss St Palmyra 6157
Email: nicolo@gemec.com.au, ben@gemec.com.au
Phone: 08 9339 8449 / 0439 093 980

GEMEC ENVIRONMENTAL CONSULTANTS

Client Project Name and Number: PBE - Cervantes 01
Location: Lot 12174 plan 39607 Mt Adams, WA
MPL Quote No: 20P329
Date results required:
Or choose: standard ~~/ 1 day / 2 day / 3 day~~
Note: Inform lab in advance if urgent turnaround is required - surcharge applies

MPL Laboratories
Address: 16-18 Hayden Crt
Myaree 6154
Phone: 08 9317 2505
Fax: 08 9317 4163
E-mail: lab@mpl.com.au

Sample information

MPL Sample ID	Client Sample ID	Depth (m)	Date sampled	Time	Type of sample
1	MW1	-	13.04.23	13:16	Water
2	Dup	-	13.04.23	-	Water
3	Trip Blank	-	13.04.23	12:00	Water
4	Rinsate	-	13.04.23	13:30	Water

Analyses Required

Gemec Suite 1 (MBTEXN, TRH, dissolved metals)	Gemec Suite 2 (MBTEXN, TRH, dissolved metals, CrVI-LL)	Ionic Balance	Extended Nutrient Suite	pH	EC	TDS (grav.)	MBTEXN & TRH	VTRH (C6-C9) + BTEX	8 metals: As B Ba Fe Li Mn Sr Zn (total) - excl. CrVI	Methane & Ethane	Dissolved metals (as per Gemec Suite 1)
	X	X	X	X	X	X				X	
X											
								X			
									X		

Comments

Email CoC with report also please
Sample containers labelled C1
Gemec Suite 2 dissolved metals: Al As B Ba Be Cd Cr CrVI (LL) Co Cu Fe Hg Li Mn Mo Ni Pb Se Sr Ti U V Zn
Gemec Suite 1 dissolved metals: Al As B Ba Be Cd Cr Co Cu Fe Hg Li Mn Mo Ni Pb Se Sr Ti U V Zn
Extended Nutrient Suite: Total N, NH3, NO3, NO2, TKN (calc.), Total P, PO4

mpl Laboratories ENVIROLAB
Job No.- PE50782
Date Rec - 14 APR 2023
Time Rec - 9:45
Rec By - GM
TAT Req - SAME 1 / 2 / 3 / ~~STD~~
Temp - cool / ambient
Cooling - Ice / Ice pack / None
Security Seal - Yes / No

Relinquished by (company): Gemec
Print Name: Dan Baldwin
Date & Time: 14.04.2023, 09:00
Signature:

Received by (company): MPL
Print Name: GM
Date & Time: 14 APR 2023 . 9:45
Signature:

Laboratory Use Only:
Samples Received: Cool / ambient
Temperature Received at: 10 (if applicable)
Transported by: Hand delivered / courier

Envirolab Services (WA) Pty Ltd trading as MPL Laboratories
ABN 53 140 099 207
16-18 Hayden Court Myaree WA 6154
ph +61 8 9317 2505 fax +61 8 9317 4163
lab@mpl.com.au
www.mpl.com.au

Sample Receipt Advice PED0782

Client Details

Client	Gemec
Attention	Nicolo Jelovsek

Sample Login Details

Your Reference	PBE - Cervantes 01 - Lot 12174 plan 39607 Mt Adams, WA
Envirolab Reference	PED0782
Date Sample Received	14/04/2023
Date Instructions Received	14/04/2023
Date Final Results Expected	21/04/2023

Sample Condition

Samples received in appropriate condition for analysis	See Comments
Number of Samples	4 Water
Turnaround Time	5 Days
Temperatures / Cooling Methods	10.0°C Ice Pack

Additional Info

Sample storage - waters are routinely disposed at approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Where no sampling date has been supplied for some or all samples, the date of sample receipt has been used as the associated sampling date. The sampling dates are used to assess compliance to recommended Technical Holding Times.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

Please direct any queries to:

Heram Halim

Phone	08 9317 2505
Fax	08 9317 4163
Email	hhalim@mpl.com.au

Meredith Conroy

Phone	08 9317 2505
Fax	08 9317 4163
Email	mconroy@mpl.com.au

Analysis underway, details on the following page

Sample Receipt Advice PED0782

Analysis Grid

The • indicates the testing you have requested. ***THIS IS NOT A REPORT OF THE RESULTS.***

	Ion Balance	Nutrient Suite	Suite 1 - Water	Suite 2 - Water	vTRH&MBTEXN	Ethane	Methane	Total Metals (LL)	Dissolved Metals (LL)	EC	pH	TDS
PED0782-01 Water | 13/04/2023 MW1	•	•		•		•	•		•	•	•	•
PED0782-02 Water | 13/04/2023 Dup			•						•			
PED0782-03 Water | 13/04/2023 Trip Blank					•							
PED0782-04 Water | 13/04/2023 Rinsate								•				

Suite Details

Suite Name	Suite Analyses
Ion Balance | Water	Alkalinity Suite, Cations - Dissolved, Chloride, Ion Balance, Sulfate
Nutrient Suite | Water	P - Total, Nitrogen - Ammonia, Nitrogen - Nitrate, Nitrogen - Nitrite, Nitrogen - NOx, Nitrogen - Total N, Organic Nitrogen, Phosphate as P, TKN as N calc
Suite 1 - Water | Water	vTRH&MBTEXN, sTRH, As - Dissolved (LL), Cd - Dissolved (LL), Cr - Dissolved (LL), Cu - Dissolved (LL), Hg - Dissolved, Ni - Dissolved (LL), Pb - Dissolved (LL), Zn - Dissolved (LL)
Suite 2 - Water | Water	vTRH&MBTEXN, sTRH, As - Dissolved (LL), Cd - Dissolved (LL), Cr - Dissolved (LL), Cu - Dissolved (LL), Hg - Dissolved, Ni - Dissolved (LL), Pb - Dissolved (LL), Zn - Dissolved (LL), Cr6+ (LL)

Envirolab Services (WA) Pty Ltd trading as MPL Laboratories
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16-18 Hayden Court Myaree WA 6154
ph +61 8 9317 2505 fax +61 8 9317 4163
lab@mpl.com.au
www.mpl.com.au

Certificate of Analysis PED0782

Client Details

Client	Gemec
Contact	Nicolo Jelovsek
Address	1/25 Foss St, PALMYRA, WA, 6157

Sample Details

Your Reference	PBE - Cervantes 01 - Lot 12174 plan 39607 Mt Adams, WA
Number of Samples	4 Water
Date Samples Received	14/04/2023
Date Samples Registered	14/04/2023

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.

Report Details

Date Results Requested by	21/04/2023
Date of Issue	21/04/2023

Accredited for compliance with ISO/IEC 17025. Tests not covered by NATA are denoted with *.

Authorisation Details

Results Approved By	Amanda Chui, Senior Chemist Lien Tang, Assistant Operations Manager Michael Hall, Inorganics & Metals Supervisor Michael Kubiak, Lab Manager Michael Mowle, Inorganics Supervisor Todd Lee, Group Operations Manager Travis Carey, Organics Supervisor
Laboratory Manager	Michael Kubiak

Certificate of Analysis PED0782

Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
PED0782-01	MW1	Water	13/04/2023	14/04/2023
PED0782-02	Dup	Water	13/04/2023	14/04/2023
PED0782-03	Trip Blank	Water	13/04/2023	14/04/2023
PED0782-04	Rinsate	Water	13/04/2023	14/04/2023

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	ADWG	PED0782-01	PED0782-02	PED0782-03
Your Reference			Health	MW1	Dup	Trip Blank
Date Sampled			Value	13/04/2023	13/04/2023	13/04/2023
TRH C6-C9	µg/L	10		<10	<10	<10
TRH C6-C10	µg/L	10		<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10		<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0		<1.0	<1.0	<1.0
Benzene	µg/L	1.0		<1.0	<1.0	<1.0
Toluene	µg/L	1.0		<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0		<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0		<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0		<1.0	<1.0	<1.0
Total Xylene	µg/L	3.0	600	<3.0	<3.0	<3.0
Naphthalene (value used in F2 calc)	µg/L	1.0		<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%			98.2	97.0	96.8
Surrogate Toluene-D8	%			98.6	98.6	99.9
Surrogate 4-Bromofluorobenzene	%			105	108	102

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	PED0782-01	PED0782-02
Your Reference			MW1	Dup
Date Sampled			13/04/2023	13/04/2023
TRH C10-C14	µg/L	50	<50	<50
TRH C15-C28	µg/L	100	<100	<100
TRH C29-C36	µg/L	100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50
Surrogate o-Terphenyl	%		88.6	105

Dissolved gases (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	PED0782-01
Your Reference			MW1
Date Sampled			13/04/2023
Methane	µg/L	5.0	<5.0
Ethane	µg/L	5.0	<5.0

Acid Extractable Metals (Water)

Envirolab ID	Units	PQL	PED0782-01
Your Reference			MW1
Date Sampled			13/04/2023
Phosphorus	mg/L	0.050	<0.050

Acid Extractable Low Level Metals (Water)

Envirolab ID	Units	PQL	ADWG	PED0782-04
Your Reference			Health	Rinsate
Date Sampled			Value	13/04/2023
Arsenic	µg/L	1.0	10	<1.0
Boron	µg/L	20	4000	<20
Barium	µg/L	1.0	2000	<1.0
Iron	µg/L	10		<10
Lithium	µg/L	1.0		<1.0
Manganese	µg/L	1.0	500	1.3
Strontium	µg/L	1.0		<1.0
Zinc	µg/L	1.0		3.3

Dissolved Low Level Metals (Water)

Envirolab ID	Units	PQL	ADWG	PED0782-01	PED0782-02
Your Reference			Health	MW1	Dup
Date Sampled			Value	13/04/2023	13/04/2023
Aluminium	µg/L	10		<10	<10
Arsenic	µg/L	1.0		<1.0	<1.0
Boron	µg/L	20	4000	330	310
Barium	µg/L	1.0	2000	57	61
Beryllium	µg/L	0.50		<0.50	<0.50
Cadmium	µg/L	0.10		<0.10	<0.10
Cobalt	µg/L	1.0		<1.0	<1.0
Chromium	µg/L	1.0		<1.0	<1.0
Copper	µg/L	1.0		<1.0	<1.0
Iron	µg/L	10		310	350
Mercury	µg/L	0.050		<0.050	<0.050
Lithium	µg/L	1.0		69	72
Manganese	µg/L	1.0		13	14
Molybdenum	µg/L	1.0		<1.0	<1.0
Nickel	µg/L	1.0		<1.0	<1.0
Lead	µg/L	1.0		<1.0	<1.0
Selenium	µg/L	1.0		<1.0	<1.0
Strontium	µg/L	1.0		7800	7700
Titanium	µg/L	1.0		<1.0	<1.0
Uranium	µg/L	1.0		<1.0	<1.0
Vanadium	µg/L	1.0		<1.0	<1.0
Zinc	µg/L	1.0		<1.0	3.3

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	ADWG	PED0782-01
Your Reference			Health	MW1
Date Sampled			Value	13/04/2023
pH	pH units		6.5-8.5	7.3
Electrical Conductivity	µS/cm	2.0		8200
Total Dissolved Solids	mg/L	5.0		5300

Inorganics - Ionic Balance and Indexes (Water)

Envirolab ID	Units	PQL	PED0782-01
Your Reference			MW1
Date Sampled			13/04/2023
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	460
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	460
Chloride	mg/L	1.0	2700
Sulfate	mg/L	1.0	270
Calcium	mg/L	0.50	130
Magnesium	mg/L	0.50	220
Potassium	mg/L	0.50	53
Sodium	mg/L	0.50	1400
Hardness as CaCO3	mg/L	3.0	1200
Ionic Balance	%		-2.4
Total Anions	mg/L	45	3500
Anions as meq	meq/L	1.5	90
Total Cations	mg/L	2.0	1800
Cations as meq	meq/L	0.10	87

Inorganics - Speciated Cr (III/VI) and Fe (II/III) (Water)

Envirolab ID	Units	PQL	ADWG	PED0782-01
Your Reference			Health	MW1
Date Sampled			Value	13/04/2023
Hexavalent Chromium	mg/L	0.0010	0.050	<0.0010

Inorganics - Nutrients (Water)

Envirolab ID	Units	PQL	ADWG	PED0782-01
Your Reference			Health	MW1
Date Sampled			Value	13/04/2023
Ammonia as N	mg/L	0.0050	0.50	0.067
Nitrate as N	mg/L	0.0050		<0.0050
Nitrate as NO3 by calculation	mg/L	0.020	50	<0.020
Nitrite as N	mg/L	0.0050		<0.0050
Nitrite as NO2 by calculation	mg/L	0.020	3.0	<0.020
NOx as N	mg/L	0.0050		<0.0050
TKN as N by calculation	mg/L	0.10		0.44
Organic Nitrogen by calc.	mg/L	0.10		0.38
Total Nitrogen	mg/L	0.10		0.44
Phosphate as P	mg/L	0.0050		0.017

Method Summary

Method ID	Methodology Summary
AT-006	Dissolved gases determined by GC-FID based on draft method USEPA SOP RSK175.
Calc	Calculation
Calc - TKN	TKN determined by calculation (Total Nitrogen - NOx).
INORG-001	pH - Measured using pH meter and electrode based on APHA latest edition, Method 4500-H+. Please note that the results for water analyses are indicative only, as analysis can be completed outside of the APHA recommended holding times. Solids are reported from a 1:5 water extract unless otherwise specified. Alternatively, pH is determined in a 1:5 extract using 0.01M calcium chloride or a solid is extracted at a ratio of 1:2.5 (AS1289.4.3.1), pH is measured in the extract.
INORG-002	Conductivity and Salinity - measured using a conductivity cell at 25°C based on APHA latest edition Method 2510. Soil results reported from a 1:5 Soil:Water extract unless otherwise specified. Please note Resistivity is estimated by calculation and may not correlate with results otherwise obtained using the Resistivity current method (based on AS 1289.4.4.1), depending on the nature of the soil being analysed.
INORG-006	Alkalinity - determined titrimetrically based on APHA latest edition 2320-B. Solids reported from a 1:5 water extract unless otherwise specified. Total Carbon Dioxide - determined by calculation in accordance with APHA latest edition,4500-CO2 D.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% i.e. total anions = total cations +/-15%.
INORG-055	Nitrate/Nitrite/NOx/TKN - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils/solids are analysed following a water extraction.
INORG-057	Ammonia - determined colourimetrically. Water samples are filtered on receipt prior to analysis. Soils and OHS media are analysed following a water extraction. Alternatively, Ammonia can be extracted from soil using 1M KCl.
INORG-060	Phosphate - determined colourimetrically using APHA latest edition 4500 P E. Water samples are filtered on receipt prior to analysis. Soils are analysed from a water extract.
INORG-081	Anions determined by Ion Chromatography. Waters samples are filtered on receipt prior to analysis. Solids are analysed from a water extract. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
INORG-118	Hexavalent Chromium by Ion Chromatographic separation and colourimetric determination. Waters samples are filtered prior to analysis. Solids are extracted with an alkaline buffered solution, for air sampling media the same alkali extraction can be used or alternatives from NIOSH/OSHA. For aqueous samples, Total Hexavalent Chromium includes the dissolved Hexavalent Chromium and any Hexavalent Chromium solubilised by the preservative i.e. Sodium Hydroxide from any particulate that may be present.
INORG-127	Total Nitrogen by high temperature catalytic combustion with chemiluminescence detection. Organic Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved forms require filtering prior to determination.
METALS-020	Determination of various metals by ICP-OES.
METALS-021	Determination of Mercury by Cold Vapour AAS.
METALS-022	Determination of various metals by ICP-MS.
ORG-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
ORG-023_F1_TOT	Determination of volatile organic compounds (VOCs) by P&T-GC-MS. Water samples are analysed directly by purge and trap GC-MS. Solids are extracted with Methanol, diluted and analysed by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

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.

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.

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.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

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.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. 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 typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

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.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volume measurements are not covered by Envirolab's NATA accreditation.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from the latest "Australian Drinking Water Guidelines", published by NHMRC. No guideline values have been set for Total Coliforms in drinking water. Increased concentrations should be investigated. Total Coliforms are not considered useful as indicators of the presence of faecal contamination.

Where we have provided guideline values eg. ADWG Health Value, it is the responsiblity of the reader to decide if the water is fit for consumption. Please note that the tests we have conducted are just a selection of common tests to give you a general idea of drinking water quality. There are many other tests included in the ADWG that we have not tested for.

Data Quality Assessment Summary PED0782

Client Details

Client	Gemec
Your Reference	PBE - Cervantes 01 - Lot 12174 plan 39607 Mt Adams, WA
Date Issued	21/04/2023

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	No	Duplicate Outliers Exist - See detailed list below
Matrix Spike	No	Matrix Spike Outliers Exist - See detailed list below
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary PED0782

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
vTRH&MBTEXN | Water	1-3	13/04/2023	17/04/2023	17/04/2023	Yes
sTRH | Water	1-2	13/04/2023	18/04/2023	20/04/2023	Yes
Ethane | Water	1	13/04/2023	21/04/2023	21/04/2023	Yes
Methane | Water	1	13/04/2023	21/04/2023	21/04/2023	Yes
Total Phosphorus | Water	1	13/04/2023	17/04/2023	18/04/2023	Yes
Total Metals (LL) | Water	4	13/04/2023	18/04/2023	20/04/2023	Yes
Dissolved Metals (LL) | Water	2	13/04/2023	18/04/2023	19/04/2023	Yes
	1	13/04/2023	18/04/2023	20/04/2023	Yes
Dissolved Metals (LL)-Hg | Water	1-2	13/04/2023	17/04/2023	18/04/2023	Yes
EC | Water	1	13/04/2023	17/04/2023	17/04/2023	Yes
pH | Water	1	13/04/2023	17/04/2023	17/04/2023	No
TDS | Water	1	13/04/2023	18/04/2023	18/04/2023	Yes
Alkalinity Suite | Water	1	13/04/2023	17/04/2023	17/04/2023	Yes
Chloride | Water	1	13/04/2023	17/04/2023	18/04/2023	Yes
Dissolved Cations | Water	1	13/04/2023	18/04/2023	19/04/2023	Yes
Ion Balance | Water	1	13/04/2023	18/04/2023	18/04/2023	Yes
Sulfate | Water	1	13/04/2023	17/04/2023	18/04/2023	Yes
Cr6+ (LL) | Water	1	13/04/2023	18/04/2023	18/04/2023	Yes
Nitrogen - Ammonia | Water	1	13/04/2023	18/04/2023	18/04/2023	Yes
Nitrogen - Nitrate | Water	1	13/04/2023	18/04/2023	18/04/2023	Yes
Nitrogen - Nitrite | Water	1	13/04/2023	18/04/2023	18/04/2023	No
Nitrogen - NOx | Water	1	13/04/2023	18/04/2023	18/04/2023	Yes
Nitrogen - Total N | Water	1	13/04/2023	17/04/2023	18/04/2023	Yes
Phosphate as P | Water	1	13/04/2023	18/04/2023	18/04/2023	No
TKN as N calc | Water	1	13/04/2023	18/04/2023	18/04/2023	Yes

Data Quality Assessment Summary PED0782

Outliers: Duplicates

METALS-022|Acid Extractable Low Level Metals (Water)| Batch BED1529

Sample ID	Duplicate ID	Analyte	% Limits	RPD
PED0782-04	DUP1	Manganese	30.00	200[4]

METALS-022|Dissolved Low Level Metals (Water)| Batch BED1445

Sample ID	Duplicate ID	Analyte	% Limits	RPD
BED1445-DUP2#	DUP2	Zinc	20.00	118[4]

ORG-020|Semi-volatile TRH (Water)| Batch BED1435

Sample ID	Duplicate ID	Analyte	% Limits	RPD
BED1435-DUP2#	DUP2	TRH C29-C36	50.00	200[4]

Outliers: Matrix Spike

METALS-020|Inorganics - Ionic Balance and Indexes (Water)| Batch BED1444

Sample ID	Analyte	% Limits	% Recovery
BED1444-MS1#	Sodium	70 - 130	##[3]

METALS-022|Acid Extractable Low Level Metals (Water)| Batch BED1529

Sample ID	Analyte	% Limits	% Recovery
BED1529-MS1#	Strontium	70 - 130	145[2]

METALS-022|Dissolved Low Level Metals (Water)| Batch BED1445

Sample ID	Analyte	% Limits	% Recovery
PED0782-02	Iron	70 - 130	##[2]
PED0782-02	Strontium	70 - 130	##[2]

Outliers: QC Frequency

ORG-023_F1_TOT|Volatile TRH and BTEX (Water)| Batch BED1406

Analysis	QC Type	Expected	Reported
vTRH&MBTEXN	Duplicate	2	1
	Matrix Spike	1	0

Quality Control PED0782

ORG-023_F1_TOT | Volatile TRH and BTEX (Water) | Batch BED1406

Analyte	Units	PQL	Blank	DUP1 PED0782-01 Samp | QC | RPD %	LCS %
TRH C6-C9	µg/L	10	<10	<10 | <10 | [NA]	94.5
TRH C6-C10	µg/L	10	<10	<10 | <10 | [NA]	94.2
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10 | <10 | [NA]	[NA]
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0		[NA]
Benzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	87.0
Toluene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	85.4
Ethylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	86.4
meta+para Xylene	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	84.8
ortho-Xylene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	86.0
Total Xylene	µg/L	3.0	<3.0	<3.0 | <3.0 | [NA]	[NA]
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	[NA]
Surrogate Dibromofluoromethane	*%*		*97.7*	*98.2 | 96.3*	*98.3*
Surrogate Toluene-D8	*%*		*99.1*	*98.6 | 97.1*	*101*
Surrogate 4-Bromofluorobenzene	*%*		*104*	*105 | 104*	*101*

ORG-020 | Semi-volatile TRH (Water) | Batch BED1435

Analyte	Units	PQL	Blank	DUP1 BED1435-DUP1# Samp | QC | RPD %	DUP2 BED1435-DUP2# Samp | QC | RPD %	LCS %	Spike % BED1435-MS1#
TRH C10-C14	µg/L	50	<50	<50 | <50 | [NA]	<50 | <50 | [NA]	97.8	94.8
TRH C15-C28	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	106	107
TRH C29-C36	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | 200 [4]	92.7	96.6
TRH >C10-C16	µg/L	50	<50	<50 | <50 | [NA]	<50 | <50 | [NA]	101	99.9
TRH >C16-C34 (F3)	µg/L	100	<100	105 | <100 | 7.67	<100 | <100 | [NA]	92.9	93.7
TRH >C34-C40 (F4)	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	111	111
Surrogate o-Terphenyl	*%*		*93.7*	*86.6 | 83.3*	*91.8 | 86.6*	*80.5*	*76.0*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

AT-006 | Dissolved gases (Water) | Batch BED2090

Analyte	Units	PQL	Blank	DUP1 BED2090-DUP1# Samp | QC | RPD %	DUP2 BED2090-DUP2# Samp | QC | RPD %	LCS %
Methane	µg/L	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	108
Ethane	µg/L	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	104

Analyte	Units	PQL	Blank	DUP3 PED0782-01 Samp | QC | RPD %	LCS %
Methane	µg/L	5		<5.0 | <5.0 | [NA]	[NA]
Ethane	µg/L	5		<5.0 | <5.0 | [NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020 | Acid Extractable Metals (Water) | Batch BED1368

Analyte	Units	PQL	Blank	DUP1 BED1368-DUP1# Samp | QC | RPD %	DUP2 BED1368-DUP2# Samp | QC | RPD %	LCS %	Spike % BED1368-MS1#
Phosphorus	mg/L	0.050	<0.050	0.122 | 0.119 | 2.04	<0.050 | <0.050 | [NA]	102	101

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PED0782

METALS-022|Acid Extractable Low Level Metals (Water) | Batch BED1529

Analyte	Units	PQL	Blank	DUP1 PED0782-04 Samp | QC | RPD %	DUP2 BED1529-DUP2# Samp | QC | RPD %	LCS %	Spike % BED1529-MS1#
Arsenic	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	101	101
Barium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	48.2 | 48.1 | 0.162	94.1	108
Boron	µg/L	20	<20	<20 | <20 | [NA]	591 | 585 | 1.03	109	119
Iron	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	113	90.5
Lithium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	1.72 | 1.70 | 1.23	108	117
Manganese	µg/L	1.0	<1.0	1.29 | <1.0 | 200 [4]	2.36 | 2.25 | 4.60	103	101
Strontium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	28.1 | 29.4 | 4.61	102	145[2]
Zinc	µg/L	1.0	<1.0	3.30 | 2.50 | 27.8	55.9 | 55.5 | 0.847	95.1	95.6

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-021|Dissolved Low Level Metals (Water) | Batch BED1365

Analyte	Units	PQL	Blank	DUP1 BED1365-DUP1# Samp | QC | RPD %	DUP2 BED1365-DUP2# Samp | QC | RPD %	LCS %	Spike % BED1365-MS1#
Mercury	µg/L	0.050	<0.050	<0.050 | <0.050 | [NA]	<0.050 | <0.050 | [NA]	97.2	98.8

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-022|Dissolved Low Level Metals (Water) | Batch BED1445

Analyte	Units	PQL	Blank	DUP1 PED0782-01 Samp | QC | RPD %	DUP2 BED1445-DUP2# Samp | QC | RPD %	LCS %	Spike % PED0782-02
Aluminium	µg/L	10	<10	<10 | <10 | [NA]	1750 | 1770 | 1.23	95.7	116
Arsenic	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	99.6	106
Barium	µg/L	1.0	<1.0	57.3 | 57.4 | 0.227	15.3 | 13.3 | 13.6	104	99.4
Beryllium	µg/L	0.50	<0.50	<0.50 | <0.50 | [NA]	<0.50 | <0.50 | [NA]	101	122
Boron	µg/L	20	<20	327 | 314 | 4.04	33.4 | 31.5 | 5.85	98.0	93.8
Cadmium	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	100	104
Chromium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	2.14 | 2.16 | 0.932	102	102
Cobalt	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	99.6	96.0
Copper	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	101	92.9
Iron	µg/L	10	<10	314 | 309 | 1.52	403 | 411 | 1.85	111	##[2]
Lead	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	97.4	90.5
Lithium	µg/L	1.0	<1.0	68.6 | 68.1 | 0.717	1.66 | 1.60 | 3.67	101	106
Manganese	µg/L	1.0	<1.0	12.8 | 12.9 | 1.13	<1.0 | <1.0 | [NA]	101	100
Molybdenum	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	102	113
Nickel	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	100	93.9
Selenium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	98.7	99.4
Strontium	µg/L	1.0	<1.0	7850 | 7740 | 1.35	21.2 | 21.4 | 0.634	102	##[2]
Titanium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	8.14 | 9.10 | 11.1	100	114
Uranium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	101	98.8
Vanadium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	2.30 | 2.34 | 1.72	100	107
Zinc	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	4.34 | 1.12 | 118 [4]	94.7	87.8

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-001|Inorganics - Physical Parameters (Water) | Batch BED1382

Analyte	Units	PQL	Blank	DUP1 BED1382-DUP1# Samp | QC | RPD %	DUP2 BED1382-DUP2# Samp | QC | RPD %	LCS %
pH	pH units		5.6	6.8 | 6.8 | 0.00	6.4 | 6.3 | 1.74	102
Electrical Conductivity	µS/cm	2.0	<2.0	721 | 723 | 0.346	350 | 341 | 2.60	92.2

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PED0782

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BED1482

Analyte	Units	PQL	Blank	DUP1 BED1482-DUP1# Samp | QC | RPD %	DUP2 BED1482-DUP2# Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	77000 | 76400 | 0.774	39800 | 38800 | 2.65	99.0

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-081 | Inorganics - Ionic Balance and Indexes (Water) | Batch BED1369

Analyte	Units	PQL	Blank	DUP1 BED1369-DUP1# Samp | QC | RPD %	DUP2 BED1369-DUP2# Samp | QC | RPD %	LCS %	Spike % BED1369-MS1#
Chloride	mg/L	1.0	<1.0	212 | 211 | 0.238	566 | 567 | 0.159	97.9	85.3
Sulfate	mg/L	1.0	<1.0	15.7 | 15.5 | 1.13	36.2 | 36.3 | 0.205	94.0	116

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-006 | Inorganics - Ionic Balance and Indexes (Water) | Batch BED1382

Analyte	Units	PQL	Blank	DUP1 BED1382-DUP1# Samp | QC | RPD %	DUP2 BED1382-DUP2# Samp | QC | RPD %	LCS %
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	133 | 134 | 0.961	40.6 | 39.1 | 3.66	[NA]
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	133 | 134 | 0.964	40.6 | 39.1 | 3.65	98.7

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020 | Inorganics - Ionic Balance and Indexes (Water) | Batch BED1444

Analyte	Units	PQL	Blank	DUP1 BED1444-DUP1# Samp | QC | RPD %	DUP2 BED1444-DUP2# Samp | QC | RPD %	LCS %	Spike % BED1444-MS1#
Calcium	mg/L	0.50	<0.50	16.1 | 15.6 | 3.11	397 | 398 | 0.0943	99.7	98.7
Magnesium	mg/L	0.50	<0.50	20.0 | 20.0 | 0.170	1320 | 1320 | 0.651	101	96.1
Potassium	mg/L	0.50	<0.50	6.09 | 6.08 | 0.0345	372 | 379 | 1.74	99.3	101
Sodium	mg/L	0.50	<0.50	103 | 104 | 0.902	11800 | 11800 | 0.255	101	##[3]
Hardness as CaCO3	mg/L	3.0	<3.0	123 | 121 | 1.12	6410 | 6450 | 0.565	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-118 | Inorganics - Speciated Cr (III/VI) and Fe (II/III) (Water) | Batch BED1504

Analyte	Units	PQL	Blank	DUP1 PED0782-01 Samp | QC | RPD %	LCS %	Spike % PED0782-01
Hexavalent Chromium	mg/L	0.0010	<0.0010	<0.0010 | <0.0010 | [NA]	92.0	108

INORG-127 | Inorganics - Nutrients (Water) | Batch BED1354

Analyte	Units	PQL	Blank	DUP1 BED1354-DUP1# Samp | QC | RPD %	DUP2 BED1354-DUP2# Samp | QC | RPD %	LCS %	Spike % BED1354-MS1#
Total Nitrogen	mg/L	0.10	<0.10	0.484 | 0.469 | 3.14	6.06 | 6.08 | 0.404	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PED0782

INORG-057 | Inorganics - Nutrients (Water) | Batch BED1554

Analyte	Units	PQL	Blank	DUP1 BED1554-DUP1# Samp | QC | RPD %	DUP2 BED1554-DUP2# Samp | QC | RPD %	LCS %	Spike % BED1554-MS1#
Ammonia as N	mg/L	0.0050	<0.0050	0.928 | 0.889 | 4.34	0.503 | 0.505 | 0.456 [1]	103	78.6
Nitrate as N	mg/L	0.0050	<0.0050	0.0876 | 0.0926 | 5.54	20.0 | 20.1 | 0.369 [1]	104	101
Nitrate as NO3 by calculation	mg/L	0.020	<0.020			[NA]	[NA]
Nitrite as N	mg/L	0.0050	<0.0050	0.0450 | 0.0447 | 0.647	0.189 | 0.189 | 0.212 [1]	113	118
Nitrite as NO2 by calculation	mg/L	0.020	<0.020			[NA]	[NA]
NOx as N	mg/L	0.0050	<0.0050	0.133 | 0.137 | 3.48	20.2 | 20.3 | 0.368 [1]	104	100
Phosphate as P	mg/L	0.0050	<0.0050	0.0837 | 0.0839 | 0.221	0.420 | 0.422 | 0.451 [1]	115	113

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

QC Comments

Identifier	Description
[1]	Matrix interference - sample was highly coloured.
[2]	Spike recovery is not applicable due to the relatively high analyte background in the sample (>3* spike level). However, the LCS recovery is within acceptance criteria.
[3]	Spike recovery is outside routine acceptance criteria (70-130%), this may be due to suspected non-homogeneity and/or matrix interference effects. However, an acceptable recovery was achieved for the LCS.
[4]	Duplicate %RPD may be flagged as an outlier to routine laboratory acceptance, however, where one or both results are <10*PQL, the RPD acceptance criteria increases exponentially.

CHAIN OF CUSTODY - Client

Client: Gemec
Project Mgr: Nicolo Jelovsek
Sampler: Nicolo Jelovsek
Address: 1/25 Foss St Palmyra 6157
Email: nicolo@gemec.com.au, ben@gemec.com.au
Phone: 08 9339 8449 / 0439 093 980

Gemec ENVIRONMENTAL CONSULTANTS

Client Project Name and Number: PBE - Cervantes 01
Location: Lot 12174 plan 39607 Mt Adams, WA
MPL Quote No: 20P329
Date results required:
Or choose: standard ~~/ 1 day / 2 day / 3 day~~
Note: Inform lab in advance if urgent turnaround is required - surcharge applies

MPL Laboratories
Address: 16-18 Hayden Crt
Myaree 6154
Phone: 08 9317 2505
Fax: 08 9317 4163
E-mail: lab@mpl.com.au

mpl Laboratories

Sample information

Analyses Required

MPL Sample ID	Client Sample ID	Depth (m)	Date sampled	Time	Type of sample	Gemec Suite 1 (MBTEXN, TRH, dissolved metals)	Gemec Suite 2 (MBTEXN, TRH, dissolved metals, CrVI-LL)	Ionic Balance	Extended Nutrient Suite	pH	EC	TDS (grav.)	MBTEXN & TRH	vTRH (C6-C9) + BTEX	8 metals: As B Ba Fe Li Mn Sr Zn (total) - excl. CrVI	Methane & Ethane	Dissolved metals (as per Gemec Suite 1)	
	/ Split	-	13.04.23	-	Water	X												

Comments

Email CoC with report also please
Sample containers labelled C1
Please send Split sample to Envirolab Sydney
Gemec Suite 1 dissolved metals: Al As B Ba Be Cd Cr Co Cu Fe Hg Li Mn Mo Ni Pb Se Sr Ti U V Zn
Extended Nutrient Suite: Total N, NH3, NO3, NO2, TKN (calc.), Total P, PO4

ENVIROLAB Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
JOB NO: 321103
Received: 14/4/23
Time: 0900
Received By: JL
Temp: Cool/Ambient 9.0
Security: Intact/Broken/None

Relinquished by (company): Gemec	MPL	**Received by (company):**	MPL
Print Name: Dan Baldwin	Haike O.	**Print Name:**	Cam
Date & Time: 14.04.2023, 09:00	17/04/23 11:00	**Date & Time:**	14 APR 2023 9:45
Signature:		**Signature:**	

Laboratory Use Only:
Samples Received: Cool / ambient
Temperature Received at: 10 (if applicable)
Transported by: Hand delivered / courier

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Gemec
Attention	Nicolo Jelovsek

Sample Login Details

Your reference	PBE-Cervantes 01
Envirolab Reference	321103
Date Sample Received	18/04/2023
Date Instructions Received	18/04/2023
Date Results Expected to be Reported	26/04/2023

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	9
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	HM in water - dissolved
Split	✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 321103

Client Details

Client	Gemec
Attention	Nicolo Jelovsek
Address	1/25 Foss St, Palmyra, WA, 6157

Sample Details

Your Reference	**PBE-Cervantes 01**
Number of Samples	1 Water
Date samples received	18/04/2023
Date completed instructions received	18/04/2023

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.

Report Details

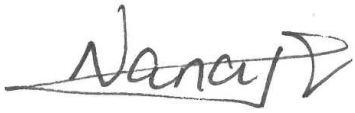
Date results requested by	26/04/2023
Date of Issue	26/04/2023

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Dragana Tomas, Senior Chemist
Kyle Gavrily, Senior Chemist
Loren Bardwell, Development Chemist

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Water		
Our Reference		321103-1
Your Reference	UNITS	Split
Date Sampled		13/04/2023
Type of sample		Water
Date extracted	-	19/04/2023
Date analysed	-	19/04/2023
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10
MTBE	µg/L	<1
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	103
Surrogate toluene-d8	%	96
Surrogate 4-BFB	%	104

svTRH (C10-C40) in Water		
Our Reference	UNITS	321103-1
Your Reference		Split
Date Sampled		13/04/2023
Type of sample		Water
Date extracted	-	19/04/2023
Date analysed	-	20/04/2023
TRH C_{10} - C_{14}	µg/L	<50
TRH C_{15} - C_{28}	µg/L	<100
TRH C_{29} - C_{36}	µg/L	<100
Total +ve TRH (C10-C36)	µg/L	<50
TRH >C_{10} - C_{16}	µg/L	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50
TRH >C_{16} - C_{34}	µg/L	<100
TRH >C_{34} - C_{40}	µg/L	<100
Total +ve TRH (>C10-C40)	µg/L	<50
Surrogate o-Terphenyl	%	83

HM in water - dissolved		
Our Reference	UNITS	321103-1
Your Reference		Split
Date Sampled		13/04/2023
Type of sample		Water
Date prepared	-	20/04/2023
Date analysed	-	20/04/2023
Arsenic-Dissolved	µg/L	<1
Aluminium-Dissolved	µg/L	<10
Boron-Dissolved	µg/L	250
Barium-Dissolved	µg/L	55
Beryllium-Dissolved	µg/L	<0.5
Cobalt-Dissolved	µg/L	<1
Cadmium-Dissolved	µg/L	<0.1
Chromium-Dissolved	µg/L	1
Copper-Dissolved	µg/L	<1
Iron-Dissolved	µg/L	340
Lithium-Dissolved	µg/L	67
Manganese-Dissolved	µg/L	17
Molybdenum-Dissolved	µg/L	<1
Selenium-Dissolved	µg/L	<1
Strontium-Dissolved	µg/L	7,500
Titanium-Dissolved	µg/L	<1
Uranium-Dissolved	µg/L	0.7
Vanadium-Dissolved	µg/L	<1
Lead-Dissolved	µg/L	<1
Mercury-Dissolved	µg/L	<0.05
Nickel-Dissolved	µg/L	<1
Zinc-Dissolved	µg/L	2

Method ID	Methodology Summary
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			18/04/2023	[NT]	[NT]	[NT]	[NT]	18/04/2023	[NT]
Date analysed	-			19/04/2023	[NT]	[NT]	[NT]	[NT]	19/04/2023	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	106	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	106	[NT]
MTBE	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	107	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	109	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate toluene-d8	%		Org-023	103	[NT]	[NT]	[NT]	[NT]	101	[NT]
Surrogate 4-BFB	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			19/04/2023	[NT]	[NT]	[NT]	[NT]	19/04/2023	[NT]
Date analysed	-			20/04/2023	[NT]	[NT]	[NT]	[NT]	20/04/2023	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	113	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	117	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	114	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	113	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	117	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	114	[NT]
Surrogate o-Terphenyl	%		Org-020	88	[NT]	[NT]	[NT]	[NT]	94	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			20/04/2023	[NT]	[NT]	[NT]	[NT]	20/04/2023	[NT]
Date analysed	-			20/04/2023	[NT]	[NT]	[NT]	[NT]	20/04/2023	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Aluminium-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	102	[NT]
Boron-Dissolved	µg/L	20	Metals-022	<20	[NT]	[NT]	[NT]	[NT]	95	[NT]
Barium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Beryllium-Dissolved	µg/L	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	99	[NT]
Cobalt-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Iron-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	98	[NT]
Lithium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	103	[NT]
Molybdenum-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Selenium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Strontium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Titanium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Uranium-Dissolved	µg/L	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	94	[NT]
Vanadium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	100	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

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.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

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: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-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.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Appendix B – Supporting Data

Land Title Details

Monitoring Well Construction Information

Field Equipment Calibration Certificate

Field Data Sheets

HSL Application Checklist

Land Title Details

WESTERN AUSTRALIA

REGISTER NUMBER	
12174/DP39607	
DUPLICATE EDITION **N/A**	DATE DUPLICATE ISSUED **N/A**

VOLUME **LR3110** FOLIO **928**

RECORD OF QUALIFIED CERTIFICATE OF CROWN LAND TITLE

UNDER THE TRANSFER OF LAND ACT 1893
AND THE LAND ADMINISTRATION ACT 1997
NO DUPLICATE CREATED

The undermentioned land is Crown land in the name of the STATE OF WESTERN AUSTRALIA, subject to the interests and Status Orders shown in the first schedule which are in turn subject to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts
REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 12174 ON DEPOSITED PLAN 39607

STATUS ORDER AND PRIMARY INTEREST HOLDER:
(FIRST SCHEDULE)

STATUS ORDER/INTEREST: RESERVE VESTED UNDER STATUTE

PRIMARY INTEREST HOLDER: NATIONAL PARKS AND NATURE CONSERVATION AUTHORITY
(XE F816234) REGISTERED 27/2/1995

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. N468019 RESERVE 24496 FOR THE PURPOSE OF PROTECTION OF FLORA REGISTERED 26/10/2016.
   J333114 AMENDMENT OF RESERVE. RESERVE AMENDED TO EXCLUDE PORTION COMPRISED IN LOT 12793 ON DEPOSITED PLAN 218516. REGISTERED 23/6/2005.
   N468019 AMENDMENT OF RESERVE.RESERVE AMENDED. REGISTERED 26/10/2016.
2. F816234 VESTED. PURSUANT TO SECTION 7 (2) OF THE CONSERVATION AND LAND MANAGEMENT ACT 1984. REGISTERED 27/2/1995.
3. J277694 TAKING ORDER. THE DESIGNATED PURPOSE OF AN INTEREST TAKEN FOR AN EASEMENT IS EASEMENT FOR THE PURPOSES OF CONSTRUCTING AND OPERATING PETROLEUM AND PRODUCED WATER PIPELINES AND INCIDENTAL INFRASTRUCTURE. REGISTERED 9/5/2005.
4. J277695 EASEMENT TO ROC OIL (WA) PTY. LTD. REGISTERED 9/5/2005.
5. J333112 PORTION COMPRISED IN LOT 12793 ON DP218516 TO VOL 3133 FOL 12. REGISTERED 23/6/2005.
6. N468021 PORTION TAKEN AS COMPRISED IN LOT 700 ON DP408197. REGISTERED 26/10/2016.
7. N468022 PORTION AS COMPRISED IN LOT 700 ON DP408197 AMALGAMATED INTO LOT 102 ON PLAN 23209 TO VOL 2165 FOL 411. REGISTERED 26/10/2016.
8. O422679 MEMORIAL. LAND ADMINISTRATION ACT 1997. SECTION 17. REGISTERED 10/6/2020.

Warning: (1) A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.
(2) The land and interests etc. shown hereon may be affected by interests etc. that can be, but are not, shown on the register.

END OF PAGE 1 - CONTINUED OVER

(3) The interests etc. shown hereon may have a different priority than shown.

----------END OF CERTIFICATE OF CROWN LAND TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	DP39607
PREVIOUS TITLE:	LR3098-892
PROPERTY STREET ADDRESS:	NO STREET ADDRESS INFORMATION AVAILABLE.
LOCAL GOVERNMENT AUTHORITY:	SHIRE OF IRWIN
RESPONSIBLE AGENCY:	DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS (SCLM)

NOTE 1: A000001A CORRESPONDENCE FILE 05153-1948-10RO.
NOTE 2: SUBJECT TO SURVEY - NOT FOR ALIENATION PURPOSES

Monitoring Well Completion Report

WELL COMPLETION REPORT

CLIENT	RCMA	CONTACT	HUGH CAMPBELL
ADDRESS		TELEPHONE	99271 215
Dongara WA 6525		FACSIMILE	99272 515

BORE LOCATION	Cervantes – 1 West of main well		
DRILL DATE	4/3/22	COMPLETED	4/3/22
DRILL METHOD	Mud Rotary		
DEVELOP METHOD	Air		
WATER QUANTITY	2 cubic meter/hour	QUALITY	Brackish
USEAGE	Monitoring		

CASING TYPE	PVC plain	CLASS	18	LENGTH	4.9
SCREEN TYPE	PVC	CLASS	18	LENGTH	9
GRAVEL PACK	Yes				
CEMENTING	No				
FOAM SEAL	Bentonite from 2mBgl to 1mtrBgl				

STRATA LOG

FROM	TO	DESCRIPTION
0	300	Top soil
300	450	Hard layer limeston
450	3.8	Layers of fine sand
3.8	14mtrs	Sand stone and fine sands
14mtrs		Hard rock layer
		Cased from 13mtrs back to top.

Field Equipment Calibration Certificates

AirMet Scientific P/L
Unit 8 Rowallan Street
Osborne Park
WA 6017, Australia
Tel: 08 9202 6600
Fax: 08 9202 6633

Calibration Certificate

This document certifies that the instrument detailed has been calibrated to the parameters

Certificate Print Date: 23-Feb-2022
Calibration Date: 23-Feb-2022
Next Calibration Due: 23-Feb-2023

Call ID / Order No: 254239
Job No / Pack No: S2542390001

Customer: Gemec-ID 602526 **Serial No:** T-105368
Description: PhoCheck Tiger Li-ion Battery Data Logging, B

Calibration Summary

Frequency: Yearly **Temp:** 22°C **As Found:** In Tolerance **Result:** Pass
Humidity: 45% **Certificate:** S2542390001

Desc	As Found Actual	As Found Result	As Left (Cal Status) Actual	As Left (Cal Status) Result
Isobutylene 0ppm	0.0	Pass	0.0	Pass
Isobutylene 100ppm	100.6	Pass	100.6	Pass

Standard Used

Equip ID	Description	Valid Until	Cert
WA237	100ppm Isobutylene	01/02/2025	
WA284	Zero Air 20.9 %vol (THC <1ppm)	01/03/2026	

Completed By: Eoin Doyle **Signed:**

AES
sensing safety

Calibration and Service Report – PID

Company:	GEMEC	**Manufacturer:**	Ion Science	**Serial #:**	T-105368
Contact:	Dan Baldwin	**Instrument:**	PHOCHECK TIGER SN: T-105	**Asset #:**	
Address:	PO Box 89 Melville WA 6956	**Model:**	TIGER	**Part #:**	
		Configuration:	VOC	**Sold:**	19.04.2023
		Wireless:		**Last Cal:**	
Phone:	0893398449	**Network ID:**		**Job #:**	149372
Fax:		**Unit ID:**		**Cal Spec:**	
Email:	dan@gemec.com.au	**Details:**		**Order #:**	CREDIT CARD

Calibration Certificate

Sensor	Type	Serial No.	Span Gas	Concentration	Traceability Lot #	CF	Reading	
							Zero	Span
Oxygen								
LEL								
PID	PID Sensor		Isobutylene	100 PPM	6481-2-1	1.0	0.0	100.0ppm
Battery								
Toxic 1								
Toxic 2								
Toxic 3								
Toxic 4								
Toxic 5								
Toxic 6								

Calibrated/Repaired by: SURESH KUMAR Date: 19.04.2023 Next Due: 19.10.2023

Calibration and Service Report – PID

Company:	GEMEC	**Manufacturer:**	Ion Science	**Serial #:**	T-105368
Contact:	Dan Baldwin	**Instrument:**	PHOCHECK TIGER SN: T-105	**Asset #:**	
Address:	PO Box 89 Melville WA 6956	**Model:**	TIGER	**Part #:**	
		Configuration:	VOC	**Sold:**	19.04.2023
		Wireless:		**Last Cal:**	
Phone:	0893398449	**Network ID:**		**Job #:**	149372
Fax:		**Unit ID:**		**Cal Spec:**	
Email:	dan@gemec.com.au	**Details:**		**Order #:**	CREDIT CARD

Item	Test	Pass/Fail	Comments	Serial Number
Battery	NiCd, NiMH, Dry cell, LiIon	P		
Charger	Power Supply	P		
	Cradle, Travel Charger	P		
Pump	Flow	P	>100 mL/min	
Filter	Filter, fitting, etc	X	Replaced	
Alarms	Audible, visual, vibration	P		
Display	Operation	P		
Switches	Operation	P		
PCB	Operation	P		
Connectors	Condition	P		
Firmware	Version	P	V 0.8.14	
Datalogger	Operation	P		
Monitor Housing	Condition	P		
Case	Condition / Type	P	Cleaned	
Sensors				
PID	Lamp	P		
PID	Sensor	P		
THP	Sensor	P		

Engineer's Report

Boot is cleaned. Date and time is updated.
Pump flow is at 157ml/min.
Inspected and calibrated, pass.

CALIBRATION CERTIFICATE

ENVIRONMENTAL CONSULTANTS
1/25 Foss St, Palmyra WA 6157
P: 08 9339 8449

Instrument: YSI Pro Plus - multiparameter water quality meter

Serial No: 17E103511

Equipment Report

Component	Checked
YSI PRO+ Display	☑
YSI Quatro Sonde	☑
Probe Guard	☑
Manual	☑

Calibration Details

Sensor	Calibration Undertaken	Accuracy	Pass
pH	pH4.00	±0.2	☑
	pH7.00	±0.2	☑
Conductivity	718µS/cm at 25°C	±0.5%	☑
	Checked Zero in air		☑
TDS	Auto calibrated using	±1%	☑
	above EC value x 0.67		
Dissolved Oxygen	100% Saturation	±2%	☑
	Pressure Compensation	1017 hPa	☑
Redox	231mV	±20mV	☑
Temperature	Factory Calibrated	±0.2°C	☑

This instrument has been calibrated in accordance with the manufacturers calibration procedure as recommended in the instrument service manual.

Date: 28.03.2023

Name: Nicolo Jelovsek

Signature: 

Field Data Sheets

Soil Sample Register

Gemec

Project:	CERVANTES-01	Sampler:	NJ / BS	Date:	5.4.23

Sample ID	Depth (m BGS)	Time	PID (ppm_v)	Dup / Split	Wall / Base	Sample Description	Contamination Observations (13.4.23)
W1	0.4	09:38	0.8			Drilling mud mixed w/ marl. Grey-Black moist clay (mud) mixed w/ pale brn limestone (marl). Generally brn, finished product.	Sulfidic odours / acrid.
W2	0.6	09:44	2.7				
W3	0.4	09:47	2.5				
W4	1-2	10:29	7.0	#1			
W5	0-5	10:35	9.8				
W6	1-0	10:44	5.7				
W7	0-2	10:54	6.7				
W8	1-5	11:03	7.8				
W9	0.5	11:10	8.0				
W10	0.1	11:22	4.6				
W11	1.7	11:34	6.2				
W12	0.6	11:42	6.3				
W13	0.3	11:50	4.6				
W14	1.4	11:56	5.8				
W15	0.6	12:03	9.7				
1 V1	3.0	13:37	0.0		W	Sand, f gr, p. brgrey, moist - sat. (at base)	NO St, NO. 303298 6749740
10 2	3.0	14:20	0.0		W	→	303310, 6749738
2 3	3.5	13:42	0.0		B	Naturally occurring sulfurous odours from groundwater expressing at base of sump	"
4 4	3.5	14:16	0.0		B		"
3 5	3.0	13:46	0.0		W		"
3 6	3.0	14:11	0.0	#2	W		"
4 7	3.5	13:50	0.0		B		"
7 8	3.5	14:07	3.1		B		→
5 9	3.0	13:55	0.0		W		WO, acrid? NO St. "
6 10	3.0	14:01	0.0		W		303295 6749711 "
11	1.0	14:35	0.0		W	Sand, f gr, lt. brn grey, damp	303307 6749713 303303 6749758 No wo st.
12	0-0.1	14:44	0.0		—	Sand, f gr, dk. gr brn, s/l. damp. (Anat. org. matter)	303327 6749741
13	0-0.1	14:52	0.0		—	as V12 Inferred cutbank soil.	303326 6749729
14	2.0	15:04	0.0		W		303288 6749696

Notes:

Groundwater Sample Log & Field Chemical Data

Gemec

Site / location:	CERVANTES-01	Sampler:	NJ	Date:	13.9.23	Casing Diameter:	50 mm

Well ID	Time	SWL (mBTOC)	Depth of well (mBTOC)	Purged volume (L)	Temp (°C) ±3%	DO (mg/L) ±10%/0.2	EC (µS/cm) ±3%	TDS (mg/L) ±3%	pH ±0.1	ORP ±10mv	Odour	Sheen	Colour	Turbidity	Sediment load	Notes
MW1	1236	3.425	13.32	0.0												
	1240			2.5	24.0	2.86	8118	5440	7.09	-53.4	—		Clear	—		~8V
	1245	DD: <0.01m		5.0	23.7	1.92	8081	5414	7.10	-77.0						pump ~6m
	1252			9.0	23.4	0.82	8006	5365	7.10	-97.2						
	1256			11.5	23.3	0.55	7910	5300	7.10	-105.6						
	1259			13.5	23.3	0.49	7900	5293	7.10	-114.0						
	1306			18.0	23.4	0.37	7884	5280	7.10	-123.1						
	1311			21.5	23.4	0.33	7871	5273	7.09	-132.0						
	1316			24.5	23.4	0.32	7867	5273	7.09	-132.6						

Dup / Split collected from well #: MW1

Sampling method (circle): Low Flow / disposable bailer / Hydra Sleeve / bore pump

HSL Application Checklist

HSL APPLICATION CHECKLIST

INTRODUCTION

This checklist is designed to allow assessors to conceptualise potential issues with contaminated land, and how to apply the HSLs. The checklist is designed to trigger responses from the assessor in determining whether the HSLs are applicable or whether consideration should be given to a more site-specific determination of risk. It highlights the key limitations and considerations that are common to contamination assessments and risk assessment.

The checklist summarises the key items from this Application Document.
It is recommended that the Application Document be read in conjunction with the use of this Checklist.

	Summary of Steps
Step 1	**Identification of key limitations to the application of health screening levels**
Step 2	**Identification of key receptors and scenarios**
Step 3	**Identification of relevant soil type**
Step 4	**Identification of impacted media and depths**
Step 5	**Identification of source concentrations to be compared with health screening levels**
Step 6	**Selecting appropriate HSL and consideration of combining vapour intrusion and direct contact exposure**
Step 7	**Applying adjustments to the HSLs based on vapour biodegradation, soil organic carbon content, air exchange rate, and soil moisture content Consideration given to soil saturation and water solubility limits**
Step 8	**Adjustments for cancer risk assessment - modification of acceptable cancer risk level, assessment of cumulative cancer risk**

Step 1 – Limitations to HSLs			Comments
Assessing contamination in soil and groundwater should only be carried out by a qualified professional.			
Are guidelines relevant for site? Check the following limitations:			
Have chemicals other than petroleum hydrocarbons been identified at the site? →	N	May consider site-specific risk asessment (refer to Section 5.2 of the Application Document)	
Is the groundwater to be used for irrigation purposes? →	N	May consider site-specific risk asessment (refer to Section 2.4.5 of the Application Document)	
Is the site conservation land? →	Y	May be required to also assess ecological values (refer to Section 2.4.6 of the Application Document)	Adjacent nature reserve
Is the depth to groundwater impact less than 2m bgs ? →	N	May consider site-specific risk asessment for direct contact May consider soil vapour sampling for vapour intrusion (refer to Section 2.4.2 of the Application Document)	
Has significant odour been observed at the site? →	Y	May be required to also assess odour for sensitive land uses (refer to Section 5.4 of the Application Document)	Naturally occurring sulphurous odours
Is the identified chemical a result of a solvent spill rather than petroleum spill/leak? →	NA	HSLs may be used where saturation point is not considered (refer to Section 5.3 of the Application Document)	No detected impacts
Is the identified contamination an atypical petroleum mixture? →	NA	May consider site-specific risk asessment to consider cumulative effects between chemicals (refer to Section 3.6 of the Application Document)	No detected impacts
Is the soil source thickness significantly different than 2 m? →	NA	For small source thicknesses, HSLs may be overly conservative if source fully depletes. For larger thicknesses HSLs may not adequately characterise risk, however lateral extent of contamination should also be considered. A site-specific HRA may be considered. (refer to Section 2.4.7 of the Application Document)	No detected impacts
Does the building have a crawl space rather than slab-on-ground construction? →	NA	HSLs may be used as likely to be conservative. However, for situations where habitants may be exposed in crawl space area such as spaces under dwellings which incorporate garages/workshop then consideration may be given to ambient air sampling. (refer to Section 2.3.4 of the Application Document)	No structures on-site
Does the building have or is likely to have a habitable basement? →	NA	May consider site-specific risk asessment (refer to Section 2.3.3 of the Application Document)	

Note that the HSLs may be used for assessing health risk. In addition to this assessment, legislation requirements still need to be fulfilled which may include other considerations and assessments. Such considerations may include:

- Assessment of environmental values and ecological impacts
- Consideration of sustainability issues
- Risks for extraction and use of groundwater
- Soil source ongoing source to groundwater contamination
- Local planning requirements, such as sensitive uses under commercial zones, or future land use zones
- Social impacts and consultation with stakeholders

Step 2 – Identify receptors and scenarios to be considered

Check the receptors and scenarios to be assessed. Note that receptors and scenarios may require consideration of future land use planning and local regulations pertaining to site redevelopment.

	☐	Residential use (refer to Sections 2.1.1 and 2.3.1 of the Application Document)
HSL-A	☐	Low-Density Residential – assumes access to soils with no management controls on site. Assessment may consider surface soils with direct contact, intrusive maintenance worker protection, and consider using surface soil HSL for all soils down to 3 m depth to protect uncontrolled excavation of contamination.
HSL-B	☐	High-Density Residential – assumes limited access to surface soils with management controls on site. Assessment may consider surface soils/dust with limited direct contact. Intrusive maintenance workers may be protected under suitable site management plan.
HSL-A	☐	Medium-Density Residential with grassed open space – assumes access to soils with management controls on site. Assessment may consider surface soils with direct contact and subsurface soils through vapour intrusion. Intrusive maintenance workers may be protected under suitable site management plan.
HSL-B	☐	Medium-Density Residential with permanent paving open space – assumes limited access to soils with management controls on site. Assessment may consider surface soils/dust with limited direct contact. Intrusive maintenance workers may be protected under suitable site management plan.
HSL-A (for VI) *HSL-A or HSL-B (for DC)*	☐	Low- or Medium-Density Residential with single basement garage – for vapour intrusion, low-density residential (HSL-A) may apply due to low air exchange rate for basement garage. HSL depth is displaced by depth of basement. For soil direct contact HSLs, select from above medium density scenarios based on access to soils. Intrusive maintenance workers may be protected under suitable site management plan (refer to Section 2.3.3 of the Application Document).
HSL-D (for VI) *HSL-B (for DC outside footprint)*	☐	Medium- or High-Density Residential with communal basement car park – assumes no access to soils with management controls on site. HSL depth is displaced by depth of basement. Intrusive maintenance workers may be protected under suitable site management plan. Note that areas outside of the basement footprint may be required to be assessed as a building without basement and with limited direct contact with soil. Also, limited exposure time for basement users and therefore HSL for Commercial Worker may be used for vapour intrusion (refer to Section 2.3.3 of the Application Document).
HSL-C	☐	Recreational / Public Open Space (refer to Section 2.1.2 of the Application Document)
	☐	Parks, ovals, pedestrian areas
	☒	National parks, conservation areas – may be required to also assess ecological values (refer to Section 2.4.6 of the Application Document)
HSL-D	☐	Commercial / Industrial Workers (refer to Section 2.1.3 of the Application Document) – considers only healthy adults under normal working conditions. Does not consider sensitive commercial uses such as schools, day care centres and medical practices.
	☐	Commercial sensitive users – may consider using residential HSLs or a site-specific HRA (refer to Section 2.4.1 of the Application Document)
	☐	Agricultural land – may consider a site specific HRA (refer to Section 2.4.5 of the Application Document)
	☐	Shallow intrusive workers down to 1 m deep. May require assessment of direct contact for soils surface to <2 m (refer to Sections 2.1.4 and 2.4.3 of the Application document)
	☐	Deep intrusive workers down to >1 m deep, such as sewer. Should be managed with appropriate procedures and work practices for confined spaces (refer to Section 2.4.4 of the Application Document)

Is a site management plan (that includes specific occupational hazard management for works on the site) to be implemented on the site (controlled site)? → ☐ N May not need to consider health risks to intrusive workers

Step 3 – Identify soil type relevant to site (soils above impacts in soil and/or groundwater)

Comments

Note the following before selecting soil type for use in assessment:

1. The prime parameter that influences the value of the HSL is the air filled porosity and volatility of the specific chemical. The higher the air filled porosity the greater the potential for volatile chemicals to migrate vertically through the soil profile.
2. The selection of a generic soil type requires knowledge of the soil profile across the site.
3. The selection of generic soil types should take into account the predominant characteristics of the soil profile and depth of contamination. The generic soil types assume a uniform profile, which at many, if not all, sites will not be the case. Where the overlying profile is predominantly fine materials (clays) (i.e. > 50% for soil column), these may be considered as the generic soil type. If the profile has a significant proportion of loose/coarse materials (including backfill) (i.e. > 50%), these materials may be considered as the generic soil type.
4. Air filled porosity is affected by moisture content. The wetter the soil, the lower the air filled porosity. Generic soil types have assumed a typical moisture content for the profile typical of average soil conditions occurring at depth. Moisture content will vary greatly by location and season. Moisture content will also vary between sub-categories of soil, e.g. between sand and clayey sand. HSLs may be adjusted based on moisture content. This is done in Step 7.
5. The selection of appropriate soil type is discussed in Section 3.2 of the Application Document.

Is there one dominant soil type on the site (> 50% of soil column)?
Or can a geological setting be conservatively identified (i.e. allowing greater vapour transport)? →
- [X] Y - Proceed
- [ ] N - Consideration may be given to assuming the more conservative soil type, or may be given to a site-specific HRA (refer to Section 4.6 of the Application Document)

Has excavated area(s) been backfilled with more porous materials ? →
- [NA] Y - Consideration should be given to adopting a more porous soil type (refer to Section 3.2 of the Application Document)
- [NA] N - Proceed

Does the site lithology contain rock formations
or soil with large cracks that can form preferential pathways? →
- [ ] Y - The derived HSLs do not include lithogies with rock formations. Consideration may be given to using soil-vapour sampling or carrying out a site-specific HRA (refer to Section 4.6 of the Application Document)
- [X] N - Proceed

Identify HSL soil type relevant to site and assessment (above impacts)

The soil profile properties have been based on a predominant soil texture grouping developed by the US Department of Agriculture. The 12 texture classes have been grouped into 3 groups: sand, silt and clay. The groupings of the classes are based on mean particle size and saturation porosities. Refer to Section 3.2 for further discussion on the soil properties.

HSL soil type selected:

- [X] **Sand** – Properties selected to be representative of a coarse textured undisturbed soil profile. Consists of texture classes sand, sandy clay.
- [ ] **Silt** – Properties selected to be representative of a coarse textured undisturbed soil profile. Consists of texture classes silt, silty clay.
- [ ] **Clay** – Properties selected to be representative of a fine textured undisturbed soil profile. Consists of texture classes clay.
- [ ] **Other** – Including soil with large cracks (preferential pathways) and fractured rock (basalt, sandstone, siltstone, limestone) - refer to Section 4.6 of the Application Document. Soil vapour measurement is preferred to soil or groundwater. Due to fractures and preferential vapour pathways in rock, consideration should be given to overlying weathered soil, or to using HSLs for surface soil in sand.

For soil assessment (texture classification) undertaken in accord with AS 1726 the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit less than 50%, and fine with liquid limit greater than 50% respectively.

Where there is uncertainty, laboratory analysis should be carried out. This may include parameters for detailed particle analysis and exact soil texture sub-class, and saturation porosity.

Step 4 – Impact media		Comments
Are there impacts to media other than soil and groundwater? (e.g surface water, biota, odours etc) Note: aesthetic issues (odours/staining/ecological impacts etc.) to be addressed separately →	[N] As well as human health assessment, consideration of other issues such as ecological, aesthetics, etc. may be required.	
Soils Are there soil impacts remaining on the site? →	[NA] Y - Proceed [NA] N - Go to groundwater section	
Depth to soil impacts. Note if considering basements, depths need to be displaced e.g. a 3 m deep basement means surface to <1 m represents 3 m to <4 m. (refer to Section 2.3.3 of the Application Document) [ ] surface to <1 m [ ] 1 m to <2 m [ ] 2 m to <4 m [ ] 4 m and deeper [ ] Displacement due to basement Distance of displacement (m) _____		
Is the site of interest an uncontrolled site where excavation activities such as construction may result in subsurface soil contaminantion brought to surface in the future? →	[ ] Consideration may be given to use of HSLs for direct contact and surface HSLs for vapour intrusion, for deeper soils. A site management plan may be used to address uncontrolled excavation at a site. (refer to Sections 2.3.1, 3.4.1, and 4.7 of the Application Document)	
Groundwater Are there groundwater impacts beneath the site? →	[ ] Y - Proceed [X] N - Go to soil vapour section	
Is the depth to groundwater less than 2 m? →	[ ] Y - The HSL values may not adequately address this scenario. A site-specific HRA may be considered. Soil vapour sampling may be used to assess vapour intrusion. (refer to Section 2.3.3 of the Application Document)	
Depth to groundwater impacts. Note if considering basements, depths should be displaced e.g. a 3 m deep basement means surface to 2 m represents 5 m (refer to Sections 2.3.3 of the Application Document). With basements, groundwater HSLs may not adequately characterise risks where the groundwater level is within 2 m of basement foundation. [ ] 2 m to <4 m [ ] 4 m to <8 m [ ] 8 m and deeper [ ] Displacement due to basement Distance of displacement (m) _____		

Step 4 – Impact media (cont.)		Comments

Soil vapour

Has soil vapour sampling been used to characterise vapour intrusion at the site? →

- [ ] Y - Proceed
- [X] N - Proceed to Step 5

Depth to soil impacts. Note if considering basements, depths need to be displaced e.g. a 3 m deep basement means surface to <1 m represents 3 m to <4 m.
(Refer to Section 2.3.3 of the Application Document.)

- [NA] surface to <1 m
- [ ] 1 m to <2 m
- [ ] 2 m to <4 m
- [ ] 4 m to <8 m
- [ ] 8 m and deeper

- [ ] Displacement due to basement
  Distance of displacement (m) _____

In using soil vapour sampling, please note the following:
1) It is recommended that soil vapour samples be taken as laterally close to a vapour source as possible (within or above).
2) Any sample taken within 1 m of the open air is subject to high levels of uncertainty due to atmospherical and meteorological effects. This includes the base and wall of excavation pits.
3) For sites subject to redevelopment with residential or commercial buildings, the soil vapour profiles are subject to change due to presence of concrete slabs. Caution is required on the use of soil vapour samples that are not within a soil source and in locations where buildings currently do not exist (refer to Section 1.6 of the Application Document).

Step 5 – Selection of relevant source concentrations

Soil concentrations

1. Is the investigation site likely to be subdivided into smaller lots? →
   - [ ] Y - Statistical analysis using entire data set may not be applicable. Consideration may be given to using the maximums or using a sub-set for statistical analysis (refer to Section 3.4.1 of the Application Document)
   - [X] N - Statistical analysis using entire data set may be applicable

2. Is the site public open space / recreational land where users are unlikely to be in the same location for extended period? →
   - [X] Y - Statistical analysis using entire data set may not be applicable. Consideration may be given to using the maximums or using a sub-set for statistical analysis (refer to Section 3.4.1 of the Application Document)
   - [ ] N - Statistical analysis using entire data set may be applicable

If statistical analysis is appropriate consideration should be given to the following methodology (refer to Section 3.4.1 of the Application Document):

1. Samples should be sub-divided into appropriate depth ranges as defined by HSLs (i.e. surface to <1 m, 1 m to <2 m, 2 m to <4 m, 4 m+). Note if considering basement, the appropriate displacement distance should be accounted for.
2. For each depth range, the statistical mean (e.g. 95% UCL arithmetic mean) soil concentration should be calculated for each chemical. One approach is described in the NSW EPA *Contaminated sites: Sampling design guidelines* (1995). The coefficient of variance test described in the document may be used to determine if the distribution is normal or lognormal. Consideration of other statistical methods may be adopted if justified (e.g. distribution does not fit a normal or lognormal distribution).
3. For samples with no detection, it is recommended to use half the detection limit during statistical analysis.
4. If the standard deviation is very large (due to outliers or low number of samples) the statistical mean may be higher than the maximum concentrations. In this case it is recommended to use the maximum.
5. It is recommended to keep note of maximum concentrations as well as statistical mean concentrations. Maximum concentrations may be required to address potential acute exposure issues.

Groundwater concentrations

Has floating product been identified in any well? →
- [X] No
- [ ] Y - Refer to point (a)

(a) If PSH is identified, dissolved phase is likely to contain chemicals at solubility limits. Proceed with HSL comparison, noting that if there is at least one chemical for which HSLs in groundwater is limiting (i.e. not all chemical HSLs are NL) then presence of PSH may be a potential vapour risk to site users (refer to Section 3.4.2 of the Application Document). Also note that the presence of PSH may trigger other legislative requirements for remediation/monitoring.

Is the area of interest represented by a single groundwater location or multiple ? →
- [X] Single - small area of interest such as residential dwelling may be represented by the maximum groundwater concentration if the dwelling location is unknown, otherwise if the building footprint is known, the groundwater well nearest to the point of interest may be used.
- [ ] Multiple - where exposure may occur over larger areas such as recreational parkland, consideration may be given to averaging the concentrations across the area of interest.

In deciding which set of monitoring data is most useful for analysis consideration may also be given to:
- Historical results to determine trends in groundwater concentrations (i.e. the likelihood that concentrations may increase)
- Upgradient wells and background concentrations
- Groundwater flow direction

(Refer to Section 3.4.2 of the Application Document.)

Comments

Step 5 – Selection of relevant source concentrations (cont)		Comments
Soil vapour concentrations		**Not Applicable**
Is the area of interest represented by a single or multiple vapour location? →	NA Single - small area of interest such as residential dwelling may be represented by the maximum soil vapour concentration if the dwelling location is unknown, otherwise if the building footprint is known, the groundwater well nearest to the point of interest may be used. NA Multiple - where exposure may occur over larger areas such as recreational parkland, consideration may be given to averaging the concentrations across the area of interest.	
Are soil vapour samples measured in shallow soil less than 1 m from the surface where there is no existing slab or concrete paving? →	NA Y - Measurements are subject to influence from weather and atmospheric conditions and may not be considered reliable.	
Are soil vapour samples measured in areas where there is no existing slab or concrete paving, and the site is planned to be redeveloped where a building will exist (residential/commercial/ industrial use)? →	NA Y - Soil vapour samples not measured within a soil or groundwater source, may not be representative of the soil vapour in the future when a building is located on site. The placement of an impermeable barrier such as a concrete slab can cause build-up of soil vapour within the soil and sub-slab, above levels measured where there is no slab present. Note soil vapour measurements from within soil and groundwater sources are not subject to vapour build-up as the soil vapour is likely to be at its maximum concentration when located within the source.	
Soil vapour measurements may be taken at multiple depths, including within the source zone, above the source zone, and directly under a building foundation. Each of the measurement depths should be considered individually.		
Refer to Sections 3.4.3 and 1.6 of the Application Document.		

Step 6 – HSL determination and combined vapour intrusion and direct contact

		Comments
HSL determination		
HSLs and satuaration/solubility limits are presented in the Appendix B HSL tables. Select the appropriate HSLs for vapour intrusion from tables for: 1) Each selected receptor listed in Step 2 2) Dominant soil texture classification listed in Step 3 3) Source depth listed in Step 4 HSLs may be compared to soil/groundwater/soil vapour source concentrations determined in Step 5. Note for TPH C6 to C10, BTEX should be subtracted from analytical result prior to comparing with HSL		
1. Is the HSL value Not Limiting 'NL'? →	[X] Y - Indicates that vapour reaches saturation point and cannot increase to a point which would result in an unacceptable health risk [ ] N - Continue with Question 2 for groundwater, or proceed to Question 3	
2. Is groundwater HSL not 'NL' and PSH identified in water? →	[ ] Y - May indicate potential vapour risk (refer to Section 3.4.2 of Application Document) [X] N - Proceed to Question 3	
3. Are comparisons being made against soil HSLs? →	[X] Y - Proceed to Question 4 [ ] N - Proceed to Question 5	
4. Does direct contact need to be considered as well as vapour intrusion? →	[ ] HSL-A Low-Density Residential - surface soils, and possibly subsurface soils if determined to be relevant (refer to Section 4.7 of Application Document). Proceed to 'Combined pathways exposure' [ ] HSL-B High-Density Residential – surface soils. Proceed to 'Combined pathways exposure' [ ] HSL-C Open Space Recreational – surface soils.Proceed to 'Combined pathways exposure' [ ] HSL-D Commercial / Industrial – surface soils. Proceed to 'Combined pathways exposure' [ ] Intrusive Maintenance Worker – down to 2 m. Proceed to 'Combined pathways exposure' [X] N - Proceed to Question 5	
5. Do cross-scenario exposure need to be considered? (eg. adjacent residential and open space) →	[ ] Y - Proceed to 'Combined pathways exposure' [X] N - Proceed to Step 7	No impacts to soil or groundwater
Combined pathways exposure		
Refer to Section 3.3 of the Application Document. Combined exposures may occur on the same property where indoor vapour intrusion occurs concurrently with outdoor direct contact. Combined exposure may also occur on adjacent properties, e.g. vapour intrusion on residential property and direct contact on adjacent open space (park). For the given scenarios/chemicals, list the HSLs. Where a vapour intrusion HSL is Not Limiting (NL) the chemical / scenario does not need to be considered in the combined pathway exposure. The combined exposure is assessed as follows: Multiple exposure pathways: $\textbf{Cumulative Fraction} = \frac{C_{\text{Under Building}}}{HSL_{\text{Vapour Intrusion}}} + \frac{C_{\text{Outside Building}}}{HSL_{\text{Direct Contact}}}$ where vapour intrusion can refer to soil, groundwater or soil vapour source Multiple exposure scenarios: $\textbf{Cumulative Fraction} = \frac{C_{\text{Land use 1}}}{HSL_{\text{Land use 1}}} + \frac{C_{\text{Land use 2}}}{HSL_{\text{Land use 2}}}$ where the HSLs may refer to HSLs for vapour intrusion or direct contact If a given C/HSL fraction is less than 0.1, the contribution of risk may be considered insignificant and the cumulative exposure need not be assessed for this scenario. Where a cumulative fraction is less than 1 risk is normally acceptable. Where the value exceeds 1 a site-specific assessment should be undertaken, or proceed to Step 7.		

Step 7 – HSLs and adjustments (vapour intrusion)		Comments
HSL adjustments (vapour intrusion only) For each adjustment, careful consideration and justification is required. **1. Vapour biodegradation** (refer to Section 4.2 of Application Document) Prior to applying attenuation factor for vapour degradation it is recommended to read the source documentation (Davis et al. 2009). The minimum requirements for allowing attenuation factors for vapour degradation are as follows: 1. Is there evidence of oxygen penetration? → NA Y - Requires measurement of oxygen in soil gas with at least 5% at 1 m depth (refer to Section 4.2.1 of Application Document) NA N - Attenuation factor may not be applicable 2. Is the source depth 2 m or deeper? → NA Y - Continue to Question 3 (refer to Section 4.2.2 of Application Document) NA N - Attenuation factor may not be applicable 3. Does the slab have one side less than 15m length? → NA Y - Degradation factor may apply. Less than 4 m depth, a factor of 10 may apply. 4 m and deeper, a factor of 100 may apply. (refer to Section 4.2.3 of Application Document) NA N - Attenuation factor may not be applicable **2. Soil organic carbon content** (refer to Section 4.3 of Application Document) May be used to adjust soil HSLs only. Soil HSLs were based on fraction organic carbon content of 0.003. HSL may be adjusted if background levels of organic carbon content at the same depth as source is different from baseline. Background sample must not be contaminated with hydrocarbons. If surface soil, background sample in open space may not be appropriate to use if comparing for soil under slab. Adjustment is linear, i.e. doubling the organic carbon will double the HSL. Applies only to soil HSL for vapour intrusion. **3. Air exchange rate** (refer to Section 4.4 of Application Document) HSLs are based on air exchange rate (AER) of 0.6 h^{-1} for residential and 0.83 h^{-1} for commercial. Careful justification may be required prior to changing AER. Consideration should be given to weather conditions, practice of leaving doors/windows open, or closed in climate controlled building. New buildings tend to be more air tight to comply with energy saving regulations. For soil and groundwater, adjustment is linear with respect to AER. For soil vapour, adjustment is variable depending on soil type and depth. Refer to the charts in Appendix D to determine the adjustment factor. **4. Moisture content** (refer to Section 4.5 of Application Document) HSLs may be adjusted if moisture content in soil is significantly different from baseline HSLs. The baseline moisture contents used were (dry wt) for sand 8%, silt 22% and clay 20%. Moisture content should be representative of long-term moisture content and not short-term result from recent rain event. Also note that for a development with future building where no building currently exists, moisture contents on site may not be representative for the future state of the site. HSL scaling factors for different land use/chemicals/soils are presented in Appendix C of the Application Document and may be applied as described in Section 4.5.		**Not Applicable**

Step 7 – HSLs and adjustments (vapour intrusion) (cont.)		Comments
Saturation/solubility limits (soil and groundwater HSLs only) Apply the adjustments to the HSLs for vapour intrusion by multiplying by the determined factors. After applying the adjustments to the HSLs, is the revised HSL greater than the solubility / saturation limit? →	[X] Y - Indicates that the predicted source concentration to produce an unacceptable vapour risk is higher than the saturation point. The revised HSL is not limiting to vapour (NL). Note this does not apply to soils with direct contact. [ ] N - Revised HSL may be compared with measured source concentrations.	
Multi-Pathway Exposure 1. Is inclusion of direct contact with soils required? →	[ ] Y - Repeat Step 6 with Adjusted Vapour Intrusion HSLs and Direct Contact HSLs [X] N - Proceed to Question 2	
2. Is cross-scenario exposure required to be assessed?	[ ] Y - Repeat Step 6 with Adjusted Vapour Intrusion HSLs and Direct Contact HSLs [X] N - Proceed to 'Screening assessment'	
Screening assessment Is the adjusted HSL less than source concentration? →	[ ] Y - Indicates potential health risk [X] N - Considered within acceptable health risks. If cancer endpoint (benzene) may also need to assess cancer risk level and cumulative cancer risk in Step 8	
Is the maximum soil, groundwater or soil-vapour concentration greater than the HSL by more than one or two orders of magnitude? →	[ ] Y - Indicates potential acute risk around hotspot [X] N - Considered within acceptable health risks	
If the screening assessment indicates the potential for unacceptable health risk, consideration may be given to further investigations such as further contaminantion deliniation, site-specific health risk assessment or site management. Before deciding the appropriate form of action considerations should include: - The magnitude of HSL exceedence - The nature of the source - The time frame required for managing health risks - Other statutory requirements		

Step 8 – Cancer risk assessment		Comments
Acceptable cancer risk (Refer to Section 5.1 of Application Document) HSLs for benzene have been based on 1 x 10^{-5} cancer risk. In some jurisdictions it may be required to assess carcinogenic risks based on 1 x 10^{-6} cancer risk. 1) The HSLs are linearly related to acceptable risk. HSLs based on a cancer risk of 1 x 10^{-6} may be calculated by dividing the HSLs in Appendix B by a factor of 10. 2) If the HSL is NL (vapour only HSL), it is possible that it may become limiting if the HSL is within a factor of 10 of the soil saturation concentration (or solubility limit for groundwater). 3) If soil or groundwater source concentration is less than an order of magnitude of the saturation concentration / solubility limit (in Appendix B), then even dividing the non-limiting HSL by 10 would result in an acceptable risk. Hence there is no need to proceed further. 4) If soil or groundwater source concentration is within an order of magnitude of the saturation concentration / solubility limit it is recommended to calculate the revised HSL from the non-limiting HSL. This process is outlined as follows: **Calculating revised HSL for 10^{-6} cancer risk from non-limiting HSL.** 1) The non-limiting HSLs are presented in Friebel & Nadebaum 2011 (Part 1). 2) The derived HSLs are presented in Appendix F. 3) Find the pages that correspond to the source type (soil, groundwater, soil vapour) for the given scenario (residential / commercial / recreational / intrusive maintenance). Note indicator chemicals and TPH have been separated. 4) For the corresponding soil category, depth and chemical, the Vapour Intrusion HSL and saturation/solubility concentration is presented in the columns on the right. 5) If this HSL is divided by 10 and the result is greater than Csat (for soil) or saturation limit (for groundwater), then the revised HSL is still NL. Otherwise the result is the revised Vapour HSL.		
Cumulative cancer risk (Refer to Section 3.6.1 of Application Document) HSLs for benzene have been based on 1 x 10^{-5} cancer risk. In most jurisdictions it is required to assess total carcinogenic risks based on 1 x 10^{-5} cancer risk. If HSLs are not NL for benzene and another carcinogenic chemical is identified, such as PAHs, follow the proedure outlined in Section 3.6.1. The-cumulative fraction may also be applied to more than two chemicals. Note that multiple sources should be considered. For example, a resident may be exposed through direct contact with PAHs in surface soil, but also benzene vapours from soil and groundwater. For vapour risk (benzene), the risk contribution should consider the greatest risk for the receptor from all vapour sources. Because multiple sources do not have an additive effect, the source with the greatest risk needs to be identified (refer to Section 3.5 for discussion on multiple vapour sources). This means that for all sources/depths the source concentration should be divided by their respective HSLs to calculate the benzene contribution to cumulative risk. The highest fraction determines which source poses the greatest risk to receptors. The same may be carried out for carcinogenic PAHs. The sum of the highest benzene fraction and the highest PAH fraction results in the highest possible cumulative fraction.		

Appendix C – Site Photographs

Site Photographs – 05 April 2023

Stabilised drilling mud and cuttings stockpile.

W7 sample location view west.

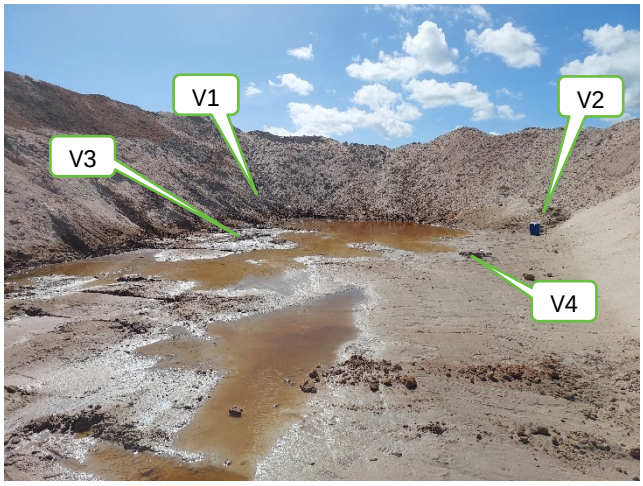
Site Photographs – 13 April 2023

Western portion of site view north.

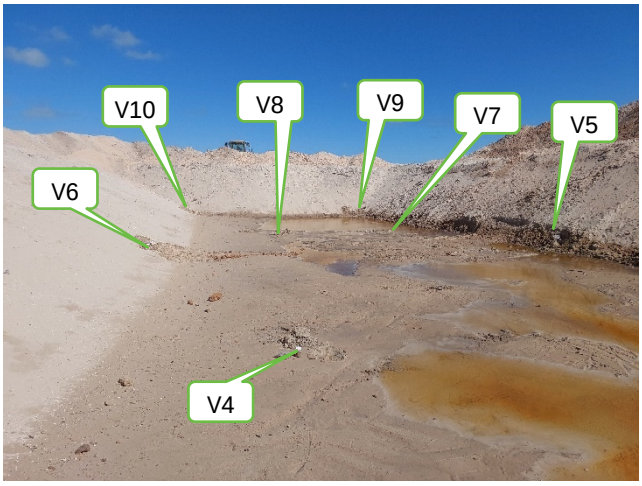
Southern portion of site view east.

Western portion of site view north-east.

Groundwater monitoring well MW1 view east.



Former drilling mud retention pond void view north.



Former drilling mud retention pond void view south.


V1 sample location.


V6 sample location.


V7 sample location.


V8 sample location.

Well head view north.

Former fuel and chemical storage view north-west.


V13 sample location.

Flare pit view south.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