McMahon EARTH SCIENCE

310 MOAMA STREET HAY NSW 2711

PRELIMINARY SITE INVESTIGATION

FOR THE REZONING OF LAND FOR A PROPOSED UNMANNED REFUELLING FACILITY

JULY 2023

REPORT NO: 9404

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Report type

Preliminary Site Investigation

For the rezoning of land for a proposed unmanned refuelling facility.

Site address

310 Moama Street

Hay NSW 2711

Report number

9404

Prepared for

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Document control

Role	Name	Signed	Date	Revision
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Contents

1.0 Executive summary

DM McMahon Pty Ltd (McMahon) conducted this Preliminary Site Investigation (PSI) at the request of Damien Mackay of TFA Project Group for the rezoning of land for a proposed unmanned refuelling facility at 310 Moama Street Hay NSW. The 4.1ha development area (the site) has a historical agricultural/horticultural land use. A map of the site investigated as part of this PSI and the future proposed development for the unmanned refuelling facility can be seen in **Attachment A**.

The issue of potential contamination is required to be considered whenever a planning proposal is presented to a planning authority where the new use may increase risk from contamination if it is present. Therefore, the purpose of this investigation is to provide TFA Project Group and the planning authority with a statement of site suitability for the proposed land use and an appropriate risk assessment framework for the management of the site during development.

The scope of work includes:

- A desktop study used to collect basic site information and identify the site characteristics.
- A detailed site inspection to complement the findings of the desktop study and site history and to identify any additional relevant site information.
- Conduct limited sampling using data quality objectives to assess the need for further investigation.
- From the information collected, develop a conceptual site model detailing the potential contamination source-pathway-receptor linkages.
- Conduct a risk assessment for site suitability regarding potential contamination and the proposed development.
- Provide a statement of site suitability for the proposed land use and recommendations for further investigation, assessment, and site management if required.

Findings of the investigation include:

- A site inspection was conducted and found the development area was generally well-maintained agricultural/horticultural land with no indicators of gross contamination.
- This PSI identified persistent pesticides that may have been used as the source of potential contamination that may affect the development.
- The soil analysis returned results below the criteria for commercial/industrial land use.
- In conclusion, the identified potential contamination sources are assessed to be of low significance in terms of risk to future site users and the site is suitable for the proposed development.

This executive summary and the findings of this PSI are subject to the recommendations in **Section 10.0** and limitations as stated in **Section 11.0**. A protocol for unexpected finds as outlined in **Section 12.0** has also been developed as part of this risk assessment framework if additional potential contamination sources are identified during planning or development.

2.0 Objectives

The objective of this investigation is to:

- Provide information regarding potential contamination on site.
- Provide a factual record of the works completed and results.
- Undertaking a risk assessment for health risk to future site users and the environment.
- Provide a statement of site suitability or recommendations for further investigation and/or site management.
- To prepare the PSI in general accordance with the relevant guidelines and legislation, namely:
    - NSW EPA, Consultants Reporting on Contaminated Land: Contaminated Land Guidelines, (2020).
    - State Environmental Planning Policy (Resilience and Hazards) 2021.
    - National Environment Protection (Assessment of Site Contamination) Measure (NEPM), (2013).

3.0 Scope of work

The scope of work includes the following:

- Review the available information regarding historical, current, and proposed land use of the site and surrounds.
- Review the environmental setting of the site and surrounds.
- Assess the potential contamination sources and chemicals of potential concern.
- Conduct limited sampling to assess the need for further investigation.
- Assess the potential contamination source-pathway-receptor linkages from the chemicals of potential concern, environmental setting, and land use.
- Develop a conceptual site model to assess potential contamination risk from the source-pathway-receptor linkages.
- Provide a clear statement on site suitability for the present and future land use and the need for further investigation and/or site management.

4.0 Site identification

The site identification and details are as follows.

- Address: 310 Moama Street Hay NSW 2711.
- Real property description: Lot 2 DP 1212081
- Development area centre co-ordinate: 303135E 6177985N MGA GDA z55.
- Property size: 4.1ha.
- Owner: IOR Property Group No. 2 Pty Ltd.
- Local Government Area: Hay Shire Council.
- Current zoning: RU1 Primary Production.
- Proposed zoning: IN1 General Industrial.
- Present use: Agriculture/horticulture.
- Development Application reference: Not known.

5.0 Site history

From research of the available resources, the following site history is offered.

Historical owners and occupiers

As follows are the registered owners and occupiers:

- 1885 South Hay Common administered by the Hay Pastoral Protection Board.
- 1962 Special lease 62/15 to Frank Danelutti. Known as Portion 119.
- 1970 part of the land resumed for road.
- 1970 owned by Francesco (Frank) Ruberto.
- 2004 owned Erminia Ruberto
- 2004 owned by Mark Sam Ruberto.
- 2019 to present owned by IOR Property Group No. 2 Pty Ltd.

Council records

A Section 10.7 Planning Certificate (Certificate No: 2023-120) was obtained from Council on 11 July 2023 and the certificate states that the site has not been declared significantly contaminated within the meaning of the Contaminated Land Management Act 1997.

EPA records

There are no records on the Contaminated Land Record Database for the site or adjacent properties pertaining to Preliminary Investigation Orders, Declaration of Significantly Contaminated Land, Approved Voluntary Management Plans, Management Orders, Ongoing Maintenance Orders, Repeal Revocation or Variation Notice, Site Audit Statement, or Notice of Completion or Withdrawal of Approved VMP. The site or adjacent properties have not been “notified” to the EPA on the list of NSW Contaminated sites as of June 2023.

Internet search

- The Hay Standard (Hay) May 1898. South Hay Common. William Cullen deposed: I know all the South Hay Common ground; I only consider a small portion fit for cultivation; it is black clayey open porous land, and swampy. I do not consider the area large enough for close settlement and making homes upon; I consider the bulk only fit for grazing purposes.
  To Mr Walker: The areas themselves are not large enough to make a living off; the area is large enough for a man in conjunction with other pursuits, provided he is not flooded out.; I believe the flood came from the north east boundary; if the canal is constructed, the banks if made strong would certainly help keep flood waters of the land.
  To Mr Walker: There was no protest to my knowledge when this land was taken over for irrigation; immediately the irrigation area was reduced the Council asked for this area as a temporary common; the land was always used for common purposes even when under the Irrigation Trust the same as under previous conditions.
- The Riverina Grazier (Hay) November 1898. The South Hay Common. The land at South Hay, which, for want of a better term is known as the South Hay common, is

about to be subdivided into a temporary common, travelling stock route, and homestead selections.

- Government Gazette of the State of NSW (Sydney) *Notification of Granting of Special Leases* Issue 102, October 1963. Frank Danelutti of Lachlan Street Hay. Situation and area of land: Portion 119.
  Area about 15 acres, 2 roods, 30 perches.
  Purpose of lease: Garden (vegetable and nursery).
  Term of lease: Sept. 1962 to Dec. 1989.
- Government Gazette of the State of NSW (Sydney) *Notification under the Public Roads Act, 1902, of Resumptions and Withdrawals of Lands for Roads, Resumptions and Withdrawals of Severed Lands of Declaration of Roads to be Public Roads and of Closing* Issue 12, January 1970. Frank Danelutti. Land withdrawn 1 acre 3 roods 25 perches, being part of Special Lease 62-15 and being part portion 119.

Previous reports

Habitat Planning (2022) Hay Structure Plan. Ref: 21138.

The Hay Structure Plan implements the recommendations of the Hay Local Strategic Planning Statement (2020), which will guide land use planning decisions for residential, rural residential and industrial development within Hay for the next 20 years.

- The Structure Plan has identified the need to rezone more land for industrial (employment) purposes. In response, the Structure plan has identified the South Hay Industrial precinct for additional industrial land supply.
- The South Hay Industrial Precinct is located to the south of Moama Street/Sturt Highway.
- The recommended rezoning of this land for industrial purposes is consistent with the environmental constrains of the land and surrounding land uses.
- The properties are currently zoned RU1 Primary Production with a minimum lot size of 90 hectares.
- All the properties are largely unconstrained (with the exception of bushfire), and the topography of the land is generally flat. Vegetation on-site is largely non-native.
- Infrastructure and services including water and sewerage can be made available to these precincts via an extension from the main urban area.
- The South Hay Industrial Precinct will cater for large scale and heavy industrial developments (>1ha in size).
- In total, the future subdivision of this land based on the proposed zoning and minimum lot size recommendations of this Strategy could increase the supply of IN1 (E4) General Industrial zoned lots by up to approximately 200 lots based on a 1ha minimum lot size. This equates to 80 years' worth of industrial land supply based on current industrial land take-up rates.

Aerial photographs and satellite images

McMahon observed the following from a review of the available aerial photography.

1962 – The site forms part of a larger paddock. Trees are scattered across the site. A faint path from all directions crosses in the approximate centre of the site. The surrounding land is agricultural with some residential development existing to the north of Moama Street.

1973 – The site has been divided into its current lot. The site has been cleared of trees.

1989 – The eastern half of the site has been established with what appears to be a vineyard.

1993 – The site has been divided into three paddocks with access via University Road to the west.

2002 – The whole site has been established as a vineyard.

2007 – No change from 2002.

2010 – The vineyard has been removed from the eastern half of the site. A bonfire is visible in the approximate centre of the site.

2011 – No change from 2010.

2013 – No change from 2011.

2015 – Remnants of a small bonfire is visible in the approximate centre of the site.

2017 – No change from 2015.

2018 – No change from 2017.

2020 – No change from 2018.

The aerial photographs and satellite images can be seen in **Attachment B**.

6.0 Site condition and surrounding environment

McMahon notes the following observations of the site condition as part of this PSI.

- The site is located on a broad alluvial plain with cracking reddish brown high plastic clay soil.
- Access to the site is via University Road, with an irrigation channel and gate along this road.
- The site consists of mostly unimproved pasture with less than half of the site having been established as a vineyard (currently dead).
- There are no improvements on site other than boundary farm fencing and the irrigation infrastructure.
- Remnants of a bonfire was observed in the centre of the site and appeared to consist of burnt fencing.
- A shallow channel enters the site along the northern boundary, travels south along the eastern boundary and then west along the southern boundary.
- Surrounding land uses include residential to the north, agricultural to the east and south and industrial and agricultural land to the west. Tapper Agri Services (agricultural supplies) is to the west, across University Road.

Maps of the site features can be seen in **Attachment C**.

Site photographs can be seen in **Attachment D**.

A summary of the site environmental setting is as follows.

Topography

The site is located the broad level Riverine Plains at an elevation of approximately 90m AHD.

Vegetation

The site is currently mostly unimproved pasture with part of the site established as a vineyard.

Natural Resources Sensitivity

A search of the Hay Local Environment Plan (2011) found the site is mapped as being in a natural resource sensitivity area for groundwater vulnerability. The site is not mapped as being in a natural resource sensitivity area for terrestrial biodiversity or riparian lands and waterways.

Weather

The average rainfall for Hay is around 360mm per annum, with the rainfall spread fairly evenly throughout the year. Hay is characterised by cold winters and hot summers.

Hydrology

An irrigation channel follows the north and south boundary and runs north south through the eastern half of the site. The Murrumbidgee River is located approximately 410m north from the approximate centre of the site. The irrigation channel joins the Murrumbidgee River approximately 710m to the north east of the site. The site is not mapped as being in a flood planning area.

Soil

Soils are cracking brown highly plastic clay topsoils overlying cracking reddish brown highly plastic clay subsoil.

Geology

The geology is the broad level Riverine Plains of Cainozoic/Quaternary alluvium. The alluvium overlies Palaeozoic and Mesozoic rocks that form the bedrock at around 300m deep.

Hydrogeology

There are no registered groundwater bores on site, but nearby bores and the Lower Murrumbidgee Groundwater Report (NSW DPIE, 2021) suggests there are two groundwater sources beneath the site. One being the shallow Shepparton Formation to around 40m depth consisting of poorly sorted and interbedded gravels, sands, and clays, while the other is the deeper Calivil Formation and Renmark Group from 40m to bedrock. The Shepparton Formation is typically a low productivity aquifer system and it generally not used as resource in the locale.

7.0 Sampling and analysis quality plan and sampling methodology

The Data Quality Objectives (DQOs) of the site assessment have been developed to define the type and quality of data to meet the project objectives. The DQOs have been developed generally in accordance with the seven step DQO process as outlined in AS 4482.1 (2005) and the USA EPA Guidance on Systematic Planning Using the Data Quality Objectives Process (2006a). These DQOs are as follows:

1. **The problem**
2. **The goal of the study**
3. **Information inputs**
4. **Study boundaries**
5. **The analytical approach**
6. **Performance and acceptance criteria**
7. **Obtaining data**

These objectives have been further outlined in the following sections.

DQO 1 - The problem

Potential contamination from previous land use may be present across the site and insufficient data relating to this source is available to determine land use suitability and the need for further investigation with the necessary level of confidence.

DQO 2 - The goal of the study

Goals of the study include:

- Undertake limited investigations, based on the data gaps to determine if there is pesticide contamination within the soil associated with the identified contamination sources.
- Determine if any contamination, should it be identified, poses a risk to current and/or future receptors at the site or within potential exposure pathways from the site, and if further investigation is required.
- Determining whether the site is currently, or can be made, suitable for the proposed development regarding contamination.

DQO 3 - Information inputs

- Desktop data including site inspections, site condition, history, geology, hydrogeology, and laboratory analysis to characterise the site.
- Observational data including visual and olfactory conditions obtained from the sampling.
- Analytical data relative to the assessment criteria.

DQO 4 - Study boundaries

- Intrusive investigation across the site.
- Temporal boundaries are limited to the proposed fieldwork timeframes in the third quarter of the year 2023.

DQO 5 - The analytical approach

Samples will be tested for heavy metals and organochlorine and organophosphate pesticides that may be persistent in the soil from the sites historical land use.

DQO 6 - Performance and acceptance criteria

Specific limits for the investigation are in accordance with the appropriate guidance made or endorsed by state and national regulations, appropriate data quality indicators, and industry standard procedures for field sampling and handling. To assess the validity of data for decision making, the data is assessed against a set of data quality indicators, the following predetermined data quality indicators have been adopted.

The key decision rules for the investigation are:

1) Has the analytical data been collected as part of the testing and met the data quality indicators? If they have then the data can be used to answer the decision rule/s and the decision statements developed in Step 2 of the DQOs. If not, then the need to collect additional data may be required.
2) Do contaminant concentrations exceed the investigation and screening criteria? If not, then the potential contamination does not pose an above low level of risk. Where results exceed the investigation and screening criteria, this may indicate an unacceptable level of risk. Further risk assessment and investigations may be warranted to determine the potential for impacts.

The key decision errors for the investigation are:

i. deciding that the site is contaminated when it truly is not.
ii. deciding that the site is not contaminated when it truly is.

The true state of nature for decision error (i) is that the site is not contaminated.
The true state of nature for decision error (ii) is that the site is contaminated.

The site assessment criteria were specifically derived and incorporate the following:

- The samples are not composited so the direct reading of contaminant levels will be found from each sample point on which an appropriate decision can be based off.
- The duplicate sample should have a Relative Percentage Difference (RPD) of <30%.
- The rinsate sample should return negligible concentrations for all parameters tested to ensure an appropriate sampling and decontamination procedure.
- If contaminant levels exceed the Tier 1 and statistical assessment criteria further investigation, assessment and management may be required.

Specific Tier 1 assessment criteria can be seen below, **Table 1**.

Table 1: *Assessment criteria*

Material	Analytes	Criteria
Soil	Heavy metals Pesticides	**Health Investigation Levels (HILs)** -Commercial/Industrial D NEPM (2013) -Table 1A(1) Heavy metals and pesticides -Soils within 3m of surface **Added Contaminants Limits (ACLs)** -Commercial/Industrial D NEPM (2013) -Table 1B(1) Zinc -Table 1B(2) Copper -Table 1B(3) Nickel -Table 1B(4) Lead -Soils within 2m of surface -pH of 7.0 ($CaCl_2$) and CEC of 20 assumed from local knowledge **Environmental Investigation Levels (EILs)** -Commercial/Industrial D NEPM (2013) -Table 1B(5) Arsenic and pesticides -Soils within 2m of surface **Ecological Screening Levels (ESLs)** -Commercial/Industrial D NEPM (2013) -Clay soils within 2m of surface

The Tier 1 assessment criteria are used as an initial screening of the data to determine whether further assessment is required. Where above criteria exceedance indicates a risk to human health or the environment, site specific risk assessment, statistical analysis, management, or remediation will be undertaken or recommended as appropriate.

DQO 7 - Obtaining data

The sampling pattern and strategy identifies the occurrence of potential contamination for suitable site characterisation. The sampling pattern and strategy has been devised based on site history, land uses, aerial imagery, site inspections, previous investigations and the NEPM (2013). The sampling pattern has been described in more detail below.

Sampling strategy and pattern

A systematic sampling pattern has been chosen based on potential contamination sources, previous land use, and requirements to delineate potential contamination. The adopted sampling pattern is suitable to make a quantitative statement about the level of confidence regarding the quality and accuracy of results. McMahon assesses that the sampling pattern is suitable to be used for decision making and site characterisation.

Key features of the sampling pattern include:

- 8 systematic soil sample locations taken across the site. Samples will be analysed for heavy metals and pesticides (organochlorines and organophosphates).
- One soil duplicate sample.
- One soil rinsate sample.

By reference to the DQOs, maps of the investigation locations can be seen in **Attachment E**.

Sampling design justification

- Samples 1 - 8: to assess the near surface soil contamination from potential persistent pesticides from diffuse application.

Failure to meet objectives procedure

If the procedures undertaken do not satisfy the expected data quality objectives, a review of the sampling plan will be conducted prior to any further works.

Sampling and analysis methodology

The sampling officer wore unused disposable nitrile gloves to extract samples directly from the excavated pit to place into appropriately preserved sample receptacles. Collected sample containers were placed into a chilled esky for preservation prior to analysis. All in-field observations and any relevant comments are detailed in the field sheets and a Chain of Custody form was produced to accompany the samples to the laboratory.

Sampling standards

Sampling was undertaken by reference to:

- AS 4482.1:2005 - Guide to the investigation and sampling of sites with potentially contaminated soil Part 1: Non-volatile and semi-volatile compounds.
- AS 4482.2:1999 - Guide to the sampling and investigation of potentially contaminated soil Part 2: Volatile substances.

Although these standards have been recently withdrawn, they have been used in the absence of other national guidelines.

8.0 Results

The site inspection and sampling for this PSI was conducted over one day on 15 June 2023. The weather was cool with light winds. A summary of the field observations and sample analytical results are as follows.

Soil and site surface

- Soils are cracking brown highly plastic clay topsoils overlying cracking reddish brown highly plastic clay.
- There were no visual or olfactory indicators of chemical contamination on site.

Soil analysis

- Heavy metals are below the Limits of Reporting (LORs) and/or the adopted criteria.
- Pesticides are below LORs and the adopted criteria.

Quality control and quality assurance results

- The duplicate sample (5) returned relative percent differences of <30%.
- The rinsate sample retuned results below the laboratory limit of reporting.
- There were no laboratory outliers.
- Based on the above, the field and laboratory quality control and quality assurance is of a suitable quality to rely upon the results.

Tabulated results can be seen in **Attachment F**.

Laboratory reports can be seen in **Attachment G**.

9.0 Conceptual site model

A conceptual site model is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors and is presented and follows.

Summary

The site has been used for agriculture/horticulture as far as records can ascertain. Chemicals associated with pesticide use may have accumulated in the soil. Receptors include future construction workers, site users, and the environment. Pathways are from soil disturbance during development and occupation. Short to medium-term soil contact is likely for future construction workers, and long-term soil contact is possible for future occupants.

Potential and known sources of contamination

- Persistent pesticides.

List of chemicals of potential concern

From the potential contamination sources, the Chemicals of Potential Concern (COPCs) are as follows:

- Heavy metals and pesticides.

Mechanism of contamination

The mechanism of contamination is predominantly top-down vertical and lateral migration into soil.

Potentially affected environmental media

- Soil.
- Surface water.
- Groundwater is unlikely to be impacted owing to the deep depths.

Consideration of spatial and temporal variations

Spatial variation in potential contamination is possible. Temporal variation is unlikely owing to the aged nature of potential contaminants.

Actual or potential exposure pathways

- Direct skin contact with soil for future construction workers, and future on-site occupants.
- Inhalation and/or ingestion of soil, vapour, and dust.
- Direct surface water contact.
- Groundwater ingestion.

Human and ecological receptors

- Future on-site users.
- Construction workers.
- Domestic groundwater users. No domestic groundwater bores currently exist on site.
- Down gradient ecological receptors.
- Future landscaping and ecological receptors.

Frequency of exposure

- Construction workers are assessed to be a short-term exposure risk.
- Future on-site users are assessed to have a long-term exposure risk.
- Future groundwater users are a medium to long-term exposure risk.
- Ecological receptors are assessed to be a medium to long-term exposure risk.

Source pathway receptor linkage assessment

- Future on-site construction workers have a risk of contact with potentially contaminated during construction and maintenance.
- Future on-site users have a risk of dermal contact with potentially contaminated soil during occupation and maintenance.
- Future on-site users have a risk of inhalation of potentially contaminated soil and dust.
- Groundwater use is unlikely.
- On site ecological receptors are limited at present but this could change with landscaping and land use.
- There is a low risk to down gradient ecological receptors from the migration of potentially contaminated surface water and groundwater as no gross soil contamination was found.
- The site is assessed to be suitable for the development given the adoption of the recommended site management strategies during development.

Discussion of multiple lines of evidence

A multiple lines of evidence approach is the process for evaluating and integrating information from different sources of data and uses best professional judgement to assess the consistency and plausibility of the conclusions which can be drawn, NEPM (2013).

Definitive information concerning the sources of potential contamination on site is satisfactory therefore the risk assessment relies heavily on the information provided by this PSI and is supplemented by data collected during sampling.

10.0 Conclusions and recommendations

This investigation met the objective of investigating and assessing potential contamination and providing a statement of site suitability for the proposed land use and an appropriate risk assessment framework for the management of the site during development.

The results of the investigation conclude that the identified potential contamination sources are assessed to be of low significance in terms of risk to current and future site users and the site is suitable for the proposed development.

The remnants of the bonfire are recommended to be classified in line with the NSW EPA (2014) Waste Classification Guidelines and disposed of at an appropriately licence landfill.

Although no filled gullies and dams were identified as part of this PSI, it is not uncommon to find these on agricultural/horticultural land. Care must be taken to identify and evaluated unexpected finds such as these during development under the unexpected finds protocol in **Section 12.0**.

This executive summary and the findings of this PSI are subject to the limitations as stated in **Section 11.0**.

11.0 Limitations and disclaimer

DM McMahon Pty Ltd has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of TFA Project Group and only those third parties who have been authorised by DM McMahon Pty Ltd to rely on this report.

The information contained in this report has been extracted from field and laboratory sources believed to be reliable and accurate. DM McMahon Pty Ltd does not assume any responsibility for the misinterpretation of information supplied in this report. The accuracy and reliability of recommendations identified in this report need to be evaluated with due care according to individual circumstances. It should be noted that the recommendations and findings in this report are based solely upon the said site location and conditions at the time of assessment. The results of the said investigations undertaken are an overall representation of the conditions encountered. The properties of the soil, vapour and groundwater within the location may change due to variations in ground conditions outside of the assessed area. The author has no control or liability over site variability that may warrant further investigation that may lead to significant design and land use changes.

12.0 Unexpected findings

If any unconsolidated, odorous, stained, or deleterious soils, or suspect bonded/friable/fibrous asbestos containing material, fuel tanks, or septic systems are encountered during any further excavation, suspected historical contaminating activities are encountered, or conditions that are not alike the above descriptions, the site supervisor should be informed, the work stopped, and this office be contacted immediately for further evaluation by an appropriately qualified environmental consultant. The unexpected findings may trigger the need for more investigation and assessment dependant on the scope and context of the unexpected finding.

13.0 Notice of Copyright

14.0 Attachments

Attachment A : *Site location and proposed development plan*

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report No. 9404
Google Earth image 2020

Legend
Boundary

Cadell St
Hay
B64
B75
Murrumbidgee River
Hay South
A20
A20
A20
Sturt Hwy
Murrumbidgee River
N
1 km
Google Earth
Image © 2023 CNES / Airbus

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report No. 9404
Google Earth image 2020

Legend
Boundary

Miller St
A20
Sturt Hwy
Moama St
University Rd

Google Earth
Image © 2023 CNES / Airbus

N

100 m

R.P.D.
LOT 2
DP1212081
AREA APPROX 42,055m²

STURT HIGHWAY

SIGNPOST

POWER POLE
STRAINER POLE

UNIVERSITY ROAD

SPEED SIGN

A
A03

50000

114400

40m² DISPERSAL AREA FOR TREATED WATER FROM ABLUTION BLOCK. AREA TO BE DESIGNED AND SYSTEM INSTALLED TO COMPLY WITH RELEVANT CODES AND DEVELOPMENT APPROVALS.

ALL WEATHER ROAD BASE

PROPOSED LEASE AREA
APPROX. 6892m²

6m HIGH PYLON SITE SIGN

ENTRY ONLY SIGN
600W x 600H

ENTRY ONLY SIGN
2150W x 600H

B
A03

20600

PROPOSED ONSITE SEWAGE TREATMENT SYSTEM

ABLUTION BLOCK

3340

60000

85/7kL DIES/ADB.

EXIT ONLY SIGN
2150W x 600H

EXIT ONLY SIGN
600W x 600H

46700

CONCRETE APRON SLAB AT FILLING POINTS TYPICAL TO DRAIN TO SPILL CONTAINMENT TO COUNCIL'S SATISFACTION.

85kL DIESEL / 7kL ADBLUE DOUBLE WALL TANK

ALL WEATHER ROAD BASE

iOR PETROLEUM

Scale Bar
10 0 10 20 30 40 50m
Metres
Figured dimensions to be taken in preference to scale readings.

revision	date	by	description	checked
1	21.11.19	DGC	PRELIMINARY FOR CLIENT REVIEW	

PROJECT MANAGERS | DESIGNERS | PLANNERS | ENGINEERS
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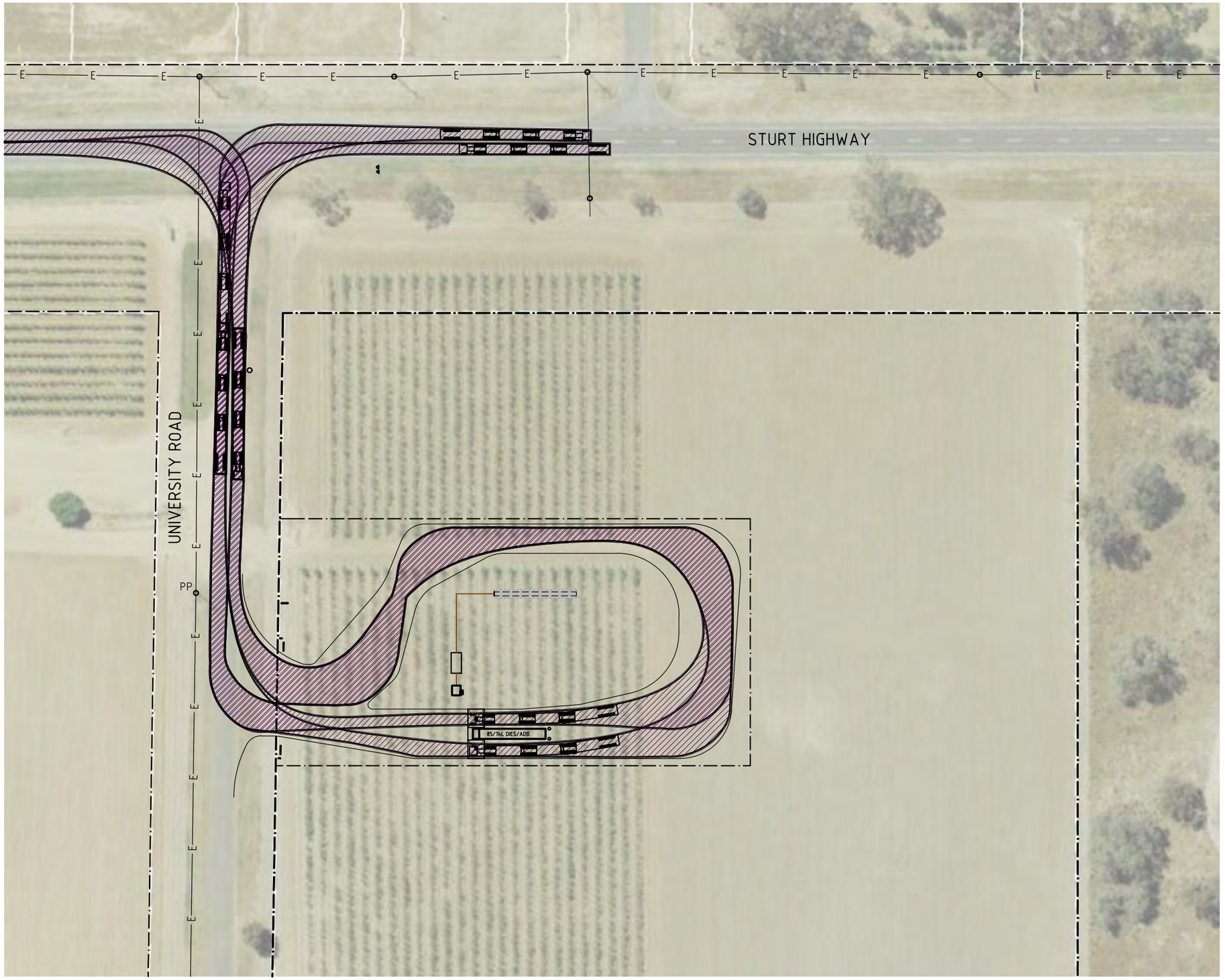
TfA Project Group

project
iOR PETROLEUM
UNMANNED TRUCK STOP
UNIVERSITY ROAD,
HAY SOUTH,
NEW SOUTH WALES

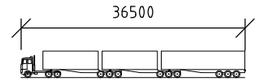
title
PROPOSED SITE LAYOUT

drawn	approved	date created	A1 scale	A3 scale
DGC	QC	21.11.19		1:1000

status	drawing no.	rev.
PRELIMINARY	19297–HAY–D01	1



R.P.D.
LOT 2
DP1212081
AREA APPROX 42,055m²



B-TRIPLE ELEVATION

iOR PETROLEUM

Scale Bar

10 0 10 20 30 40 50m

Metres

Figured dimensions to be taken in preference to scale readings.

revision	date	by	description	checked
A	21.11.19	DGC	PRELIMINARY FOR CLIENT REVIEW	

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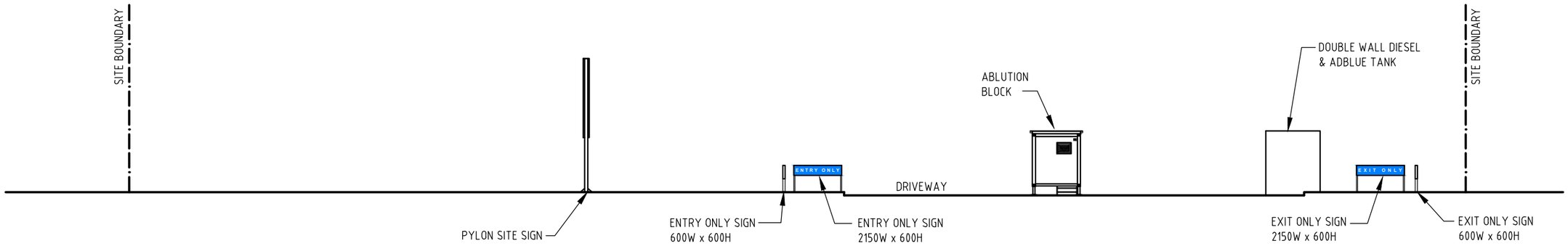
NEW SOUTH WALES

title
VEHICLE TURNING PATHS

drawn	approved	date created	A1 scale	A3 scale
DGC		21.11.19		1:1000

status	drawing no.	rev.
PRELIMINARY	19297–HAY–D02	1

A D01 ELEVATION
1:200



B A02 ELEVATION
1:200

iOR PETROLEUM

Scale Bar

2 0 5 10m

Metres

Figured dimensions to be taken in preference to scale readings.

revision	date	by	description	checked
A	20.11.19	DGC	PRELIMINARY FOR CLIENT REVIEW	

PROJECT MANAGERS | DESIGNERS | PLANNERS | ENGINEERS
Head office - 17 Dover Street, Albion QLD 4010 Australia
Email: enquiry@tfa.com.au Ph. 61 7 3854 2900 Fax. 61 7 3854 2999

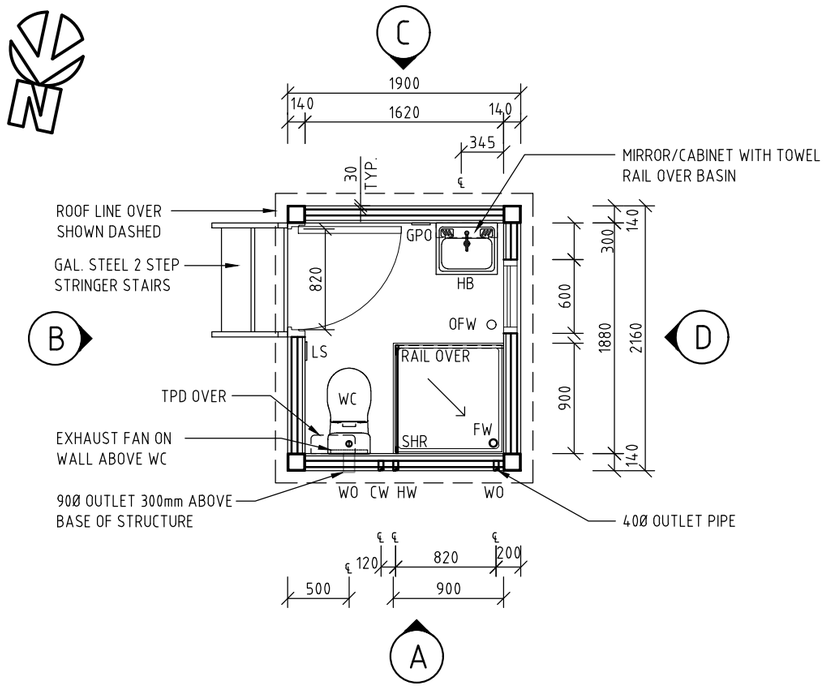
TFA Project Group

project
iOR PETROLEUM
UNMANNED TRUCK STOP
UNIVERSITY ROAD,
HAY SOUTH,
NEW SOUTH WALES

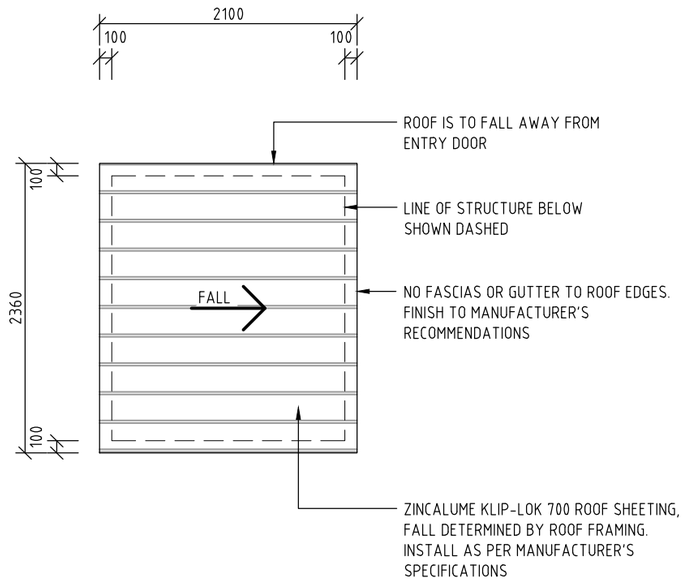
title
PROPOSED SITE ELEVATIONS

drawn	approved	date created	A1 scale	A3 scale
DGC		21.11.19		1: 200

status	drawing no.	rev.
PRELIMINARY	19297–HAY–D03	1



FLOOR PLAN



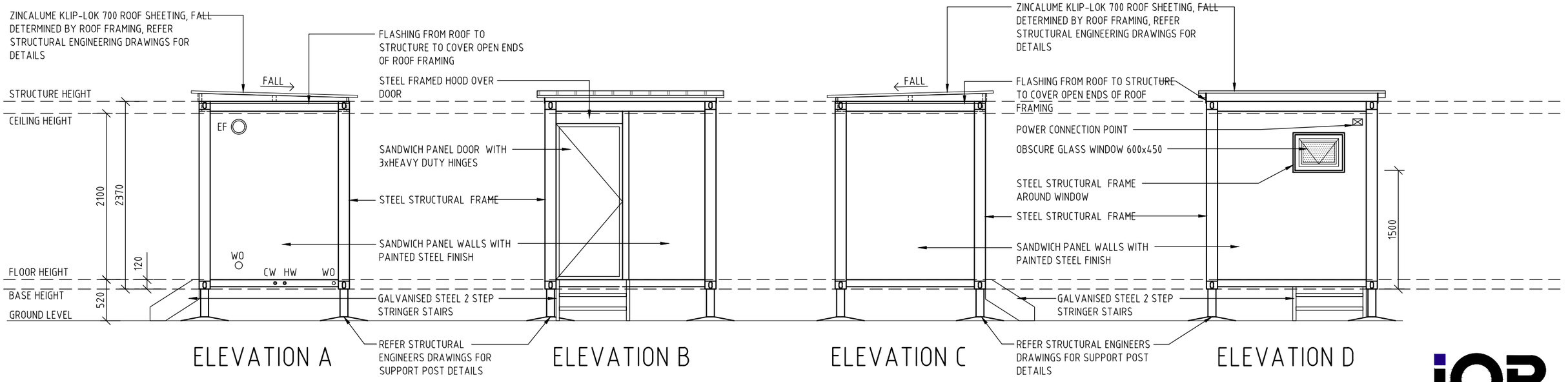
ROOF PLAN

NOTES

1. ALL SERVICES TO BE CONCEALED, RUN BELOW FLOOR OR IN WALL/ CEILING CAVITIES.
2. THE CONTRACTOR IS TO VERIFY ON SITE THAT THE INVERT & SERVICE LEVELS & REQUIRED COVER OVER DRAINAGE LINES ARE OBTAINABLE BEFORE COMMENCING WORKS.
3. ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE BY-LAWS & THE REQUIREMENTS OF THE LOCAL BUILDING & PLUMBING INSPECTOR. ENSURE MATERIALS MEET THE FIRE RATING REQUIREMENTS OF THE QLD BUILDING CODE OF AUSTRALIA.
4. THESE DRAWINGS MUST BE READ IN CONJUNCTION WITH THE ARCHITECTS / DESIGNERS COUNCIL OR CERTIFIERS APPROVED BUILDING DRAWINGS.
5. FINISHED FLOOR LEVELS DETERMINED BY ON SITE CONDITIONS. REFER CIVIL & STRUCTURAL DESIGN FOR LEVELS, FOOTINGS AND STAIR REQUIREMENTS.

LEGEND

CW	COLD WATER CONNECTION
EF	EXHAUST FAN
FW	FLOOR WASTE
GPO	POWER OUTLET SINGLE
HB	HAND BASIN
HW	HOT WATER CONNECTION
HWU	HOT WATER UNIT
LS	LIGHT SWITCH
OFW	OVERFLOW FLOOR WASTE
ORG	OVERFLOW RELIEF GULLY
SHR	SHOWER
TPD	TOILET PAPER DISPENSER
WC	WATER CLOSET
WO	WASTE OUTLET



iOR PETROLEUM

Scale Bar

0.5 0 0.5 1 1.5 2 2.5m

Metres

Figured dimensions to be taken in preference to scale readings.

revision	date	by	description	checked
1	21.11.19	DGC	PRELIMINARY FOR CLIENT REVIEW	

PROJECT MANAGERS | DESIGNERS | PLANNERS | ENGINEERS
Head office - 166 Knapp St, Fortitude Valley QLD 4006 Australia
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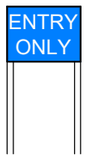
TfA Project Group

project
iOR PETROLEUM
UNMANNED TRUCK STOP
UNIVERSITY ROAD,
HAY,
NEW SOUTH WALES

title
ABLUTIONS – FLOOR PLAN, ROOF PLAN & ELEVATIONS

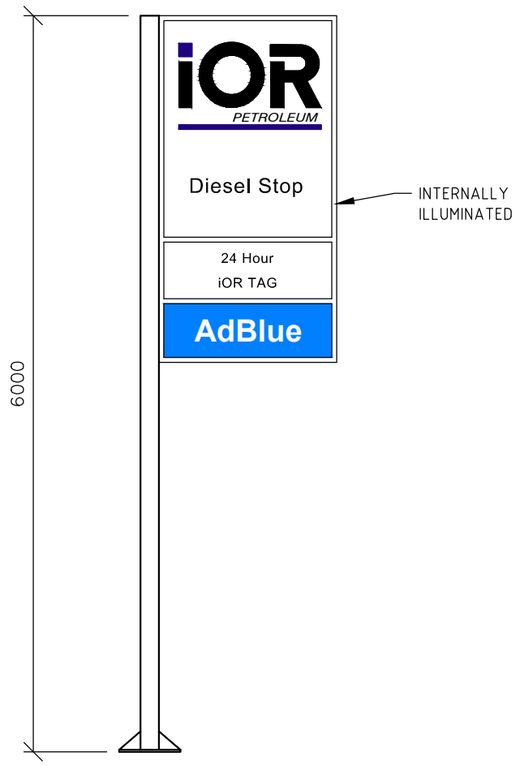
drawn	approved	date created	A1 scale	A3 scale
DGC		21.11.19	1: 25	1: 50

status	drawing no.	rev.
PRELIMINARY	19297–HAY–D04	1



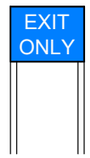
ENTRY ONLY SIGN
600W x 600H
1:50

ENTRY ONLY SIGN
2150W x 600H
1:50



6m HIGH PYLON SITE
SIGN
1:50

EXIT ONLY SIGN
2150W x 600H
1:50



EXIT ONLY SIGN
600W x 600H
1:50

Scale Bar

0.5 0 0.5 1 1.5 2 2.5m

Metres

Figured dimensions to be taken in preference to scale readings.

revision	date	by	description	checked
A	21.11.19	DGC	PRELIMINARY FOR CLIENT REVIEW	

PROJECT MANAGERS | DESIGNERS | PLANNERS | ENGINEERS
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TfA Project Group

project
iOR PETROLEUM
UNMANNED TRUCK STOP
UNIVERSITY ROAD,
HAY SOUTH,
NEW SOUTH WALES

title
PROPOSED SIGNAGE DETAILS

drawn	approved	date created	A1 scale	A3 scale
DGC		21.11.19		1:50

status	drawing no.	rev.
PRELIMINARY	19297–HAY–D05	1

iOR PETROLEUM

Attachment B : *Aerial photographs and satellite images*

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report No. 9404
NSW LPI image 1962

Legend
Boundary

Miller St
A20
Sturt Hwy
Moama St
University Rd
N
100 m
Google Earth
Image © 2023 CNES / Airbus

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report No. 9404
NSW LPI image 1973

Legend
Boundary

Miller St
A20
A20
Sturt Hwy
Moama St
University Rd

Google Earth
Image © 2023 CNES / Airbus

N

100 m

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report No. 9404
NSW LPI image 1989

Legend
Boundary

Miller St
A20
A20
Sturt Hwy
Moama St
University Rd
N
100 m
Google Earth
Image © 2023 CNES / Airbus

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report No. 9404
NSW LPI image 1993

Legend
Boundary

Miller St
Sturt Hwy
A20
Moama St
University Rd
N
100 m
Google Earth
Image © 2023 CNES / Airbus

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report No. 9404
Google Earth image 2002

Legend
Boundary

Miller St
A20
A20
Sturt Hwy
Moama St
University Rd
N
100 m
Google Earth
Image © 2023 Maxar Technologies

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report No. 9404
Google Earth image 2007

Legend
Boundary

Miller St
A20
A20
Sturt Hwy
Moama St
University Rd

N

100 m

Google Earth
Image © 2023 Maxar Technologies

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report No. 9404
Google Earth image 2010

Legend
Boundary

Miller St
A20
A20
Sturt Hwy
Moama St
University Rd
N
100 m
Google Earth
Image © 2023 Maxar Technologies

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report No. 9404
Google Earth image 2011

Legend
Boundary

Miller St
A20
A20
Sturt Hwy
Moama St
University Rd

N
100 m

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report No. 9404
Google Earth image 2013

Legend
Boundary

Miller St
A20
A20
Sturt Hwy
Moama St
University Rd

N

100 m

Google Earth
Image © 2023 CNES / Airbus

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report No. 9404
Google Earth image 2015

Legend
Boundary

Miller St
A20
A20
Sturt Hwy
Moama St
University Rd

N
100 m

Google Earth
Image © 2023 Maxar Technologies

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report No. 9404
Google Earth image 2017

Legend
Boundary

Miller St
A20
A20
Sturt Hwy
Moama St
University Rd
N
100 m
Google Earth
Image © 2023 Maxar Technologies

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report No. 9404
Google Earth image 2018

Legend
Boundary

Miller St
A20
A20
Sturt Hwy
Moama St
University Rd

N
100 m

Google Earth
Image © 2023 CNES / Airbus

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report No. 9404
Google Earth image 2020

Legend
Boundary

Miller St
A20
Sturt Hwy
Moama St
University Rd

N
100 m

Attachment C : *Site features*

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report. No. 9404
Google Earth image 2020

Legend

- Boundary
- Irrigation channel

Sturt Hwy
A20
Moama St
Miller St
Access gate
Irrigation gate
Access gate
Bonfire
Google Earth
Image © 2023 CNES / Airbus
N
100 m

Attachment D : *Site photographs*

Photograph 1: The cracking clay.

Photograph 2: Access gate to University Road.

Photograph 3: Irrigation channel and gate along University Road.

Photograph 4: Unimproved pasture with the vineyard in the background (facing east).

Photograph 5: Vineyard (facing north west). Tapper Agri Services can be seen in the background.

Photograph 6: Remnants of the bonfire in the centre of the site.

Attachment E : *Sampling map*

310 Moama Street Hay NSW 2711

Preliminary Site Investigation
Report. No. 9404
Google Earth image 2020

Legend

- Boundary
- Investigation locations

Miller St
A20
Sturt Hwy
Moama St
University Rd
1
2
3
4
5
6
7
8
N
100 m
Google Earth
Image © 2023 CNES / Airbus

Attachment G : *Tabulated results*

Page: 1 of 1
Job number: 9404
Project: 310 Moama Street Hay

	Sample date	6/7/23	6/7/23	6/7/23	6/7/23	6/7/23	6/7/23	6/7/23	6/7/23	-	-	-	-						
	Sample location	Paddock	Paddock	Paddock	Paddock	Paddock	Paddock	Paddock	Paddock	-	-	-	-						
	Sample ID	1	2	3	4	5	6	7	8	-	-	-	-						
	Sample depth (m)	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	-	-	-	-						
Compound	**LOR**	**Unit**	Result	Result	Result	Result	Result	Result	Result	Result	-	-	-	-	**HILs**	**HSLs**	**ACLs**	**EILs**	**ESLs**
Arsenic	5	mg/kg	5	<5	<5	<5	6	6	5	<5	-	-	-	-	3000	-	-	160	-
Cadmium	1	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-	-	900	-	-	-	-
Chromium	2	mg/kg	29	29	29	28	35	34	31	34	-	-	-	-	-	-	660	-	-
Copper	5	mg/kg	30	41	39	35	38	41	44	44	-	-	-	-	240000	-	320	-	-
Lead	5	mg/kg	14	14	14	14	17	17	16	16	-	-	-	-	1500	-	1800	-	-
Nickel	2	mg/kg	24	24	24	23	24	24	25	24	-	-	-	-	6000	-	460	-	-
Zinc	5	mg/kg	46	48	46	44	50	52	51	54	-	-	-	-	400000	-	1100	-	-
Mercury	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	730	-	-	-	-
PCBs	0.1	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-
HCB	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	-	-	80	-	-	-	-
Heptachlor	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	-	-	50	-	-	-	-
Chlordane	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	-	-	530	-	-	-	-
Endrin	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	-	-	100	-	-	-	-
Endosulfan	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	-	-	2000	-	-	-	-
Aldrin+dieldrin	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	0.99	<0.05	<0.05	-	-	-	-	45	-	-	-	-
DDT+DDE+DDD	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	0.98	<0.05	<0.05	-	-	-	-	3600	-	-	-	-
Chlorpyrifos	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	-	-	2000	-	-	-	-
Phenols	0.5	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	240000	-	-	-	-
PAHs	0.5	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	4000	-	-	-	-
Benzo(a)pyrene	0.5	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-				
Benzo(a)pyrene TEQ (half LOR)	0.5	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	40	-	-	-	0.7
TRH C6-C10 minux BTEX (F1)	10	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	310	-	-	215
TRH C10-C16 minus napthalene (F2)	50	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	170
TRH C16-C34 (F3)	100	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2500
TRH C34-C40 (F4)	100	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6600
Benzene	0.2	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	95
Toluene	0.5	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	135
Ethylbenzene	0.5	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	185
Xylenes	0.5	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	95
Napthalene	1	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	370	-

Commercial/Industrial (D) Criteria

Attachment H : *Laboratory reports*

CERTIFICATE OF ANALYSIS

Work Order	: **ES2322626**	Page	: 1 of 8
Client	: **DM MCMAHON PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR DAVID MCMAHON	Contact	: Customer Services ES
Address	: 6 JONES ST Wagga Wagga NSW, AUSTRALIA 2650	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 6931 0510	Telephone	: +61-2-8784 8555
Project	: 310 Moama Street Hay	Date Samples Received	: 07-Jul-2023 10:50
Order number	: 9404	Date Analysis Commenced	: 10-Jul-2023
C-O-C number	: ----	Issue Date	: 13-Jul-2023 11:40
Sampler	: D. McMahon		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 10		
No. of samples analysed	: 10		

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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

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.

- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	1	2	3	4	5
			Sampling date / time	06-Jul-2023 00:00	06-Jul-2023 00:00	06-Jul-2023 00:00	06-Jul-2023 00:00	06-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	ES2322626-001	ES2322626-002	ES2322626-003	ES2322626-004	ES2322626-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**20.2**	**20.5**	**18.7**	**19.1**	**22.5**
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	**6**
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	**29**	**29**	**29**	**28**	**35**
Copper	7440-50-8	5	mg/kg	**30**	**41**	**39**	**35**	**38**
Lead	7439-92-1	5	mg/kg	**14**	**14**	**14**	**14**	**17**
Nickel	7440-02-0	2	mg/kg	**24**	**24**	**24**	**23**	**24**
Zinc	7440-66-6	5	mg/kg	**46**	**48**	**46**	**44**	**50**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	1	2	3	4	5
				Sampling date / time	06-Jul-2023 00:00	06-Jul-2023 00:00	06-Jul-2023 00:00	06-Jul-2023 00:00	06-Jul-2023 00:00
Compound	CAS Number	LOR	Unit		ES2322626-001	ES2322626-002	ES2322626-003	ES2322626-004	ES2322626-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**96.2**	**99.8**	**89.7**	**108**	**89.8**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**82.2**	**87.3**	**75.0**	**88.4**	**77.9**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	6	7	8	Duplicate	----
			Sampling date / time	06-Jul-2023 00:00	06-Jul-2023 00:00	06-Jul-2023 00:00	06-Jul-2023 00:00	----
Compound	CAS Number	LOR	Unit	ES2322626-006	ES2322626-007	ES2322626-008	ES2322626-009	--------
				Result	Result	Result	Result	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**22.2**	**21.2**	**22.5**	**22.1**	**----**
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**6**	**5**	<5	**5**	**----**
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	**----**
Chromium	7440-47-3	2	mg/kg	**34**	**31**	**34**	**36**	**----**
Copper	7440-50-8	5	mg/kg	**41**	**44**	**44**	**38**	**----**
Lead	7439-92-1	5	mg/kg	**17**	**16**	**16**	**17**	**----**
Nickel	7440-02-0	2	mg/kg	**24**	**25**	**24**	**24**	**----**
Zinc	7440-66-6	5	mg/kg	**52**	**51**	**54**	**50**	**----**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	**----**
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	**----**	**----**
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	<0.05	**----**	**----**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	6	7	8	Duplicate	----
			Sampling date / time	06-Jul-2023 00:00	06-Jul-2023 00:00	06-Jul-2023 00:00	06-Jul-2023 00:00	----
Compound	CAS Number	LOR	Unit	ES2322626-006	ES2322626-007	ES2322626-008	ES2322626-009	--------
				Result	Result	Result	Result	----
EP068A: Organochlorine Pesticides (OC) - Continued								
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	**103**	**93.3**	**99.6**	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**96.5**	**81.3**	**85.2**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Rinsate	----	----	----	----
				Sampling date / time	06-Jul-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2322626-010	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
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	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143

Chain of Custody

DM McMahon Pty Ltd
6 Jones Street
PO Box 6118, Wagga Wagga NSW 2650
Ph: (02) 69 310 510

Turnaround Requirements: ☑ Standard TAT ☐ Non Standard or Urgent TAT (List Due Date):

Relinquished by:	D. McMahon
Date:	6/07/2023
Signature:	DM
Received by:	Zac-S
Date:	7/7/23 10:50
Signature:	
Relinquished by:	
Date:	
Signature:	
Received by:	
Date:	
Signature:	

Analysing Laboratory:	ALS Environmental - Sydney
Project:	310 Moama Street Hay
Order No.:	9404
Project Manager:	David McMahon
Contact Ph:	(02) 69 310 510
Sampling Officer:	D. McMahon
Report Format:	Default
Email Reports to:	admin@dmmcmahon.com.au
Email Invoice to:	admin@dmmcmahon.com.au

For Laboratory Use Only (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice/ Frozen ice bricks present upon sample	Yes	No	N/A
Random sample temp on receipt:			°C
Other comments:			

QUOTE NO.:

Lab Comments:

COC SEQUENCE NUMBER

COC: 1 2 3 4 5 6 7 8
OF: 1 2 3 4 5 6 7 8

LAB USE	SAMPLE DETAILS			CONTAINER INFORMATION		ANALYSIS REQUIRED including suites (where metals are required, specify Total or Dissolved)										Additional Information
LAB ID	SAMPLE ID	DATE/TIME	MATRIX (ref below)	TYPE & PRESERVATIVE (see codes below)	TOTAL CONTAINERS	S-2 (metals)	S-12 (OCP/OPP)	W-2 (metals)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	1 to 8	6/07/2023	S	Jar	8	✓	✓									
2	Duplicate	6/07/2023	S	Jar	1	✓										
3	Rinsate	6/07/2023	W	NP	1			✓								
				TOTAL	10											

Environmental Division
Sydney
Work Order Reference
ES2322626

Telephone : +61-2-8784 8555

Matrix	Container Codes:
W- Water; S - Soil; Sed - Sediment; Sl - Sludge; A - Air; D - Dust.	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 : **ES2322626**

Client	: **DM MCMAHON PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR DAVID MCMAHON	Contact	: Customer Services ES
Address	: 6 JONES ST Wagga Wagga NSW, AUSTRALIA 2650	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: david@dmmcmahon.com.au	E-mail	: ALSEnviro.Sydney@ALSGlobal.com
Telephone	: 02 6931 0510	Telephone	: +61-2-8784 8555
Facsimile	: 02 6931 0511	Facsimile	: +61-2-8784 8500
Project	: 310 Moama Street Hay	Page	: 1 of 3
Order number	: 9404	Quote number	: EB2017DMMCMA0001 (EN/222)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: D. McMahon		

Dates

Date Samples Received	: 07-Jul-2023 10:50	Issue Date	: 07-Jul-2023
Client Requested Due Date	: 13-Jul-2023	Scheduled Reporting Date	: **13-Jul-2023**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 12.1'C - Ice Bricks present
Receipt Detail	: Hard Esky	No. of samples received / analysed	: 10 / 10

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 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 direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- 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 - S-02 8 Metals (incl. Digestion)	SOIL - S-12 OC/OP Pesticides
ES2322626-001	06-Jul-2023 00:00	1	✓	✓	✓
ES2322626-002	06-Jul-2023 00:00	2	✓	✓	✓
ES2322626-003	06-Jul-2023 00:00	3	✓	✓	✓
ES2322626-004	06-Jul-2023 00:00	4	✓	✓	✓
ES2322626-005	06-Jul-2023 00:00	5	✓	✓	✓
ES2322626-006	06-Jul-2023 00:00	6	✓	✓	✓
ES2322626-007	06-Jul-2023 00:00	7	✓	✓	✓
ES2322626-008	06-Jul-2023 00:00	8	✓	✓	✓
ES2322626-009	06-Jul-2023 00:00	Duplicate	✓	✓	

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - W-02T 8 metals (Total)
ES2322626-010	06-Jul-2023 00:00	Rinsate	✓

Proactive Holding Time Report

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

Requested Deliverables

ADMIN

- *AU Certificate of Analysis - NATA (COA)	Email	admin@dmmcmahon.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	admin@dmmcmahon.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	admin@dmmcmahon.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	admin@dmmcmahon.com.au
- A4 - AU Tax Invoice (INV)	Email	admin@dmmcmahon.com.au
- Chain of Custody (CoC) (COC)	Email	admin@dmmcmahon.com.au
- EDI Format - XTab (XTAB)	Email	admin@dmmcmahon.com.au

DAVID MCMAHON

- *AU Certificate of Analysis - NATA (COA)	Email	david@dmmcmahon.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	david@dmmcmahon.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	david@dmmcmahon.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	david@dmmcmahon.com.au
- A4 - AU Tax Invoice (INV)	Email	david@dmmcmahon.com.au
- Chain of Custody (CoC) (COC)	Email	david@dmmcmahon.com.au
- EDI Format - XTab (XTAB)	Email	david@dmmcmahon.com.au

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2322626**	Page	: 1 of 5
Client	: **DM MCMAHON PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR DAVID MCMAHON	Telephone	: +61-2-8784 8555
Project	: 310 Moama Street Hay	Date Samples Received	: 07-Jul-2023
Site	: ----	Issue Date	: 13-Jul-2023
Sampler	: D. McMahon	No. of samples received	: 10
Order number	: 9404	No. of samples analysed	: 10

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

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

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
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
1, 2, 3, 4, 5, 6, 7, 8, Duplicate	**06-Jul-2023**	**----**	----	----	**11-Jul-2023**	20-Jul-2023	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
1, 2, 3, 4, 5, 6, 7, 8, Duplicate	**06-Jul-2023**	**12-Jul-2023**	02-Jan-2024	✓	**12-Jul-2023**	02-Jan-2024	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
1, 2, 3, 4, 5, 6, 7, 8, Duplicate	**06-Jul-2023**	**12-Jul-2023**	03-Aug-2023	✓	**13-Jul-2023**	03-Aug-2023	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068)							
1, 2, 3, 4, 5, 6, 7, 8	**06-Jul-2023**	**10-Jul-2023**	20-Jul-2023	✓	**11-Jul-2023**	19-Aug-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
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068)							
1, 2, 3, 4, 5, 6, 7, 8	**06-Jul-2023**	**10-Jul-2023**	20-Jul-2023	✓	**11-Jul-2023**	19-Aug-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 Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
Rinsate	**06-Jul-2023**	**10-Jul-2023**	02-Jan-2024	✓	**10-Jul-2023**	02-Jan-2024	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
Rinsate	**06-Jul-2023**	**----**	----	----	**11-Jul-2023**	03-Aug-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)							
Moisture Content	EA055	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Pesticides by GCMS	EP068	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Pesticides by GCMS	EP068	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Pesticides by GCMS	EP068	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	5.00	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 Mercury by FIMS	EG035T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	18	5.56	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
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 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)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM Schedule B(3).
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.
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

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).
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)