Enirgi Power Storage Recycling Consolidation Project
Environmental Impact Statement
Appendix F - G

July 2018

Appendix F – Independed Audit of the Facility

Independent Environmental Audit

2018

"ENIRGI POWER RECYCLING FACILITY BOMEN NSW

FEBRUARY 2018

Document Verification

Project Title: "Enirgi Power Recycling Facility Bomen NSW

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CONTENTS

ACRONYMS AND ABBREVIATIONS

AQMP	Air Quality Management Plan
AEMR	Annual Environmental Monitoring Report
CAR	Corrective Action Request
DA	Development Approval
DP&E	NSW Department of Planning and Environment
EPA	Environmental Protection Authority
EPL	Environmental Protection Licence
WWCC	Wagga Wagga City Council
Ml	Megalitres
NMP	Noise Management Plan
NOW	NSW Office of Water
NSW	New South Wales
NVMP	Native Vegetation Management Plan
OFI	Opportunity for Improvement
OEMP	Operational Environmental Management Plan
OoC	Observation of Concern
POEO Act	Protection of the Environment Operations Act 1997
RMS	NSW Roads and Maritime Services (Formerly Roads and Traffic Authority)
SoC	Statements of Commitments for EIA
WMP	Waste Management Plan
SSWMP	Soil and Storm Water Management Plan

AUDITED ORGANISATION	**PROJECT**
Renewed Metal Technologies Pty Ltd.	Enirgi Power Storage Recycling
LOCATION OF AUDIT	**PROPOSED DATE OF AUDIT**
509 Byrnes Road Bomen NSW 2650	Wednesday 7 February 2018
DEPTH OF AUDIT	**SCOPE OF AUDIT**
Environmental Compliance	Compliance with: • Development Consent: DA05/0517.05 (7/9/2016) • Development Consent: DA16/0386 (2/11/2016) • EPL 12878 • Pt 10 POEO Reg Waste (+ S.76)
AUDIT CRITERIA	**AUDIT DETAILS**
• Consent: DA05/0517.05 • Consent: DA16/0386 • EPL 12878 • Pt 10 POEO Reg Waste (CoAs)	Opening Meeting – 8.30am Closing Meeting – 4.30pm
PROJECT REPRESENTATIVES	**AUDIT TEAM**
Mr Darren Nelson Mr Matthew Morton	Mike Sutherland, NGH Environmental – Lead Auditor Erwin Budde, NGH Environmental – Backup/QA
AUDIT REPORT	
A Draft Audit Report will be submitted within 7 days of the site inspection subject to the provision of any further information or subsequent investigations.	
PREVIOUS AUDIT DATE	**PREVIOUS AUDIT REFERENCE**
N/A	N/A
PREVIOUS EPL REPORT PERIOD	**PREVIOUS EPL REFERENCE**
01-05-2016 to 30-04-2017	EPL 12878

1 INDEPENDENT AUDIT CERTIFICATION

Development Name	Enirigi Power Storage Recycling Bomen
Development Consent No.	DA05/0517.05 (7/9/2016) and DA16/0386 (2/11/2016)
Description of Development	Lead Battery Recycling Facility
Development Address	509 Byrnes Road, Bomen, NSW, 2650 Lot 3 DP 594679, Lot 21 DP 1128492
Operator	ENIRGI POWER STORAGE RECYCLING PTY LTD, ACN: 114 135 821, ABN 50114135821, Formerly: RENEWED METAL TECHNOLOGIES PTY LTD
Operator Address	212 East Bomen Road, Bomen, NSW, 2650
Independent Audit	
Title of Audit	Independent environmental audit of operation

I certify that I have undertaken the independent audit and prepared the contents of the attached independent audit report and to the best of my knowledge:

- *The audit has been undertaken in accordance with relevant approval condition(s) and in accordance with the auditing standard AS/NZS ISO 19011:2014 and Post Approval Guidelines – Independent Audits*
- *The findings of the audit are reported truthfully, accurately and completely;*
- *I have exercised due diligence and professional judgement in conducting the audit;*
- *I have acted professionally, in an unbiased manner and did not allow undue influence to limit or over-ride objectivity in conducting the audit;*
- *I am not related to any owner or operator of the development as an employer, business partner, employee, sharing a common employer, having a contractual arrangement outside the audit, spouse, partner, sibling, parent, or child;*
- *I do not have any pecuniary interest in the audited development, including where there is a reasonable likelihood or expectation of financial gain or loss to me or to a person to whom I am closely related (i.e. immediate family);*
- *Neither I nor my employer have provided consultancy services for the audited development that were subject to this audit except as otherwise declared to the lead regulator prior to the audit; and*
- *I have not accepted, nor intend to accept any inducement, commission, gift or any other benefit (apart from fair payment) from any owner or operator of the development, their employees or any interested party. I have not knowingly allowed, nor intend to allow my colleagues to do so.*

Note:

a) *The Independent Audit is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.*

b) *The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or $22,000, or both).*

Signature	
Name of Lead / Principal Auditor	Mr M Sutherland, NGH Environmental
Address	1/39 Fitzmaurice St Wagga Wagga, NSW, 2650
Email Address	*michial.s@nghenvironmental.com.au*
Date:	6 March 2018

2 REPORT SUMMARY

2.1 INTRODUCTION

NGH Environmental (NGH) were engaged by Enirgi Power Storage Recycling Pty Ltd to complete an Independent Environmental Audit of the operation of the lead acid battery recycling facility at Bomen. The audit is a requirement of the NSW Department of Planning and Environment (DP&E) Secretary's Environmental Assessment Requirements (SEARs) for the expansion of the facility. Specifically, the SEARs require discussion on the:

"Suitability of the Site to include the *results of an independent audit of the operation of the existing facility against the conditions of all development consents and all Environment Protection Licences* (EPL) *in force in respect of the existing facility to ascertain the baseline for the site*."

The audit examined compliance with the:

a) Wagga Wagga City Council (WWCC) modified consent for the lead acid battery recycling facility, DA05/0517.05 (7/9/2016).
b) NSW Environment Protection Authority (EPA) Environment Protection Licence (EPL #12878) for "Metallurgical Activities" and "Resource Recovery".
c) NSW EPA Immobilised Contaminants Approval (No.: 2010-S-09) for 16,000t/y of smelter slag waste.
d) WWCC consent for a Change of Use to Resource Recovery Facility DA16/0386 and relates to land described as Lot 3 DP 594679, Lot 1 DP 850711, at 212 East Bomen Road, Bomen, NSW, 2650. **This consent was not activated by Enirgi Power Storage Recycling Pty Ltd.**

The original Development Application (DA05/0517) for a lead battery recycling facility was approved by WWCC at its April 2006 meeting subject to conditions. The 2006 application and approval were subsequently modified on five separate occasions by WWCC under ADA07/0022, ADA10/0033, ADA10/0075, DA05/0517.04 and most recently DA05/0517.05. The most recent modification increased the annual production capacity from 42,000 tonnes to 70,000 tonnes. This has been achieved through increased plant efficiency and operating hours. The Development Application DA16/0386 approved in November 2016 relates to Lot 3 DP 594679, Lot 1 DP 850711, Lot 21 DP 1128492. This DA modified the use of the land from Buckman Laboratories (Lot 3 DP 594679) to a plastics recycling facility in conjunction with the adjoining Enirgi Power Storage Recycling facility. The former Buckman Laboratories administration building is now used by Enirgi as their main administration facility.

The premises are located within the Bomen Industrial Estate approximately 7.5km north west of Wagga Wagga (Figure 2-1). The lead acid battery recycling facility is immediately south of the former Wool Combing Plant. It is east of Byrnes Road and the Main Southern railway line. To the south is open farm paddocks zoned IN1 for industrial use and a strip of land zoned RE1 recreational land south of East Bomen Road. To the east of the facility is farm land zoned as IN1 and then RU1. The premises on lot 21 DP 1128492 are serviced by a sealed access from Byrnes Road (Figure 2-2). The new administration area Lot 3 DP 594679 is accessed from 212 East Bomen Road (Figure 2-1).

NGH conducted a site visit on the 7th February 2018 at 509 Byrnes Road, Bomen for the purpose of conducting an audit of the facility. During the site visit a number of documents including management plans, construction drawings, test results, monitoring results, process records, correspondence and waste records were reviewed. The site visit included an inspection of the lead acid battery recycling facility and surrounds.

Figure 2-1: Enirgi Power Storage Recycling Facility Bomen (Not including Lot 22 DP1128492)

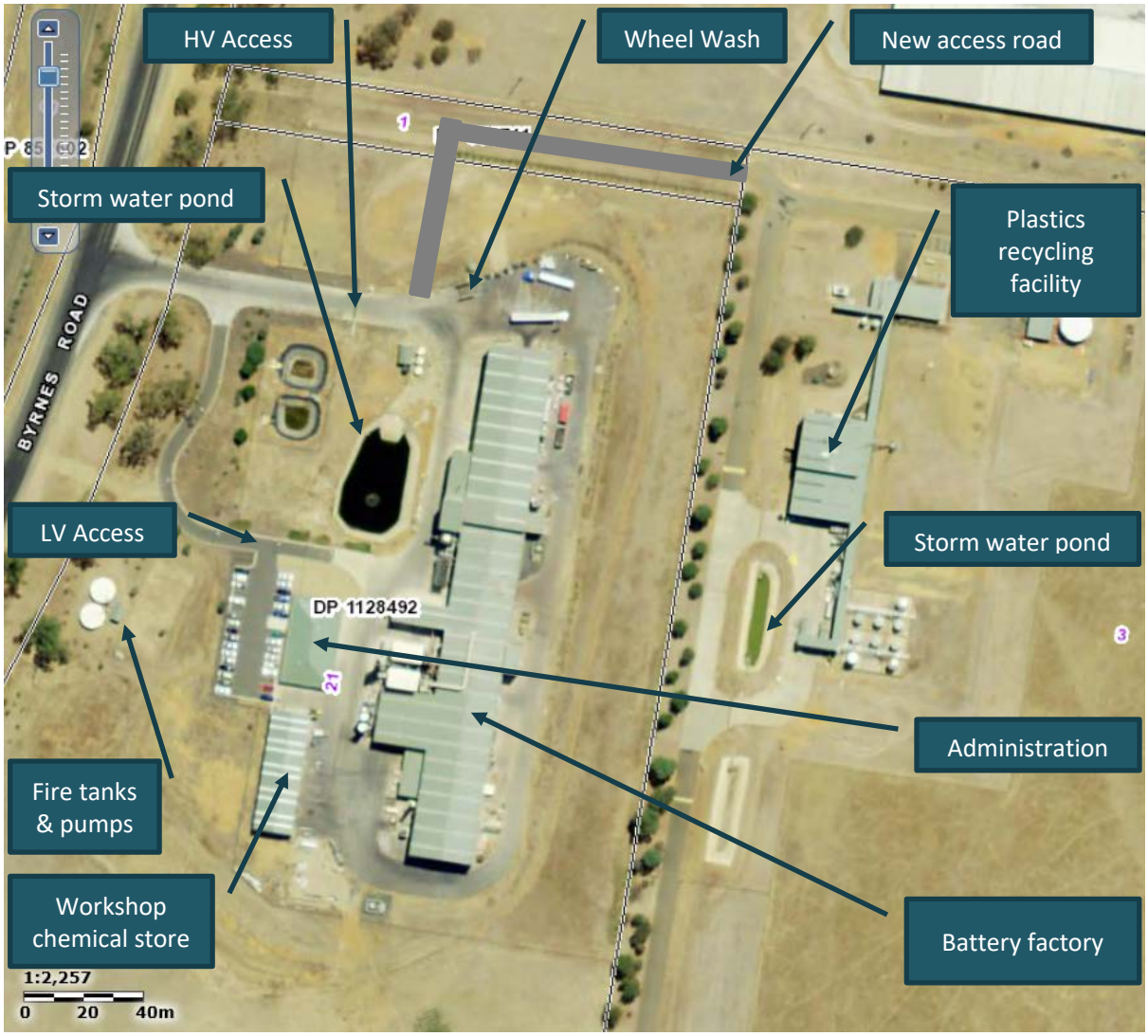

Figure 2-2: Enirgi Power Storage Recycling Facility Layout

2.2 SCOPE OF THE AUDIT

In completing the audit NGH environmental:

1. Carried out the audit in accordance with ISO 19011:2002 – Guidelines for Quality and/or Environmental Management Systems Auditing;
2. Assessed compliance with the requirements of the WWCC development approvals above;
3. Assessed compliance with the requirements of the EPL above;
4. Assessed compliance with the requirements of the Immobilised Contaminants Approval above and
5. Reviewed the effectiveness of the environmental management of the project, including any environmental impact mitigation works.

2.3 SUMMARY OF CORRECTIVE ACTIONS

The following Corrective Action Requests (CAR) were identified during the audit (Table 1-1). They are deficiencies in meeting specified requirements that have led to a non-compliance with various conditions.

Table 1-1: Corrective Actions Requests

CAR No.	Report Section	Details
CAR 001/2018	4.2.1	Biannual Environmental Audits of the Recycling Facility were conducted by the internal Enirgi Group Corporation Audit Committee team and not by an independent Auditor (DA05/0517.05, Planning CoA 22)
CAR 002/2018	4.2.1	Evidence of a comprehensive Hazard Audit of the Facility being completed or submitted to WWCC was not available (DA05/0517.05, Planning CoA 23).

2.4 SUMMARY OF OBSERVATIONS OF CONCERN

The following Observations of Concern (OoC) were identified during the audit (Table 1-2). They are deficiencies in meeting specified requirements and if not rectified, may lead to a risk of non-compliance.

Table 1-2: Observations of Concern

OoC No.	Report Section	Details
OoC 001/2018	4.2.1	Additional details are required for the Annual Environmental Monitoring Report (AEMR) to meet the requirements of points a), c) and f) (DA05/0517.05, Planning CoA 17).
OoC 002/2018	4.2.1	Pre-Operation Compliance Report and an Occupation Certificate from WWCC not available at the time of the audit (DA05/0517.05, Planning CoA 21).
OoC 003/2018	4.2.2	An Occupation Certificate is to be obtained from the Council before occupation, No clear record of a Final Occupation Certificate was not available at the time of the Audit (DA05/0517.05, Building CoA 14). Two interim OCs cited.
OoC 004/2018	4.2.5	Quarterly detailed Monitoring/Sampling reports for the Sewage Treatment Plant (STP) not routinely available (DA05/0517.05, Env. Health CoA 14).
OoC 005/2018	4.2.5	A licenced discharge point has not been obtained for the irrigation area from the EPA (DA05/0517.05, Env. Health CoA 20).

2.5 SUMMARY OF OPPORUNITIES FOR IMPROVEMENT

The following Opportunities for Improvement (OFI) were identified during the audit (Table 1-3). They are considered to be areas of improvements that would prevent future problems.

Table 1-3: Opportunities for Improvement

OFI No.	Report Section	Details
Ofl 001/2018	4.2.2	Letter acknowledging Council's conditions of consent signed and returned to WWCC, no record available of letter (DA05/0517.05, Building CoA 1).
Ofl 002/2018	4.2.2	No record of site inspection prior to the commencement of construction (DA05/0517.05, Building CoA 7).
Ofl 003/2018	4.2.4	Water Plumbing Certificate form RWCC and evidence of submission to WWCC not able at the time of the audit (DA05/0517.05, Plumbing CoA 3).

3 AUDIT PROCESS

3.1 OPENING MEETING

An opening meeting was held onsite at 10am on the morning of the 7th February 2018, attended by Richard Sanders Enirgi Risk and Sustainability Superintendent and Michial Sutherland, Auditor NGH. At the opening meeting, the audit process was discussed. In addition, discussion was held on the events leading up to the audit over the previous six months. Discussion was also held on the operation of the facility since 2008 and the prior sand extraction.

3.2 CLOSING MEETING

A closing meeting was held at 4.30pm on the afternoon of the 9th July 2018, attended by Mathew Morton Plant Metallurgist and Michial Sutherland, Auditor NGH. At the closing meeting, a review of the audit findings occurred including a discussion of corrective actions, observations of concern, and opportunities for improvement. Additional discussion was held on records required from off site to clarify some issues raised during the audit.

3.3 SITE INSPECTION

A site inspection with Richard Sanders and Michial Sutherland was conducted in the morning of 7th July 2018. The morning site inspection included:

- The northern entrance and wheel wash
- Staff hygiene and administration area
- Stormwater control pond and filtration system
- The battery delivery, unpacking, inspection, sorting and storage area
- Battery delivery conveyor, grinders, separators and plastics recovery areas
- Bunded waste water system and bunded sulphuric acid and sodium hydroxide storage
- Process dosing, mixing, reaction areas, and boiler,
- Crystallisation and sodium sulphate recovery area
- Process control rooms and SCADA operating systems
- Raw materials bulk storage area
- Smelters, smelter control room, slag handling, and filtered particulate storage
- Lead refinery, casting area, ingot storage and ingot loading area
- QA Laboratory, workshops, liquid O_2 storage, dry reactants storage areas
- Sodium hydroxide and sulphuric acid unloading area, Waste storage and site transformer
- Heavy vehicle entry, external emergency document storage and pondage area
- Byrnes Road north and south of the facility entrance

3.4 DOCUMENT INSPECTION

Documents were requested by the auditor and provided by Enirgi. Records were viewed electronically and in hard copy format. Records (photographs, notes, reports, digital files) were made of the documents examined. Notes were made about the documents against and regarding the CoA requirements. An opinion

was formed on the adequacy of the evidence in relation to the CoA and compliance. Documents related to the approval, plant, used lead acid batteries (ULAB), processes, products and procedures viewed included:

- Excel Spread sheets 2017-18, 2016-17 of ULAB received and processed
- Interim Occupation Certificate 4/12/2009
- Interim Occupation Certificate 16/03/2010
- RMT (Enrigi) letter to NSW EPA to increase capacity from 10,000 to 70,000t/year
- Electronic acknowledgement of EPL annual return submission 29/06/2017
- Annual EPL return for 2016-2017
- Review of EPA EPL register for EPL and Annual returns for period of operations
- Pollution Incident Response Plan March 2017
- Excel Spread sheets 2016-2017, Stormwater Pond water quality test results
- KBR design Drawings SEE570-S-DWG-110, slab bunding, H_2SO_4, NaOH bunding
- Photos (x3) HDPE liner, geotextile and drainage sumps under construction
- KBR design Drawings SEE570-C-DWG-009 below slab drainage design
- Excel Spread sheets 2015-2018, Membrane leakage monitoring and test results
- Real time SCADA feed showing, valves, pumps, vessels, alarms and process controls
- Phoenix Calibration Certificate for Main stack sensors August 2017
- RMT (Enrigi) letter to NSW EPA Jan 2018, with monthly test results for both stacks
- EPSR Calibration and test method Certificate for sensors, 2017
- Excel Spread sheets Jan 2018, reportable meteorological data, on-site weather station.
- RMT (Enrigi) email response to complainant with explanation and actions Sept 2013.
- Signage at entrance, contact/complaint line number and separate security number
- RMT (Enrigi) email and attached sulphur emissions report to NSW EPA (U1 EPL #12878)
- Slag sampling classification and disposal procedure 2017 March 2017
- Excel Spread sheets 2016-2018, Slag sampling, test results, waste classification
- Slag waste EPA Transport certificates October 2016, October 2017
- Enirgi Renewed Metals Technologies Annual Environmental Management Report 2016-17
- ELIZABETH DRIVE LANDFILL FACILITY, Kemps Creek NSW, EPL #4068
- Operational Environmental Management Plan 2012 and Subplans for the facility
- WWCC acceptance letter of OEMP Oct 2009
- Operational Environmental Management Plan 2017 and Subplans for the facility
- Internal Enirgi report of lead wastes (not batteries) processed 2017-2018
- RMT - Quarterly Stack Reports. May 2016 and August 2017
- RMT Annual LBL Return, Signed, April 2017
- RMT Groundwater Bore Licence 2009
- Waste Transport EPL #13199
- NSW EPA, Consignment Authorisation - No. 2C00133571, lead transport Sept. 2017-2018
- WWCC Sewage Completion Notice, August 2012
- WWCC Amended Development applications – 10_0033, 10_0077, 11-0075
- WWCC Construction Certificates – CC09_0352, CC09_477, CC09_0533, CC12-0108
- WWCC Report of Development Application DA05/0517.05 – Recommends Approval
- Site plans for extended on-site sewage disposal area.
- Several Aerated Waste water treatment certificates.
- Baseline Contamination Survey (ARTL July 2009) - 509 Byrnes Road, Bomen, NSW
- Lead Battery recycling Facility Wagga Wagga EIS, May 2005

- Construction Environmental Management Plan, KBR, April 2009 (part only)
- Other Construction drawings for the plant and roads and minor buildings
- SEE for Plastics Recycling Facility 2017
- Fire Safety Certificate 2017
- WWCC acknowledgement letter for submission of Fire Safety Certificate 2017

3.5 SITE DESCRIPTION

The site is accessed from Byrnes Road via a sliding security gate (Figure 3-1). The site entrance is approximately 920m north of East Bomen Road and 7.9 km North West of the Wagga Wagga CBD. The site slopes to the west towards Byrnes Road and the Main Southern Rail line. The site elevation is approximately 245m AHD. A north south oriented ridge with an elevation of 260m AHD is to the east of the facility. The site is set in a mixed industrial and rural setting and is Zoned IN1 Industrial. The site is bounded by agriculture to the east and west and industry to the north and south. The nearest residence is Rose Hill about 1.3 km to the east. Planted vegetation exists immediately east of the factory. Roadside native vegetation exists to the west along Byrnes Road. A patch of remnant native vegetation (136mx30m) exists 140m south of the factory.

The facility is dominated by the recycling factory, a large metal framed and clad structure (Figure 2-1). The factory building is approximately 180m long and variously 22 to 40m wide and up to 8m high set on a bunded concrete base. To the west of the factory is an administration, amenities and hygiene building. Also, to the west of the factory at the southern end is a series of workshops and storage sheds. The factory is ringed by a bunded concrete driveway with piped stormwater drainage. This drainage is directed to a concrete lined stormwater pond north of the administration building. Light vehicle access and car parking are to the north and west of the administration building respectively.

Figure 3-1: Heavy vehicle access from Byrnes Road

Heavy vehicles accessing the site stop at the security gate and call for security to approve entry. Entry signage provides direction for heavy vehicle movement (Figure 3-2). Light vehicles for staff and visitors are

directed to the administration area carpark. Light vehicles apart from specific trades vehicles do not routinely access heavy vehicle movement areas. Heavy vehicles move to the appropriate pick up or drop off point and are managed by on-site staff. The ULABs are delivered to the northern end of the factory. ULAB storage on site is minimised as far as practicable. Only the batteries required to meet several days of processing are held on site at any one time (Pers. Com R Sanders).

Figure 3-2: Entry directional signage (left) and emergency information cabinet (right)

ULAB delivered to site arrive on wrapped pallets, handled by a fork lift. Pallets are stored inside to await processing. Pallets were observed to be unwrapped and inspected for contaminants. Wrapping and contaminants are segregated for recycling or disposal. Batteries were placed on a feed convey one unit at a time. Large batteries are hand processed to reduce their size as required. Batteries are fed to the process at a controlled rate. The SCADA system controls all aspects of the process. At the time of the audit it was observed that this was closely monitored by Enirgi staff. The battery storage area drains to a sump and separator in the bunded factory floor.

ULABs are fed into the process to be crushed and separated into components in the CX-breaker (Figure 3-4). The battery electrolyte plastics and lead components are separated and go through separate processes. The ULAB plastics emerge as a washed chip of irregular shape about 50mm in diameter breakdown. The electrolyte is recovered and goes through a crystallisation process to recover sodium sulphate as a powder. The lead components of the ULABs emerge as lead solids grids and poles, and as a lead past for use in smelting.

The process was observed during the site inspection. The process was noisy but not excessively so. The process was not observed to be dusty due to the electrolyte and other liquids used tin the process. Washdown water and process fluids are directed to a sump (Figure 3-4) and reintroduced to the process. No liquid waste was observed to be produced from this process. Both sodium hydroxide and sulphuric acid are used in the process. These reagents are held in vertical tanks inside concrete bunding (Figure 3-5).

Figure 3-3: Battery storage area

Figure 3-4: Processing ULABs / plastic recovery (left) and the liquids floor sump (right)

Figure 3-5: Bunded storage of sodium hydroxide and sulphuric acid

The recovered lead is mixed with ingredients (soda ash, coke etc.). These are held in concrete lined bays in the bulk storage area within the factory (Figure 3-6). The bulk storage area is adjacent to the two furnaces within the factory. The furnaces are fed with a loader and controlled by SCADA process software. The SCADA system is monitored by staff continuously. Furnace batches take about six hours to complete. Dusts and fumes are directed to bag filters to remove fine particulates. Particulates are returned to the process as a source of lead. When a batch is ready the slag is removed first and held to cool. Molten lead is then transferred to the kettles for refining (Figure 3-7).

Figure 3-6: Bulk storage (left) and large furnace (right)

When cooled the slag is tipped from the crucible and broken up (Figure 3-7). The slag is tested to assess lead, arsenic and selenium content. Failed slag is returned to the process. Slag that passes is sent for

disposal to an EPA licensed waste facility. The slag is managed and disposed of in accordance with an Immobilised Contaminants Approval (#2010-S-09).

Figure 3-7: Slag or naturally immobilised waste (left) and a refining kettle (right) with dross ladle and bin.

Molten lead in the kettles is refined (Figure 3-7) removing more contaminants know as dross. The dross is held in the bulk storage area and returned to the process as a feedstock. Sampling and testing is used confirm the quality of each batch meets the specification of the order. When the refining process is complete the molten lead is pumped to the moulds conveyor. The moulds conveyor shapes the molten lead into ingots. The ingots are stamped for identification. The ingots are removed and stored inside ready for transport. Heavy vehicles are loaded by forklift at the southern end of the factory.

Heavy vehicles accessing the factory area generally move in an anti-clockwise direction around the factory. Sodium hydroxide and sulphuric acid deliveries are discharged on the north west side of the factory. Spill containment, management and clean-up facilities were cited during the audit. Sodium sulphate is picked up near the centre of the factory on the west side. All heavy vehicles pass through the wheel wash prior to exiting the site (Figure 3-9).

Figure 3-8: Ingot mould conveyor (left) and stored ingot awaiting transport (right)

Figure 3-9: Wheel wash prior to vehicle exit

Stormwater from the buildings and concrete surfaces surrounding the factory are collected and stored. This potentially contaminated stormwater is held in a concrete lined aerated storage pond (Figure 3-10). The water in the pond is routinely tested. The water is filtered tested and irrigated on land to the south of the factory.

All staff working within the factory pass through a hygiene area at the staff of the shift. At this point staff are given coveralls, respirator, hardhat, hearing protection, gloves and boots. During breaks or at the end of the shift staff re-access the hygiene area and disrobe and shower to remove any potential contamination. Staff are tested monthly for blood lead levels.

Sewage from staff amenities is directed to and onsite sewage treatment and subsurface disposal area. These facilities are west of the administration building and were observed at the time of the audit.

Figure 3-10: Stormwater pond (left) and filtration (right).

4 DETAILS OF AUDIT FINDINGS

This section details the findings of the audit report. This section details those findings requiring action. For complete details of the findings of the Audit, refer to the Audit Protocol contained in Appendix A.

4.1 PREVIOUS AUDITS

The status of the previous audit findings are summarised below.

Previous Audits	Non-Compliance	Audit Comments	Status
No previous independent audits have occurred.	N/A	N/A	N/A

4.2 CONSENT LEAD ACID BATTERY RECYCLING FACILITY, DA05/0517.05 (SEPT. 2016)

This consent was initially for land at 59 Byrnes Road Bomen on Lot 21 DP 1128492. Based on subsequent modification the consent now relates to 21 DP 1128492 and Lot 3 DP 594679. No physical works have occurred on Lot 3 DP 594679. The Former Buckmans Laboratories administration building is now currently being used for additional administration offices by Enirgi Power Storage Recycling Pty Ltd.

4.2.1 Planning Section Conditions

Sufficient evidence was obtained to demonstrate that CoAs 1 to 16 were satisfactorily met at the time of the audit.

CoA 17 requires the preparation and submission of an Annual Environmental Management Report (AEMR) to Council. The AMER for the 2016/17 reporting period was cited. The AEMR adequately addresses the requirements of points b), d), e), g) and h). The AEMR requires additional information to meet the requirements of points:

a) Details of compliance with the conditions of this consent,

c) *A comparison of the environmental impacts and performance of the Recycling Facility against the conclusions and recommendations of those documents listed under condition 1of this consent* and

f). *Identification of trends in monitoring data over the life of the Recycling Facility to date.* Note: In relation to f) some discerning dates for figures cited in section 4 of the AEMR would be beneficial.

This issue is raised as an Observation of Concern (OoC) OoC 001/2018.

Sufficient evidence was obtained to demonstrate that CoAs 18 to 20 were satisfactorily met at the time of the audit.

CoA 21 requires the submission of a *Pre-Operation Compliance Report* to Council prior to the issue of an occupation certificate. Two interim occupation certificates were issued by WWCC, one for the battery storage and CX Breaker area (December 2009) and one for the administration building (March 2010).

However, at the time of the audit a *Pre-Operation Compliance Report* and evidence of submission to Council could not be produced.

This issue is raised as Observation of Concern (OoC) OoC 002/2018

CoA 22 requires, *Within two (2) years of the date of commencement of operations, and every two years thereafter, …, the Applicant shall commission at full cost to the Applicant, an independent Environmental Audit of the Recycling Facility in accordance with ISO 14010.* At the time of the audit it was found that internal audits of the facility have been completed by RMT 2015 and Enirgi Group Corporations, Human Capital and Risk & Sustainability 2017. However, these Audits were not considered to be *independent* because they were conducted by internal agents. Biannual independent Environmental Audits of the Recycling Facility must be conducted by external parties independent of the design, approval and operation of the facility.

This issue is raised as a Corrective Action Request (CAR) CAR 001/2018

CoA 23 requires, *Twelve months after the commencement of operation of the Recycling Facility, …, the Applicant shall carry out a comprehensive Hazard Audit of the Recycling Facility, and submit a report to Council within one month of the Audit.* At the time of the audit documentation demonstrating a Hazard Audit of the Recycling Facility was not available. No evidence was available that a Hazard Audit of the Recycling Facility had been submitted to WWCC. It is recommended that a Hazard Audit in accordance with the requirements of NSW State Environmental Planning Policy 33 Guidelines Hazardous Industry Planning Advisory Papers No. 5 Hazard Audit Guidelines.

This issue is raised as a Corrective Action Request (CAR) CAR 002/2018

Sufficient evidence was obtained to demonstrate that CoA 24 to 58 were satisfactorily met at the time of the audit.

4.2.2 Building Section Conditions

CoA 1 requires that *Council's acknowledgement letter regarding understanding of conditions of consent is to be signed and returned to Council prior to the commencement of any works*. Several Construction Certificates have been issued for works on the facility. However, at the time of the Audit no evidence was available demonstrating that the Council's acknowledgement letter had been signed and returned to Council. A search of Council's records for the development may provide this evidence.

This issue is raised as an Opportunity for Improvement (OfI) OfI 001/2018

CoA 2 requires that *A site inspection is required prior to commencement of works and Council's building Surveyor will need to meet the owner, builder or authorised person on site for this inspection.* Several Construction Certificates have been issued for works on the facility. However, at the time of the Audit no evidence was available demonstrating that a meeting with Council's staff had occurred. A search of Council's records for the development may provide this evidence.

This issue is raised as an Opportunity for Improvement (OfI) OfI 002/2018

Sufficient evidence was obtained to demonstrate that CoA 3 to 6 were satisfactorily met at the time of the audit.

CoA 7 requires that an *Occupation Certificate is to be obtained from the Council before occupation.* Two interim occupation certificates have been issued for two separate areas of the factory. At the time of the

Audit no evidence was available demonstrating that final occupation certificates had been issued for all or part of the facility. A final occupation certificates should be requested from WWCC for the facility.

This issue is raised as an Observation of Concern (OoC) OoC 003/2018

Sufficient evidence was obtained to demonstrate that CoA 8 to 14 were satisfactorily met at the time of the audit.

4.2.3 Engineering Section Conditions

Sufficient evidence was obtained to demonstrate that CoA 1 to 14 were satisfactorily met at the time of the audit.

4.2.4 Plumbing Section Conditions

Sufficient evidence was obtained to demonstrate that CoA 1 and 2 were satisfactorily met at the time of the audit.

CoA 3 required that, *A Water Plumbing Certificate from Riverina Water County Council is to be submitted to Wagga Wagga City Council prior to the issue of a Final Certificate on any building work.* A Water Plumbing Certificate was not available for the connection to the RWCC supply. Evidence of submission for a Plumbing Certificate to WWCC was not available. A Water Plumbing Certificate should be requested from RWCC and submitted to WWCC.

This issue is raised as an Opportunity for Improvement (OfI) OfI 003/2018

4.2.5 Environmental Health Section Conditions

Sufficient evidence was obtained to demonstrate that CoA 1 to 13 were satisfactorily met at the time of the audit.

CoA 14 required the submission *to Council a detailed Monitoring/Sampling Program for the Sewage Treatment Plant (STP) that is to include BOD5, total nitrogen, suspended solids and heavy metals on a quarterly basis. Reports are required to contain sampling results, comparison with standards and past results and remedial actions if required.* This reporting requirement is commensurate with the above ground disposal of effluent from an aerated treatment system. The facility currently processes effluent with an aerated treatment system but disposed of that effluent below the soil surface with the use of a transpiration bed. Several treatment system maintenance reports were cited at the time of the audit. The latter reports showed evidence of submission to council. Detailed reporting for subsurface effluent disposal should be removed from the conditions of consent through modification.

This issue is raised as Observation of Concern (OoC) OoC 004/2018

Sufficient evidence was obtained to demonstrate that CoA 15 to 19 were satisfactorily met at the time of the audit.

CoA 20 requires that, *The applicant must obtain a licensed discharge point approval from Office of Environment and Heritage prior to the commissioning of the stormwater treatment system approved in the modification to this consent under ADA11/0075.* A licenced discharge point has not been obtained for the irrigation area from the EPA. A licenced discharge point should be added to the EPL # 12878 or this condition removed through modification of the consent.

This issue is raised as Observation of Concern (OoC) OoC 005/2018

Compliance with the WWCC development approval DA05/0517.05 (September 2016) was not found for all conditions of the Consent. Ten non-compliances were found in relation to WWCC development consent. During the audit two corrective action requests, five observations of concern and three possible improvements were identified. Some administrative elements associated with the construction, initial operation and documentation for same could not be demonstrated as compliant with the consent. At the time of the audit the observed operation of the facility appeared to be within the boundaries of its consent. Further, the monitoring results, EPL annual returns, soil testing, aerial photography and other records did not indicate any measurable degradation of the natural, built or human environment as a consequence of the facilities operation.

4.3 WWCC CONSENT LEAD ACID BATTERY RECYCLING FACILITY, DA16/0386 (SEPTEMBER 2016)

This consent is for land at 212 East Bomen Road Bomen on Lot 3 DP 594679 and Lot 1 DP850711. This change of use converts buildings used for the former Buckman's Laboratories to a plastics recycling facility by Enirgi Power Storage Recycling Pty Ltd. Enirgi Power Storage Recycling Pty Ltd own the land and buildings. Repeta Pty Ltd own and operate the plastics washing and recycling plant. Liquid waste containing lead sulphate is returned to Enirgi Power Storage Recycling for lead and sulphate recovery. Lead oxide paste is recovered and returned to Enirgi for lead recovery. Repeta Pty Ltd supplies the processed plastic chip as a recovered plastics resource for further manufacturing.

4.3.1 Prior to commencement of works and during works conditions

Sufficient evidence was obtained to during the audit to demonstrate that CoA 1 to 7 were satisfactorily met at the time of the audit.

4.3.2 Prior to the release of the Occupation Certificate / Prior to Operation

Sufficient evidence was obtained to during the audit to demonstrate that CoA 8 to 12 were satisfactorily met at the time of the audit.

4.3.3 General Conditions

Sufficient evidence was obtained to during the audit to demonstrate that CoA 13 to 25 were satisfactorily met at the time of the audit.

4.4 ENVIRONMENTAL PROTECTION LICENCE

4.4.1 Administrative Conditions

EPL #12878 Condition A1 requires:

The licence authorises the carrying out of the scheduled activities listed in the licence at the premises specified in A2 as 212 East Bomen Road, Bomen NSW, Lot 3 DP594679, Lot 21 DP1128492. The activities are listed (A1) according to their scheduled activity classification, fee-based activity classification and the scale of the operation.

Scheduled Activity	Fee Based Activity	Scale
Metallurgical activities	Metal waste generation	> 100 T annual volume of waste generated or stored
Metallurgical activities	Non-ferrous metal production (scrap metal)	> 10000 T annual production capacity
Resource recovery	Recovery of hazardous and other waste	Any hazardous and other waste recovered

A review of the imagery and cadastral information using NSW Government Six Maps demonstrates that the recycling facility is within the Lot 21 DP1128492 while the new administrative facility is at 212 East Bomen Road, Bomen NSW within Lot 3 DP594679 as required by the licence (Condition A2).

4.4.2 Discharges to Air and Water and Applications to Land

Condition P1.1 nominates the monitoring points and discharge types covered under the licence. These include:

- Point 1 - Discharge to air from the CX section sanitary air emissions stack (C-530)
- Point 2 - Discharge to air from the process gasses and sanitary air emissions stack (C-720)
- Point 3 - Discharge to air from the refining kettles burners emissions from stack (C830)
- Point 4 - Discharge to air from the steam boiler emissions stack (SBB)
- Point 5 - Discharge to air from the $Na_2 SO_4$ stack

A utilisation area is not described in the EPL under condition P1.2.

4.4.3 Limit Conditions

Nothing in the EPL #12878 allows for the pollution of waters. No visible evidence of pollution of waters was observed to be occurring on or off site as a consequence of the activity at the time of the audit.

Condition L2.1 and L2.2 provide for the assessable pollutants discharged from the premises and include:

Assessable Pollutant	Load limit (kg)
Coarse Particulates (Air)	
Fine Particulates (Air)	
Lead (Air)	
Nitrogen Oxides (Air)	
Sulfur Oxides (Air)	
Volatile organic compounds (Air)	

Conditions under L3 provide concentration limits for each pollutant at each discharge point. Broad compliance with the concentration limits was found during the audit based on a review of the monitoring data available and the submitted annual returns.

Condition L4 prohibits the receival of waste at the premises other than that describe below. No other wastes are received and processed at the facility

Code	Waste	Description	Activity	Other Limits
NA	Lead acid batteries and other lead scrap		Resource recovery	NA
NA	General or Specific exempted waste	Waste that meets all the conditions of a resource recovery exemption under Clause 51A of the Protection of the Environment Operations (Waste) Regulation 2005	As specified in each particular resource recovery exemption	NA
NA	Waste	Any waste received on site that is below licensing thresholds in Schedule 1 of the POEO Act, as in force from time to time	-	NA

Condition L5 provides the limits for noise from the facility when measured at various receptors. Noise monitoring in 2013 indicated that the facility was compliant with the EPL requirements. At the time of the audit the facility was clearly audible at the western property boundary. However, the facility was largely inaudible from the former Buckmans administration building to the east.

Condition L5 provides for potentially offensive odour. The facility has not received odour complaints for more than three years. Sources of odour exist within the Bomen industrial area and adjacent to the facility. At the time of the audit no offensive odours were observed within or outside the facility.

4.4.4 Operating Conditions

Condition O1.1 requires that licensed activities must be carried out in a competent manner. At the time of the audit the licensed activities were compliant with the requirements of the EPL conditions. The site was well organised and free of litter and unmanaged wastes. External paved surfaces were free of debris, ULABs, chemical inputs, derelict plant and equipment, waste stockpiles, and unused products.

Condition O2.1 requires that plant be maintained and operated in a proper and efficient condition. The plant was operating at capacity at the time of the audit. Each section of plant appeared to be free of excessive noise and vibration that might indicate lack of maintenance. Fluids and emissions within the facility from factory processes were directed toward purpose-built controls. Test results from required monitoring and reported indicated few recent exceedances (historic) and no systemic exceedances.

Condition O3.1 requires that the licensee to minimise external dust emissions from the premises. At the time of the audit the licensed activities were not resulting in the emission of visible dusts from any openings or stacks. The emissions controls on the stacks were operating and the captured dusts were observed.

Condition O4.1 requires that the licensee to maintain and implement a Pollution Incident Response Management Plan (PIRMP). At the time of the audit the PIRMP was cited and appeared adequate. The PIRMP had been tested in March 2017. The PIRMP also forms part of the emergency information displayed at the front gate of the facility.

Condition O5.1 requires that the licensee to prepare and implement a Stormwater Management Scheme. A Soil and Stormwater Management Plan forms part of the OEMP for the facility. This plan adequately provides for the management of clean and dirty water associated with the facility.

Condition O5.2 requires that the licensee to classify waste stored or generated at the premises using the DECC waste Classification guidelines. Slag from the smelter is classified using the guidelines and other waste is pre-classified. Treated stormwater is routinely tested prior to irrigation on site and is not treated as a waste.

Condition O6.1 requires that above ground tanks holding harmful materials to be bunded or have an alternative spill containment. Sodium hydroxide and sulphuric acid tanks are under roof and bunded by more than 100% of the largest vessel. In addition, the facility floor is bunded and spills directed to a sump with at 1000 L of capacity. Finally, all sealed hardstands outside the facility that may receive any errant flows are directed to the stormwater treatment pond for capture and management.

Condition O6.2 requires that alarms, control valves with interlocks and one way valves are installed on all ponds, clarifiers and pipes to prevent spills. At the time of the audit the valves and controls were observed on site and also in the SCADA control system.

4.4.5 Other operating Conditions

Condition O7.1 requires the slab under the northern half of the factory to be lined with an impervious liner. At the time of the audit photographs demonstrated the placement of an HDPE liner. The liner was covered with and protective geotextile membrane prior the slab being formed and poured.

Condition O7.2 requires the slab above to have a leak protection system in place. Designs for the leak detection system and monitoring/test results from same were cited at the time of the audit.

Condition O7.3 required process water storage to be lined with an impervious liner. The stormwater ponds have been lined with a polymer and the main pond concrete lined in addition to a clay base.

4.4.6 Monitoring and Recording Conditions

Conditions M1.1 – 1.3 requires records required to be kept for the EPL to be legible, kept for 4 years, produced when an officer requires and contain specified details. At the time of the audit numerous records were cited. These records included a range of electronic formats but principally excel spreadsheets. The requirements of M1 were met at the time of the audit for the records cited.

Conditions M2.1 – 2.3 required the licensee to monitor air emissions at the five points listed (P1.1) for a range of pollutants relative to each point. The conditions also indicate the units of measurement, the frequency of sampling and the sampling method. The licensee is also required to ensure the monitoring devices are calibrated. At the time of the audit the various stack reports were cited as well as the spread sheet collating test results. Calibration certificates for sensors were also cited. Monitoring was carried out using the correct sampling and test methods. The frequency of monitoring was appropriate as were the units of measurement in the reporting.

Conditions M3 and M4 Testing methods for concentration limits and load limits. The audit found that the monitoring was carried out using the correct sampling and test methods. Reports from the instrument installer and calibrator verified the test methods used were compliant with the licence. Monitoring of the loads of pollutants has been completed as required and submitted to the EPA annually.

Condition M5 requires the licensee to collect and monitor weather data at the premises. The weather station was observed to be well maintained and in working order at the time of the audit. Weather records were cited at the time of the audit for 2017. The units, frequency and method for observation of meteorological conditions was as required by the EPL.

Conditions M6.1 – M6.4 requires the licensee to make and keep detailed records of complaints in relation to pollution incidents and to provide those details on request to an EPA officer. Complaints have not been received regarding the facility for about three years. Records of complaints from before that time were cited at the time of the audit. These records are held electronically. The details were appropriate. A written response the complainant was also cited.

Conditions M7.1 – M7.3 requires that a telephone complaints line be available during operation and that this number be publicised. A sign at the front of the facility provides both a telephone complaint line number (02) 69379525 which was found to be active at the time of the audit.

4.4.7 Reporting Conditions

Condition R1 requires the licensee to submit a certified annual return with a series of compliance statements for the required reporting period and retain a copy of the annual for four years. A review of the EPA licensing web site indicates that annual returns have been routinely submitted and for the last two years without any non-compliances. At the time of the audit both the transmittal advice and the annual return were cited for 2017 and 2016.

Condition R1 requires the licensee to make a notification of harm to the pollution line 131555 immediately and to follow with a written report to the EPA within 7 days. No notifiable events have occurred on site over the last four years.

Condition R3 requires the licensee to provide a written report to the EPA where an EPA officer has reasonable grounds to suspect a pollution event has occurred. The report must be based on reasonable inquiries and contain sufficient detail. Further details can be requested by the EPA. No written reports of incidents have been requested in the last four years.

4.4.8 General Conditions

Condition G1.1 requires that a copy of the licence must be kept at the premises to which the licence applies. At the time of the audit a copy of the licence was held and available on site.

4.4.9 Pollution Studies and Reduction Programs

Condition U1.1 requires the licensee to investigate, record and report on concentration emission spikes for sulphur dioxide. The report for a twelve month period should detail the spikes. It should also provide an explanation of the spikes in terms of materials processed and any measures taken to minimise spikes in sulphur dioxide emissions. At the time of the audit emails (1/11/2016) to the EPA submitting the specialist study were cited. The specialist study was also cited. The report appears to satisfy the requirements of the condition.

Compliance with the EPL #12878 was found to be comprehensive. On-site management, monitoring and record keeping were all found to be in accordance with the various licence conditions. In 2017 63,420t of batteries and waste lead (1000t) were received. This below the EPL limit of 70,000t/annum. The ULAB after being recycled produce 36,866t of lead ingots.

4.5 IMMOBILISED CONTAMINANT APPROVAL

4.5.1 Approval Details A to E

Approval # 2010-S-09 is valid until 30 September 2019 for 16,000t per annum of Naturally Immobilised Waste Slag from the premises. Arsenic selenium and lead are the contaminants covered in this approval. Enirgi Power Storage Pty Ltd are the *responsible person* under the regulation and this approval.

4.5.2 Conditions of Approval F

Condition F1 requires the responsible person to prepare and implement a quality control program. The quality control program must have a statistically valid sampling plan, testing plan (condition 2) and procedures for rejecting/allowing disposal of the waste to landfill. Arsenic selenium and lead total and leachable concentrations are to be monitored as part of the testing plan. At the time of the audit the OEMP, waste management plan and the Slag Sampling Classification and Disposal Procedure (2107) were cited. These plans and procedures satisfy the requirements of Condition F1. At the time of the audit the slag sampling test results and waste classification in an excel spread sheets that was cited.

Condition F2 requires the responsible person to ensure samples are assessed using test methods defined in the Waste Classification Guidelines (2014) for total and leachable concentrations of contaminants within an upper confidence limit of 95%. The laboratory results cited at the time of the audit indicated that the test methods were appropriate and results with in the upper confidence limit of 95%.

Condition F3 requires the responsible person to classify the slag using the Waste Classification Guidelines (2014) based on the leachable concentrations of arsenic selenium and lead. At the time of the audit the waste was being classified using the leachable concentrations of arsenic selenium and lead. This was recorded in the spreadsheet for the slag analytical test results.

Condition F4 requires the responsible person to ensure Naturally Immobilised Waste slag classified as general solid waste or restricted solid waste is disposed of at a general solid waste landfill or restricted solid waste landfill respectively. Both landfill types must be licensed to accept that type of waste and have an operating leachate collection system. The land fill must monitor leachate for arsenic selenium and lead. The landfill must be notified in writing of the waste type classification.

At the time of the audit the slag waste has been classified based on the TCLP results as general solid waste for the past five years (Slag Disposal Record.xls). That waste is sent to Kemps Creek under licence 4068 and is tracked and documented. EPL 4068 in condition L3.1 allows for the disposal of waste subject to specific immobilisation approvals. This includes the requirement for a leachate collection system. This licence also requires monitoring of leachate and groundwater for As Pb and Se. The facility is notified of the waste type through the online tracking system.

Condition F5 requires the responsible person to keep test records and waste disposal records for a period of six years. The EPA must be notified within 48hours of test results for slag that do not meet to requirements of the approval. Test results for condition 1 must be submitted every 6 months to the EPA. Test results Cited from 2012. An email was cited at the time of the audit submitting slag test results to the EPA.

Condition F6 requires the responsible person to ensure waste transported is tracked in accordance with Part 10 of the POEO Regulation 2014. Prior written approval from the EPA must be obtained if slag is to be transported and not tracked using the online waste tracking system. Waste consignment authorisation No. 2C00121417 cited and Transport Certificate 2T00792959 15 Jun 2017 cited.

Compliance with the Immobilised Contaminant Approval # 2010-S-09 for the slag was found to be comprehensive. On-site management, monitoring and record keeping were all found to be in accordance with the various Approval conditions.

5 CONCLUSION

NGH environmental has completed the Independent Environmental Audit of the of the operation of the lead acid battery recycling facility at Bomen. This included the plastic recycling facility on the adjacent lot to the ULAB facility. The audit has found broad compliance with the conditions of EPL, and both WWCC consents for the land. The audit has identified two corrective actions, seven observations of concern and three opportunities for improvement.

The ULAB recycling facility and the Plastics Recycling facility operate in tandem. Overall both facilities occupy a small proportion of the land on which they are located. The facility currently has sufficient resources and management systems commensurate with the nature and scale of the operation. The audit findings are based on the observations made during the site inspection and the available documents and records for review.

In general, the practical day to day management and monitoring of the facility is of a high standard. Monitoring and management required by the WWCC consents, EPL and Immobilised Contaminant Approval is completed as required. All data is stored electronically with hard copies of test results available. Records relating to the early commissioning of the facility were not always available during the audit. As such it was difficult to prove compliance with several consent conditions. Additional effort is warranted to finalise and document those matters still outstanding with WWCC in relation to both consents.

In terms of the facilities impact on the immediate environment there was little evidence to indicate any lasting impact. Emissions to air at the time of the audit and for several years prior are within the limits required for the EPL. Emissions to land are minor and consist of treated, filtered and tested stormwater. At the time of the audit it was evident that house keeping on site is very thorough. No hazardous materials or other chemicals are stored inappropriately, and signage is of a high standard. No Emissions to water occur as a result of the facilities operation. Noise from the factory is obvious when on site. However, the noise levels are not high and the facility is shielded from adjacent residences by topography and distance.

APPENDIX A AUDIT PROTOCOL FEBRUARY 2018

See Attached Spread Sheet

Ref	Required Audit Action, and Terms of Approval	Auditing Notes from 2014/2015	Evaluation	Comments	Finding	Action Ref	Comment
	• Application No: DA05/0517.05 • Proponent: Renewed Metal Technologies Pty Ltd • Approval Authority: Wagga Wagga City Council • Project: Lead Battery Recycling Facility, Wagga Wagga						
Premises Details							
	212 East Bomen Road, Bomen, NSW, 2650 Lot 3 DP 594679, Lot 21 DP 1128492						
PLANNING SECTION							
1	The Applicant shall comply with any requirement of Council in respect of the implementation of any measure arising from any report, plan, correspondence or other document submitted in accordance with the conditions of this consent, within such time as the Council may agree.	Previous audits have found broard compliance with this requirement. Evidence such as continued operations and the issuing of occupation certificates (WWCC 24/4/2006/ 16/3/2010) and acceptance of DA's for modifications to eisting concents support broard compliance.	Satisfactory				
2	The applicant shall ensure that all employees, contractors and sub-contractors are aware of, and comply with, the conditions of this consent.	This concent is available for view by all employees and staff, staff are made aware of the document at the time of induction. Concent conditions that are relevant form part of the Operational Environmental Management Plan 2017 that is implemented by staff..	Satisfactory				
3	The applicant shall ensure that all licences, permits and approvals are obtained and kept up-to-date as required throughout the life of the development. No condition of this consent removes the obligation for the applicant to obtain, renew or comply with such licences, permits or approvals.	The applicant has obtained and maintained an EPL for the operation of the project. Consignment authorisations have been obtained for the transport of slag. Imobilised Contaminants Approval for the slag waste. Licence from 2009 for the installation of monitoring piezometers cited.	Satisfactory				
4	The applicant shall carry out all practicable measures to prevent and minimise harm to the biophysical or built environments as a result of the construction, maintenance, operation, and where relevant, the decommissioning of the Recycling Facility.	Construction of the facility occured over 7 years ago and it is beyond the scope of this audit to assess construction impacts. Discharges to air and have met the EPL requirements, see EPL annual returns. Enirgi do not dicharge waste waster off site. All storwarter from the facility's paved areas is captured treated and irrigated on site. Solid waste genereated from the facility is either recycledd or disposed of in compliance with waste clasifications and an EPA *Imobilised Contaminants Approval.* No solid wastes are dischaged to land at the facility. No complaints have been received regarding the facilities operation for the past three years.	Satisfactory				
5	The applicant shall comply with the General Terms of Approval issued by the Department of Environment and Conservation, Notice Number: 1051850", dated 2 February 2006, and obtain an Environment Protection Licence from the Department of Environment and Conservation before commencing any construction work in or on the site.	An EPL from the EPA (DEC) has been in place for the lifetime of the facilities operation. The first licenece is recorded on the EPA website as the 1 May 2008.	Satisfactory				
6	The applicant shall submit a completed Application for Survey Certificate (for release of survey plan of subdivision), in accordance with the details of this consent, to the satisfaction of the Director of External Services prior to issue of a Construction Certificate. Note: For release of Survey Plan the applicant is required to submit a completed Application for Survey Certificate, together with the original survey plan plus thirteen (13) paper copies of the Survey Plan to be signed by the Director of External Services, for release by Council.	Construction of the facility occured over 7 years ago and it is beyond the scope of this audit to assess construction impacts. However, the auditor has cited construction certificates for the facility and as such assumes the Survey Certicate process is complete.	Satisfactory				
7	The processing of scrap acid batteries and other approved scrap materials in the Recycling Facility shall not exceed 70,000 tonnes per annum.	Production records cite for the facility indicate that in the past twelve months the facility has received 63,420t of bateries and scrap lead waste for processing.					

7A	The current Environment Protection Licence (EPL) No. 12878 shall be varied in accordance with the requirements of the Environment Protection Authority as outlined in correspondence and Attachment A dated 6 September 2016. The variation must be completed within two months of the date of the approval of the modified application referenced DA05/0517.05 and a copy of the amended licence provided to Council.	The licence was varried to increase the annual tonage from 42,000t to 70,000t per annunum. The increase in tonnage was achieved by increasing the duration of operation and not the process rates.	Satisfactory				
8	Prior to commencement of construction activities, the applicant shall notify the Director of External Services of the name and contact details of an employee who will have the role of Environmental Management Representative (EMR) for the Battery Recycling Facility. The EMR shall be suitably qualified and experienced and shall report to an Executive Director of the Recycling Facility, or other person of equal responsibility. The EMR role shall be filled for the life of the facility and shall have the following duties: a) Responsible for all Environmental Management Plans, monitoring and reporting required under this consent; b) Responsible for considering and advising on matters specified in the conditions of this consent, and compliance with such matters; c) Responsible for receiving and responding to complaints; d) Required to facilitate an induction and training program for all persons involved with the construction and operation of the smelter; and e) Given the authority and independence to require reasonable steps to be taken to avoid or	The OEMP nominates the General Manager and the Plant Metallurgist (back up) as the EMR. The role and responsibilities are defined in the OEMP. The responsibilities and authorities required by the concent are specified in the OEMP.	Satisfactory				
9	The applicant shall notify the Director of External Services of the name(s) and contact details of the EMR upon appointment, and any changes to that appointment for the life of the operation.	The EMR has bee nominated to WWCC 11 October 2012, noting that the position of Director of External Services no longer exists within WWCC.	Satisfactory				
10	The applicant shall prepare, and submit to the satisfaction of the Director of External Services, an Environmental Management Plan (EMP) for the site. The EMP shall be prepared and implemented with aims to: a) Detail environmental management practices and procedures; b) Provide a basis for immediate and long-term environmental performance planning; and c) Provide a mechanism for the control of change to the operation of the smelter and any consequent change in the environmental impacts.	An OEMP has been prepared for the operation of the facility and meets the requirements of A), B), and C) of the condition. The EMP was submitted to Council in 2009, acceptance letter from WWCC cited.	Satisfactory				
11	The applicant shall consult with the Department of Environment and Conservation and Council during the preparation of the EMP, and meet any requirement or recommendation of the Department of Environment and Conservation and Council in respect of the scope and content of the EMP.	OEMP refered to DEC (now EPA) in 2009 as referenced in the WWCC correspondence of October 2009.	Satisfactory				

12	The EMP required under this consent shall include, but not necessarily be limited to: a) The following Construction Management Plans: - Noise Management Plan; - Sediment and Erosion Control Management Plan; - Air Quality Management Plan (including dust and odour); - Waste Management Plan; and - Transport Management Plan b) The following Operational Management Plans: - Noise Management Plan; - Hazard and Risk Management Plan; - Air Quality Management Plan (including dust and odour); - Soil and Water Management Plan (including Stormwater); - Waste Management Plan; - Greenhouse Gas Management Plan; and - Transport Management Plan c) Environment Policy to be guided by, but not compulsorily certified to, ISO14001:2004; d) Identification of all statutory and other obligations that the applicant is required to fulfil in relation to the construction and operation of the smelter, including all consents, licences, approvals and consultations; e) Definition of the role, responsibility, authority, accountability and reporting of personnel relevant for compliance with environmental performance goals during the construction and operation of the smelter; f) Environmental management procedures for all activities that are important for the quality of the environment in respect of permanent and/or temporary works including measures to avoid and/or control the occurrence of environmental impacts and to provide positive environmental offsets to unavoidable environmental impacts; g) Monitoring, inspection and test procedures, where relevant, that are important to the	Construction of the facility occured over 7 years ago and it is beyond the scope of this audit to assess construction planning and impacts. The OEMP has the following sub-plans: - Noise Management Plan; - Hazard and Risk Management Plan; - Air Quality Management Plan (including dust and odour); - Soil and Water Management Plan (including Stormwater); - Waste Management Plan; - Greenhouse Gas Management Plan; and - Transport Management Plan The OEMP contains an environmental policy on page 9 and the policy is prominently displayed at several locations in offices and resta areas. The OPMP and subplans list the relevant legislative, licence and other approval requirements. The OPMP defines roles and responcibilities in section 9. The definition of the roles place appropriate responsibilities in the hands of key staff at the facility both in management and in the factory. Environmental management proceduces are identified in the subplans to the oemp. These subplans are suproted by *safe work instructions* that are used by staff to execute duties on a daily basis. A frame work and some details for monitoring and test procedures is included in the OEMP for external environmentsal monitoring. Detailed plant operations and monitoring are controlled by the SCADA process controls and this system provides robust control over emmisions. The OEMP does not include evidence of consultation with Council apart from the CoA's	Satisfactory				
13	The part of the EMP related to environmental management during the construction of the Recycling Facility (the "Construction EMP") shall be submitted for the approval of the Director of External Services prior to issue of a Construction Certificate.	Construction of the facility occured over 7 years ago and it is beyond the scope of this audit to assess construction impacts. However, as construction certificates have been issued for the facility it is assumed the condition is compliant.	Satisfactory				
14	The part of the EMP related to environmental management during the operation of the Recycling Facility (the "Operational EMP") shall be submitted for the approval of the Director of External Services prior to issue of an oddupation certificate, or within such period as otherwise agreed in writing by the Director of External Services.	As the facility has been operating for over ten years it is assumed this condition is complied with.	Satisfactory				
15	The applicant shall update the EMP, or any component of the EMP to reflect changes in operational, procedural, managerial or environmental conditions at the site or in response to changes in the requirements of the Department of Environment and Conservation or Council.	The OEMP has been updated to reflect recent approvals and changes to both the EPL and to plant operations.	Satisfactory				
16	Clean water harvesting is to comply with the requirements of the Water Management Act 2000.	No Cleanwater harvesting was observed on the site at the time of the audit.	Satisfactory				

17	The Applicant shall, throughout the life of the Recycling Facility, prepare and submit to Council, an Annual Environmental Management Report (AEMR). The AEMR shall review the performance of the Battery Recycling Facility against the Environmental Management Plan, the conditions of this consent, and other licences and approvals relating to the Battery Recycling Facility. The AEMR shall include, but not necessarily be limited to: a) Details of compliance with the conditions of this consent; b) details of any complaints received in relation to the operation, an overview of how these complaints were handled, and the results of any actions taken by the Applicant to address the complaint for the preceding twelve month period; c) A comparison of the environmental impacts and performance of the Recycling Facility against the conclusions and recommendations of those documents listed under condition 1of this consent; d) Results of all environmental monitoring required under this consent and other approvals, including interpretations and discussion by a suitably qualified person; e) A list of all occasions during the preceding twelve months when environmental performance goals have not been achieved, indicating the reason for failure to meet the goals and the action taken to prevent a recurrence of that type of incident; f) Identification of trends in monitoring data over the life of the Recycling Facility to date; g) a list of any variations obtained to approvals applicable to the Recycling Facility and to the site	The AMER for the 2016/17 reporting period was cited. The AEMR adequately addresses the requirements of points b), d), e), g) and h). The AEMR requires additional information to meet the requirements of points a), c) and f). In relation to f) some discerning dates for figures cited in section 4 of the AEMR would be beneficial.	Unsatisfactory	Several ellements of the AEMR are not addressed as required by the COA. These sections should be added to the report. Some of the required data including trend data has been observed during the audit in other reports.	OoC	OoC 001/2018	
18	The first AEMR shall be submitted to Council no later than twelve months after the date of commencement of operations. The Applicant shall submit at least one copy of the AEMR to the Department of Environment and Conservation at the same time the AEMR is submitted to Council. The Applicant shall consent to Council making the AEMR available for public inspection.	Commencement of operations was in excess of seven years ago as such this condition is beyond the statute of limitations and the scope of this report.	Satisfactory	AEMR are now being submitted to council on an annual basis.			
19	Council or the Department of Environment and Conservation may request an independent investigation of a complaint be conducted, at the Applicant's expense, should the complaint be in response to: a) an actual or potential incident with actual or potential off-site impacts; b) a recurring incident; or c) an incident that the Applicant has failed to adequately address within six (6) weeks of an initial complaint.	To date the WWCC and the EPA have not requested an independent investigation of a complaint.	Satisfactory				
20	Prior to the issue of a Construction Certificate, the Applicant shall submit for the approval of the Director of External Services, a Pre-Construction Compliance Report, and detailing compliance with all relevant conditions that apply prior to the commencement of construction.	Construction Certificates have been issued to the Applicant, as such it is assumed that this condition has been met.	Satisfactory				
21	Prior to issue of an occupation certificate, the Applicant shall submit for the approval of the Director of External Services a Pre-Operation Compliance Report, detailing compliance with all relevant conditions that apply prior to the commencement of operation.	Previous intenal audits have found no evidence of a Pre-Operation Compliance Report, an Occupation Certificate from WWCC was not available.	Unsatisfactory	While the plant has been operating for in excess of seven years no evidence was found to meet this condition.	OoC	OoC 002/2018	
22	Within two (2) years of the date of commencement of operations, and every two years thereafter, or as otherwise directed by the Director of External Services, the Applicant shall commission at full cost to the Applicant, an independent Environmental Audit of the Recycling Facility in accordance with ISO 14010 - Guidelines and General Principles for Environmental Auditing and ISO 14011 - Procedures for Environmental Auditing (or the current versions), and in accordance with any specifications required by Council and the Department of Environment and Conservation. The Audit shall: a) Assess compliance with the requirements of this consent, licences and approvals applying to the Recycling Facility; b) Assess the environmental performance of the development against the predictions made and conclusions drawn in the documents referred to under condition 1 of this consent; and c) Review the effectiveness of the environmental management of the project, including any mitigation works.	The Recycling facility has been subject to audits every two years by the corporate audit arm of the company. At the time this was though to be independent. Enirgi are now of the opinion that external environmental auditors not involved in the development, construction or operation of the facility is more appropriate.	Unsatisfactory	Ensure biannual independent Environmental Audit of the Recycling Facility is conducted by external parties.	CAR	CAR 001/2018	

23	Twelve months after the commencement of operation of the Recycling Facility, or within such further period as the Director of External Services may agree, the Applicant shall carry out a comprehensive Hazard Audit of the Recycling Facility, and submit a report to Council within one month of the Audit. The Audit shall be carried out at the Applicant's expense by a suitably qualified independent person or team, approved by the Director of External Services prior to commencement of the Audit. Further Hazard Audits shall be undertaken as may be requested by Council. Hazard Audits shall be carried out in accordance with the Department of Planning's Hazardous Industry Planning Advisory Paper No. 5 - Hazard Audit Guidelines. The Applicant shall meet any reasonable requirement of Council with respect to information contained in the Hazard Audit, within such period as the Director of External Services may agree.	No Hazard Audit has been conducted at RMT facility to date.	Unsatisfactory	Undertake the commissioning and completeion of a Hazard Audit in accordance with the Department of Planning's Hazardous Industry Planning Advisory Paper No. 5 - Hazard Audit Guidelines or similar.	CAR	CAR 002/2018	
24	The Applicant must prepare a Health Risk Assessment to assess the level of risk for routine and abnormal operation conditions and to provide a baseline for assessing the impact of short term baghouse failures. This Assessment shall be submitted to the Director of External Services for approval prior to issue of Construction Certificate.	Construction Certificates have been issued to the Applicant, as such it is assumed that this condition has been met.	Satisfactory				
25	The requirements for quality control and elimination of unsuitable battery types shall be incorporated in the contract conditions for the supply of batteries.	Contracts do not exist between battery suppliers and Enirgi. However, battery suppliers are provided with "*Guidance for Packaging Used lead Acid Batteries for Recycling* " ABRI. In addition each load is un packed by hand to ensure that only lead acid batteries are placed into the process	Satisfactory				
26	A suitable fire detection system shall be provided in the battery storage area to the satisfaction of the Director of External Services.	In March 2015 FM Global conducted a Fire & Natural Hazards Basline Risk Evaluation at RMT. Based on FM Globals reccommendations RMT installed smoke detectors in the control rooms and electrical room and conducted leakage test of the gas safety shutoff valves. An RMT fire plan with the local fire brigade is currently in progress.	Satisfactory				
27	The design of the dust collection system shall be reviewed to minimise the potential for dust explosions. These include a review of requirements for: a) Earthing of equipment; b) Minimising hot sources; c) Use of Intrinsically safe equipment; and d) provision of explosion vents in ventilation system.	The dust in the plant is non-combustible and therefore there is no potential for dust explosions. The following measures are in place: Equipment is earthed. Cool air intakes ramps down burner automatically, second stage cuts out. Drop out box. Low combustible bags (Teflon coated). Pre-ignition safety switch installed. Explosion vents are not in the ventilation system as hoods are installed across the top of the baghouse	Satisfactory				
28	The pressure regulating station shall be located a minimum of 1m from the site boundary to ensure that there is no offsite impact to members of the public.	The pressure regulating system is approximately 1m east of the western boundary. Evidence: Image pressure regulating system and boundary fence	Satisfactory				
29	A remotely operated shutoff valve shall be provided for the fuel gas supply to ensure that jet fires can be isolated.	The fuel gas supply has a shutoff valve installed adjacent to the western site boundary. Evidence: Image Shut off Valve on Gas Supply.	Satisfactory				
30	The Recycling Facility design shall include an opacity meter in the vent with a high opacity alarm to detect bag failure.	An Opacity Meter is installed in the main stack and is calibrated yearly. Evidence: Various Calibration Certificates	Satisfactory				
31	The applicant shall undertake measures regarding health and safety of workers as outlined in the Lead Battery Recycling Facility, Wagga Wagga - Environmental Impact Statement.	An air quality management plan forms part of the OEMP. Safety and environmental Safeguards are in place such as ventilation, ducted and filtered exhaust systems, water sprays to prevent dust, PPE, safety training. Monthly blood test for lead are conducted for all staff (pers Com Richard Sanders). First Aid Kits, emergency showere and eye baths observed on site. Full hygiene change/rooms showers cited during site inspection. Material Safety Data Sheets (MSDS) and emergency procedures availablke at front gate and various locations through plant.	Satisfactory				

32	Transportation routes associated with delivery to, or dispatch from, the Recycling Facility through Wagga Wagga City shall be restricted to designated truck routes wherever possible (as described in the Lead Battery Recycling Facility, Wagga Wagga - Environmental Impact Statement). Transportation routes shall avoid major congregation points such as (but not limited to) shopping centres and sensitive areas such as (but not limited to) areas of dense commuter traffic, schools and hospitals.	Transport routes are detailed in the OEMP subplan "*Transport Management Plan* " cited during the site inspection.	Satisfactory				
33	The Applicant shall prepare and submit to the Director of External Services, an Energy Saving and Greenhouse Gas Management Plan. The Plan shall be submitted as part of the Environmental Management Plan. The Plan shall be prepared and implemented to describe and manage the net contribution to greenhouse gases due to the operation of the Recycling Facility and associated developments. The Plan shall demonstrate that all practical measures are being implemented to minimise emissions of greenhouse gases from the project as a whole.	Appendix F "*Energy and Greenhouse Gas Management Plan* ", forms part of the OEMP. The OEMP has been submitted to and accepted by WWCC. Monitoring of CO2 emmissions from the plant forms part of the Plan. CO2 levels have decreased 3.06% per tonne of lead produced in the last reporting period. Reporting on energy saving and greenhouse gas emission is included in the AEMR.	Satisfactory				
34	The applicant is required to conduct ambient air quality monitoring (particulates and gaseous) at strategic locations, in a minimum of 3 locations, around the boundary of the subject site in order to verify the results of predictive modelling and identifying potential exceedances of ambient air quality criteria. Results of this monitoring will be included as part of the Annual Environmental Management Report required under this consent.	Ambient air quality monitoring was conducted at three location in 2011. The monitoring included paticulates, Pb, SO2, Nox. The monitoring found that the levels measured over a minimum of 24 hours met the NEPM air quality goals (and often oders of magnitude better). Air emmisons from the plant are monitored as per the EPA EPL and continuously meet the required criteria.	Satisfactory				
35	The applicant is required to conduct ambient measurement of lead in the local area soil in order to identify existing lead levels and monitor the potential changes whilst the Recycling Facility is operating. Results of this monitoring will be included as part of the Annual Environmental Management Report required this consent. Consideration should be given to locating these measurements at potentially sensitive receptors, such as the local Winery and/or dwellings. Final monitoring locations should be selected in consultation with the Director of External Services and the Department of Environment and Conservation. A minimum of five (5) locations shall be monitored.	Initial soil monitoring report for 2009 cited. Subsequent soil test reports indicate that follow up Biennial Soil monitoring is being conducted.	Satisfactory				
36	The Applicant shall monitor Dioxins and Furans on a quarterly basis for the first two (2) years of operation of the plant and then annually after that, or such a time basis as the Director of External Services considers appropriate. The monitoring shall be undertaken at the point referred to as Point 2 in condition M2.1 of the Department of Environment and Conservation General Terms of Approval and analysis provided to Council and the Department of Environment and Conservation in accordance with any standard nvironmental protection licence requirements.	Dioxins and Furans monitored at point 2 as per the requirement of the EPL, results for June 2017 cited.	Satisfactory				
37	The applicant must take all reasonable steps to minimise dust and noise generation during the construction process.	The site was constructed more than 8 years ago. Validation of noise and dust controls during construction is beyond the scope of this audit.					
38	Due to the heat present in the slag as it is removed from the recycling process, slag must be cooled before transport and is not to be transported at elevated temperatures (meaning no more than 10 degrees Celsius above the ambient temperature).	A cover slag management area exist to the south of the furnaces. Slag is broken up and stored in this area for at least 24 hours or more prior to transport.	Satisfactory				
39	Any slag stored on site for cooling shall be stored in an appropriately covered and screened area (preferably inside a building) to the satisfaction of the Director of External Services.	Slag was observed cooling inside the building at the time of the audit. No slag was observed outside the building at the time of the audit.	Satisfactory				
40	The need for pre-wetting of slag or the provision of water sprays to minimise dust generation at licensed disposal site(s) shall be reviewed. If exothermic reaction upon wetting of slag is likely than other dust suppression methods should be investigated. Outcomes of this investigation shall be submitted to Council and the Department of Environment and Conservation prior to commencement of operations. Upon receipt of further study, Council or the Department of Environment and Conservation may require specific management methods be included in the EMP to ensure procedures are followed with respect to pre-wetting of slag.	The management of waste at waste disposal facilities is not the resposibility of Enirgi. Currently waste is disposed of at Kemps Creek. That facility is licenced to receive immobilised contaminants of this type.	Satisfactory				

41	The Applicant must ensure that there is a screening methodology in place to ensure that only approved types of materials are received at the site for processing and unapproved materials rejected. The Applicant must have a contingency measure in place to ensure correct disposal of non-conforming materials inadvertently accepted into the facility.	A quality control plan and procedure, including a sampling and testing plan for the slag was cited. The plan details when and how sampling will occur. The control plan also deals with acceptance and rejection criteria for the was. To support the procedure is a Safe Work Instruction that provides staff with additional advice for the management of slag. Non conforming slag is reprocessed on site.	Satisfactory				
42	For foundry slags, hard rubber and separators and other wastes the Applicant must: a) Ensure that a suitable sampling and analysis programme is put into place to ensure classification to satisfy the depot at which the waste is to be disposed or re-processed, b) if waste is classified by (a) is found to be controlled (i.e. Hazardous, Industrial or Group A wastes), obtain all necessary approvals and consignment numbers and ensure that suitably licensed transporters are used, c) should the waste be reprocessed/re-used at another facility, ensure that the operator receiving this material is suitably licensed to receive/reprocess it and obtain all relevant permits/consignment numbers in accordance with Protection of the Environment Operations Act 1997 and associated regulation and guidelines, and d) if waste is classified by (a) is found to be controlled (i.e. Hazardous, Industrial or Group A wastes) these wastes must be monitored, tracked and reported in accordance with Protection of the Environment Operations Act 1997 and associated regulation and guidelines.	As above the quality cpntrol plan for the Immobilised contaminants includes a sampling and testing program for the slag. Based on the test results the slag waste is classified and disposed of in accordance with the approval and the disposal facility EPL. Non compliant slag is reprocessed at the Bomen facility and does not leave the site. Hazardous waste does not leave the Bomen facility and is reporocessed on site to reduce contaminant to acceptable levels as specified by the waste clasification criterior. Test results for several years of testing were cited at the time of the audit.	Satisfactory				
43	Any residuals produced by the wastewater treatment process used to remove solids from stormwater run-off must be classified and disposed of in accordance with the Waste Guidelines.	Filter cartirges are included in the foundry process to recover any contaminants or lead.	Satisfactory				
44	The applicant is to ensure that all liquid waste storage vessels are stored in an appropriately bunded and/or graded area with a roof, impervious flooring and the capacity to contain 110% of the volume of the largest storage vessel contained in the area. The bund shall be designed and installed in accordance with the requirements of the Department of Environment and Conservation Environmental Protection Manual Technical Bulletin Bunding and Spill Management.	Stormwater capture and treatment pond is supported by two additional overflow ponds. These ponds have 100% of the capacity of the primary pond. Internal waste waster storage areas have bunding of at least 100% of their volume.	Satisfactory				

45	The Applicant shall prepare and submit, for the approval of the Director of External Services, a Landscape Plan prior to issue of a Construction Certificate. The Landscape Plan shall be prepared by a suitably qualified person and shall comply with all relevant commitments made in the Lead Battery Recycling Facility, Wagga Wagga - Environmental Impact Statement, 2005 and supporting documentation and should include (but not limited to): a) Visual Assessment in accordance with conditions of this consent; b) Details of tree to be removed as required by Council's Tree Management Policy; c) The proposed size, location and design of all signage; d) Landscaping for full length of Lot A (current plans only show landscaping for northern portion of the lot); e) Appropriate species identified to minimise the time before mitigating effect is realized (Note: DCP 2005 requires that trees be of a mature height matching the scale and bulk of the proposed building); f) Landscaping for car park areas; g) Landscaping proposed for unused portion of Lot A; h) Proposed maintenance plan for landscaping; i) Landscaping should screen any outdoor storage areas; j) Consider use of shrubs of lower height, and denser greener growth patterns, along with mature trees, to provide visual screen from close views; k) species shall be propagated from local provenance seed stock only are to be specified as part of the Landscape Plan, to ensure consistency with the surround native vegetation; and l) Lighting design demonstrating any proposed lighting will not create a nuisance to surrounding properties in accordance with conditions of this consent.	RMT submitted a Landscaping Plan prepared by Kellog Brown & Root (2007). Kellog Brown & Root also prepared a Visual and Landscaping Requirement validation report addressing the criteria A to L and certifying that the relevant conditions were met by the plan. Construction certificates were subsequently issued in 2008 and 2009.	Satisfactory				
46	A detailed Visual Assessment shall be prepared and submitted to the satisfaction of the Director of External Services as part of the Landscape Plan prior to issue of a Construction Certificate. The Visual Assessment shall establish the design basis for the Landscape Plan shall address the following considerations: a) Colouring - a colour scheme should provide variation of tones reflecting architectural elements of the building (roof, walls, doorways and the like) and made up entirely of wheaten tones to provide interest and to be compatible with existing landscape tones; b) appropriate landscaping - mature species that are fast growing in the conditions are preferred for the length of the Byrnes Road frontage to Lot A (necessary in order to obstruct views of the main processing building from south along Byrnes Road), together with dispersed landscaping through the site, and an appropriate maintenance schedule; c) Architectural treatments - altering roofline to interrupt views, use of different materials, reduce bulk of building at extremities of the building, architectural detailing and the like; d) potential for modifying the configuration of equipment within the processing building to reduce the length of the main processing building (as shown in Figure 8.5 of the Lead Battery Recycling Facility, Wagga Wagga - Environmental Impact Statement, 2005); e) Demonstrate mitigating effect of the smaller buildings on site; and f) if fencing on the Byrnes Road frontage used that is not of decorative design, the fence shall be substantially screened by landscaping to the satisfaction of the Director of External Services.	A detailed visual assessment was submitted by RMT to WWCC. Kellog Brown & Root 2007 also prepared a Visual and Landscaping Requirement validation report certifying that the Vissual Assessment met the requirments of the relevant conditions of approval.	Satisfactory				

47	The Landscape Plan shall include details regarding proposed lighting (prepared by a suitably qualified person) that demonstrates: a) Locations of proposed external lighting; b) Specification of light designs to avoid light spillage while providing sufficient safety for staff and visitors; and c) proposed method for minimising energy use of lighting (for example, low wattage and timers).	AS above	Satisfactory				
48	All lighting shall be designed, installed and operated as a minimum in accordance with the requirements of AS4282- Control of the Obtrusive Effects of Outdoor Lighting.	The External Lighting Design Report has been designed in accordance with standard AS4282. At the time of the audit the lighting was observed to be sheilded and directional.	Satisfactory				
49	Nothing in this consent allows the Applicant to erect or display any advertising structure(s) or advertisements associated with the development. The Applicant may seek development consent from Council for the erection of advertising structures where necessary.	No advertising or advertising structures were observed within or adjacent to the Bomen site at the time of the audit.	Satisfactory				
50	A minimum of 32 car parking spaces are to be provided on site as shown in plans provided as part of this development consent. These spaces must be designed in accordance with Australian Standards 2890.1 and 2890.2. This condition should be read in conjunction with the recommended condition requiring a Landscape Plan to show landscaping in the design of car parking areas.	As observed on site at the time of the audit and cross checked with aerial images 32 car parking spaces are available to the west of the administration area.	Satisfactory				
51	Detailed design of the layout of the car park, including internal roadway width, aisle widths, parking bay dimensions and loading docks are to be in accordance with AS 2890.1-2004 and AS 2890.1-2002 and shall include the following: a) The proposed main site access driveway to the subject site off Byrnes Road is to be constructed with a minimum width of 6-9 metres in accordance with AS 2890.1-2004 for a class 1 parking facility and Category 2 access driveway; b) The swept path of the largest vehicle entering /exiting the subject site and manoeuvrability through the site is to be in accordance with current Australian Standards and to the satisfaction of Council; c) A sealed Basic left Turn (BAL) treatment is constructed for vehicle movements into and out of the site to and from the southbound lane off Byrnes Road as mentioned in the traffic study report accordance with the RTA Road Design Guide; d) An Auxiliary Right Turn (AUR) Lane is to be constructed for right turn movements into the site from Byrnes Road as mentioned in the traffic study report accordance with the RTA Road Design Guide; e) Proposed ingress and egress location off Byrnes Road is to have an adequate sight distance in either direction in accordance with the RTA Road Design Guide and/or relevant Australian Standards for the prevailing speed limit; f) Full time "No Stopping" restriction is to be implemented along the Byrnes Road frontage of the subject property prior to commencement of any works; g) All vehicles should be able to enter and exit the subject site in a forward direction; h) All works associated with the development shall be at no cost to the RTA or Council; i) Appropriate directional signage into and out of the site is to be installed to assist in directing vehicles around and through the facility; j) Suitable provision for parking and manoeuvring should be made on site for all construction vehicles to alleviate any need to park on Byrnes Road; k) Stormwater run-off from the subject site onto Byrnes Road, as a result of the proposed	The following observations are made using aerial photography: a) site entry is 11m wide. B) B-doubles were observed entering and manouvering on site without restriction. C and D) BAR and AUR (100m in either direction) are constructed at the access from Byrnes Road. E) Sight distance of approximately 270m avaialble to the north and south. F) No stopping signage was not observed at the time of the audit but may be on site. G) B-doubles were observed entering and leaving in a forward direction at the site at the time of the audit. H) Noted. this is a standard conditon of consent. I) Appropriate directional signage was cited on site at the time of the audit. J) Three large (1200m2) on-site parking areas during construction were identified from historic aerial images (20/7/2009). K) Clean water from above the development is directed arrond the facility to Byrnes road. Rainfall falling on the facility is captured, tested and filtered prior to irrigation south of the facility. This results in a net decrease in water reaching Byrnes Road from the subject land. L) Bike parking is committed to in the Transport Management Plan and ample room is available at the administration building.					
52	Details of the second 'emergency only' access must be provided to Council prior to issue of a Construction Certificate and must be shown in the Landscape Plan. The access should be landscaped and designed so that it is clearly a secondary access and must be signposted to direct traffic to the main entrance for vehicles exiting the entering the site.	A second emergency only access is provided 70m to the south of the main entrance. The access is unpaved and is clearly a secondary access.	Satisfactory				
53	Where possible, vehicle access drives to the site should be positioned to avoid the removal of any trees.	Comparison of 2006 and 2009 aerial photography indicates minimial if any large tree removal in the road reserv for access.	Satisfactory				

54	Internal roads, driveways, parking areas, loading bays and vehicular turning areas shall be maintained clear of obstruction and used exclusively for the purposes of parking, vehicle access and loading and unloading respectively. Under no circumstances shall these areas be used for the storage of goods or waste materials or any other purpose.	At the time of the audit vehicle movement and parking areas werefree of goods and wastes. All goods and waste were held within the factory. Some empty pallets were stored imediately north of the facilty.	Satisfactory				
55	The Applicant shall clearly mark all visitor, disabled, and service vehicle parking areas.	Disabled parking was clearly signed at the time of the audit. Visitors are able to use any of the 32 car carks available adjacent the administration area.	Satisfactory				
56	The car parking layout is to be physically indicated on the site (by means of line marking, physical barriers, etc.) in accordance with Council's adopted car parking standards (Australian Standard AS 2890-1 - 2004 Parking facilities for off street parking) in a manner so as to allow the vehicles to enter and leave the site in a forward direction.	Carparking is phisically marked with white lines on the asphalt.	Satisfactory				
57	In the event that an Aboriginal relic is uncovered during the construction of the Recycling Facility, all construction work in the vicinity of the relic shall cease and the Applicant shall contact the National Parks and Wildlife Service immediately. The Applicant shall meet any requirement of the National Parks and Wildlife Service with respect to the treatment, management and preservation of any such relic.	No record of an aboriginal relic being found during construction was available at the time of the audit.	Satisfactory				
58	Should any non-indigenous archaeological relic be uncovered during the construction of the Recycling Facility, all construction work in the vicinity of the relic shall cease and the Applicant shall contact the Heritage Office (Department of Planning) immediately. Approval under Section 139 of the Heritage Act 1977 may be required for disturbance and/ or removal of any such relics.	No record of heritage items being found during construction was available at the time of the audit.	Satisfactory				
BUILDING SECTION							
1	Council's acknowledgement letter regarding understanding of conditions of consent is to be signed and returned to Council prior to the commencement of any works.	No record of the acknowledgement letter is avaialable at the time of the audit. However, construction certificates and occupation certificates area available for the facility indicating broard compliance with this condition.	Satisfactory	The elapsed time period is beyond the statue of limitations for retention of these types of records. However where posible records of compliance with concent conditons should be retained	OfI	OfI 001/2018	
2	A site inspection is required prior to commencement of works and Council's building Surveyor will need to meet the owner, builder or authorised person on site for this inspection.	No record of the site inspection was available at the time of the audit. However, construction certificates and occupation certificates area available for the facility indicating broard compliance with this condition.	Satisfactory	The elapsed time period is beyond the statue of limitations for retention of these types of records. However where posible records of compliance with concent conditons should be retained	OfI	OfI 002/2018	
3	All work is to be carried out in accordance with the Environmental Planning and Assessment Act 1979, the Local Government Act 1993 (Approvals) Regulations, the Building Code of Australia and the approved plans and specifications and Council's Policy for Sediment and Erosion Control.	A CEMP and subplans were produced for the works. No records of compliance were available at the time of the audit. Given the time elapsed sinse the construction the statute of limitations has elapsed.	Satisfactory				
4	The Applicant shall notify Council, in writing, of the appointment of a Principal Certifying Authority. The Principal Certifying Authority shall determine when inspections and compliance certificates for the Recycling Facility are required, and notify Council of the timing for inspections and compliance certificates.	KBR was nominated as the Principal Certifying Authority. Several certifying documents have been prepared by KBR for the RMT project.	Satisfactory				
5	Application for a Construction Certificate is to be approved prior to commencement of building work.	Applications for Construction Certificate were approved prior to commencement of building work. Two certificates cited.	Satisfactory				
6	All plumbing and drainage works including levels shall comply with the provisions of the NSW Plumbing and Drainage Code. Attention is drawn to a minimum required distance of 225mm from the floor level to the finished ground level to allow for the proper placement of the yard gully.	Underground services including sewage was drawn by KBR Aug 2009.	Satisfactory				
7	Occupation Certificate is to be obtained from the Council before occupation.	Interim Ocupation certificate issued 12/2009 for commisioning of factory and second interim certificate issued for administartion building 03/2010. No final certificates cited.	Satisfactory	The elapsed time period is beyond the statue of limitations for retention of these types of records. However where posible records of compliance with concent conditons should be retained	OoC	OoC 003/2018	

8	Certificate of Classification is to be obtained from the Council before occupation;	The Certificate of Classification is part of the construction certificate. Construction certificates were approved by WWCC.	Satisfactory				
9	Toilet facilities are to be provided on site or within close proximity whilst construction work is being undertaken.	It is beyond the scope of this audit to determine the location of toilet facilities during construction.	Satisfactory				
10	Council requires the provision of a storage bin for any waste material during the course of construction.	It is beyond the scope of this audit to determine the supply and location of waste bins during construction.	Satisfactory				
11	The Builder/Owner Builder is responsible for the placement of a sign on this building site, and if Council is appointed as the Principle Certifying Authority (PCA) for this development, then the enclosed sticker nominating Wagga Wagga City Council as the PCA, is to be placed on the Builders sign.	It is beyond the scope of this audit to determine the placement of signage on site during construction. WWCC were not nominated as the Principal Certifying Authority.	Satisfactory				
12	Structural Engineers details of the following shall be submitted to Council prior to the commencement of building works. - Footings; - Floor; - Steelwork; - Retaining Walls	KBR provided certification for the building work.	Satisfactory				
13	Should Council be nominated as the Principal Certifying Authority then the following inspections are required with a Complying Component Certificate being issued by Council:- a) Pier pads prior to pouring concrete; b) Foundations with footing steel reinforcement in position; c) Concrete floor - waterproof membrane and steel reinforcement in position; d) Steel reinforcement for concrete tilt panels; e) Frame - wall and roof frame; f) Wet area/flashings; g) Final - on completion of building; NOTE: These inspections must be performed by persons other than the designer and should be considered in addition to any normal Engineers Inspections.	WWCC were not nominated as the Principal Certifying Authority for construction. KBR provided certification for the building work.	Satisfactory				
14	Mechanical ventilation to comply with AS1668 "SAA Mechanical Ventilation and Air Conditioning Code".	KBR provided certification for the building work.	Satisfactory				
ENGINEERING SECTION							
1	The paving of all driveways and car park areas in front of the security fencing shall be either hot mix sealed or 125mm of reinforced concrete. All other roadways and car park areas shall consist of 150mm of compacted gravel, sealed with a three coat bituminous flush seal as a minimum standard.	At the time of the audit all drive ways to and from the site were observed to be of concrete. The lack of cracking apart from formed joints points to adequate thickness and reinforcing. Dedicated light vehicle movement areas were of a fleible pavement with bituminous seal.	Satisfactory				
2	Vehicular access within the road reserve shall be constructed to Council standard at full cost to the developer, by a licensed approved contractor.	Reference to aerial photography indicate the road works on Byrnes Road were constructed before 2009 prior to the completeion of the Factory. Cost arangments are not known for the road construction.	Satisfactory				
3	The requirements of other public utility authorities shall be satisfied prior to release of the plan of subdivision.	Noted, Construction certificate only issued after subdivision plan is released.	Satisfactory				
4	The development shall connect to Council's sewer system when it is available at the boundary of the subject site. Upon connection to sewer the onsite sewage treatment plant shall be decommissioned.	Councils reticulated sewerage system does not extended to the site of the battery facility. On-site sewage systems and certificates cited at the time of the audit.					
5	Stormwater from the development shall be contained and discharged equivalent to the rural run-off to the swale drain within Byrnes Road reserve.	The landscape design sited at the time of the audit, site observations and areal photography indicate that clean water is diverted around the development and discharged to Byrnes road. Stormwater from within the site is collected, treated, tested and discharged to an irrigation area south of the plant.	Satisfactory				

6	Prior to the issue of a Construction Certificate, the Applicant shall obtain written evidence that arrangements have been made with the relevant energy authority, for the provision of electricity services to the Recycling Facility. Any substation(s) existing, or required by the relevant energy authority, shall be suitably screened or enclosed.	A construction certificate has been issued for the development. Views of the transformer west of the plant are screened by tree and srub plantings on the western boundary and work sheds west of the factory.	Satisfactory				
7	Prior to the issue of a Construction Certificate, the Applicant shall obtain written evidence that arrangements have been made with the relevant water authority for the provision of water to the Recycling Facility.	A construction certificate has been issued for the development. Water supply to the site was observed at the time of the audit.					
8	Prior to issue of a Construction Certificate, the Applicant shall identify all potential pollutants in run off and assess the short term and long term risks to downstream environments as part of the Operational Soil and Water Management Plan required by conditions of this consent.	A construction certificate has been issued for the development. The OEMP contains the Soil and Stormwater management plan as an appendix. These plans were cited at the time of the audit and adequately identify and address likely contaminants	Satisfactory				
9	Prior to connection to Council's sewer system (as required under Condition 4 above), the applicant shall enter into a Trade Waste Agreement with Council.	Councils reticulated sewerage system does not extended to the site of the battery facility. All liquide wastes are processed on site.	Satisfactory				
10	The Applicant shall ensure that effluent discharged from the site achieves discharge performance standards as set by Council in the above Trade Waste Agreement (or any superseded agreement).	Councils reticulated sewerage system does not extended to the site of the battery facility. All liquide wastes are processed on site.	Satisfactory				
11	Prior to issue of a Construction Certificate, the Applicant shall identify (including, but not limited to the position and level of service) all public utility services on the site, roadway, nature strip, footpath, public reserve or any public areas that are associated with, and/or adjacent to the site, and/or likely to be affected by the construction and operation of the development. Details are to be submitted to the satisfaction of the Director of External Services.	A construction certificate has been issued for the development.					
12	The Applicant shall design, construct and maintain all stormwater management infrastructure on the site to: a) Restrict future stormwater flows from the site to existing flow levels or better; b) restrict discharge of stormwater to the sewerage system (unless otherwise approved); c) Treat all contaminated stormwater to minimise the discharge of sediments and other pollutants from the site; and d) Be designed in accordance with any relevant Council stormwater policy; e) Comply with the relevant provisions in the New South Wales Government's Best Practice Guidelines for Contaminated Water Retention and Treatment Systems.	The landscape design sited at the time of the audit, site observations and areal photography indicate that clean water is diverted around the development and discharged to Byrnes road. Stormwater from within the site is collected, treated, tested and discharged to an irrigation area south of the plant.	Satisfactory				
13	The Applicant shall be responsible for, and bear the full cost associated with, monitoring and maintaining all stormwater infrastructure on the site during the life of the development.	Noted, no infrastructure for stormwater other than the facilities infrastructure is present on the site.	Satisfactory				
14	Should the Applicant undertake construction work in, on or over a public road, a separate approval shall be obtained from Council under Section 138 of the Roads Act 1993 prior to the commencement of any such works.	As above the road construction works with in the road reserve were completed before the completeion of the facilities construction and prior to the issue of a construction certificate.	Satisfactory				
PLUMBING SECTION							
1	Supply any septic, trade waste or stormwater plans with pipe and pit sizing to meet the requirements of AS 3500, to be approved by Council's Plumbing Inspector prior to the issue of the Construction Certificate.	Certifcate for the completion and operation of the on-site sewage system (Nov 2012) cited.	Satisfactory				
2	Any septic, trade waste or stormwater works associated with the proposed development are to meet the requirements of AS3500. In this regard it may be necessary for you to contact a licensed plumber and drainer.	No evidence of a licenced plumber and drainer was citeed. However, council does not issue completion certificates for on site sewage systems unless the plaumbing drainage is completed by a licenced plumber and drainer.	Satisfactory				
3	A Water Plumbing Certificate from Riverina Water County Council is to be submitted to Wagga Wagga City Council prior to the issue of a Final Certificate on any building work.	Water Plumbing Certificate was not available for the connection to the RWCC supply. Evidence of submission for a Plumbing Certificate to WWCC was not available.	Unsatisfactory	RWCC should be approached to obtain a final connection certificate for water supply and this should be forwarded to WWCC.	OfI	OfI 003/2018	
ENVIRONMENTAL HEALTH SECTION							

1	The Applicant is to ensure that all waste generated from activities on the site are: a) collected and transported by an appropriately licensed contractor; and b) disposed of to an appropriate Council approved or EPA licensed waste disposal facility. Note: To deposit elsewhere is in breach of Environmental Legislation and this consent.	Specifically Imobilised Waste (slag) transported by Rodney Transports Services under EPL 13199. Clag is transported to licenced facility at Kemps Creek. General waste is transported by Cleanaway EPL 12945, to WWCC facility at Gregadoo or Kurrajong Waratah EPL #20661.	Satisfactory				
2	All sediment and erosion control measures are to be constructed to prevent sediment from leaving the site or entering downstream properties, drainage lines, watercourses or environmentally sensitive areas.	Erosion and sediment control during construction was not able to be evaluated at the time of the audit. Stormwater from with in the site is collected, treated and tested prior to irrigation on site. Soil erosion is addressed in the OEMP.	Satisfactory				
3	Erosion and sediment control measures on the perimeter of the site must be installed prior to the commencement of any works.	Erosion and sediment control during construction was not able to be evaluated at the time of the audit.	Satisfactory				
4	All sediment and erosion control measures are to be regularly inspected and maintained. Measures are to be inspected following each rainfall event to ensure effectiveness is not compromised.	Erosion and sediment control during construction was not able to be evaluated at the time of the audit.	Satisfactory				
5	All areas not subject to construction works are to be free from disturbance or damage. These areas may require fencing off or use of other means to ensure compliance with this condition.	Erosion and sediment control during construction was not able to be evaluated at the time of the audit.	Satisfactory				
6	Stockpiles of erodible materials (sand, soil, spoil and vegetation) must be protected by a sediment fence or bund. Stockpiled material must be stored clear of any drainage line and within the property boundary. If the stockpile area is prone to high winds or is to be there for a long time then the stockpile must be covered.	Erosion and sediment control during construction was not able to be evaluated at the time of the audit.	Satisfactory				
7	The Applicant shall ensure that the construction works do not exceed the construction noise criteria outlined in the Department of Environment and Conservation's Environmental Noise Control Manual. Construction and demolition activities shall only be undertaken between the hours of: a) Monday to Friday 7.00am to 6.00pm; b) Saturday 8.00am to 1.00pm; and c) not on public holidays.	An evaluation of construction noise levels and hours of works during construction was not able to be completed at the time of the audit due to the time past.	Satisfactory				
8	Within 90 days of commencement of operation of the development, and during a period in which the development is operating under design loads and normal operating conditions, the Applicant shall conduct a Noise Audit of its operations. This Audit shall: a) be undertaken by a suitability qualified and experienced person; b) assess whether the development is complying with the intrusive and amenity noise criteria; and c) if any non-compliance is detected, identify what additional measures could be implemented to ensure compliance.	Noise audit completed by Stephenson Environmental Management February 2013 demonstrated broad compliance with the concent conditions. No noise complaints have been received for the facility in the last several years.	Satisfactory				
9	The Applicant shall prepare and submit for the approval of the Director of External Services, a Waste Management Plan. The Plan shall be submitted as part of the Environmental Management Plan. The Plan shall be prepared and implemented with an aim to detail measures to minimise the production and impact of waste produced at the Recycling Facility through the implementation of waste reduction, reuse and recycling principles. The Applicant shall consult with the Department of Environment and Conservation and Council during the preparation of the Plan.	A waste management plan has been prepared as part of the OEMP. The plan identifies the major waste streams and measures for mangement. The EPA reviews the annual returns for the EPL and the AEMR which deals with the waste streams from the facility.	Satisfactory				
10	The Applicant shall keep the following records of any waste material produced (including, but not limited to, slag): a) Dates and volumes of waste transported from the site; b) Receipts for disposal of any waste material; c) Disposal locations and operator details for receiving site; and d) Other information relevant to identifying methods of waste disposal and disposal sites.	Waste records (spread sheet) cited for slag waste. Chemical analysis, lot ID, Waste clasification, Transport certificate number, etc cited for Dec 2017 and Jan 2018. EPA Transport certificate (2T00792959) for slag waste cited.	Satisfactory				
11	No trees may be removed, without prior written approval from the Director of External Services, in accordance with Council's Tree Management Policy.	Aerial images do no indicate that mature trees have been removed for the purpose of the development.	Satisfactory				

12	A Septic Tank Application is to be submitted to Council and approved prior to the release of a Construction Certificate. A geotechnical soil report shall be submitted with the application. The report will need to include site features, dimensions of buffer distances from disposal area, emersion and percolation tests, type of treatment systems and land application best suited to site. The report is to be carried out by an accredited geotech soil engineer. For further information contact Wagga Wagga City Council on 6926 9345.	Certifcate for the completion and operation of the on-site sewage system (Nov 2012) cited.	Satisfactory				
13	As detailed in the approved documentation, the proposed Sewage Treatment Plant (STP) shall only accept domestic grade waste. All effluent from the STP shall be directed to the approved on site Water Treatment Plant. A backflow prevention device is required to be installed and serviced annually.	Certifcate for the completion and operation of the on-site sewage system (Nov 2012) cited.	Satisfactory				
14	The applicant is required to submit to Council a detailed Monitoring/Sampling Program for the Sewage Treatment Plant (STP) that is to include BOD5, total nitrogen, suspended solids and heavy metals on a quarterly basis. Reports are required to contain sampling results, comparison with standards and past results and remedial actions if required.	It appears from the reports (WWCC) that an aerated waste water treatment system processes sewage and the waste water is disposed of in transpiration beds (520m2). This system was approved for operation by WWCC Nov 2012. The reporting required in this condition is commensurate with above ground effluent disposal, currently not used.	Unsatisfactory	While an aerated system is used to treat the waste below ground disposal is occuring. While compliance was not achieved the rporting now serves little purpose as effluent is being disposed of below ground. Ensure treatment system test results from maintenance are forwarded to Council.	OoC	OoC 004/2018	
15	The applicant is required to submit a system management plan for the Sewage Treatment Plant (STP) that includes procedures for system failures and for the maintenance of pumps, blowers, fans, air venturi, alarm systems, chlorinator and replenishment of disinfectant.	The OEMP in the soil and water management plan details the key components and treatment processes for onsite sewage disposal. The OEMP has been submitted to WWCC.	Satisfactory				
16	Aerated Waste Treatment System (AWTS) maintenance reports are to be submitted quarterly with the sampling program covering the items in the management plan and sampling program.	Aerated Waste Treatment System (AWTS) maintenance reports cited for June 2009, Nov 2017, reports submitted to WWCC by the service agent.	Satisfactory				
17	An amended Septic Tank Application to alter the system is to be submitted to Council and approved prior to release of the Construction Certificate.	Construction certificate for the facility issued.	Satisfactory				
18	Until the proposed first flush storage area is completed, the water levels in the stormwater retention pond shall be managed to prevent the possibility of "Water Pollution", as defined in the Protection of the Environment Operations Act 1997.	Assessment of compliance with the CoA was not possible due to the elapsed time period sinse construction. However, based on a review of aerial photography the storwater treatment dam was insalled prior to the completeion of construction in july 2009 and the stormwater treatment facility was installed some time between july 2009 and Dec 2012 (next available image).	Satisfactory				
19	The proposed first flush storage area shall be completed and operational by 5.00pm on 1 April 2011.	Exact compliance with this condition could not be established at the time of the audit. Given the dam was completed in early 2009 it would seam plausible that the sytems construction may have been completed by April 2011 some 22 months later.	Satisfactory				
20	The applicant must obtain a licensed discharge point approval from Office of Environment and Heritage prior to the commissioning of the stormwater treatment system approved in the modification to this consent under ADA11/0075.	A licenced discharge point has not been obtained for the irrigation area from the EPA.	Unsatisfactory	An EPL for the facility has been in place for over nine years. In that time the EPA has not asked to licence the discharge point.	OoC	OoC 005/2018,	
	• Application No: DA16/0386 • Proponent: Renewed Metal Technologies Pty Ltd • Approval Authority: Wagga Wagga City Council • Project: Change of Use to Resource Recovery Facility						
Premises Details							
	212 East Bomen Road, Bomen, NSW, 2650 Lot 3 DP 594679, Lot 1 DP 850711						
APPROVED PLANS AND DOCUMENTATION							

1	The development must be carried out in accordance with the approved plans and specifications as follows. -Statement of Environmental Effects, prepared by Salvestro Planning, 23 June 2016 - 150023-1, Proposed Additions for Recycling Plant - Site Plan, prepared by Xeros Piccolo, Issue 5, 11 October 2016 - Written documentation prepared by RMT, 27 October 2016 - L212-1016, Ground Floor Plan, prepared by RMT Engineers, Issue P1, October 2016 The Development Application has been determined by the granting of consent subject to and as amended by the conditions of development consent specified below. NOTE: Any modifications to the proposal shall be the subject of an application under Section 96 of the Environmental Planning and Assessment Act, 1979.	The road, gates and fencing has been completed in accordance with the submitted documents and plans. No other alterations to the site were observed at bthe time of the audit. Plastics washing and chipping was taking place as described in the SEE.	Satisfactory				
PRIOR TO COMMENCEMENT OF WORKS							
2	An Environmental Management Plan (EMP) shall be prepared for the Plastics Resource Recovery Facility and submitted to Council for the approval of the Manager of City Development (or their delegate) prior to works commencing on the site. The EMP shall detail the environmental management practices and procedures and emergency procedures for the site and shall include, but not necessarily be limited to: a) the following Construction Management Plan: - Sediment and Erosion Control Management Plan; b) the following Operational Management Plans: - Transport Management Plan - Stormwater Management Plan - Hazard and Risk Management Plan (including an Incident Response Management Plan) - Waste Management Plan (including chemical assessment of all waste); c) Identification of any statutory and other obligations that the operator is required to fulfil in relation to operation of the facility, including all consents, licences and approvals; d) Monitoring, inspection and test procedures that are appropriate to the environmental management of the site operations and health of workers, including monitoring protocols and procedures to follow and steps the Proponent intends to undertake to ensure that all plans and procedures are being complied with. The approved construction works and the ongoing operation of the facility shall then be carried out in accordance with the EMP approved via this condition of consent, as should be reviewed as necessary and may be amended to ensure it remains compatible with any legislative changes. NOTE 1: The EMP shall generally be prepared in accordance with the document Guideline for the Preparation of Environmental Management Plans (2004) produced by the former NSW Department of Infrastructure, Planning and Natural Resources, as well as relevant environmental documentation standards such as ISO 14001:2015 Environmental management systems. NOTE 2: It is the responsibility of the Operator with the benefit of this consent to ensure that the waste products are appropriately tested and categorised and that the development complies with the relevant legislative requirements for the storage, handling and transportation of waste	The EMP has been prepared for the propose facility and works. The EMP has bee submitted to Council. Council endorsed the EMP in a letter dated Feb 2017 The EMP included an SECMP, TMP, SWMP, HRMP, RMP, WMP. The EMP included Identification of any statutory and other obligations. The EMP addressed the procedures for monitoring and testing required for the EPL and human health. The EMP prepared was generally in acordance with the Guidelines for the preparation of EMP's. Enirgi complete testing of waste products as required. A copy of the EMP is held on site	Satisfactory				
3	A physical barrier shall be erected to prevent any unauthorised vehicles from entering the Renewed Metal Technologies contamination containment zone at the battery processing facility located on Lot 21 DP 1128492. The location and nature of the physical barrier shall be shown on a revised site plan to be included with the Transport Management Plan for Council's approval in accordance with Condition 2 of this consent. NOTE 1: The proposed internal transport road shall not connect to the potentially contaminated area of the RMT site, as identified as purple on the Battery Recycling Facility Stormwater Drainage Area Plan (Drawing No SEE70-C-DWG-SK001/A) in the Stormwater Management Plan. NOTE 2: Modification to the operation procedures and protocols of the existing RMT battery processing facility do not form part of this application or consent.	Lockable gates have been erected to control access between the plastics recycling facility and the ULAB recycling facility. They are drawn in plans within the TMP Appendix B of the EMP.	Satisfactory				

4	Prior to the commencement of earthworks, the sedimentation and erosion control measures approved in accordance with Condition 2 of this consent are to be established and maintained to prevent silt and sediment escaping the site or producing erosion. NOTE: This work must be carried out and maintained in accordance with Council's:- a) Development Control Plan 2010 (Section 2.8 and Appendix 2) b) Erosion and Sediment Control Guidelines for Building Sites; and c) Soils and Construction Volume 1, Managing Urban Stormwater	At the time of the audit the road construction had been completed for several month. The site had revegetated and the ERSED controls removed.	Satisfactory				
5	A Section 68 Approval must be obtained from Council prior to any sewer or stormwater work being carried out on the site. The licensed plumber must submit to Council, at least two (2) days prior to the commencement of any plumbing and drainage works on site a "Notice of Works". NOTE: A copy of the Notice of Works form can be found on Council's website.	Sewer is not available at the site. Engineered stormwater is also not available at the site.	Satisfactory				
DURING WORKS							
6	All earthworks, filling, building, driveways or other works, must be designed and constructed (including stormwater drainage if necessary) so that at no time, will any ponding of stormwater occur on adjoining land as a result of this development.	Existing swail drains trom the east to the west direct storwater from the construction site to the able drains with in the road reserve.	Satisfactory				
7	Where road works involve excavation, filling or grading of land, dust is to be suppressed by regular watering until such time as the road is established to prevent airborne dust transport.	At the time of the audit the road construction had been completed for several month. Dust management was not evidenced at the time of the audit.	Satisfactory				
PRIOR TO RELEASE OF OCCUPATION CERTIFICATE/PRIOR TO OPERATION							
8	Prior to the issue of Operation, the paving of all vehicular movement areas must be either a minimum of 150mm thick flexible pavement and sealed or 150mm thick reinforced concrete.	At the time of the audit it was observed that Constructed roads include a fleible pavement with at least 150mm thickness with bitument and chip seal.	Satisfactory				
9	The Applicant/Operator shall clearly mark all visitor, disabled, and service vehicle parking areas.	Disabled parking areas maked on site.	Satisfactory				
10	Prior to Operation, the building must comply with the Fire Safety Schedule, attached. NOTE: The Fire Safety Schedule supersedes any earlier Fire Safety Schedule and will cease to have effect when any subsequent Fire Safety Schedule is issued.	Fire Safety Certificate cited, dated 28th Feb 2017. Compliance with schedule required for the issue of the Fire Safety Certificate	Satisfactory				
11	Prior to Operation, the owner must submit to Council a final Fire Safety Certificate stating that each essential fire safety measure specified in the current Fire Safety Schedule for the building to which the certificate relates: a) has been assessed by a properly qualified person; and b) was found, when it was assessed, to be capable of performing to a standard not less than that required by the current Fire Safety Schedule for the building. Further, the assessment must be carried out within a period of three (3) months of the date on which the final Fire Safety certificate was issued. The owner of the building must forward a copy of the certificate to the New South Wales Fire Brigades and must prominently display a copy in the building. NOTE: A final Fire Safety Certificate must be provided before a final Occupation Certificate can be issued for the building and must be provided if a Fire Safety Order is made in relation to the building premises.	Letter from WWCC was provided at the time of the audit documenting the submission of the final Fire Safety Statement to WWCC.	Satisfactory				
12	A final inspection must be carried out upon completion of plumbing and drainage work and prior to occupation of the development, prior to the issuing of a final plumbing certificate Council must be in possession of Notice of Works, Certificate of Compliance and Works as Executed Diagrams for the works. The works as Executed Diagram must be submitted in electronic format in either AutoCAD or PDF file in accordance with Council requirements. All plumbing and drainage work must be carried out by a licensed plumber and drainer and to the requirements of the Plumbing and Drainage Act 2011. NOTE: Additional fees for inspections at the Plumbing Interim Occupancy / Plumbing Occupation stage may apply. This will depend on the number of inspections completed at this stage of the work/s.	No plumbing works have taken place for the installation or operation of the plastics recycling facility. (pers Com Matt Morton)	Satisfactory				
GENERAL							

13	The applicant/operator is required to ensure that prior to commencing use of Regulated Systems (cooling towers) that the systems are notified and registered with Council's Environmental Health Section. It is required that the operation and maintenance of the Regulated System on site is conducted in accordance with the Public Health Act 2010, Public Health Regulations 2012 and AS/ NZS3666 with regular servicing and disinfection.	No cooling towers exist on site for the purpose of the plastics recycling facility.	Satisfactory				
14	The applicant/operator is to ensure the on-site sewage management systems are operated and maintained in accordance with the Local Government Act 1993, Local Government (General) Regulation 2005 and Conditions of Approval to Install an On-site Sewage Management System. Proponent shall enter into service agreement with accredited service agents to ensure Aerated Wastewater Treatment Systems installed on the premises are serviced on a quarterly basis and service reports submitted to Council regularly	Jim Jenkins Plumbing services the AWTS on the site.	Satisfactory				
15	The development shall not process more than 5,000 tonnes (or equivalent figure as updated by legislation) of general waste per year.	Based on plastic product received by Repeta for Enirgi for May 2017 annual plastic receivals would be in the order of 2000t per annumn.	Satisfactory				
16	The development shall not store more than 2,500 tonnes (or equivalent figure as updated by legislation) of general waste on the site at any one time.	Plastic stored at any one time is equivalent to a truck load or approximately 30t.	Satisfactory				
17	A statement detailing the total amount of production in tonnes, is to be submitted to Council for review within 10 days of the date of consent each year.	At the time of the audit the anaversary for this requirement had not been reached.	Satisfactory				
18	The applicant/operater is to update and comply with any relevant EPA Licence requirements.	No alterations to the EPL are required at this stage as the EPL includes the land and the recovery of other waste (plastic Chip).	Satisfactory				
19	All Internal roads, driveways, parking areas, loading bays and vehicular turning areas shall be maintained clear of obstruction and used exclusively for the purposes of parking, vehicle access and loading and unloading respectively. Under no circumstances shall these areas be used for the storage of goods or waste materials or any other purpose.	At the time of the audit the parking and vehicle movement areas were not used for the storage of any product, waste or processed plastics.	Satisfactory				
20	No other land use on the site is permitted without prior consent.	No other land use was observed for the subject land at the time of the audit.	Satisfactory				
21	The development must comply with the New South Wales Industrial Noise Policy.	Activities associated the approved project were not observed to be excessively noisey at the time of the audit. The plant was operating during the site vist and noise was audible bu not greatly higher than background.	Satisfactory				
22	Any building work must be carried out in accordance with the requirements of the Building Code of Australia.	No building work has occurred on site.	Satisfactory				
23	The plastic product received by the facility and any liquid and non-liquid waste produced is to be tested at least quarterly for the measurable properties of waste, including possible chemical and metal residues and contaminants informed by the history of the waste. Contaminant thresholds of the source product are to remain below the classification of General Solid Waste (Non-Putrescible). Waste generated by the process shall be appropriately categorised, stored and dealt with in accordance with the relevant legislation and any EPA Guidelines. Particulars of the initial product and waste analysis and management particulars shall be included in the Waste Management Plan furnished for Council's approval as part of the Environmental Management Plan in accordance with Condition 2 of this consent. NOTE 1: Waste testing and classification shall be undertaken in accordance with the waste classification guidelines published by the relevant NSW authority, as may be updated or amended, presently: Waste Classification Guidelines -Part 1: Classifying Waste (2014) by the NSW Environment Protection Authority.	Rinse water produced by the washing process during plastic recycling is returned to the ULAB recycling factory for use in their processes. Lead Paste recovered from the washing process during plastic recycling is returned to the ULAB recycling factory for use in their processes.	Satisfactory				
24	The owner must submit to Council an Annual Fire Safety Statement, each 12 months after the final Safety Certificate is issued. The certificate must be on, or to the effect of, Council's Fire Safety Statement (copy attached).	At the time of the audit the anaversary for this requirement had not been reached.	Satisfactory				
25	The car park and all associated facilities must be laid out in accordance with Australian Standards AS2890.1.2004 AS2890.2 2002 and AS/NZS2890.6.2009.	The car park has not been altered from its original layout.	Satisfactory				

NSW EPA Environment Protection Licence							
	• Licence No: 12878 • Licensee: Renewed Metal Technologies Pty Ltd • Approval Authority: NSW EPA • Scheduled Actyivity: (1) Metallurgical activities and (2) Resource Recovery						
	Renewed Metal Technolgies PTY LTD 212 East Bomen Road, Bomen, NSW, 2650						
ADMINISTRATIVE CONDITIONS							
A1.1	This licence authorises the carrying out of the schedueld activities listed below at the premises specified in A2.1. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation. Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.						
	Scheduled Activity / **Fee Based Activity** / **Scale** Metallurgical activities / Metal waste generation / > 100 T annual volume of waste generated or stored Metallurgical activities / Non-ferrous metal production (scrap metal) / > 10000 T annual production capacity Resource recovery / Recovery of hazardous and other waste / Any hazardous and other waste recovered	ated that for the 56173t 2016) of d. This produced t 2016).	Satisfactory				
	Note: Condition A1.1 is restricted by the Notice of Determination of Modification of Development Application DA05/0517 issued by Wagga Wagga City Council which limits the activity to processing no more than 70,000 tonnes of Used Lead Acid Batteries in any one year.	In the last reporting period 63420t of ULAB were processed.	Satisfactory				
A1.2	The licensee must not carry on any scheduled activities until the scheduled development works are completed, except as elsewhere provided in this licence.	No development works were required for the expansion of the battery processing limits.	Satisfactory				
A2.1	The licence applies to the following premises: **Premises Details** RENEWED METAL TECHNOLOGIES PTY LTD 212 EAST BOMEN ROAD BOMEN NSW 2650 LOT 3 DP 594679, LOT 21 DP 1128492	Battery processing is on lot 21 Dp 1128492, Administarion processing (not subject to the EPL) are occuring 594679.	Satisfactory				
A3.1	Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence. In this condition the reference to "the licence application" includes a reference to: a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulations 1998; and b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.	The proposal for the original licence could not be produced at the time of the audit. However, previous annual returns for EPL's and previous internal audits indicate that activities are being carried out in broad compliance with the licence and its conditions.	Satisfactory				
DISCHARGES TO AIR AND WATER AND APPLICATIONS TO LAND							

P1.1	The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point. **EPA identification no.** / **Type of Monitoring Point** / **Type of Discharge Point** / **Location Description** 1 / Discharge to Air / Discharge to Air / CX section sanitary air emissions from stack described as C-530 in Appendix A of "Battery Recovery Plant, Wagga Wagga, NSW, Air Quality Impact Assessment", report prepared by Heggies Australia Pty Ltd, 3/8/05. 2 / Discharge to Air / Discharge to Air / Process gases and sanitary air emissions from stack described as C-720 in Appendix A of Battery Recovery Plant, Wagga Wagga, NSW, Air Quality Impact Assessment", report prepared by Heggies Australia Pty Ltd, 3/8/05. 3 / Discharge to Air / Discharge to Air / Refining kettle burners emissions from stack described as C-830 in "Appendix A of "Battery Recovery Plant, Wagga Wagga, NSW, Air Quality Impact Assessment", report prepared by Heggies Australia Pty Ltd, 3/8/05. 4 / Discharge to Air / Discharge to Air / Steam boiler emissions from stack decribed as SBB Stack in Appendix A of "Battery Recovery Plant, Wagga Wagga, NSW, Air Quality Impact Assessment", report prepared by Heggies Australia Pty Ltd, 3/8/05 5 / Discharge to Air / Discharge to Air / Sodium sulphate drying emissions from stack described as Na2SO4 stack in Appendix A of "Battery Recovery Plant, Wagga Wagga, NSW, Air Quality Impact Assessment", report prepared by Heggies Australia Ltd, 3/8/05.	Emmissions discharge points identified on site during site inspection.	Satisfactory				
P1.2	The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.	No utilisation area is nominated in the EPL.	Satisfactory				
LIMIT CONDITIONS							
L1.1	Except as may be expressly provided in any other condition of this licence, the licensee must comply with Section 120 of the Protection of the Environment Operations Act 1997.	Noted, no obvious dicharges to the environment were noted other than the irrigation of water from the stormwater basin west of the plant. The water collected in the basin is tested filtered and irrigated on land south of the plant	Satisfactory				
L2.1	The actual load of an assessable pollutant discharged from the premises during the reporting period must not exceed the load limit specified for the assessable pollutant in the table below.	N/A, no load limits specified in the licence	Satisfactory				
L2.2	The actual load of an assessable pollutant must be calculated in accordance with the relevant **Assessable Pollutant** / **Load limit (kg)** Coarse Particulates (Air) Fine Particulates (Air) Lead (Air) Nitrogen Oxides (Air) Sulfur Oxides (Air) Volatile organic compounds (Air)	N/A, as above	Satisfactory				

	Note: An assessable pollutant is a pollutant which affects the licence fee payable for the licence. Note: The load limits will be determined after 12 months of operation of the facility. The licensee must conduct emissions monitoring consistent with the Load Calculation Protocol for the determination of limits during the first year of operation. At the first anniversary date the licensee must use the monitoring data to determine and pay the pollutant load fee.	Noted	Satisfactory				
L3.1	For each monitoring/discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.	Ektimo complete the installation and maintenace of stack monitoring. Each stack is monitoried in acordance with the EPL. Monitoring reports (2017x2) and annual return (2017) cited.	Satisfactory				
L3.2	To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\s.	Noted, no polution of waters observed. Stormwater from the site managed using stormwater capture treatment, testing and disposal to land.	Satisfactory				
L3.3 Point 1	Air Concentration Limits **Pollutant** / **Units of measure** / **100 percentile concentration limit** / **Reference conditions** / **Oxygen correction** / **Averaging period** Solid Particles / milligrams per cubic metre / 5 / Dry, 273 K, 101.3 kPa / / Refer to Note in L3 3 Type 1 and Type 2 substances in aggregate / milligrams per cubic metre / 1 / Dry, 273 K, 101.3 kPa / / Refer to Note in L3 3 Lead / milligrams per cubic metre / 0.5 / Dry, 273 K, 101.3 kPa / / Refer to Note in L3 3	Reports and return cited, no exceedances recorded.	Satisfactory				
L3.3 Point 2	**Pollutant** / **Units of measure** / **100 percentile concentration limit** / **Reference conditions** / **Oxygen correction** / **Averaging period** Solid Particles / milligrams per cubic metre / 5 / Dry, 273 K, 101.3 kPa / / Refer to Note in L3.3 Lead / milligrams per cubic metre / 0.5 / Dry, 273 K, 101.3 kPa / / Refer to Note in L3.3 Sulfuric acid mist and sulfur trioxide (as SO3) / milligrams per cubic metre / 5 / Dry, 273 K, 101.3 kPa / / Refer to Note in L3.3 Type 1 and Type 2 substances in aggregate / milligrams per cubic metre / 1 / Dry, 273 K, 101.3 kPa / / Refer to Note in L3.3 Sulphur dioxide / milligrams per cubic metre / 400 / Dry, 273 K, 101.3 kPA / / Refer to Note in L3.3 Dioxins & Furans / nanograms per cubic metre / 0.1 / Dry, 273 K, 101.3 kPA / / Refer to Note in L3.3	Reports and return cited, no exceedances recorded.	Satisfactory				

L3.3 Point 3	**Pollutant** / **Units of measure** / **100 percentile concentration limit** / **Reference conditions** / **Oxygen correction** / **Averaging period** Nitrogen Oxides / milligrams per cubic metre / 250 / Dry, 273 K, 101.3 kPA / / Refer to Note in L3.3	ces recorded.	Satisfactory				
L3.3 Ponit 4	**Pollutant** / **Units of measure** / **100 percentile concentration limit** / **Reference conditions** / **Oxygen correction** / **Averaging period** Nitrogen Oxides / milligrams per cubic metre / 250 / Dry, 273 K, 101.3 kPa / / Refer to Note in L3.3	ces recorded.	Satisfactory				
L3.3 L3.3 POIN T 5	**Pollutant** / **Units of measure** / **100 percentile concentration limit** / **Reference conditions** / **Oxygen correction** / **Averaging period** Solid particles / Milligrams per cubic metre / 5 / Dry, 273 K, 101.3kPa / / Refer to Note in L3.3	Reports and return cited, no exceedances recorded.	Satisfactory				
	Note: 1. The pollutant "Nitrogen Oxides" in condition L3.3 is defined as "Oxides of Nitrogen (as NO2 equivalent)"; and 2. The averaging period in L3.3 is 1 hour, or the minimum sampling period specified in the	Noted	Satisfactory				
L3.4	If an averaging period is specified for a pollutant in the table below, the average concentration of that pollutant discharged over the course of the averaging period must not exceed the 100 **Pollutant** / **Units of Measure** / **100 percentile limit** / **Reference Conditions** / **Averaging Period** Point 2 sulphur dioxide / Milligrams per cubic metre / 150 / Dry, 273K, 101.3kPa / Special Averaging Period 1	Noted	Satisfactory				
L3.5	To avoid any doubt, condition L3.3 does not authorise the discharge or emission of any other pollutants.	Noted	Satisfactory				
L4.1	The licensee must not cause, permit or allow any waste to be received at the premises, except the wastes expressly referred to in the column titled "Waste" and meeting the definition, if any, in the column titled "Description" in the table below. Any waste received at the premises is subject to those limits or conditions, if any, referred to in relation to that waste contained in the column titled "Other Limits" in the table below. This condition does not limit any other conditions in this licence. **Code** / **Waste** / **Description** / **Activity** / **Other Limits** NA / Lead acid batteries and other lead scrap / / Resource recovery / NA NA / General or Specific exempted waste / Waste that meets all the conditions of a resource recovery exemption under Clause 51A of the Protection of the Environment Operations (Waste) Regulation 2005 / As specified in each particular resource recovery exemption / NA NA / Waste / Any waste received on site that is below licensing thresholds in Schedule 1 of the POEO Act, as in force from time to time / - / NA	Enirgi only accepts used lead acid batteries at the Byrnes Road facilities. The batteries are predominantly car and truck batteries (95%). Other battery types including telecomunications batteries, computer batteries, submarine batteries and hand held car jump batteries are also received. While these require manual handling they are still lead acid batteries and are processed by the plant eg. computer key or recycled off confirmed though process staff and contaminants cited	Satisfactory				

L5.1	Noise from the premises must not exceed: a) an LA10 (15 minute) noise emission criterion of 37dB(A) (7am to 6pm) Monday to Friday; and 7am to 1pm Saturday; and b) an LA10 (15 minute) noise emission criterion of 36dB(A) during the evening (6pm to 10pm) Monday to Friday; and c) at all other times, an LA10 (15 minute) noise emission criterion of 35 dB(A), except as expressly provided by this licence.	The Noise Audit (Stephenson 2013), demonstrated that the noies from the plant was compliant with the EPL in 2013. Noise monitoring of the plant was conducted in July 2017 by Regional enviroscience. The monitoring recorded an 38.4 Laeq at the southern propoerty boundary. While this represents an excedance of the criteria it is a marginal exceedance.	Satisfactory				
L5.2	Noise from the premises is to be measured at nearest or most sensitive receiver to determine compliance with this condition. Note: Definition LA10 (15 minute) is the sound pressure level that is exceeded for 10% of the time when measured over a 15 minute period. Note: Noise measurement For the purpose of noise measures required for condition L5.1, the LA10 noise level must be measured or computed at any point nearest the most effected sensitive receptor over a period of 15 minutes use "FAST" response on the sound level meter. For the purpose of the noise criteria for condition L5.1, 5dBA must be added to the measured level if the noise is substantially tonal or impulsive in character. Noise measurements are to be made either: i) 1 metre from the facade of the residence for night time measurement; or ii) 30 metres from the residence where the boundary is more than 30 metres from the residence.	Noise monitoring completed by Stephenson Environmental Management in 2013 was compliant with this condition.	Satisfactory				
L6.1	No condition of this licence identifies a potentially offensive odour for the purposes of section 129 of the Protection of the Environment Operations Act 1997. Note: Section 129 of the Protection of the Environment Operations Act 1997 provides that the licensee must not cause or permit the emission of any offensive odour from the premises but provides a defence if the emission is identified in the relevant environment protection licence as a potentially offensive odour and the odour was emitted in accordance with the conditions of a licence directed at minimising odour.	Observations on site during the site visit did not detect any strong odours external to the factory from its operation. No odour complaints have been received for the last three years. (RIMS data base cited).	Satisfactory				
OPERATING CONDITIONS							
O1.1	Licensed activities must be carried out in a competent manner. This includes: a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.	At the time of the site audit the handling of materials through the process and the various waste streams was competent. The storage and handling of reagents was organised, labelled and appropriately signed. Hazardous materials, inputs, waste and product registers cited were electronic, ledgible and comprehensive.	Satisfactory				
O2.1	All plant and equipment installed at the premises or used in connection with the licensed activity: a) must be maintained in a proper and efficient condition; and b) must be operated in a proper and efficient manner.	In general at the time of the audit the buildings, plant waste management and equipment were in a satisfactory state of repair. The work shop for maintance was active and well resourced. Ample parts and critical backup components were cited during the inspection.	Satisfactory				
O3.1	All operations and activities occurring at the premises must be carried out in a manner that will minimise the emission of dust from the premises.	During the audit dust outside the plant was not visible. The dust extraction in the bag houses is working very well with air emmissions for solid particles well below the EPL limits.	Satisfactory				
O4.1	The licensee must maintain, and implement as necessary, a current Pollution Incident Response Management Plan (PIRMP) for the premises. The licensee must keep the incident response plan on the premises at all times. The incident response plan must document systems and procedures to deal with all types of incidents (e.g. spills, explosions or fire) that may occur at the premises or that may be associated with activities that occur at the premises and which are likely to cause harm to the environment. The licensee must develop a Pollution Incident Response Management Plan in accordance with the requirements in Part 5.7A of the Protection of the Environment Operations (POEO) Act 1997 and POEO regulations.	PIRMP 2017 cited. Testing of the PIRMP occurred 19/3/2017. The PIRMP is available on the company website, at the front gate and through the RIMS record system.	Satisfactory				

O5.1	A Stormwater Management Scheme must be prepared for the development and must be implemented. Implementation of the Scheme must mitigate the impacts of stormwater runoff from and within the premises following the completion of construction activities. The Scheme should be consistent with the Stormwater Management Plan for the catchment. If a Stormwater Management Plan has not yet been prepared the Scheme should be consistent with the guidance contained in *Managing Urban Stormwater: Council Handbook* (available from the EPA).	Stormwater management plan cited and part of the overall OEMP for the facility. Clean and dirty water seperation noted. Dirty water captured treated and tested prior to any on site irrigation.	Satisfactory				
O5.2	The licensee must ensure that any liquid and/or non liquid waste generated and/or stored at the premises is assessed and classified in accordance with the DECC Waste Classification Guidelines as in force from time to time.	The facility produces a number of waste streams. Office and ammenities waste is preclasified as solid waste. Effluent from ablutions and toilets are processed through septic systems and disposed of on site through transpiration beds. Plastic chip generated on site is sold as a product for reuse and is preclasified as general solid waste. Lead and Na2SO4 are sold as products for use in industry and are not waste. Slag produced by the proces is tested and classified using the solide waste guidelines and is also managed through a specific Immobilised Contaminants Approval. Stormwater captured in the dam and treated, tested and discharged to land and is not subject to any licence conditions for this EPL.	Satisfactory				
O6.1	All above ground tanks containing material that is likely to cause environmental harm must be bunded or have an alternative spill containment system in place.	Observations at the time of the audit for the indicated that the largest tanks for NaOH and H2 SO4 tanks were in the order of 8m3 and 18.69m3 respectively. The separate bundings for both tanks were sufficient to hold 100% of each volume. Process fluids are collected and contained in the interal subfloor drainage system.	Satisfactory				
O6.2	The licensee must ensure that suitable measures (e.g. high/low alarms, control valves with interlock control, one way valves) are installed on all tanks, ponds or clarifiers and associated pipes and hoses to prevent the spillage of waste.	A range of level sensors (some cameras) are used for level detection on tanks and vessels.Control valves, one way valves and interlock controls (as required) are used in conjuction with the SCADA sytsem to control process levels and fluid movments	Satisfactory				
O7.1	The battery bunker, the electrolyte collection and filtration unit, the CX batter feed unit and the CX breaker must be lined with a liner which is generally impervious to the material likely to be contained or spilt in those areas.	During the site inspection it was observed that fluids in these areas were draining to the subfloor drainage network and being captured for reuse in the process. Images were provided during the audit that demonstrated an HDPE linner below the floor slab	Satisfactory				
O7.2	Leak detection must be installed under the liner within the battery bunker and any other acid storage areas. Leak detection is not required where acid is stored in dedicated acid resistant storage tanks.	Leak detection system was observed on site and the pits are checked and tested on a 2 month basis. Results for the testing viewed.	Satisfactory				
O7.3	All process water storage dams or ponds must be lined with a liner with a performance equivalent to a clay liner of 500mm thickness and with a permeability not exceeding 10-9m/s.	The dams on site are lined with clay and variously concrete or pvc.	Satisfactory				
MONITORING AND RECORDING CONDITIONS							
M1.1	The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.	Noted	Satisfactory				
M1.2	All records required to be kept by this licence must be: a) in a legible form, or in a form that can readily be reduced to a legible form; b) kept for at least 4 years after the monitoring or event to which they relate took place; and c) produced in a legible form to any authorised officer of the EPA who asks to see them.	Records observed at the time of the audit were all kept in an electronic form, mostly as spreadsheets, pdf reports or word documents. The records were ledgible. Records as farback as 2013 were cited (5 years). Records are available to an EPA officer on request (pers Com Matt Morton).	Satisfactory				
M1.3	The following records must be kept in respect of any samples required to be collected for the purposes of this licence: a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected; c) the point at which the sample was taken; and d) the name of the person who collected the sample.	The sampling required by the licence has the required level of detail. Continuous sampling is forwarded monthly to the EPA by Matt Morton.	Satisfactory				

M2.1	For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency specified opposite in the other columns.	Results of monitoring as required for the points below was cited for several time periods at the time of the audit.	Satisfactory				
M2.2	Air Monitoring Requirements POINT 1 **Pollutant** / **Units of measure** / **Frequency** / **Sampling Method** Carbon dioxide / percent / Quarterly / TM-24 Dry gas density / kilograms per cubic metre / Quarterly / TM-23 Lead / milligrams per cubic metre / Quarterly / TM-12 Moisture content / percent / Quarterly / TM-22 Molecular weight of stack gases / grams per gram mole / Quarterly / TM-23 Oxygen (O2) / percent / Quarterly / TM-25 Solid Particles / milligrams per cubic metre / Quarterly / TM-15 Temperature / degrees Celsius / Quarterly / TM-2 Type 1 and Type 2 substances in aggregate / milligrams per cubic metre / Quarterly / TM-12, TM-13 & TM-14 Velocity / metres per second / Quarterly / TM-2 Volumetric flowrate / cubic metres per second / Quarterly / TM-2	Stack report cited and manufacturer cerificates cited validating compliance with sampling methods in the EPL	Satisfactory				
	POINT 2 **Pollutant** / **Units of measure** / **Frequency** / **Sampling Method** Dioxins & Furans / nanograms per cubic metre / Yearly / TM-18 Lead / milligrams per cubic metre / Quarterly / TM-12 Oxygen (O2) / percent / Continuous / CEM-3 Solid Particles / milligrams per cubic metre / Quarterly / TM-15 Sulfuric acid mist and sulfur trioxide (as SO3) / milligrams per cubic metre / Quarterly / TM-3 Sulphur dioxide / milligrams per cubic metre / Continuous / CEM-2 Temperature / degrees Celsius / Continuous / TM-2 Type 1 and Type 2 substances in aggregate / milligrams per cubic metre / Quarterly / TM-12, TM-13 & TM-14 Velocity / metres per second / Continuous / CEM-6	Stack report cited and manufacturer cerificates cited validating compliance with sampling methods in the EPL	Satisfactory				
	POINT 3 **Pollutant** / **Units of measure** / **Frequency** / **Sampling Method** Nitrogen Oxides / milligrams per cubic metre / Yearly / TM-11	Stack report cited validating compliance with sampling	Satisfactory				
	POINT 4 **Pollutant** / **Units of measure** / **Frequency** / **Sampling Method** Nitrogen Oxides / milligrams per cubic metre / Yearly / TM-11	Stack report cited validating compliance with sampling					

	POINT 5 **Pollutant** / **Units of measure** / **Frequency** / **Sampling Method** Solid Particles / milligrams per cubic metre / Yearly / TM-15 Note: The pollutant "Nitrogen Oxides" in condition M2.2 is defined as "Oxides of Nitrogen (as	Stack report cited validating compliance with sampling	Satisfactory				
M2.3	Following installation of the monitoring device used to meet the requirements for Point 2 of M2.1 the device must be checked and validated by a suitably qualified professional to ensure it is calibrated and operating correctly. The data collected for Point 2 as required by M2.1 for sulphur dioxide must be submitted in electronic format to the EPA on a monthly basis. The monitoring data must be compared against the limits for Point 2 contained in Condition L3.3 and L3.4.	Calibration certificat from *Phoenix Instrumentation* for point two cited. Email to NSW EPA with monthly results (1/2/18) cited. Data compared against limits in EPL	Satisfactory				
M3.1	Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with: a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place. Note: The *Protection of the Environment Operations (Clean Air) Regulation 2010* requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".	Test methods used were observed to be compliant with the EPL. This was demonstrated through the stack emmission monitoring reports.	Satisfactory				
M4	Note: Division 3 of the *Protection of the Environment Operations (General) Regulation 2009* requires that monitoring of actual loads of assessable pollutants listed in L2.2 must be carried out in accordance with the relevant load calculation protocol set out for the fee-based activity classification listed in the Administrative Conditions of this licence.	Noted.	Satisfactory				
M5.1	The licensee must collect and analyse meteorological data at the premises for the following parameters at the frequency, and using the method, specified for each parameter: **Parameter** / **Units of Measure** / **Averaging Period** / **Method** / **Frequency** Location / n/a / n/a / AM-1 & AM-4 / n/a Measurement / n/a / n/a / AM-2 & AM-4 / n/a Wind Speed @ 10m / m/s / 1 hour / AM-2 & AM-4 / Continuous Wind Direction @ 10m / Degrees / 1 hour / AM-2 & AM-4 / Continuous Sigma Theta @ 10m / Degrees / 1 hour / AM-2 & AM-4 / Continuous Temperature @ 10m / Kelvin / 1 hour / AM-4 / Continuous Temperature @ 2m / Kelvin / 1 hour / AM-4 / Continuous Total Solar Radiation @ 10m / Watts per square metre / 1 hour / AM-4 / Continuous	Met station observed to the northwest of the factory. The station apperaed to be well maintained and in working ıarameters, :PL.	Satisfactory				
M6.1	The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.	Complaints have not beed received for the past three years. Complaints prior to this period were recorded as per the requirements below.	Satisfactory				

M6.2	The recprd must include details of the following: a) the date and time of the complaint; b) the method by which the complaint was made; c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect; d) the nature of the complaint; e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f) if no action was taken by the licensee, the reasons why no action was taken.	The details required are being recorded in RIMS as per the EPL. Copies of all incoming emails and scanned letters are attached to the complaint.	Satisfactory				
M6.3	The record of a complaint must be kept for at least 4 years after the complaint was made.	Records from 2012 and 2013 cited.	Satisfactory				
M6.4	The record must be produced to any authorised officer of the EPA who asks to see them.	Records are available on request.	Satisfactory				
M7.1	The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.	A complaints line number is displayed at the front entrance. During normal business hours this will be answered by an operator and outside this time it will be recorded and actioned the next day. A 1300 number is available on the web site for complaints during business hours. A web email is also available from the website 24hours a day.	Satisfactory				
M7.2	The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.	Phone number on sign at front gate signed as an emergency number and complaint line.	Satisfactory				
M7.3	The preceding two conditions do not apply until 3 months after the date of the issue of this licence.	This audit was conducted more than five years after the commencement of operations and validation of this condition is not posible at this point in time.	Satisfactory				
REPORTING CONDITIONS							
R1.1	The licensee must complete and supply to the EPA an Annual Return in the approved form comprising: 1. a Statement of Compliance, 2. a Monitoring and Complaints Summary, 3. a Statement of Compliance - Licence Conditions, 4. a Statement of Compliance - Load based Fee, 5. a Statement of Compliance - Requirement to Prepare Pollution Incident Resposne Management Plan, 6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and 7. a Statement of Compliance - Environmental Management Systems and Practices. At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.	The statements required in this condition were sited in the 2016/2017 annual return.	Satisfactory				
R1.2	An Annual Return must be prepared in respect of each reporting period, except as provided below. Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.	The last return noted the reporting period as the 1/5/2016 to the 30/4/2017. For the previous period the annual return was for the period 1/5/2015 to 30/4 2016.	Satisfactory				
R1.3	Where this licence is transferred from the licensee to a new licensee: a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period. Note: An application to transfer a licence must be made in the approved form for this purpose.	Not applicable the licence has not been transferred.	Satisfactory				

R1.4	Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on: a) in relation to the surrender of the licence - the date when notice in writing of approval of the surrender is given; or b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.	Not applicacble the licence has not been surrendered.	Satisfactory				
R1.5	The Annual Return for the reporting period must be supplied to the EPA via eConnect *EPA* or by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').	The previous return was submitted 14/06/16 via certified mail. The last return was submitted on the 5/06/2017 via eConnect.	Satisfactory				
R1.6	Where the licensee is unable to complete a part of the Annual Return by the due date because the licensee was unable to calculate the actual load of a polklutant due to circumstances beyond the licensee's control, the licensee must notify the EPA in writing as soon as practicable, and in any event not later than the due date. The notification must specify: a) the assessable pollutants for which the actual load could not be calculated; and b) the relevant circumstances that were beyond the control of the licensee.	Not Applicable, all load calculations were completed and submitted with the annual return.	Satisfactory				
R1.7	The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.	The annual return for 2013/2014 was cited. Reecords and returns exist from 2010 to the present.	Satisfactory				
R1.8	Within the Annual Return, the Statements of Lcompliance must be certified and the Monitoring and Complaints Summary must be signed by: a) the licence holder; or b) a person approved in writing by the EPA to sign on behalf of the licence holder.	The Annual return for 2016 2017 was certified and signed by Company CEO and the Company Secretary Todd Vains and Tim Scanian respectively.	Satisfactory				
R2.1	Notifications must be made by telephoning the Environment Line service on 131 555. Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.	No notifications have been made in recent times. The 131555 polution line number was cited in the PIRMP and internal Emergency Management Plan.	Satisfactory				
R2.2	The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.	Noted, no events in recent times.	Satisfactory				
R3.1	Where an authorised officer of the EPA suspects on reasonable grounds that: a) where this licence applies to premises, an event has occurred at the premises; or b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carryout out of the activities authorised by this licence, and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.	Noted, no events in recent times.	Satisfactory				
R3.2	The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.	Noted, no events in recent times.	Satisfactory				
R3.3	The request may require a report which includes any or all of the following information: a) the cause, time and duration of the event; b) the type, volume and concentration of every pollutant discharged as a result of the event; c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event; d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort; e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;	Noted, no events in recent times.	Satisfactory				
R3.4	The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.	Noted, no events in recent times.	Satisfactory				
GENERAL CONDITIONS							

G1.1	A copy of this licence must be kept at the premises to which the licence applies.	A copy of the current EPL was cited at the entry to the site. Electronic copy also available in RIMS and shared hard drive.	Satisfactory				
G1.2	The licence must be produced to any authorised officer of the EPA who asks to see it.	Noted	Satisfactory				
G1.3	The licence must be available for inspection by any employee or agent of the licensee working at the premises.	The licence is available in hard copy or electronicaly for staff on site.	Satisfactory				
POLLUTION STUDIES AND REDUCTION PROGRAMS							
U1.1	The objective of this pollution study is to record, investigate and report on emission concentration spikes and variability of sulphur dioxide from Emission Point 2. For a period of 12 months following the commencement of this condition, in the event of either: 1. an SO2 concentration greater than 300mg/m3, for a 1 hour averaging period; or 2. an SO2 concentration greater than 150mg/m3, for Special Averaging Period 1, the licensee must investigate and record the cause of the SO2 emission variability and concentration spike, and identify any potential mitigation measures (including management practices) to reduce future SO2 spikes and variability. After a period of 18 months following the commencement of this condition the licensee must submit a final report to EPA Manager South West. The report must provide: 1. an analysis and summary of SO2 emissions from the process, including observed variability; 2. each concentration spike of SO2 as identified as greater than 300mg/m3 for a 1 hour averaging period, or greater than 150mg/m3 for a Special Averaging Period 1; 3. the results of each investigation conducted for the SO2 spikes identified, including but not limited to: a) A detailed explanation or analysis of emissions and processes when a spike was recorded; b) Details of the materials being processed at the time the spike was recorded, and their influences on the recorded emission concentration of SO2; c) Details of quality assurance and control measures including but not limited to the analysis and quantification of the raw materials used to minimise the emission of SO2; d) Any other relevant information as required to provide a clear and transparent explanation of the cause of the recorded SO2 emission concentrations; and e) Actions taken to reduce emission spikes and variability. 4. any potential mitigation measures identified to reduce the occurrence of future SO2 spikes.	PSRP report sent 1/11/2016 and acknowledged by EPA Unit Head 3/11/2016. No comment has been received to date. Four incidents of SO2 greater than 300mg/m3 occurred in the reporting period. These were investigated and reported upon. The SO2 levels were compliant for 99.95% of the readings. For the four errant readings it was though the timing of the monitoring period may have had an effect. However, Enirgi has implemented additional controls for sulphur management in the process to further improve consistency of sulphur levels in furnace paste. The report as cited satisfies the requirements of the condition.	Satisfactory				
SPECIAL CONDITIONS							
E1.1	"Special Averaging Period 1" means the duration of the batch.						
E1.2	"Batch" means the time from when the burner in the furnace at the Premises is ignited to when the burner is switched off.	Noted					
IMMOBILISED CONTAMINANTS APPROVAL							
	• Approval: Part 10 Protection of the Environment Operations (Waste) Regulation - Immobilised Contaminants Approval • Licensee: Renewed Metal Technologies Pty Ltd • Approval Authority: NSW EPA • Approval No.: 2010-S-09						
	• 16,000 tonnes per annum of lead smelter slag waste • 509 Byrnes Road, Bowen Covering:						
CONDITIONS OF APPROVAL							

F1	Quality Assurance / Quality Control 1.1. The responsible person must implement a quality control program to ensure compliance with the conditions of this approval. The program must include: 1.1.1. a statistically valid sampling program appropriate to the quantity of naturally immobilised waste which is consistent with the acceptance/rejection procedures adopted for the naturally immobilised waste; 1.1.2. a testing plan which complies with Condition 2 of this approval; and 1.1.3. acceptance/rejection procedures which ensure that only naturally immobilised waste which satisfies all of the requirements of this approval is disposed of off-site to landfill. NOTE: The sampling program will depend on a number of factors including the quantity and variability of material to be tested. 1.2. All testing must be undertaken by analytical laboratories accredited by the National Association of Testing Authorities to perform the particular test. 1.3. The following parameters must be monitored as part of the testing plan: 1.3.1. total concentration of As, Pb and Se in the naturally immobilised waste; and 1.3.2. leachable concentration of As, Pb and Se in the naturally immobilised waste.	A quality control plan and procedure, including a sampling and testing plan for the slag was cited. The plan details when and how sampling will occur. The control plan also deals with acceptance and rejection criteria for the was. To support the procedure is a Safe Work Instruction that provides staff with additional advice for the management of slag. The slag is classified as General solid wast, resticted soild waste or hazardous waste. Slag clasffied as General solid wast, resticted soild waste is sent to the same facility but managed differently on receival. Slag clasified as hazardous waste would be reprocessed on site through the furnace. However this has yet to occur on the site. Slag samples are tested for AS Pb and Se as total and leachable metals.	Satisfactory				
F2	Test Methods 2.1. The total concentration of As, Pb and Se must be measured as the Specific Contaminant Concentration (SCC) in accordance with the method specified in the Waste Classification Guidelines (2014). 2.2. The leachable concentration of As, Pb and Se must be measured using the Toxicity Characteristics Leaching Procedure (TCLP) as specified in the Waste Classification Guidelines (2014). 2.3. SCC and TCLP test results used for assessing compliance with the conditions of this approval must be within the 95% upper confidence limit (UCL).	The test results cited indicated that the applicable test methods were used for the analysis specified	Satisfactory				
F3	Waste Assessment Requirements Note: Refer to the Waste Classification Guidelines (2014) for more information about waste classification including SCC and TCLP limit values for As, Pb and Se. 3.1. The total concentration (SCC) limits for As, Pb and Se do not apply to the classification of the naturally immobilised waste provided that the waste complies with all of the conditions of this Approval. 3.2. With respect to As, Pb and Se naturally immobilised waste which complies with all of the conditions of this Approval may be classified according to the leachable concentration (TCLP) value alone. 3.3. All other contaminants in the naturally immobilised waste must be assessed in accordance with the procedure in the Waste Classification Guidelines (2014), namely that both total concentrations and leachable concentrations (where specified) apply.	Slag test results are compared to the Waste clasification Guidelines to characterise the waste. This charted and graphed for each sample taken. The TCLP resultes for the last six months indicated the slag waste was well below the limit for general solid waste.	Satisfactory				

F4	Disposal Restrictions 4.1. Naturally immobilised waste subject to this approval that satisfies the requirements of the Waste Classification Guidelines (2014) for classification as general solid waste may only be disposed of at a general solid waste (non-putrescible) landfill or a restricted solid waste landfill which has currently operating leachate management systems and which is licensed by the EPA to accept that particular type of waste. 4.2. Naturally immobilised waste subject to this approval that satisfies the requirements of the Waste Classification Guidelines (2014) for classification as a restricted solid waste may only be disposed of at a restricted solid waste landfill which has currently operating leachate management systems and which is licensed by the EPA to accept that particular type of waste. 4.3. A landfill receiving the naturally immobilised waste: 4.3.1. must have licence conditions to receive waste subject to immobilisation approvals with this type of disposal restriction; and 4.3.2. must monitor landfill leachate and groundwater for As, Pb and Se. 4.4. The responsible person must advise the disposal facility in writing that the naturally immobilised waste to be disposed of has been classified in accordance with the conditions of this approval.	The slag waste has been classified based on the TCLP results as general solid waste for the past five years. That waste is sent to Kemps Creek under licence 4068. EPL 4068 in condition L3.1 allows for the disposal of waste subject to specific immobilisation approvals. This includes the requirement for a leachate collection system. This licence also include the requirment to monitor leachate and groundwater for As Pband Se. The facilityis notified of the waste type through the online tracking system.	Satisfactory				
F5	Notification and Record Keeping Requirements 5.1. For naturally immobilised waste disposed of under this approval, the responsible person is required to keep all test results and disposal documentation for a period of at least 6 years from the date on which the waste is disposed of off site. 5.2. The responsible person is required to notify the EPA within 48 hours of receiving any test result which shows that the naturally immobilised waste does not meet the requirements for disposal under this approval. 5.3. The responsible person is required to provide monitoring test results as per Condition 1 above to the EPA every 6 months from date of this approval.	As per the requirement of the licence the licensee has kept test results for the required period as per the condition of the day. No notifications have been required or occurred in the last five years. Reports and emails cited indicate that results bare sent to the EPA on a six monthly basis.	Satisfactory				
F6	Waste Tracking Requirements 6.1. Naturally immobilised waste must, when transported, be tracked in accordance with Part 10 of the Protection of the Environment Operations (Waste) Regulation 2014. 6.2. Prior written approval must be obtained from the EPA if the naturally immobilised waste is not to be tracked using the EPA's online waste tracking system.	Waste dockets indicate that the waste is being transported using the online wast tracking system.	Satisfactory				

Appendix G – Air Quality Impact Assessment

Enirgi Power Storage Recycling

Enirgi Power Storage Recycling Consolidation Project EIS

Air Quality Assessment

June 2018

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Appendices

1. Introduction

1.1 Project background

Enirgi Power Storage Recycling Pty Ltd (EPSR) propose to increase the production capacity of its existing used lead acid battery recycling facility at 509 Byrnes Road, Bomen.

In November 2010 EPSR opened a lead recycling facility located in Bomen, Wagga Wagga. The plant was approved to process 42,000 tonnes per annum (tpa) of used lead acid batteries (ULAB). This produces 25,000 tonnes of soft lead and lead alloy products, in addition to other products including 7,000 tonnes of sodium sulphate and 3,000 tonnes of polypropylene and other plastics.

In September 2016 EPSR was approved to increase the production capacity of its facility from 42,000 to 70,000 (tpa) through a modification to the existing consent.

EPSR are now proposing to develop the Enirgi Power Storage Recycling Consolidation Project (the Project). The Project involves an expansion of the existing used lead acid battery (ULAB) recycling facility within the Bomen Industrial Estate. The project involves the following components:

- Increasing production at the site from 70,000 to 120,000 tonnes per annum.
- A new building to the east of the current facility will contain a new salt storage, crystallisation area, purification and scrubber.
- A new storage warehouse to the north of the existing facility capable of holding 4800 pallets of ULAB's, chemicals and raw materials.
- The existing facility will undergo some upgrades to include a new furnace to supplement the existing furnace, a new filter baghouse and exhaust stack, modified battery breaker to increase capacity, relocation of slag bay, addition of on site oxygen generation.
- A small increase to the capacity of existing car park.
- The current office/change house building will be modified to contain a change house and the office employees will be moved to another nearby facility.
- Alterations to the internal site roads to provide access to the new buildings and plastic resource recovery facility.
- Inclusion of the recycling activities of the adjoining plastics resource recovery facility.

Construction of the proposal would take approximately 6 months to complete and will be constructed in stages.

The purpose of this Air Quality Impact Assessment (AQIA) is to assess and document the potential air quality impacts of the project.

1.2 Scope

This report has been prepared to support the Environmental Impact Statement (EIS) for the proposal. The scope of the AQIA is:

- Conducting a divergence test on meteorological data from 2012 to 2016 in order to determine the year that best represents 'normal' meteorological conditions.
- Creating surface files containing meteorological data for the chosen year using data from both the nearby weather station and from the BOM Wagga Wagga AMO site.

- Running a TAPM prognostic model to obtain a coarse meteorological 3D gridded dataset for the site for the selected year.
- Running of CALMET in order to resolve the wind field around the proposal site.
- Producing an emission inventory for the proposed operations and modelling the emissions using CALPUFF with the meteorological data produced in previous steps.
- Assessment of the potential air quality and odour impacts at nearby sensitive receivers.
- Provision of mitigation measures where applicable.

1.3 Environmental assessment requirements

1.3.1 Secretary's Environmental Assessment Requirements

The Secretary's Environmental Assessment Requirements (SEARs) are summarised in Table 1-1 together with a reference to where they are addressed in the report.

Table 1-1 Secretary's Environmental Assessment Requirements

Secretary's Environmental Assessment Requirements		Location addressed
Air quality and Odour		
1)	A quantitative air quality assessment of the air quality and odour impacts of the existing and proposed development including impacts on any surrounding receivers. The assessment must consider impacts from construction and operation, and include:	
	• Detail the air emission inputs and outputs	Section 4.1
	• Identify all pollutants of concern	Section 4.2.3
	• Include a quantitative assessment of all potential impacts using dispersion modelling, including adequate justification and validation (where appropriate) of all model inputs and outputs	Section 5.4 Section 6
	• A cumulative assessment of all existing and proposed emission sources	Section 6.3
	• Details of the proposed management and monitoring measures	Section 7
2)	Impacts of the development that provides for a quantitative assessment of the air quality and odour impacts of the development on surrounding receivers, including impacts from construction operation and transportation; and details of the proposed management and monitoring measures.	Section 4 Section 6.3 Section 7
3)	The goals of the project in relation to air quality should include mitigation of air quality impacts such that potential impacts on sensitive receptors are minimised.	Section 7
4)	The Environmental Assessment must include a detailed quantitative Air Quality Assessment (AQIA) that is prepared strictly in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales 2005 (the Approved Methods). All potentially impacted receptors must be identified and included in the assessment.	Section 2.2

Secretary's Environmental Assessment Requirements		Location addressed
5)	The AQIA must demonstrate compliance with the requirements of the Protection of the Environment Operations (Clean Air) Regulation 2010.	Section 3 Section 6.3
6)	The Air Quality impact Assessment (AQIA), as required by the approved methods, must include, but not necessarily limited to the following:	
	• A detailed process description outlining all the process inputs and outputs, and emissions to air	Section 4.2.3 Section 4.1
	• A detailed description of the existing environment	Section 2
	• The identification of the pollutants of concern, including oxides of nitrogen (NOX), oxides of sulphur (SOX), particulate matter, individual toxic air pollutants and odour	Section 4.1
	• An emissions inventory that identifies all relevant fugitive and point source emission and their release parameters	Section 4.2.3
	• Details on all emission controls with supporting manufacture specifications and guarantees for all fugitive and point sources identified	Section 4.4
	• An assessment of all relevant fugitive and point source emission sources	Section 4.1
	• A detailed quantitative assessment of potential impacts using dispersion modelling, including adequate justification and validation (where appropriate) of all model inputs and outputs	Section 5.4
	• A cumulative assessment of all existing and proposed sources	Section 4 Section 6.3
7)	Additionally the AQIA should include the following components:	
	Best Practice Determination The proposal must be benchmarked against International best Practice. This includes demonstrating Best Available Techniques (BAT) by benchmarking the emission performance against nominated metrics and other existing plants internationally. Reference should be made to reference documents such as, but not necessarily limited to the European Commission IPPC Directive.	Section 4.4

Secretary's Environmental Assessment Requirements		Location addressed
	Air Quality Emission Control Performance The assessment must provide a detailed discussion of all proposed air quality emission control measures, for all proposed point and fugitive emission sources. For point source emission controls this should include: • Links to the Best Practice Determination • Details on which pollutants the controls treat • The efficiencies achieved by the pollution control equipment with supporting manufacturer specifications and guarantees • The nominated monitoring and management measures that will be used to maintain the control efficiencies • For fugitive source emission control (such as location extraction ventilation) this should include: • Links to the best Practice Determination • Nominated design parameters such as ventilation rates, and air changes per hour • An assessment of the proposed emission controls ability to adequately prevent fugitive emissions • The nominated monitoring and management measures that will be used to maintain the effectiveness of the fugitive controls	Section 7

1.3.2 Legislation, policies and guidelines

This report has been prepared with consideration of the following documents:

- Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA 2016)
- Protection of the Environment Operations (Clean Air) Regulation 2010
- Environment Protection Licence (Licence number 12878) issued by the EPA.

1.4 Limitations

This report: has been prepared by GHD for Enirgi Power Storage Recycling and may only be used and relied on by Enirgi Power Storage Recycling for the purpose agreed between GHD and the Enirgi Power Storage Recycling as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Enirgi Power Storage Recycling arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Enirgi Power Storage Recycling and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

2. Existing environment

2.1 Location

The site is located at 509 Byrnes Road, Bomen (Lot 21 DP 1128492) which is in the City of Wagga Wagga Local Government Area (LGA) located approximately 10 km north-east of Wagga Wagga. The site is located in the General Industrial Zone (IN1) with industrial developments located north and south of the site and rural farmland to the east.

2.2 Sensitive receivers and land uses

Representative sensitive receivers used for modelling and assessment purposes were identified based on aerial photography and previous air quality assessments at the site. The sensitive receivers identified are listed in Table 2-1 and shown in Figure 2-2. Land uses surrounding the proposal area include IN1 General Industrial, IN2 Light Industrial and RU1 Primary Production.

Table 2-1 Representative sensitive receiver locations

Receiver ID	Receiver address	Receiver type	Approximate distance from the proposal, m
R1	66 East Bomen Rd	Residential	1250
R2	64 East Bomen Rd	Residential	1640
R3	4 Trahairs Rd	Residential	1800
R4	1365 Olympic Hwy, Brucedale	Residential	2000
R5	1494 Olympic Hwy, Brucedale	Residential	2700
R6	Shepherds Siding Rd, Harefield	Residential	3500

2.3 Ambient air quality

The NSW Office of Environment and Heritage (OEH) operates ambient air quality monitoring stations in selected areas around NSW. In October 2011, an air quality monitoring station wascommissioned in Wagga Wagga North. This monitoring station provides measurement data for fine particulates, including PM_{10} and $PM_{2.5}$. The station does not monitor for NO_2, SO_2 or other pollutants considered in this assessment.

2.3.1 Particulates

The OEH operates ambient air quality monitoring stations in selected areas around NSW. The nearest station to the site is Wagga Wagga Northwhich is approximately 8 km to the south west of the site. Wagga Wagga North has air quality sampling data for fine particles including both PM_{10} and $PM_{2.5}$, A summary of the data set from Wagga Wagga North in 2013 is shown in Figure 2-1. The figure shows 15 exceedances of the PM_{10} criteria of 50 $\mu g/m^3$ and three exceedances of the $PM_{2.5}$ criteria of 25 $\mu g/m^3$ in 2013.

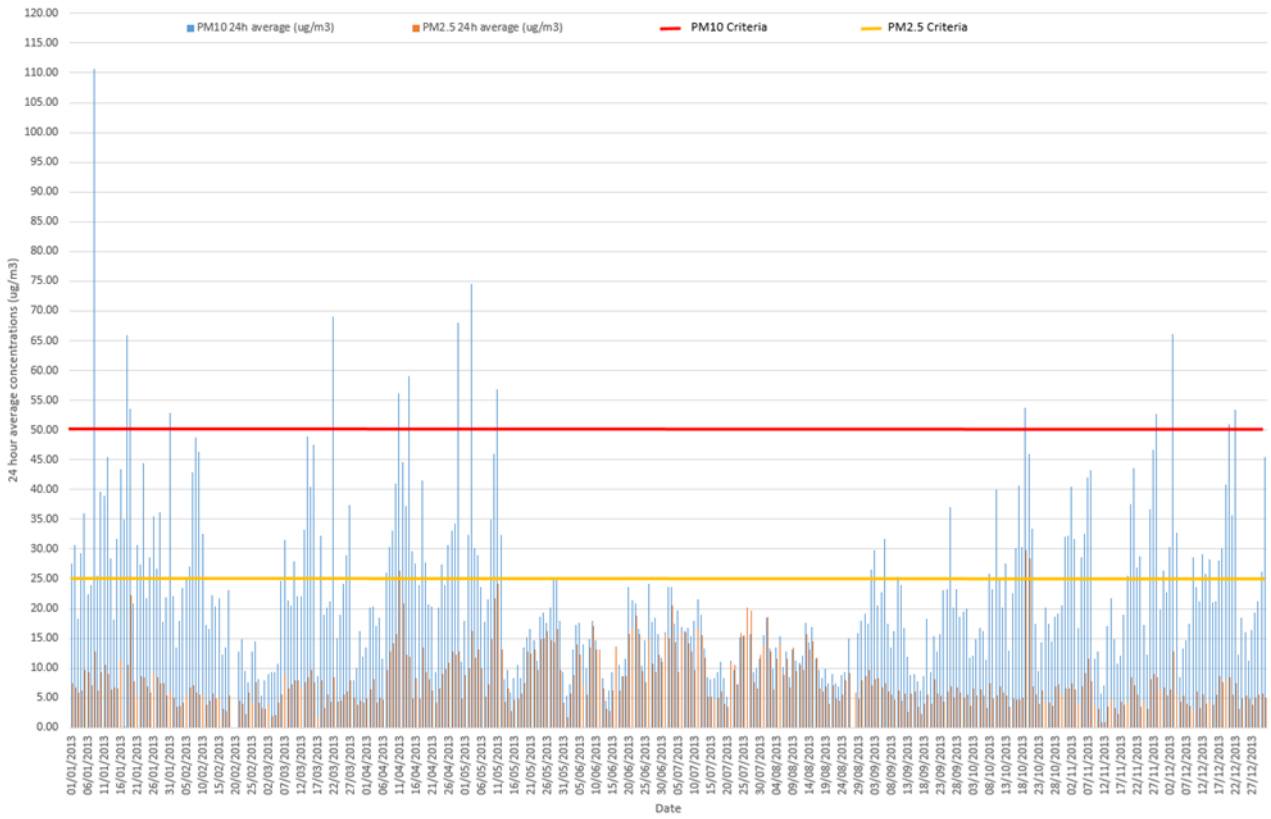


Figure 2-1 24 hour average PM_{10} Data monitored at Wagga Wagga North 2013

The annual PM_{10} average for 2013 was 21.9 µg/m^3 and the annual $PM_{2.5}$ average was 7.9 µg/m^3 which is to be used as the background. This is higher than the level of 21 µg/m^3 assumed in the EPSR Air Quality Management Plan Appendix C.

For TSP, given a lack of measured background data, a TSP to PM_{10} ratio of 2:1 was assumed, giving a background value of 43.8 µg/m^3. This ratio is typical for ambient air regions where road traffic is not the dominant particulate source (USEPA, 2001). These values will be used as a conservative estimate for background annual TSP, $PM_{10,}$ and $PM_{2.5}$ levels, shown in Table 2-2. Both of these are typical of a rural environment away from industrial sources and major urbanised environments.

Table 2-2 Ambient levels for TSP, PM_{10} and $PM_{2.5}$

Pollutant	Assumed ambient concentration (µg/m^3)
$PM_{2.5}$ (Annual average)	7.9
PM_{10} (Annual average)	21.9
TSP (Annual average)	43.8

2.3.2 Sulphur Dioxide (SO_2)

The main source of sulphur dioxide in the air is industrial activity that processes materials that contain sulphur, e.g. the generation of electricity from coal, oil or gas that contains sulphur. The existing EPSR site is a source of SO_2 and existing measured source levels are discussed in this report in Section 4. In order to undertake this assessment consistent with earlier assessments at the site, GHD has referenced the background levels used in Enirgi Power Storage Recycling *Licence Variation – Assessing Maximum SO_2 Stack Emission Concentration Using Dispersion Modelling* (ERM, October 2014). In this assessment, ERM used the measured levels of SO_2 in NSW for the year 2012 and these are presented in Table 2-3 below. GHD also checked the nearest OEH sites to the site that measured SO_2 (Albion Park South and Wollongong) in 2012, and both of these had lower 1 hour average maximum values than used in the ERM study.

Table 2-3 Measured levels for SO_2 in NSW (2012) (Source ERM 2014)

Averaging period	Maximum Value (ppm)	Maximum SO_2 concentration ($\mu g/m^3$)[1]
1 hour	0.035	100.1
24 hour	0.010	28.6
Annual	0.002	5.7

1. Conversion factor to $\mu g/m^3$ from pphm provided in the document "Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales", prepared by the NSW EPA. The conversion factor (0°C) converts pphm to $\mu g/m^3$ by multiplying with 28.6.

2.3.3 Nitrogen dioxide (NO_2)

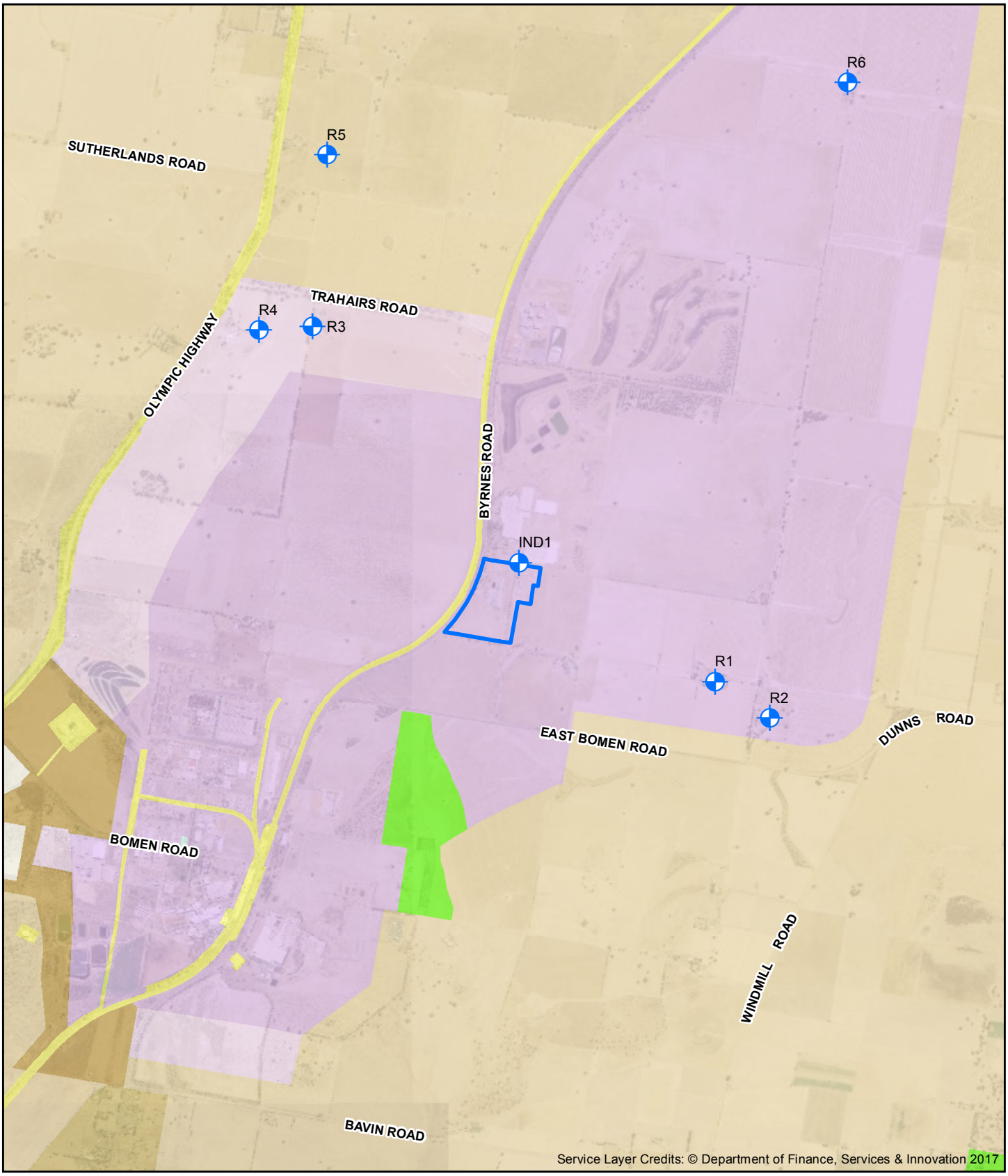
The major source of nitrogen dioxide in Australia is the burning of fossil fuels: coal, oil and gas. Most of the nitrogen dioxide in cities comes from motor vehicle exhaust (about 80%). Other sources of nitrogen dioxide are petrol and metal refining, electricity generation from coal-fired power stations, other manufacturing industries and food processing (Department of Environment and Heritage, 2005). Although there is some traffic and industry in the local area, existing NO_2 emissions are considered negligible in this assessment. The predicted emissions of NO_2 from this facility are low, and cumulative impacts are not expected.

2.3.4 Other pollutants

All other pollutants in this assessment have also assumed to have zero background concentration, due to the very low ambient levels present in most rural environments. These substances are lead, Type 1 and Type 2 substances, SO_3 and dioxins and furans.

2.3.5 Odour

Existing sources of odour in the Bomen area includes the Riverina Oils and Bioenergy (ROBE) facility which crushes oilseeds to the north of the EPSR site, and Teys Australia abattoir to the south west of the site. SO_2 emissions from the existing EPSR site would result in low levels of odour in the surrounding environment.



LEGEND

- Project boundary
- Receivers

Zoning

- RU1 Primary Production
- DM Deferred Matter
- SP2 Infrastructure
- RE1 Public Recreation
- B1 Neighbourhood Centre
- IN1 General Industrial
- IN2 Light Industrial
- RU4 Primary Production Small Lots
- RU6 Transition

Paper Size A4

0 250 500 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Enirgi Power Storage Recycling Consolidation Plant EIS

Representative sensitive receivers, noise monitoring locations and land use map

Job Number	23-15946
Revision	A
Date	18 Jun 2018

Figure 2-2

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

N:\AU\Wagga Wagga\Projects\23\15946\GIS\Maps\Deliverables\23_15946_Z006_Air_SMA.mxd (SMA record: 13)

Data source: Aerial Imagery & Topographic Data: Sixmaps 2015, 2017. Created by:mking3

3. Existing regulatory requirements

3.1 Overview

3.1.1 Legislation

The *Protection of the Environment Operations Act 1997* (POEO Act) establishes, amongst other things, the procedures for issuing licences for environmental protection in relation to aspects such as waste, air, water and noise pollution control. The owner or occupier of premises engaged in scheduled activities is required to hold an environmental protection licence (EPL) and comply with the conditions of that licence.

The POEO Act requires that no occupier of any premises causes air pollution through a failure to maintain or operate equipment or deal with materials in a proper and efficient manner. The operator must also take all practicable means to minimise and prevent air pollution (sections 124, 125, 126 and 128 of the POEO Act).

The Protection of the Environment Operations (Clean Air) Regulation 2010 (Clean Air Regulation) provides regulatory measures to control emissions from wood heaters, open burning, motor vehicles and fuels and industry. The regulation outlines the grouping of activities and plant into 6 groups based on when the activities commenced operation. Group 6 applies to activities that commence operation after 1 September 2005 as a result of an environment protection licence granted under the POEO Act pursuant to an application made on or after 1 September 2005.

Schedule 4 of the Clean Air Regulation includes standards of concentration for scheduled premises: general activities and plant, which are relevant to the proposal at EPSR. As the site already has an Environment Protection Licence (EPL), it has release limits for existing emission points which are lower or equal to class 6 limits. It is assumed than any new point sources of emission will have the same emission limits as existing, as long as the proposal meets ground level impact assessment criteria as discussed in more detail below.

3.1.2 Environment Protection Licence

The EPA has issued an EPL (Licence number 12878) associated with operations of the site. This EPL provides concentration limits for each discharge points on the site, shown in Table 3-1. For each discharge point, the concentration of a pollutant discharged must not exceed the concentration limits specified for that pollutant (Condition L3.1).

Table 3-1 Discharge point air concentration limits (Condition L3.3 of the EPL)

Pollutant	Units of measure	100th percentile concentration limit
Point 1		
Solid Particles	Milligrams per cubic metre	5
Type 1 and Type 2 substances in aggregate	Milligrams per cubic metre	1
Lead	Milligrams per cubic metre	0.5
Point 2		
Solid Particles	Milligrams per cubic metre	5
Lead	Milligrams per cubic metre	0.5
Sulphuric acid mist and sulphur trioxide (SO_2)	Milligrams per cubic metre	5

Pollutant	Units of measure	100th percentile concentration limit
Type 1 and Type 2 substances in aggregate	Milligrams per cubic metre	1
Sulphur dioxide	Milligrams per cubic metre	400
Dioxins and Furans	nanograms per cubic metre	0.1
Point 3		
Nitrogen dioxide	Milligrams per cubic metre	250
Point 4		
Nitrogen dioxide	Milligrams per cubic metre	250
Point 5		
Solid Particles	Milligrams per cubic metre	5

The EPL condition does not authorise the discharge or emission of any other pollutants, as specified in condition L3.5.

3.2 Air quality assessment

3.2.1 Approved Methods

The Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales ('the Approved Methods') (EPA, 2016) lists the statutory methods for modelling and assessing emissions of air pollutants from stationary sources in NSW. The assessment criteria for pollutants is applied at the nearest existing or likely future off-site sensitive receptor.

3.2.2 Project impact assessment criteria

The Approved Methods provides the following relevant criteria for the emission of air pollutants in NSW at all sensitive receivers, shown in Table 3-2. As the Approved Methods does not provide a 24 hour average criteria for TSP, the PM_{10} criteria has been used to assess TSP for this period.

Table 3-2 Impact assessment criteria

Pollutant	Averaging period	Concentration ($\mu g/m^3$)
Total suspended particulates (TSP)	Annual	90
PM_{10}	24 hours	50
PM_{10}	Annual	25
$PM_{2.5}$	24 hours	25
$PM_{2.5}$	Annual	8
Type 1 and Type 2 Substances (assessed as beryllium, refer Section 4.1)	1 hour	4.0E-03
Lead	Annual	0.5
SO_3	1 hour	18
SO_2	10 minutes	712
	1 hour	570
	24 hours	228
	Annual	60

Pollutant	Averaging period	Concentration (μg/m^3)
NO_2	1 hour	246
	Annual	62
Dioxins and furans	1 hour	2.0E-06

4. Emissions associated with current and proposed project

4.1 Emission discharge points

Currently the facility emits pollutants from the licenced discharge points identified in the EPL and shown in more detail in Table 4-1. Current emissions from the facility are discussed below in Section 4.2.

Table 4-1 Summary of existing discharge points

Source	Stack height (m)	Exit temp (°C)	Exit diameter (m)	Exit velocity (m/s)	Moisture content (%)	Actual Flow rate (Am^3/s)	Normalised Flow rate (Nm^3/s)
Scrubber (Point 1)	15	30	0.61	14.5	2.5	4.2	3.7
Main Stack (Point 2)	20	80	1.60	32	2.2	64.3	48.6
Kettles (Point 3)	15	180	0.60	9	4.2	2.5	1.5
Boiler #1 (Point 4)	15	200	0.45	16	16	2.5	1.2
Salt Silo #1 (Point 5)	15	80	0.35	18	1.5	1.7	1.3

The project will have one new discharge point from the following source:

- Hygiene air from the new hygiene baghouse.

The emission sources from the upgraded site, including the existing discharge points are summarised in Table 4-2. This information was provided by EPSR.

Table 4-2 Proposed operational source design parameters

Source	Stack height (m)	Exit temp (°C)	Exit diameter (m)	Exit velocity (m/s)	Moisture content (%)	Flow rate (Am^3/s)	Flow rate (Nm^3/s)
Scrubber (Point 1)	15	30	0.75	15.1	2.5	6.7	5.9
Main Stack (Point 2)	20	80	1.60	22.8	2.2	45.8	34.7
Kettles (Point 3)	15	180	0.60	9	4.2	2.5	1.5
Boiler #1 (Point 4)	15	200	0.45	11.2	16	1.8	0.9
Salt Silo #1 (Point 5)	15	80	0.45	9.1	1.5	1.4	1.1
Hygiene Air (Point 6)	20	40	1.00	19.5	2.2	15.3	13.1

4.2 Emissions overview

Enirgi Power Storage Recycling (EPSR) currently processes around 70,000 tonnes per annum (tpa) of used lead acid batteries (ULABs). The proposed project involves expanding the existing operations to achieve a production capacity of 120,000 tpa. The operations of the plant results in the emissions of the following air pollutants from different stacks, shown in Table 4-3 below. The site currently has emission limits for these pollutants as described in Section 3.

Table 4-3 Air pollutants emitted during processing

Air Pollutants	Stacks emitting pollutant (refer Table 4-1)
Total suspended particulates (TSP)	1, 2, 5, 6
Type 1 substances	1, 2, 6
Type 2 substances	1, 2, 6
Lead	1, 2, 6
SO_3	2
SO_2	2
NO_2	3, 4,
Dioxins and furans	2

In order to assess Type 1 and Type 2 substances, the *Emissions Testing Report - Enirgi Power Storage Recycling, Bomen* (Ektimo, December 2016) was used to review worst case emissions of individual substances from the main stack. The measured pollutant levels emitted from the stack were compared with the relevant ground level criteria as a percentage, to determine which Type 1 and 2 substances rank the highest. Based on stack emissions, Beryllium was determined to rank highest and has been assessed in more detail, assuming that if Beryllium complies then the others will too. The source emissions and criteria are shown in Table 4-4 below.

Table 4-4 Type 1 and type 2 substance emission comparison

Pollutant	Type	Source emissions (mg/m^3)	Ground level criteria (mg/m^3)	% of criteria
antimony	1	0.002	0.009	22%
arsenic	1	0.001	0.00009	1111%
cadmium	1	0.00095	0.000018	5278%
mercury	1	0.0001	0.00018	56%
beryllium	2	0.0005	0.000004	12500%
chromium	2	0.0003	0.00009	333%
manganese	2	0.0008	0.18	0%
nickel	2	0.0006	0.00018	333%

4.2.1 Calculation of Short-term (10 minute) SO_2 concentration

The Approved Methods includes a criteria for SO_2 using an averaging period of 10 minutes. Due to modelling time constraints the CALPUFF model calculates concentrations at 1 hour intervals, making it impossible to calculate the 10 minute average concentration directly. Therefore, the 10 minute average has been calculated from the 1 hour average concentration using the peak to mean ratio shown in Equation 4-1 below. This method was taken from Enirgi Power Storage Recycling Licence Variation – *Assessing Maximum SO_2 Stack Emission Concentration Using Dispersion Modelling* (ERM, October 2014).

Equation 4-1 Peak to mean ratio to calculate 10 minute GLC from 1 hour average

$$10\ minute\ GLC = 1\ hour\ GLC \times \left(\frac{60}{10}\right)^{0.2}$$

$Where\ GLC = Ground\ Level\ Contribution$

This method produces a 10 minute average SO_2 concentration of 218.2 µg/m^3 from a 1 hour average concentration of 152.5 µg/m^3, measured at the nearest residential receiver.

4.2.2 Peak to mean method validation

In order to validate the method used above, the following stability-dependent multiplicative factors were applied to the 1 hour concentration within the model, from Duffee et al. (1991), shown in Table 4-5 below. The resulting 10-minute average SO_2 concentration from this method is 176.66 at the same receiver. This produces a close correlation to the peak to mean ratio method used above and demonstrates the validity of this method.

Table 4-5 Conversion factors for 1 hour to 10 minute SO_2 concentration (Duffee et al, (1991))

Stability class	A	B	C	D	E	F
Conversion Factor	2.45	2.45	1.82	1.43	1.35	1.35

4.2.3 Odour

SO_2 emissions from the existing EPSR site would result in low levels of odour in the surrounding environment. The odour threshold of SO_2 is reported to range from 0.8 mg/m^3 and 8 mg/m^3 (DECOS, 2003). 0.8 mg/m^3 corresponds to 800 µg/m^3, a SO_2 concentration which is not predicted to occur at any receivers in this assessment. Potential odour impacts are therefore not discussed in more detail in this assessment.

4.3 Project emissions

In order to conservatively assess potential impacts on nearby sensitive receptors, maximum allowable emission rates from the EPL have been used in the assessment with the exception of Type 1 and 2 substances. The EPL allows an emission concentration of 1 mg/m^3 in total for Type 1 and 2 substances which is made up of a range of toxics listed in Table 4-4 and lead. Modelling any individual Type 1 and 2 substance with an emission rate of 1 mg/m^3 is therefore overly conservative so GHD has used measured data (Ektimo, December 2016) for the worst-case substance as discussed in Section 4.1. Actual site emissions for all other pollutants are currently lower than the allowable EPL limits however in order to be conservative the maximum allowable emission limits have been used.

EPSR currently have an allowable SO_2 emission rate from Emission Point 2 for a 'special averaging period', which means the duration of a batch. The allowable SO_2 concentration over this period is 150 mg/m^3. While this special averaging period limit is much lower than the EPL limit of 400 mg/m^3, GHD has modelled the higher limit of 400 mg/m^3 to be conservative and allow for any increases in stack emissions in the future. The emissions modelled in this study are presented in Table 4-6 below.

Table 4-6 Proposed operational air pollutant emissions

Air pollutant	Emission rate (g/s)	Emission concentration (mg/Am^3)	Emission concentration (mg/Nm^3)
Scrubber			
Solid particles	0.029	4.39	5
Type 1 and type 2 substances	3.3E-06	0.0005	-
Lead	0.003	0.44	0.5
Main Stack			
Solid particles	0.17	3.78	5
Type 1 and type 2 substances (assessed as Beryllium)	2.8E-05	0.0006	-
Lead	0.017	0.378	0.5
SO_3	0.17	3.782	5
SO_2	13.9	303	400
Dioxins and furans ($nanograms/m^3$)	3.5E-09	7.6E-08	1.00E-07
Kettles			
NO_2	0.37	144	250
Boiler #1			
NO_2	0.22	121	250
Salt Silo #1			
Solid particles	0.006	3.81	5
Hygiene Air			
Solid particles	0.065	4.27	5
Type 1 and type 2 substances (assessed as Beryllium)	7.66E-06	0.0005	-
Lead	2.01E-05	1.31E-03	0.5

4.4 Emission control technologies

EPSR have numerous exhaust fans, extraction units, baghouse filters, sanitary air scrubbers and other mechanisms in place to reduce any fugitive air emissions. EPSR undertake continuous monitoring of SO_2 at existing Point 2 (Stack C-720) with quarterly sampling of other pollutants.

Dust emissions from the baghouse are continuously monitored by an in-stack obscuration meter to detect issues with any bags.

The site is managed in accordance with the EPSR Operational Environmental Management Plan, which includes monitoring and reporting requirements. Results of air quality monitoring undertaken at the site show ongoing compliance with EPL emission limits.

GHD has reviewed “Establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for the non-ferrous metals industries” which is a reference document under the IPPC Directive and the IED. The following best practice technology associated emission levels apply. Section 1.4.1 relates to air emissions for BAT conclusions for lead and or tin production and requirements are outlined in Table 4-7.

Table 4-7 BAT requirements

Requirement	EPSR achieves
In order to reduce dust and metal emissions to air from raw material preparation (such as reception, handling, storage, metering, mixing, blending, drying, crushing, cutting and screening) in primary and secondary lead/or and tin production, BAT is to use a bag filter	Yes
BAT-associated emission levels for dust emissions to air from battery preparation (crushing, screening and classifying: and BAT-associated emission levels for dust emissions to air from raw material preparation in primary and secondary lead and/or tin production • Dust ≤ 5 mg/Nm^3	Yes
In order to prevent or reduce diffuse emissions from material pre-treatment (such as drying, dismantling, sintering, briquetting, pelletising and battery crushing, screening and classifying) in primary lead and secondary lead and/or tin production, BAT is to use one or both of the techniques given below. • Enclosed equipment. When dusty materials are used the emissions are collected and sent to an abatement system	Yes
In order to prevent or reduce SO_2 emissions to air (other than those that are routed to the sulphuric acid or liquid SO_2 plant) from charging, smelting and tapping in primary and secondary lead and/or tin production, BAT is to use one or a combination of the techniques given below. • Alkaline leaching of raw materials that contain sulphur in the form of sulphate • Dry or semi-dry scrubber • Wet scrubber • Fixation of sulphur in the smelt phase	Yes. EPSR operate alkaline leaching and fixation of sulphur in the smelt phase plus the baghouse achieves a level of dry scrubbing.
BAT-associated emission levels for SO_2 emissions to air (other than those that are routed to the sulphuric acid or liquid SO_2 plant) from charging, smelting and tapping in primary and secondary lead and/or tin production • SO2 - 50-350 mg/Nm^3	Yes – average SO_2 levels for 2017 – 2018 were 36 mg/m^3
BAT-associated emission levels for dust and lead emissions to air from remelting, refining and casting in primary and secondary lead and/or tin production • Lead ≤ 1 mg/Nm^3	Yes

5. Assessment methodology

5.1 Selection of a representative year of meteorology

A comprehensive analysis of the meteorological data has been undertaken that covers five years of data from the BoM site at Wagga Wagga (Wagga Wagga AMO, ID 072150). The analysis included five consecutive years of meteorological data from 2012 to 2016, as per guidance in the Approved Methods (EPA, 2016).

The analysis shows that the year 2013 is the most representative year based on a review of temperature, humidity, wind speed and wind direction.

The analysis ranked each year for the above parameters against all years and found 2013 to be closest to the average across the five year period, and is therefore considered most representative. Probability density function graphs of the wind speed and direction over the five years are provided in Appendix A.

EPSR has an onsite weather station that was also used in the assessment. The data wasreviewed and was found to be over 90% complete and therefore meets the minimum requirements of the Approved Methods. Site specific meteorological data is preferred for a level 2 air quality impact assessment.

5.2 Meteorological modelling

5.2.1 TAPM prognostic meteorological model

The TAPM prognostic model was run to obtain a coarse meteorological 3D gridded dataset for the site for the selected year. This dataset is based on synoptic observations, local terrain and land use information with a resolution of 1000 m. The TAPM model parameters are summarised in Table 5-1.

Table 5-1 Selected TAPM model settings

Parameter	Value
Modelled Year	2013
Domain centre	Latitude = S 35° 4.5’ Longitude = E 147°24.5’
Site location	539.071 km E; 6120.294 km S
Number of vertical levels	25
Number of Easting Grid Points	30
Number of Northing Grid Points	30
Outer Grid Spacing Number of Grids (nests)	30,000 m x 30,000 m 3
Grid Resolution	Level 1 – 10,000 m Level 2 – 3,000 m Level 3 – 1,000 m

GHD has found from previous studies that TAPM does not predict light wind conditions as well as CALMET. It is these meteorological conditions which give rise to the upper percentile air quality impacts, (i.e. top 0.1 per cent) that are critical for the correct prediction of impacts.

Upon completion of the broad scale TAPM modelling runs, a CALMET simulation was set up to run for the modelled year, combining the three dimensional gridded data output from the TAPM model and using the CALTAPM conversion utility available with CALMET. This approach is consistent with NSW OEH (2011) guidance documentation. Observational data was obtained from the EPSR site weather station and the closest BOM AWS at Wagga Wagga and was input into CALMET to influence the wind fields around the site.

5.2.2 CALMET diagnostic meteorological pre-processor

The US EPA approved version of CALMET (Version 5.8.5) was used to resolve the wind field around the project area to a 400 m spatial resolution. The application of CALMET is an approved modelling approach in New South Wales (Approved Methods, EPA, 2016), with model guidance documentation provided (OEH, 2011).

All model settings were selected based on the guidance as per the CALPUFF modelling guidelines (OEH, 2011, p. 5). CALMET was run using the OBS mode with the TAPM data provided as an initial guess field.

All CALMET settings were selected as per the CALPUFF guidance document OEH (2011), with the exception that O'Brien adjustment for vertical velocity smoothing (IOBR = 1) was used.

The terrain of the site is shown in Figure 5-1, where Lakes Calpuff View was used to generate the geo file containing topography and land use data to the resolution required for the CALMET run. This file was modified manually to produce the results with the site location shown in red in the centre. The surface meteorology of the region was input into the model using data from the an existing weather station on the site, as well as data from the BOM Wagga Wagga AMO site approximately 12 km away.

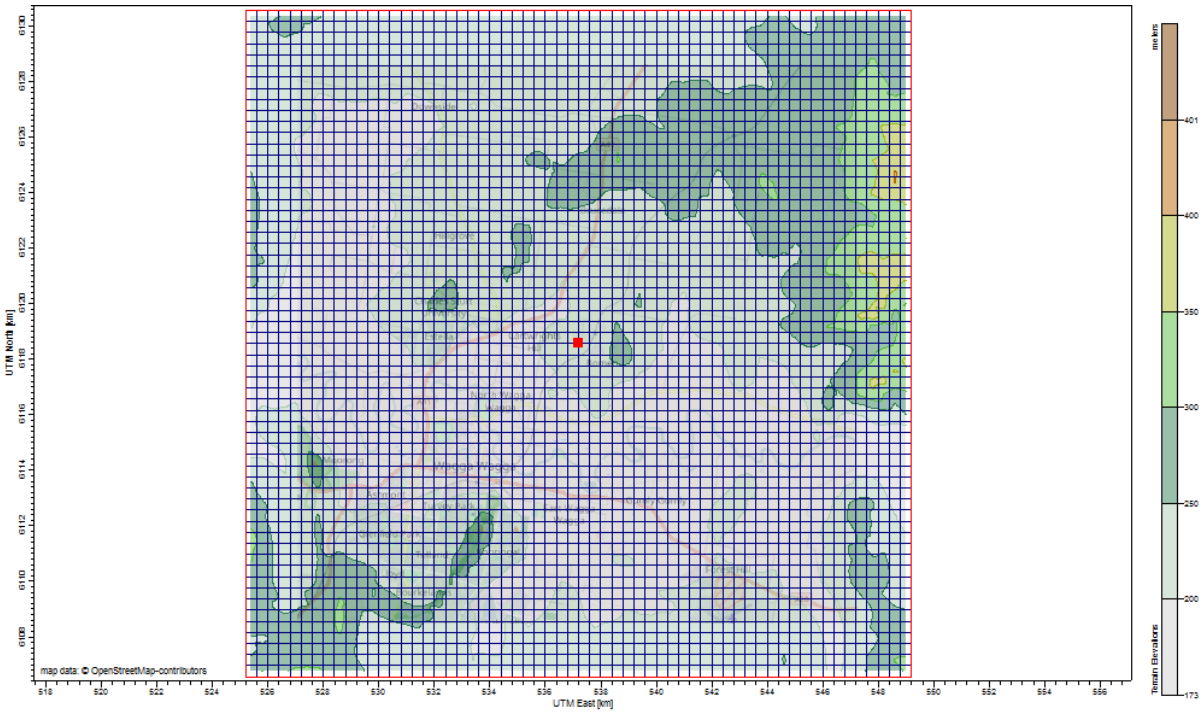


Figure 5-1 Terrain of site (site location shown in red)

The TERRAD variable was set to a value of 7 km based on an inspection of the terrain elevations in the immediate vicinity of the site, based on OEH (2011) guidance. The CALMET model parameters are summarised in Table 5-2, with the input file listing supplied in Appendix B.

Table 5-2 Selected CALMET model settings

Parameter	Value
Mode	Surface observations included (SURF.DAT file)
UTM Zone	55
Domain Origin (SW corner)	Easting: 525.197 km Northing: 6106.563 km
Grid Resolution	60 x 60 at 0.4 km resolution (24 km x 24 km)
Number of Vertical Levels	11
Vertical Levels (m)	0, 20,40,60,90,120,180,250,500,1000,2000,3000
CALMET Settings for Obs mode (OEH, 2011)	TERRAD = 7 km O'Brien Vertical Velocity Adjustments

5.3 Analysis of dispersion meteorology across the project area

5.3.1 Wind speed and direction

The average predicted annual wind rose for the site is shown in Figure 5-2 and indicates that predominant annual average wind directions are from the northeast quadrant and from the southwest. The annual average wind speed was 1.74 m/s. The observed wind speed distribution indicates that the largest proportion of high wind speeds (> 4.5 m/s) are from the southwest, while the largest proportion of light winds (<1.5 m/s) are from the west.

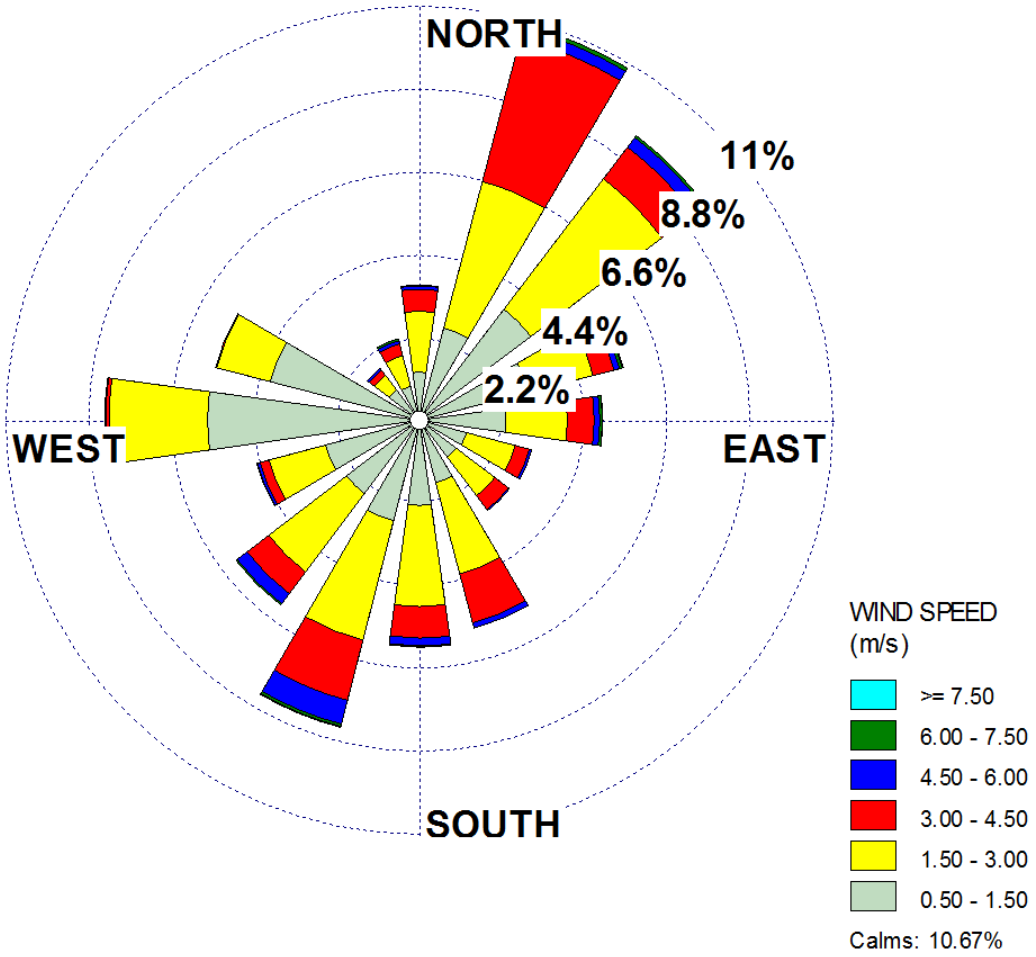
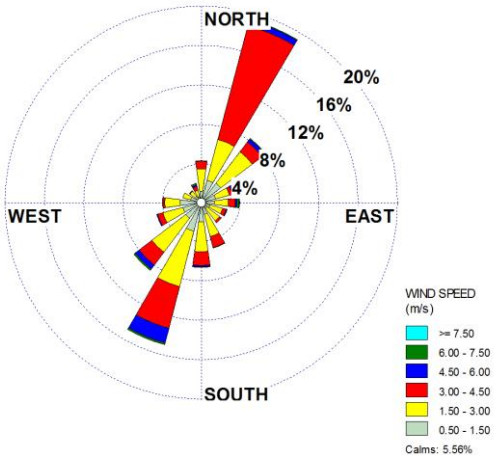


Figure 5-2 CALMET derived 2013 annual wind rose for the proposal site

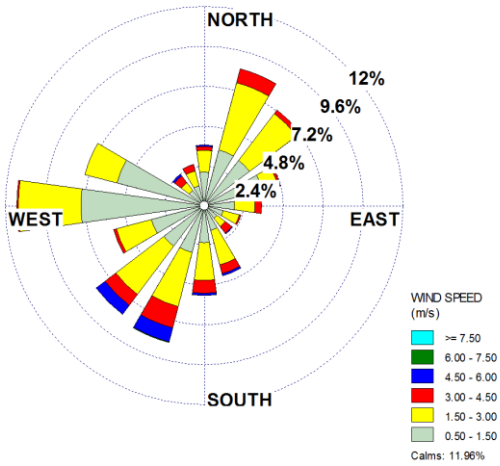
The seasonal wind roses in Figure 5-3 indicate that:

- In winter, the winds are quite highly spread, but predominantly from the west and also eastern quadrants. This observation reflects cool air drainage flows from the hills and mountains from the surrounding land in the east, as well as with the synoptic winter westerlies associated with the pre-frontal (stronger) winds.
- In summer, the majority of stronger winds are from the northeast and southwest, with sharp spikes in these directions, reflecting summertime breeze in the afternoon and evening.
- Autumn and spring are transitional seasons with high spread. However autumn winds predominate in the southwest and west, while spring winds predominate in the northeast.
- The seasonal incidence of high winds (>4.5 m/s) is greatest in summer, and lowest in winter, while the incidence of light (<2 m/s) winds is greatest in winter as well.
- The direction and high proportion of light winds in winter and autumn are predominantly westerly. These air flows are likely to be associated with high stability, and can be expected to define the direction of poorest dispersion for low lying emission sources.
- Calm conditions occur for all seasons throughout the year, except during summer.

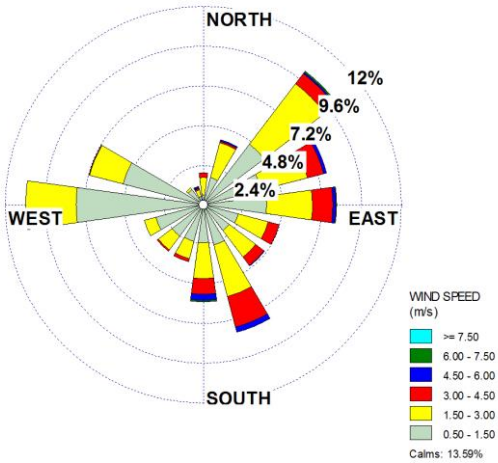
Summer



Autumn



Winter



Spring

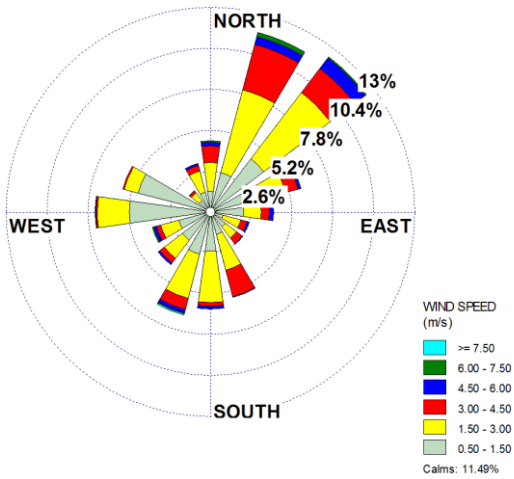


Figure 5-3 CALMET derived 2013 seasonal wind roses for the proposal site

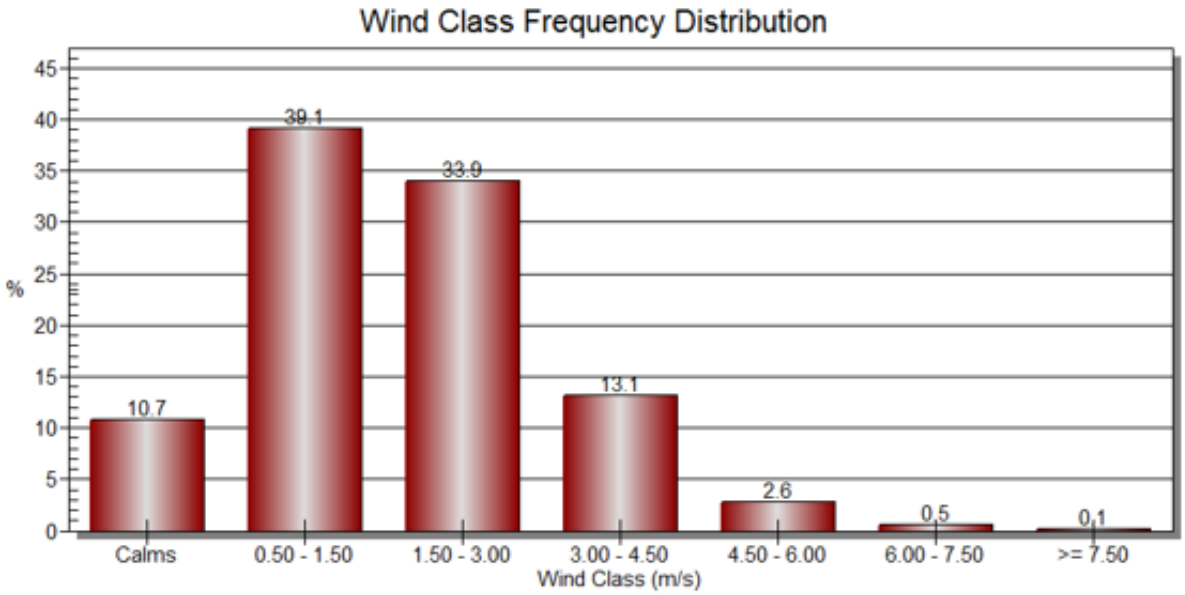


Figure 5-4 Wind speed frequency distribution

5.3.2 Validation of meteorological modelling

In order to validate the model, CALMET outputs at the BoM Wagga Wagga AMO located at the airport. The windroses in Figure 5-5 show a very similar wind pattern, which gives confidence in the accuracy of the meteorological modelling.

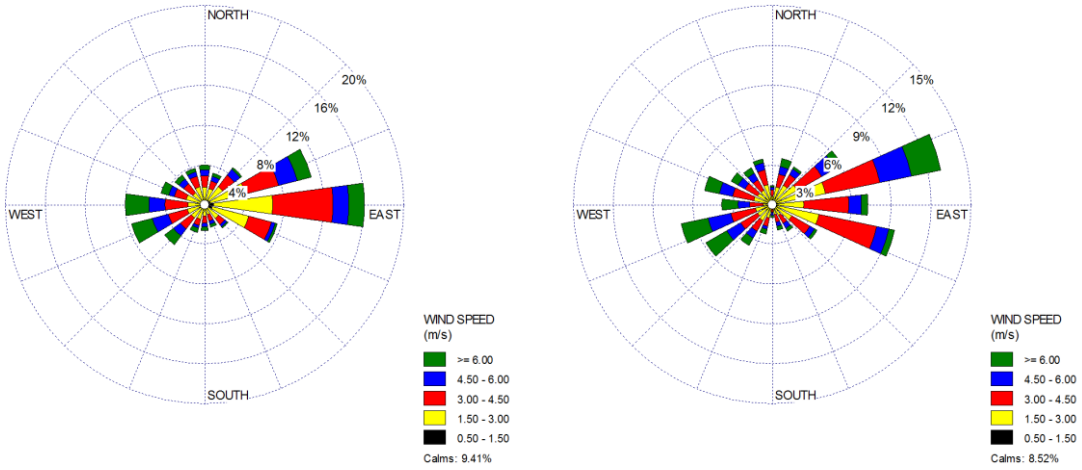


Figure 5-5 Comparison of CALMET (left) and BoM (right) windroses for Wagga Wagga AMO 2013

5.3.3 Atmospheric stability

In the Pasquill/Gifford atmospheric stability scheme, stability is classified into six classes of A through F. A, B and C stability classes represent strongly, moderately and slightly unstable atmospheres respectively. Under unstable conditions dispersion of emissions from near-ground sources is good due to convectively vertical turbulent mixing.

The stability category D denotes neutral atmospheric conditions (strong winds any time of day in moderate temperatures or lighter winds on overcast to mostly cloudy days and nights). Categories E and F denote slightly and moderately stable atmospheres when dispersion is poorest, as vertical mixing of air is suppressed. Stable atmospheric conditions occur in the absence of strong gradient winds, and mostly on nights with clear or only partly cloudy skies. They are often associated with ground-based radiation forced temperature inversions, sometimes with fog, mist or frost.

Neutral stability (D class) conditions generally occur most frequently and along with the prevailing wind direction can indicate the most common direction for potential odour impact. Under night-time E and F class conditions, odour emissions from ground based sources result in a downwind plume that is detectable to a greater distance than during the day with associated neutral or unstable atmospheric conditions. It is commonly these conditions that result in odour complaints at maximum range.

Figure 5-6 shows the stability rose for the entire data period and Figure 5-7 shows the frequency distribution of each stability class. Neutral atmosphere (D) comprises 5.4% of incident time while the A, B and C class contribute unstable atmospheres 42.1% of the time and the stable E and F conditions contribute 41.9%. Figure 5-6 shows that the stable winds are in all directions, with a higher percentage from the east, north and western quadrants.

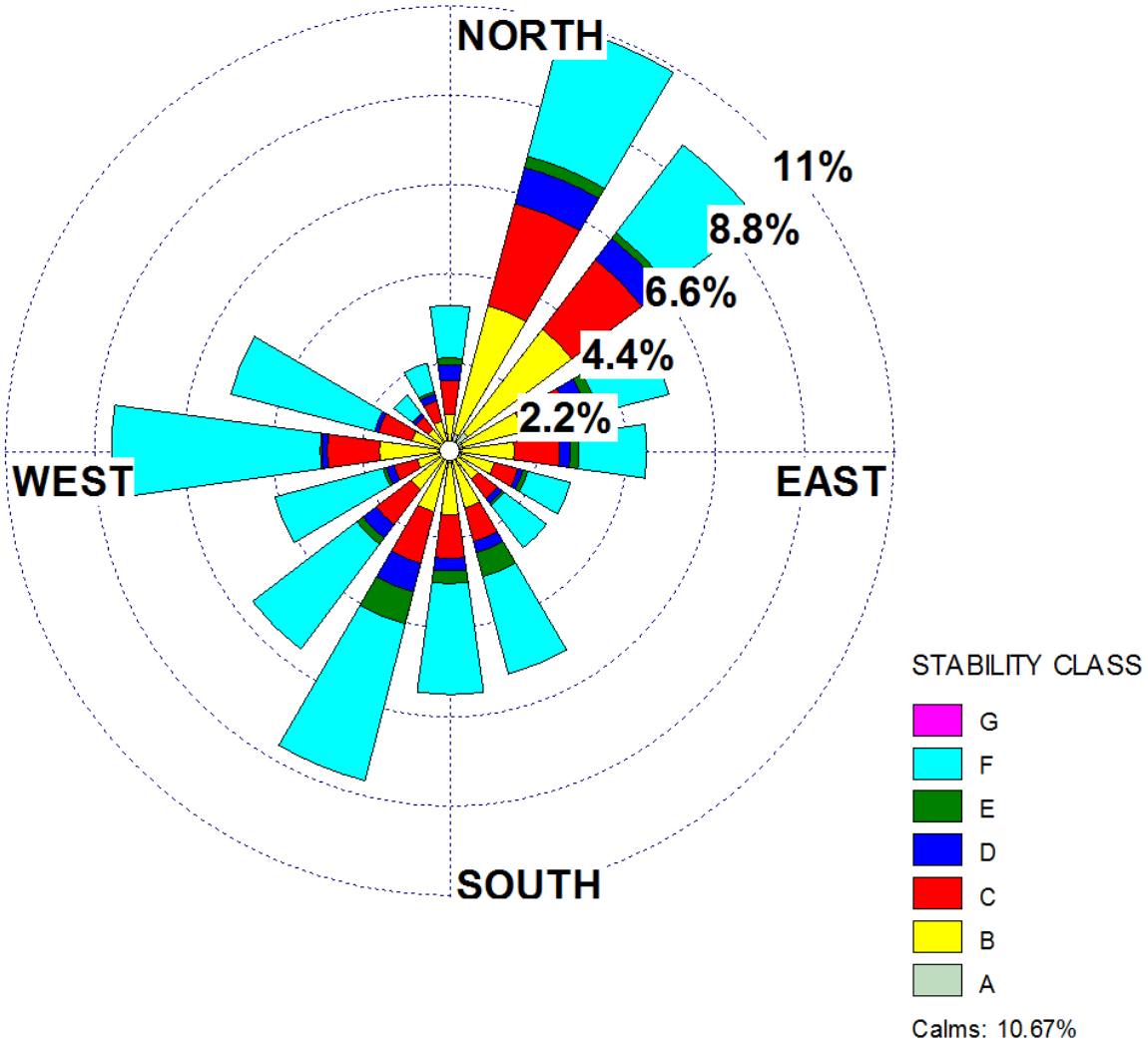


Figure 5-6 CALMET derived 2013 annual stability rose for the proposal site

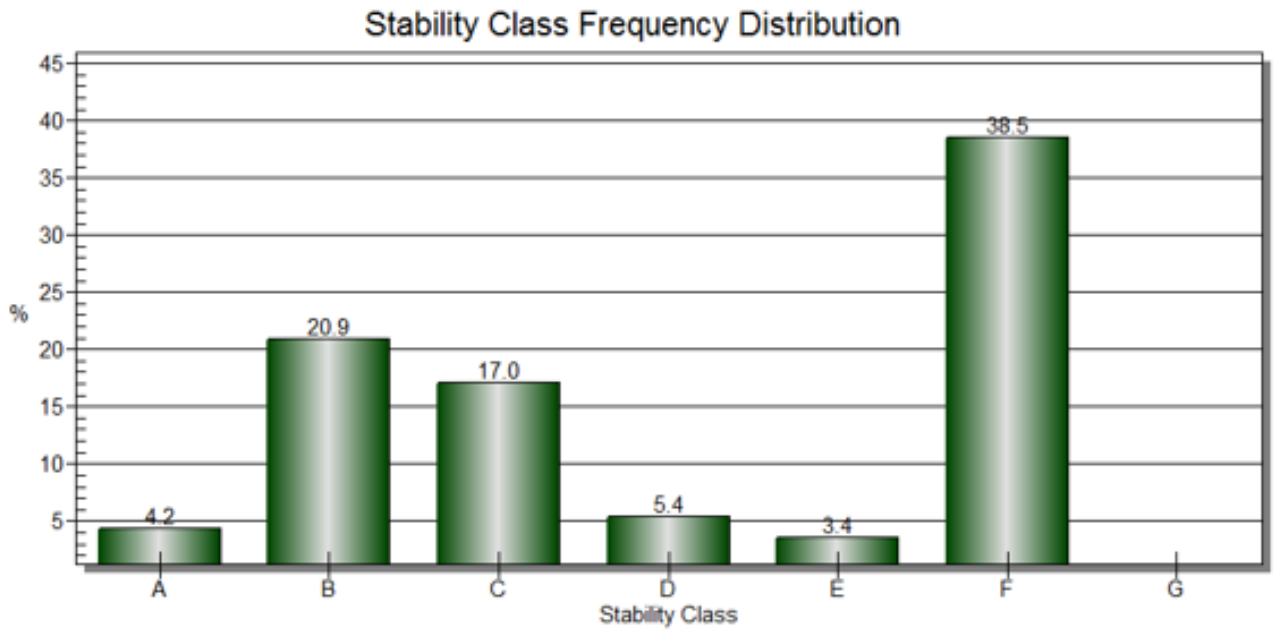


Figure 5-7 Stability class frequency distribution

Figure 5-8 shows the following seasonal variation trends in atmospheric stability:

- In summer, stable and unstable winds spike in the northeast and southwest directions.
- In autumn, stable winds predominate from all directions. Winds are primarily from the north eastern and south western quadrants.
- In winter, stable winds predominate from the eastern quadrant, with a spike in the westerly direction. Unstable winds spike in the north easterly direction.
- In spring, stable and unstable winds predominate from all directions. Winds are primarily from the northeast.

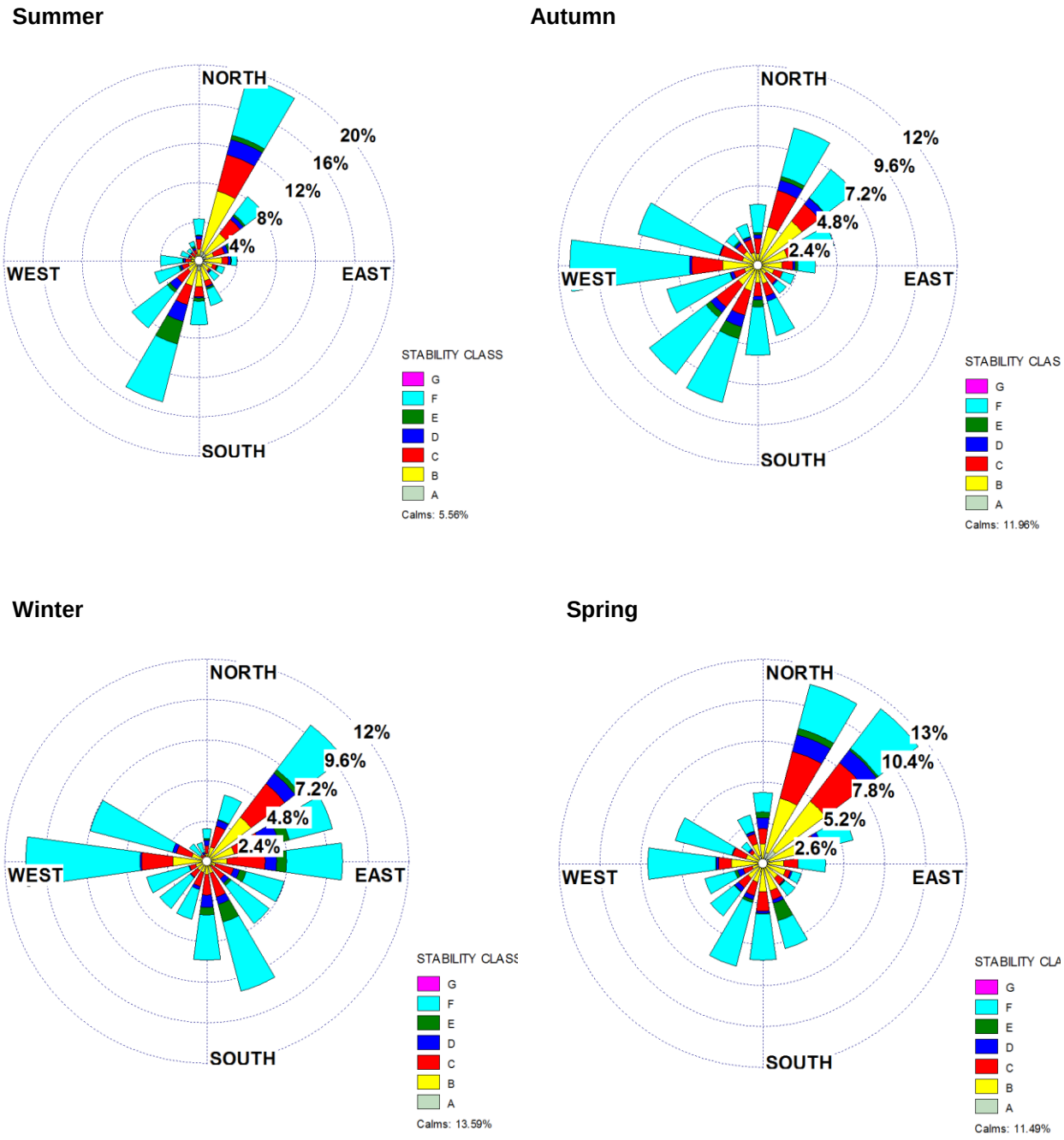


Figure 5-8 CALMET derived 2013 seasonal stability roses for the proposal site

5.4 Dispersion modelling

Atmospheric dispersion modelling was carried out using the CALPUFF dispersion model. CALPUFF is a non-steady-state, Lagrangian puff dispersion model. It is accepted for use by OEH and EPA for application in environments where wind patterns and plume dispersion is strongly influenced by complex terrain, the land-sea interface or where there is a high frequency of stable calm night-time conditions.

While the local terrain surrounding the site is not overly complex, there is a high proportion of stable conditions experienced at the site making CALPUFF the most appropriate dispersion model for this assessment.

For this assessment, the CALPUFF dispersion model was used to predict ground-level concentrations of odour downwind of the proposal. The grid size used in the CALPUFF model was equivalent to the CALMET domain. The same grid resolution of 400 m used for the CALMET model run was used in CALPUFF.

5.5 Buildings

Buildings generate downwind wake effects up to 5 times the lesser of the building height or projected building width. EPSR site buildings have been included into the CALPUFF model. The model takes into account building downwash and details of the buildings included in the model are provided in Table 5-3 below.

Table 5-3 Building dimensions included in downwash

Building No.	Building height (m)	Building corner coordinates (AMG – 84, Zone 55, m E, m S)
1	13	539131, 6120395 539153, 6120391 539144, 6120332 539122, 6120335
2	16	539116, 6120342 539122, 6120341 539121, 6120330 539114, 6120331
3	8	539119, 6120359 539125, 6120358 539122, 6120342 539117, 6120343
4	10	539122, 6120332 539143, 6120330 539125, 6120219 539104, 6120222 539110, 6120258 539091, 6120261 539094, 6120277 539112, 6120275 539116, 6120299 539097, 6120302 539099, 6120310 539117, 6120306
5	16	539096, 6120285 539107, 6120284 539106, 6120277 539095, 6120279
6	13	539098, 6120294 539109, 6120293

Building No.	Building height (m)	Building corner coordinates (AMG – 84, Zone 55, m E, m S)
		539108, 6120286 539097, 6120288
7	13	539131, 6120256 539155, 6120252 539160, 6120293 539137, 6120296
8	13	539179, 6120388 539188, 6120387 539179, 6120334 539165, 6120337 539169, 6120362 539176, 6120361
9	16	539179, 6120388 539176, 6120362 539169, 6120363 539173, 6120389
10	6	539057, 6120273 539070, 6120271 539064, 6120231 539049, 6120232
11	4	539064, 6120313 539082, 6120310 539077, 6120280 539059, 6120283
12	10	539077, 6120425 539198, 6120405 539203, 6120439 539082, 6120459

6. Air quality impacts

6.1 Construction impacts

Short term construction dust and particulates have the potential to impact on nearby sensitive receptors if not appropriately managed. Stage 1 (site construction works) has the highest potential to cause dust, during bulk earthworks. A review of the potential equipment list in the EIS shows that trucks on unsealed roads, graders and excavators are potential sources of elevated dust.

The site is rural in nature with the nearest residential receptor over 1 km away. Dust impacts from construction are not anticipated from the proposed construction activities this far away.

In order to ensure potential impacts are managed, mitigation measures are outlined in Section 7 of this report.

6.2 Predicted operational impacts

The dispersion modelling was conducted to predict the pattern of maximum off-site ground level pollutant concentrations resulting from emissions from the site for operating scenario discussed in Section 4.

The predicted incremental concentration (from the site only) of each pollutant at all nearby sensitive receivers is shown in Table 6-1. Results have been presented for all assessed pollutants over the relevant averaging periods. The maximum (100^{th} percentile) impact has been assessed for all pollutants at the nearest sensitive receivers. The general pattern of poor dispersion is evident to the south southwest of the site. Incremental pollutant concentration plots for each substance assessed in this report are provided in Appendix C.

The results demonstrate compliance for all pollutants at all receivers. Cumulative impact for SO_2, $PM_{2.5}$, PM_{10} and TSP is discussed in Section 6.3.

The predicted incremental results are generally at least an order of magnitude lower than the impact assessment criteria, with the exception of SO_2. The worst case (10-minute average) predicted SO_2 level is approximately 22% of the impact assessment criterion. As discussed earlier in the assessment, this predicted value would be conservative, as the site would not emit the modelled SO_2 emissions over the entire day.

Table 6-1 Predicted incremental pollutant concentrations at nearby sensitive receptors

Pollutant	Averaging period	Criteria µg/m^3	R1 µg/m^3	R2 µg/m^3	R3 µg/m^3	R4 µg/m^3	R5 µg/m^3	R6 µg/m^3
TSP	Annual	90	0.024	0.018	0.008	0.007	0.006	0.013
PM_{10}	Annual	25	0.024	0.018	0.008	0.007	0.006	0.013
PM_{10}	24 hours	50	0.23	0.19	0.18	0.16	0.13	0.16
$PM_{2.5}$	Annual	8	0.012	0.009	0.004	0.004	0.003	0.007
$PM_{2.5}$	24 hours	25	0.12	0.10	0.09	0.08	0.06	0.08
Type 1 and Type 2 Substances (beryllium)	1 hour	4.0E-03	2.2E-04	2.3E-04	2.9E-04	2.3E-04	1.6E-04	1.6E-04
Lead	Annual	0.5	9.5E-04	7.5E-04	3.2E-04	2.6E-04	2.1E-04	5.8E-04
SO_3	1 hour	18	0.6	0.5	1.4	0.9	0.7	0.8
SO_2	10 minutes[1]	712	66	62	160	109	88	92
	1 hour	570	46	43	112	76	61	64
	24 hours	228	9	7	6	5	4	9
	Annual	60	0.8	0.6	0.3	0.2	0.2	0.5
NO_2	1 hour	246	19	13	8	9	5	6
	Annual	62	0.07	0.05	0.03	0.03	0.02	0.04
Dioxins and furans	1 hour	2.00E-06	1.2E-08	1.1E-08	2.8E-08	1.9E-08	1.5E-08	1.6E-08

Note 1: the 10 minute average concentration for SO_2 was calculated using the peak to mean ratio, as outlined in Section 4.2.1 above.

6.3 Cumulative impacts

Cumulative air pollution may occur for those substances which are already present in the ambient environment. The review of ambient air quality discussed in Section 2.3 of this report determined that elevated ambient levels of air pollutants are expected to exist for $PM_{2.5}$, PM_{10}, TSP and SO_2.

Estimated background values for these have been added to the modelled concentrations at receivers from site operations in order to determine the total cumulative impact at receivers. The results are shown in Table 6-2. The predicted cumulative levels for 24 hour $PM_{2.5}$ and PM_{10} levels are the maximum level from a contemporaneous assessment as per the Approved Methods methodology, and detailed in Section 6.4.

Table 6-2 Predicted cumulative pollutant concentrations at nearby sensitive receptors

Pollutant	Averaging period	Criteria µg/m³	R1 µg/m³	R2 µg/m³	R3 µg/m³	R4 µg/m³	R5 µg/m³	R6 µg/m³
TSP	Annual	90	43.8	43.8	43.8	43.8	43.8	43.8
PM_{10}	Annual	25	21.9	21.9	21.9	21.9	21.9	21.9
PM_{10}	24 hours	50	48.8	48.8	48.8	48.8	48.8	48.8
$PM_{2.5}$	Annual	8	7.9	7.9	7.9	7.9	7.9	7.9
$PM_{2.5}$	24 hours	25	24.2	24.2	24.2	24.2	24.2	24.2
SO_2	10 minutes	712	166	162	260	209	188	192
	1 hour	570	146.3	143.4	212.1	176.1	161.3	164.4
	24 hours	228	37.8	35.5	34.9	33.6	32.5	37.1
	Annual	60	6.5	6.3	6.0	5.9	5.9	6.2

The results above demonstrate compliance for all receivers with ambient pollutant levels taken into account. No adverse air pollutant impacts are predicted for any sensitive receivers.

6.4 Contemporaneous particulate assessment

A contemporaneous assessment has been undertaken at the nearest receiver (R1) in accordance with the Approved Methods to predict PM_{10} and $PM_{2.5}$ levels from the proposal site. The maximum measured background, site increment and total for PM_{10} and $PM_{2.5}$ is shown in Table 6-3 and Table 6-4 below. Results show compliance with the criteria of 50 µg/m³ and 25 µg/m³ for both PM_{10} and $PM_{2.5}$. It should be noted that the background and incremental levels will not sum up to the provided total levels as the maximum background, incremental and total impacts occur on different days. Days which already exceeded the criteria were not included in the assessment.

Table 6-3 Summary of highest measured and predicted PM_{10} µg/m³ levels (R1)

Date	PM_{10} Background µg/m³	Date	PM_{10} increment µg/m³	Date	PM_{10} Total µg/m³
14/03/2013	48.8	21/11/2013	0.2	14/03/2013	48.8
08/02/2013	48.6	31/12/2013	0.2	08/02/2013	48.7
16/03/2013	47.6	5/07/2013	0.2	16/03/2013	47.6
27/11/2013	46.7	19/07/2013	0.2	27/11/2013	46.7
09/02/2013	46.3	19/05/2013	0.2	09/02/2013	46.3
10/05/2013	46.0	21/03/2013	0.2	20/10/2013	46.0
20/10/2013	45.9	29/08/2013	0.2	10/05/2013	46.0
12/01/2013	45.4	14/10/2013	0.2	31/12/2013	45.4
31/12/2013	45.2	12/06/2013	0.2	12/01/2013	45.4
12/04/2013	44.6	26/08/2013	0.2	12/04/2013	44.6

Table 6-4 Summary of highest measured and predicted $PM_{2.5}$ µg/m³ levels (R1)

Date	$PM_{2.5}$ Background µg/m³	Date	$PM_{2.5}$ increment µg/m³	Date	$PM_{2.5}$ Total µg/m³
11/05/2013	24.2	21/11/2013	0.1	11/05/2013	24.2
19/01/2013	22.3	31/12/2013	0.1	19/01/2013	22.3
10/05/2013	21.7	5/07/2013	0.1	10/05/2013	21.7
12/04/2013	20.8	19/07/2013	0.1	12/04/2013	20.8
03/07/2013	20.6	19/05/2013	0.1	03/07/2013	20.6
26/07/2013	20.2	21/03/2013	0.1	26/07/2013	20.2
27/07/2013	19.6	29/08/2013	0.1	27/07/2013	19.6
22/06/2013	18.8	14/10/2013	0.1	22/06/2013	18.8
01/08/2013	18.6	12/06/2013	0.1	01/08/2013	18.6
09/06/2013	17.1	26/08/2013	0.1	09/06/2013	17.1

7. Mitigation

Short term potential construction dust impacts will be managed with the adoption of standard dust management measures in the Construction Environmental Management Plan (CEMP). General management measures during construction may include:

- Minimising the amount of land cleared for construction
- Watering of exposed soil, access and haul routes and excavation areas as required to reduce dust
- Covering of stockpiles and any trucks transporting spoil
- Reducing or minimising construction works on day with very high winds
- Rehabilitating cleared areas as soon as practicable

The predicted operational pollutant levels at nearby sensitive receivers in Section 6 show compliance with all relevant criteria. The site currently has emission controls in place which will be applied to duplicated emission sources as part of the Project and this assessment shows that additional mitigation measures are not needed.

EPSR should continue to operate the site in accordance with the EPL and the EPSR Operational Environmental Management Plan.

8. Conclusion

GHD has prepared an Air quality Impact Assessment (AQIA) to assess the potential operational Air quality and Odour impacts resulting from the proposed expansion of the lead recycling facility located in Bomen, Wagga Wagga.

Impacts have been assessed at all nearby residential and industrial receivers and ambient pollutant levels have been considered, as outlined in Section 2.

Regulatory requirements including the EPL have been reviewed in order to determine suitable criteria for assessment of impacts. The EPA's Approved Methods, has been used to assess air quality impacts at receivers, while the EPL has set out emission limits for the development, as outlined in Section 3.

Emissions resulting from the development have also been reviewed and a detailed emissions inventory has been produced and provided in Section 4.

A prognostic meteorological model was produced using TAPM, with a more accurate diagnostic model produced using CALMET. Dispersion modelling was conducted using CALPUFF in order to predict air quality impacts at sensitive receivers. Details of the modelling methodology and parameters are provided in Section 5.

The modelling results indicate that no air quality impacts are predicted for any nearby sensitive receivers. Cumulative effects were also considered based on ambient pollutant levels and predict no adverse impacts due to air quality. The results of the assessment are outlined in Section 6.

The results of the study indicate that no further mitigation is required in order to achieve compliant air pollutant levels.

9. References

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Duffee, R.A., O'Brien, M.A. and Ostojic, N., 1991. Recent developments and current practices in odour regulations, controls and technology." Odour Modeling-Why and How" Air and Waste Management Association Transactions Series, (18), pp.289-306.

Environment Protection Authority (2016). Approved Methods for the Modelling and Assessment of Air Pollutants in NSW

Department of the Environment and Heritage (2005). Nitrogen dioxide (NO_2) Air quality fact sheet, Environment protection publications and resources, viewed 21/06/17 *http://www.environment.gov.au/protection/publications/factsheet-nitrogen-dioxide-no2*

Environmental Resources Management Australia (ERM), Licence Variation – Assessing Maximum SO_2 Stack Emission Concentration Using Dispersion Modelling, Submitted to the EPA October 2014, Prepared for Enirgi Power Storage Recycling.

Protection of the Environment Operations Act 1997 (NSW)

Protection of the Environment Operations (Clean Air) Regulation 2010 (NSW)

USEPA (2001) "Federal Register: Control of Air Pollution from New Motor Vehicles: Heavy Duty Engine and Vehicle Standards; Highway Diesel Fuel Sulfur Control Requirements; Proposed Rules".

Appendices

Appendix A – Probability density functions for wind speed and wind direction

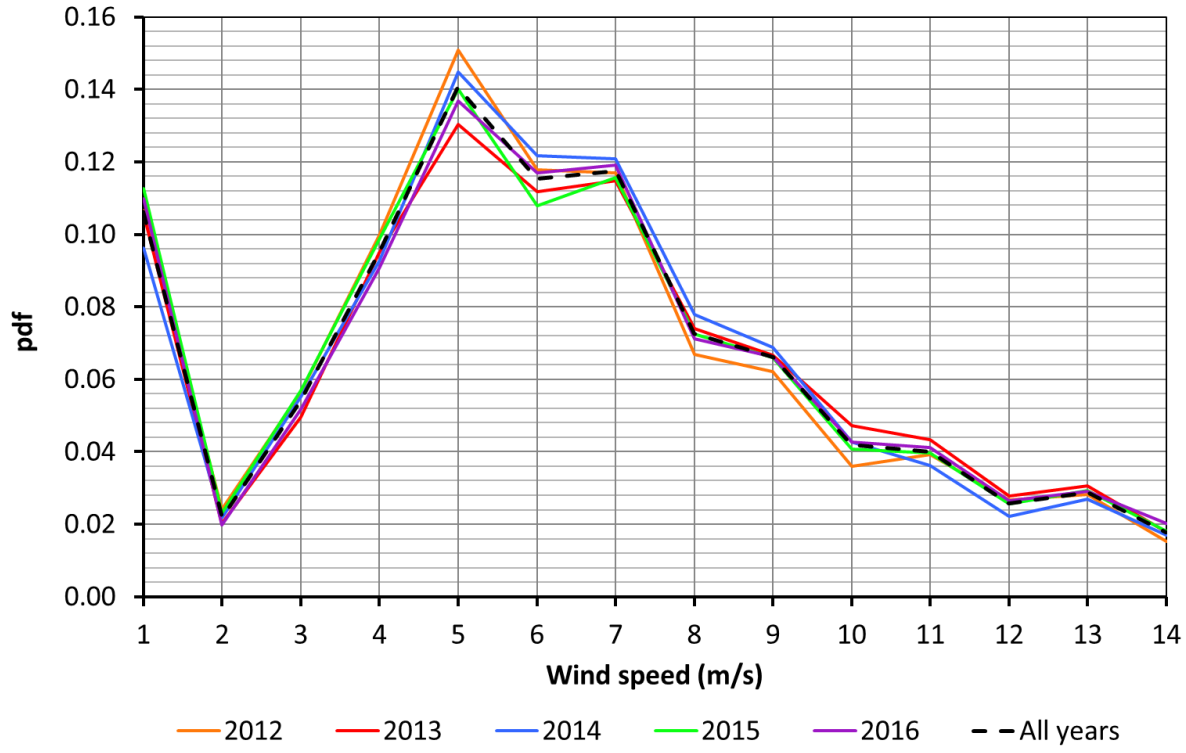


Figure A- 1 Wind speed probability distribution function (pdf)

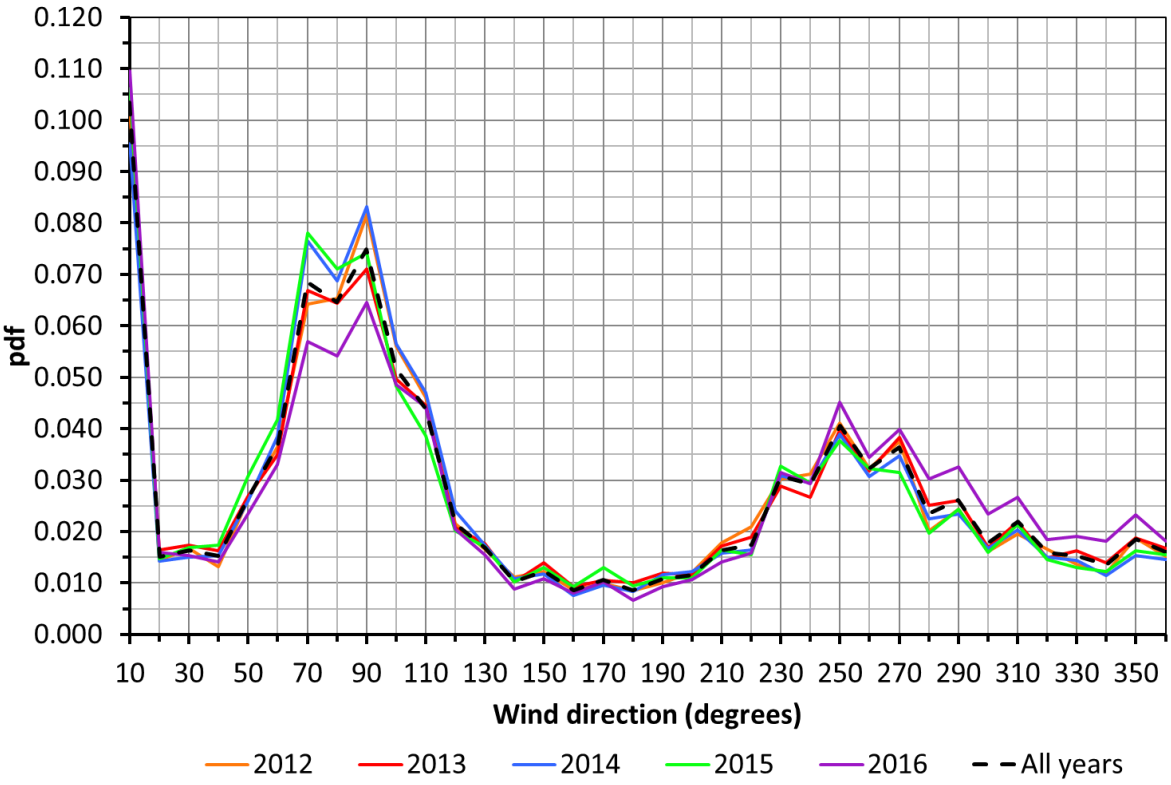


Figure A- 2 Wind direction probability distribution function (pdf)

Appendix B – CALMET model Input file

```
RMT Air Quality Run 01


---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT = *
    or
ISCMET.DAT    input    * ISCDAT = *
    or
PLMMET.DAT    input    * PLMDAT = *
    or
PROFILE.DAT   input    * PRFDAT = *
SURFACE.DAT   input    * SFCDAT = *
RESTARTB.DAT  input    * RSTARTB = *
------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST = CALPUFF.LST !
CONC.DAT      output   ! CONDAT = CONC.DAT !
DFLX.DAT      output   ! DFDAT = DFLX.DAT !
WFLX.DAT      output   ! WFDAT = WFLX.DAT !

VISB.DAT      output   * VISDAT = *
RHO2D.DAT     output   * RHODAT = *
RESTARTE.DAT  output   * RSTARTE = *
------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT = *
VOLEMARB.DAT  input    * VOLDAT = *
BAEMARB.DAT   input    * ARDAT = *
LNEMARB.DAT   input    * LNDAT = *
------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT = *
VD.DAT        input    * VDDAT = *
CHEM.DAT      input    * CHEMDAT = *
H2O2.DAT      input    * H2O2DAT = *
HILL.DAT      input    * HILDAT = *
HILLRCT.DAT   input    * RCTDAT = *
COASTLN.DAT   input    * CSTDAT = *
FLUXBDY.DAT   input    * BDYDAT = *
BCON.DAT      input    * BCNDAT = *
DEBUG.DAT     output   * DEBUG = *
MASSFLX.DAT   output   * FLXDAT = *
MASSBAL.DAT   output   * BALDAT = *
FOG.DAT       output   * FOGDAT = *
------------------------------------------------------------------------------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = F !
         F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT files for run (NMETDAT)
                                   Default: 1       ! NMETDAT = 8 !

     Number of PTEMARB.DAT files for run (NPTDAT)
                                   Default: 0       ! NPTDAT = 0 !

     Number of BAEMARB.DAT files for run (NARDAT)
                                   Default: 0       ! NARDAT = 0 !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                                   Default: 0       ! NVOLDAT = 0 !

!END!

-------------
Subgroup (0a)
-------------

  The following CALMET.DAT filenames are processed in sequence if NMETDAT>1
```



```
Default Name  Type          File Name
------------  ----          ---------
 none         input    ! METDAT=CALMET_2013-01-01-00-0000-2013-02-16-00-0000.DAT     !  !END!
 none         input    ! METDAT=CALMET_2013-02-16-00-0000-2013-04-02-00-0000.DAT     !  !END!
 none         input    ! METDAT=CALMET_2013-04-02-00-0000-2013-05-18-00-0000.DAT     !  !END!
 none         input    ! METDAT=CALMET_2013-05-18-00-0000-2013-07-02-00-0000.DAT     !  !END!
 none         input    ! METDAT=CALMET_2013-07-02-00-0000-2013-08-17-00-0000.DAT     !  !END!
 none         input    ! METDAT=CALMET_2013-08-17-00-0000-2013-10-02-00-0000.DAT     !  !END!
 none         input    ! METDAT=CALMET_2013-10-02-00-0000-2013-11-16-00-0000.DAT     !  !END!
 none         input    ! METDAT=CALMET_2013-11-16-00-0000-2014-01-01-00-0000.DAT     !  !END!


-------------
Subgroup (0b)
-------------

  The following PTEMARB.DAT filenames are processed in sequence if NPTDAT>0
  (Each file contains a subset of the sources, for the entire simulation)

Default Name  Type          File Name
------------  ----          ---------
* PTDATLIST = *


-------------
Subgroup (0c)
-------------

  The following BAEMARB.DAT filenames are processed in sequence if NARDAT>0
  (Each file contains a subset of the sources, for the entire simulation)

Default Name  Type          File Name
------------  ----          ---------
* ARDATLIST = *


-------------
Subgroup (0d)
-------------

  The following VOLEMARB.DAT filenames are processed in sequence if NARDAT>0
  (Each file contains a subset of the sources, for the entire simulation)

Default Name  Type          File Name
------------  ----          ---------
* VOLDATLIST = *

------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file     (METRUN)   Default: 0       ! METRUN = 0 !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in met. file

     Starting date:   Year (IBYR) -- No default       ! IBYR = 2013 !
     (used only if   Month (IBMO) -- No default       ! IBMO = 1 !
      METRUN = 0)        Day (IBDY) -- No default       ! IBDY = 1 !
                        Hour (IBHR) -- No default       ! IBHR = 0 !

     Base time zone       (XBTZ) -- No default       ! XBTZ = -10 !
        PST = 8., MST = 7.
        CST = 6., EST = 5.

     Length of run (hours) (IRLG) -- No default       ! IRLG = 8760 !

     Number of chemical species (NSPEC)
                                  Default: 5       ! NSPEC = 7 !

     Number of chemical species
     to be emitted  (NSE)         Default: 3       ! NSE = 7 !

     Flag to stop run after
     SETUP phase (ITEST)          Default: 2       ! ITEST = 2 !
     (Used to allow checking
     of the model inputs, files, etc.)
           ITEST = 1 - STOPS program after SETUP phase
           ITEST = 2 - Continues with execution of program
                       after SETUP

     Restart Configuration:
```



```
     Control flag (MRESTART)      Default: 0       ! MRESTART = 0 !

        0 = Do not read or write a restart file
        1 = Read a restart file at the beginning of
            the run
        2 = Write a restart file during run
        3 = Read a restart file at beginning of run
            and write a restart file during run

     Number of periods in Restart
     output cycle (NRESPD)        Default: 0       ! NRESPD = 0 !

        0 = File written only at last period
       >0 = File updated every NRESPD periods

     Meteorological Data Format (METFM)
                                  Default: 1       ! METFM = 1 !

        METFM = 1 - CALMET binary file (CALMET.MET)
        METFM = 2 - ISC ASCII file (ISCMET.MET)
        METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
        METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                    surface parameters file (SURFACE.DAT)
        METFM = 5 - AERMET tower file (PROFILE.DAT) and
                    surface parameters file (SURFACE.DAT)

     Meteorological Profile Data Format (MPRFFM)
            (used only for METFM = 1, 2, 3)
                                  Default: 1       ! MPRFFM = 1 !

        MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
        MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

     PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
     Averaging Time (minutes) (AVET)
                                  Default: 60.0    ! AVET = 60 !
     PG Averaging Time (minutes) (PGTIME)
                                  Default: 60.0    ! PGTIME = 60 !


!END!


------------------------------------------------------------------------------

INPUT GROUP: 2 -- Technical options
--------------


     Vertical distribution used in the
     near field (MGAUSS)          Default: 1     ! MGAUSS = 1 !
        0 = uniform
        1 = Gaussian

     Terrain adjustment method
     (MCTADJ)                     Default: 3     ! MCTADJ = 3 !
        0 = no adjustment
        1 = ISC-type of terrain adjustment
        2 = simple, CALPUFF-type of terrain
            adjustment
        3 = partial plume path adjustment

     Subgrid-scale complex terrain
     flag (MCTSG)                 Default: 0     ! MCTSG = 0 !
        0 = not modeled
        1 = modeled

     Near-field puffs modeled as
     elongated slugs? (MSLUG)     Default: 0     ! MSLUG = 0 !
        0 = no
        1 = yes (slug model used)

     Transitional plume rise modeled?
     (MTRANS)                     Default: 1     ! MTRANS = 1 !
        0 = no  (i.e., final rise only)
        1 = yes (i.e., transitional rise computed)

     Stack tip downwash? (MTIP)   Default: 1     ! MTIP = 1 !
        0 = no  (i.e., no stack tip downwash)
        1 = yes (i.e., use stack tip downwash)

     Method used to simulate building
     downwash? (MBDW)             Default: 1     ! MBDW = 2 !
        1 = ISC method
        2 = PRIME method
```



```
     Vertical wind shear modeled above
     stack top? (MSHEAR)          Default: 0     ! MSHEAR = 0 !
        0 = no  (i.e., vertical wind shear not modeled)
        1 = yes (i.e., vertical wind shear modeled)

     Puff splitting allowed? (MSPLIT)  Default: 0     ! MSPLIT = 0 !
        0 = no (i.e., puffs not split)
        1 = yes (i.e., puffs are split)

     Chemical mechanism flag (MCHEM)   Default: 1     ! MCHEM = 0 !
        0 = chemical transformation not
            modeled
        1 = transformation rates computed
            internally (MESOPUFF II scheme)
        2 = user-specified transformation
            rates used
        3 = transformation rates computed
            internally (RIVAD/ARM3 scheme)
        4 = secondary organic aerosol formation
            computed (MESOPUFF II scheme for OH)

     Aqueous phase transformation flag (MAQCHEM)
     (Used only if MCHEM = 1, or 3)    Default: 0     ! MAQCHEM = 0 !
        0 = aqueous phase transformation
            not modeled
        1 = transformation rates adjusted
            for aqueous phase reactions

     Wet removal modeled ? (MWET)      Default: 1     ! MWET = 0 !
        0 = no
        1 = yes

     Dry deposition modeled ? (MDRY)   Default: 1     ! MDRY = 0 !
        0 = no
        1 = yes
        (dry deposition method specified
         for each species in Input Group 3)


     Gravitational settling (plume tilt)
     modeled ? (MTILT)                 Default: 0     ! MTILT = 0 !
        0 = no
        1 = yes
        (puff center falls at the gravitational
         settling velocity for 1 particle species)

     Restrictions:
         - MDRY  = 1
         - NSPEC = 1  (must be particle species as well)
         - sg    = 0  GEOMETRIC STANDARD DEVIATION in Group 8 is
                      set to zero for a single particle diameter

     Method used to compute dispersion
     coefficients (MDISP)              Default: 3     ! MDISP = 2 !

        1 = dispersion coefficients computed from measured values
            of turbulence, sigma v, sigma w
        2 = dispersion coefficients from internally calculated
            sigma v, sigma w using micrometeorological variables
            (u*, w*, L, etc.)
        3 = PG dispersion coefficients for RURAL areas (computed using
            the ISCST multi-segment approximation) and MP coefficients in
            urban areas
        4 = same as 3 except PG coefficients computed using
            the MESOPUFF II eqns.
        5 = CTDM sigmas used for stable and neutral conditions.
            For unstable conditions, sigmas are computed as in
            MDISP = 3, described above.  MDISP = 5 assumes that
            measured values are read

     Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
     (Used only if MDISP = 1 or 5)     Default: 3     ! MTURBVW = 3 !
        1 = use sigma-v or sigma-theta measurements
            from PROFILE.DAT to compute sigma-y
            (valid for METFM = 1, 2, 3, 4, 5)
        2 = use sigma-w measurements
            from PROFILE.DAT to compute sigma-z
            (valid for METFM = 1, 2, 3, 4, 5)
        3 = use both sigma-(v/theta) and sigma-w
            from PROFILE.DAT to compute sigma-y and sigma-z
            (valid for METFM = 1, 2, 3, 4, 5)
        4 = use sigma-theta measurements
            from PLMMET.DAT to compute sigma-y
            (valid only if METFM = 3)

     Back-up method used to compute dispersion
```

```
      when measured turbulence data are
      missing (MDISP2)                      Default: 3     ! MDISP2 = 3 !
      (used only if MDISP = 1 or 5)
         2 = dispersion coefficients from internally calculated
             sigma v, sigma w using micrometeorological variables
             (u*, w*, L, etc.)
         3 = PG dispersion coefficients for RURAL areas (computed using
             the ISCST multi-segment approximation) and MP coefficients in
             urban areas
         4 = same as 3 except PG coefficients computed using
             the MESOPUFF II eqns.

      [DIAGNOSTIC FEATURE]
      Method used for Lagrangian timescale for Sigma-y
      (used only if MDISP=1,2 or MDISP2=1,2)
      (MTAULY)                              Default: 0     ! MTAULY = 0 !
         0 = Draxler default 617.284 (s)
         1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
        10 <Direct user input (s)             -- e.g., 306.9


      [DIAGNOSTIC FEATURE]
      Method used for Advective-Decay timescale for Turbulence
      (used only if MDISP=2 or MDISP2=2)
      (MTAUADV)                             Default: 0     ! MTAUADV = 0 !
         0 = No turbulence advection
         1 = Computed (OPTION NOT IMPLEMENTED)
        10 <Direct user input (s)   -- e.g., 300


      Method used to compute turbulence sigma-v &
      sigma-w using micrometeorological variables
      (Used only if MDISP = 2 or MDISP2 = 2)
      (MCTURB)                              Default: 1     ! MCTURB = 1 !
         1 = Standard CALPUFF subroutines
         2 = AERMOD subroutines

      PG sigma-y,z adj. for roughness?      Default: 0     ! MROUGH = 0 !
      (MROUGH)
         0 = no
         1 = yes

      Partial plume penetration of          Default: 1     ! MPARTL = 1 !
      elevated inversion?
      (MPARTL)
         0 = no
         1 = yes

      Strength of temperature inversion     Default: 0     ! MTINV = 0 !
      provided in PROFILE.DAT extended records?
      (MTINV)
         0 = no (computed from measured/default gradients)
         1 = yes

      PDF used for dispersion under convective conditions?
                                            Default: 0     ! MPDF = 0 !
      (MPDF)
         0 = no
         1 = yes

      Sub-Grid TIBL module used for shore line?
                                            Default: 0     ! MSGTIBL = 0 !
      (MSGTIBL)
         0 = no
         1 = yes

      Boundary conditions (concentration) modeled?
                                            Default: 0     ! MBCON = 0 !
      (MBCON)
         0 = no
         1 = yes, using formatted BCON.DAT file
         2 = yes, using unformatted CONC.DAT file

      Note:  MBCON > 0 requires that the last species modeled
             be 'BCON'.  Mass is placed in species BCON when
             generating boundary condition puffs so that clean
             air entering the modeling domain can be simulated
             in the same way as polluted air.  Specify zero
             emission of species BCON for all regular sources.

      Individual source contributions saved?
                                            Default: 0     ! MSOURCE = 0 !
      (MSOURCE)
         0 = no
         1 = yes
```



```
     Analyses of fogging and icing impacts due to emissions from
     arrays of mechanically-forced cooling towers can be performed
     using CALPUFF in conjunction with a cooling tower emissions
     processor (CTEMISS) and its associated postprocessors.  Hourly
     emissions of water vapor and temperature from each cooling tower
     cell are computed for the current cell configuration and ambient
     conditions by CTEMISS. CALPUFF models the dispersion of these
     emissions and provides cloud information in a specialized format
     for further analysis. Output to FOG.DAT is provided in either
     'plume mode' or 'receptor mode' format.

     Configure for FOG Model output?
                                           Default: 0     ! MFOG = 0 !
     (MFOG)
        0 = no
        1 = yes  - report results in PLUME Mode format
        2 = yes  - report results in RECEPTOR Mode format


     Test options specified to see if
     they conform to regulatory
     values? (MREG)                        Default: 1     ! MREG = 0 !

        0 = NO checks are made
        1 = Technical options must conform to USEPA
            Long Range Transport (LRT) guidance
                       METFM    1 or 2
                       AVET     60. (min)
                       PGTIME   60. (min)
                       MGAUSS   1
                       MCTADJ   3
                       MTRANS   1
                       MTIP     1
                       MCHEM    1 or 3 (if modeling SOx, NOx)
                       MWET     1
                       MDRY     1
                       MDISP    2 or 3
                       MPDF     0 if MDISP=3
                                1 if MDISP=2
                       MROUGH   0
                       MPARTL   1
                       SYTDEP   550. (m)
                       MHFTSZ   0
                       SVMIN    0.5 (m/s)


!END!


-------------------------------------------------------------------------------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !            !END!
! CSPEC =          NO2 !            !END!
! CSPEC = DIOXIN&FURAN !            !END!
! CSPEC =         LEAD !            !END!
! CSPEC = SOLIDPARTICL !            !END!
! CSPEC =          SO3 !            !END!
! CSPEC =    Beryllium !            !END!


                                                        Dry                 OUTPUT GROUP
    SPECIES          MODELED          EMITTED        DEPOSITED                 NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,                   (0=NONE,
   (Limit: 12                                        1=COMPUTED-GAS          1=1st CGRUP,
    Characters                                       2=COMPUTED-PARTICLE    2=2nd CGRUP,
    in length)                                       3=USER-SPECIFIED)      3= etc.)

!          SO2  =          1,                1,           1,                  0   !
!          NO2  =          1,                1,           1,                  0   !
! DIOXIN&FURAN  =          1,                1,           1,                  0   !
!         LEAD  =          1,                1,           2,                  0   !
! SOLIDPARTICL  =          1,                1,           2,                  0   !
!          SO3  =          1,                1,           1,                  0   !
!    Beryllium  =          1,                1,           0,                  0   !
```



```
!END!

  Note:  The last species in (3a) must be 'BCON' when using the
         boundary condition option (MBCON > 0).  Species BCON should
         typically be modeled as inert (no chem transformation or
         removal).


-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.



-------------------------------------------------------------------------------


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                     Default: UTM    ! PMAP = UTM !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                    Default=0.0     ! FEAST = 0.0 !
     (FNORTH)                   Default=0.0     ! FNORTH = 0.0 !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                   No Default      ! IUTMZN = 55 !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                   Default: N      ! UTMHEM = S !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection

     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                    No Default      ! RLAT0 = 0.00N !
     (RLON0)                    No Default      ! RLON0 = 0.00E !

         TTM :  RLON0 identifies central (true N/S) meridian of projection
                RLAT0 selected for convenience
         LCC :  RLON0 identifies central (true N/S) meridian of projection
                RLAT0 selected for convenience
         PS  :  RLON0 identifies central (grid N/S) meridian of projection
                RLAT0 selected for convenience
         EM  :  RLON0 identifies central meridian of projection
                RLAT0 is REPLACED by 0.0N (Equator)
         LAZA:  RLON0 identifies longitude of tangent-point of mapping plane
                RLAT0 identifies latitude of tangent-point of mapping plane

     Matching parallel(s) of latitude (decimal degrees) for projection
     (Used only if PMAP= LCC or PS)
     (XLAT1)                    No Default      ! XLAT1 = 30S !
     (XLAT2)                    No Default      ! XLAT2 = 60S !

         LCC :  Projection cone slices through Earth's surface at XLAT1 and XLAT2
         PS  :  Projection plane slices through Earth at XLAT1
                (XLAT2 is not used)

     ----------
     Note:  Latitudes and longitudes should be positive, and include a
            letter N,S,E, or W indicating north or south latitude, and
            east or west longitude.  For example,
            35.9  N Latitude  =  35.9N
            118.7 E Longitude = 118.7E
```



```
     Datum-region
     ------------

     The Datum-Region for the coordinates is identified by a character
     string.  Many mapping products currently available use the model of the
     Earth known as the World Geodetic System 1984 (WGS-84).  Other local
     models may be in use, and their selection in CALMET will make its output
     consistent with local mapping products.  The list of Datum-Regions with
     official transformation parameters is provided by the National Imagery and
     Mapping Agency (NIMA).

     NIMA Datum - Regions(Examples)
     ------------------------------------------------------------------------------
     WGS-84    WGS-84 Reference Ellipsoid and Geoid, Global coverage (WGS84)
     NAS-C     NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
     NAR-C     NORTH AMERICAN 1983 GRS 80 Spheroid, MEAN FOR CONUS (NAD83)
     NWS-84    NWS 6370KM Radius, Sphere
     ESR-S     ESRI REFERENCE 6371KM Radius, Sphere

     Datum-region for output coordinates
     (DATUM)                    Default: WGS-84     ! DATUM = WGS-84 !


METEOROLOGICAL Grid:

     Rectangular grid defined for projection PMAP,
     with X the Easting and Y the Northing coordinate

            No. X grid cells (NX)      No default     ! NX = 61 !
            No. Y grid cells (NY)      No default     ! NY = 61 !
         No. vertical layers (NZ)      No default     ! NZ = 11 !

           Grid spacing (DGRIDKM)      No default     ! DGRIDKM = 0.4 !
                                       Units: km

                Cell face heights
                    (ZFACE(nz+1))      No defaults
                                       Units: m
   ! ZFACE =  0.0, 20.0, 40.0, 60.0, 90.0, 120.0, 180.0, 250.0, 500.0, 1000.0, 2000.0, 3000.0 !

            Reference Coordinates
           of SOUTHWEST corner of
                 grid cell(1, 1):

            X coordinate (XORIGKM)     No default     ! XORIGKM = 524.9970 !
            Y coordinate (YORIGKM)     No default     ! YORIGKM = 6106.3630 !
                                      Units: km


COMPUTATIONAL Grid:

     The computational grid is identical to or a subset of the MET. grid.
     The lower left (LL) corner of the computational grid is at grid point
     (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of the
     computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
     The grid spacing of the computational grid is the same as the MET. grid.

        X index of LL corner (IBCOMP)      No default     ! IBCOMP = 1 !
                  (1 <= IBCOMP <= NX)

        Y index of LL corner (JBCOMP)      No default     ! JBCOMP = 1 !
                  (1 <= JBCOMP <= NY)


        X index of UR corner (IECOMP)      No default     ! IECOMP = 61 !
                  (1 <= IECOMP <= NX)

        Y index of UR corner (JECOMP)      No default     ! JECOMP = 61 !
                  (1 <= JECOMP <= NY)



SAMPLING Grid (GRIDDED RECEPTORS):

     The lower left (LL) corner of the sampling grid is at grid point
     (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of the
     sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
     The sampling grid must be identical to or a subset of the computational
     grid.  It may be a nested grid inside the computational grid.
     The grid spacing of the sampling grid is DGRIDKM/MESHDN.

        Logical flag indicating if gridded
        receptors are used (LSAMP)         Default: T     ! LSAMP = T !
        (T=yes, F=no)
```

```
        X index of LL corner (IBSAMP)      No default     ! IBSAMP = 31 !
         (IBCOMP <= IBSAMP <= IECOMP)

        Y index of LL corner (JBSAMP)      No default     ! JBSAMP = 31 !
         (JBCOMP <= JBSAMP <= JECOMP)


        X index of UR corner (IESAMP)      No default     ! IESAMP = 42 !
         (IBCOMP <= IESAMP <= IECOMP)

        Y index of UR corner (JESAMP)      No default     ! JESAMP = 45 !
         (JBCOMP <= JESAMP <= JECOMP)


       Nesting factor of the sampling
        grid (MESHDN)                     Default: 1     ! MESHDN = 1 !
        (MESHDN is an integer >= 1)

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 5 -- Output Options
--------------
                                            *                          *
     FILE                        DEFAULT VALUE             VALUE THIS RUN
     ----                        -------------             --------------

   Concentrations (ICON)              1                    ! ICON = 1 !
   Dry Fluxes (IDRY)                  1                    ! IDRY = 0 !
   Wet Fluxes (IWET)                  1                    ! IWET = 0 !
   2D Temperature (IT2D)              0                    ! IT2D = 0 !
   2D Density (IRHO)                  0                    ! IRHO = 0 !
   Relative Humidity (IVIS)           1                    ! IVIS = 0 !
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                       Default: T          ! LCOMPRS = T !

   *
    0 = Do not create file, 1 = create file


    QA PLOT FILE OUTPUT OPTION:

       Create a standard series of output files (e.g.
       locations of sources, receptors, grids ...)
       suitable for plotting?
       (IQAPLOT)                       Default: 1          ! IQAPLOT = 1 !
         0 = no
         1 = yes

    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

       Mass flux across specified boundaries
       for selected species reported hourly?
       (IMFLX)                         Default: 0          ! IMFLX = 0 !
         0 = no
         1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                  are specified in Input Group 0)

       Mass balance for each species
       reported hourly?
       (IMBAL)                         Default: 0          ! IMBAL = 0 !
         0 = no
         1 = yes (MASSBAL.DAT filename is
              specified in Input Group 0)


    LINE PRINTER OUTPUT OPTIONS:

       Print concentrations (ICPRT)    Default: 0          ! ICPRT = 1 !
       Print dry fluxes (IDPRT)        Default: 0          ! IDPRT = 0 !
       Print wet fluxes (IWPRT)        Default: 0          ! IWPRT = 0 !
       (0 = Do not print, 1 = Print)

       Concentration print interval
       (ICFRQ) in hours                Default: 1          ! ICFRQ = 24 !
       Dry flux print interval
       (IDFRQ) in hours                Default: 1          ! IDFRQ = 1 !
       Wet flux print interval
       (IWFRQ) in hours                Default: 1          ! IWFRQ = 1 !
```



```
       Units for Line Printer Output
       (IPRTU)                         Default: 1          ! IPRTU = 3 !
                        for             for
                   Concentration    Deposition
           1 =        g/m**3          g/m**2/s
           2 =       mg/m**3         mg/m**2/s
           3 =       ug/m**3         ug/m**2/s
           4 =       ng/m**3         ng/m**2/s
           5 =      Odour Units

       Messages tracking progress of run
       written to the screen ?
       (IMESG)                         Default: 2          ! IMESG = 2 !
         0 = no
         1 = yes (advection step, puff ID)
         2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


     SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                 ---- CONCENTRATIONS ----   ------ DRY FLUXES ------   ------ WET FLUXES ------   --
MASS FLUX --
   SPECIES
   /GROUP        PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?
SAVED ON DISK?
   -------       ------------------------   ------------------------   ------------------------
--------------
!         SO2 =      1,          1,           1,          0,           1,          0,           0
  !
!         NO2 =      1,          1,           1,          0,           1,          0,           0
  !
! DIOXIN&FURAN =     1,          1,           1,          0,           1,          0,           0
  !
!        LEAD =      1,          1,           1,          0,           1,          0,           0
  !
! SOLIDPARTICL =     1,          1,           1,          0,           1,          0,           0
  !
!         SO3 =      1,          1,           1,          0,           1,          0,           0
  !
!   Beryllium =      1,          1,           1,          0,           1,          0,           0
  !

  Note:  Species BCON (for MBCON > 0) does not need to be saved on disk.


     OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

       Logical for debug output
       (LDEBUG)                                 Default: F     ! LDEBUG = F !

       First puff to track
       (IPFDEB)                                 Default: 1     ! IPFDEB = 1 !

       Number of puffs to track
       (NPFDEB)                                 Default: 1     ! NPFDEB = 1000 !

       Met. period to start output
       (NN1)                                    Default: 1     ! NN1 = 1 !

       Met. period to end output
       (NN2)                                    Default: 10    ! NN2 = 10 !

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
       Number of terrain features (NHILL)       Default: 0     ! NHILL = 0 !

       Number of special complex terrain
       receptors  (NCTREC)                      Default: 0     ! NCTREC = 0 !

       Terrain and CTSG Receptor data for
       CTSG hills input in CTDM format ?
       (MHILL)                                  No Default     ! MHILL = 2 !
       1 = Hill and Receptor data created
           by CTDM processors & read from
           HILL.DAT and HILLRCT.DAT files
```



```
       2 = Hill data created by OPTHILL &
           input below in Subgroup (6b);
           Receptor data in Subgroup (6c)

       Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M = 1.0 !
       to meters (MHILL=1)

       Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M = 1.0 !
       to meters (MHILL=1)

       X-origin of CTDM system relative to      No Default     ! XCTDMKM = 0.0 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

       Y-origin of CTDM system relative to      No Default     ! YCTDMKM = 0.0 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
     HILL information


HILL           XC        YC       THETAH  ZGRID  RELIEF    EXPO 1    EXPO 2   SCALE 1    SCALE 2
AMAX1     AMAX2
 NO.          (km)      (km)      (deg.)   (m)     (m)      (m)       (m)       (m)        (m)
(m)       (m)
----          ----      ----      ------  -----  ------    ------    ------   -------    -------
-----     -----

---------------
Subgroup (6c)
---------------

    COMPLEX TERRAIN RECEPTOR INFORMATION

                      XRCT         YRCT        ZRCT          XHH
                      (km)         (km)         (m)
                     ------        -----       ------        ----


-------------------
1
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain receptor
                    (NOTE: MUST BE ENTERED AS A REAL NUMBER)

   **
     NOTE: DATA for each hill and CTSG receptor are treated as a separate
           input subgroup and therefore must end with an input group terminator.

-------------------------------------------------------------------------------

INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

      SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY    MESOPHYLL RESISTANCE     HENRY'S
LAW COEFFICIENT
       NAME        (cm**2/s)                                            (s/cm)
(dimensionless)
      -------     -----------      ----------      ----------    --------------------
----------------------
* DRYGAS = *

!END!
```



```
-------------------------------------------------------------------------------

INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

     For SINGLE SPECIES, the mean and standard deviation are used to
     compute a deposition velocity for NINT (see group 9) size-ranges,
     and these are then averaged to obtain a mean deposition velocity.

     For GROUPED SPECIES, the size distribution should be explicitly
     specified (by the 'species' in the group), and the standard deviation
     for each should be entered as 0.  The model will then use the
     deposition velocity for the stated mean diameter.

      SPECIES       GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME              DIAMETER                  DEVIATION
                         (microns)                 (microns)
      -------       -------------------        ------------------
* DRYPART = *
!END!

-------------------------------------------------------------------------------

INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

     Reference cuticle resistance (s/cm)
     (RCUTR)                           Default: 30    ! RCUTR = 30 !
     Reference ground resistance  (s/cm)
     (RGR)                             Default: 10    ! RGR = 10 !
     Reference pollutant reactivity
     (REACTR)                          Default: 8     ! REACTR = 8 !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                            Default: 9     ! NINT = 9 !

     Vegetation state in unirrigated areas
     (IVEG)                            Default: 1     ! IVEG = 1 !
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
        IVEG=3 for inactive vegetation

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                      Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------
* WETDEPOS = *
!END!

-------------------------------------------------------------------------------

INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1            ! MOZ = 1 !
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a monthly background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb                      Default: 12*80.
     ! BCKO3 = 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00 !

     Monthly ammonia concentrations
     (Used only if MCHEM = 1, or 3)
```

```
(BCKNH3) in ppb                    Default: 12*10.
! BCKNH3 = 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00 !

Nighttime SO2 loss rate (RNITE1)
in percent/hour                    Default: 0.2          ! RNITE1 = 0.2 !

Nighttime NOx loss rate (RNITE2)
in percent/hour                    Default: 2.0          ! RNITE2 = 2 !

Nighttime HNO3 formation rate (RNITE3)
in percent/hour                    Default: 2.0          ! RNITE3 = 2 !

H2O2 data input option (MH2O2)     Default: 1            ! MH2O2 = 1 !
(Used only if MAQCHEM = 1)
   0 = use a monthly background H2O2 value
   1 = read hourly H2O2 concentrations from
       the H2O2.DAT data file

Monthly H2O2 concentrations
(Used only if MQACHEM = 1 and
 MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
(BCKH2O2) in ppb                   Default: 12*1.
! BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !


--- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
    (used only if MCHEM = 4)

    The SOA module uses monthly values of:
         Fine particulate concentration in ug/m^3 (BCKPMF)
         Organic fraction of fine particulate     (OFRAC)
         VOC / NOX ratio (after reaction)         (VCNX)
    to characterize the air mass when computing
    the formation of SOA from VOC emissions.
    Typical values for several distinct air mass types are:

       Month    1    2    3    4    5    6    7    8    9   10   11   12
                Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

    Clean Continental
       BCKPMF  1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
       OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20  .15
       VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

    Clean Marine (surface)
       BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
       OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30  .25
       VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

    Urban - low biogenic (controls present)
       BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
       OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20  .20
       VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.

    Urban - high biogenic (controls present)
       BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
       OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35  .25
       VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

    Regional Plume
       BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
       OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30  .20
       VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

    Urban - no controls present
       BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
       OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35  .30
       VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.

    Default: Clean Continental
    ! BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
    ! OFRAC = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
    ! VCNX = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !


!END!

-------------------------------------------------------------------------------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
----------------

    Horizontal size of puff (m) beyond which
    time-dependent dispersion equations (Heffter)
```



```
    are used to determine sigma-y and
    sigma-z (SYTDEP)                        Default: 550.   ! SYTDEP = 550 !

    Switch for using Heffter equation for sigma z
    as above (0 = Not use Heffter; 1 = use Heffter
    (MHFTSZ)                                Default: 0      ! MHFTSZ = 0 !

    Stability class used to determine plume
    growth rates for puffs above the boundary
    layer (JSUP)                            Default: 5      ! JSUP = 5 !

    Vertical dispersion constant for stable
    conditions (k1 in Eqn. 2.7-3)  (CONK1)  Default: 0.01   ! CONK1 = 0.01 !

    Vertical dispersion constant for neutral/
    unstable conditions (k2 in Eqn. 2.7-4)
    (CONK2)                                 Default: 0.1    ! CONK2 = 0.1 !

    Factor for determining Transition-point from
    Schulman-Scire to Huber-Snyder Building Downwash
    scheme (SS used for Hs <Hb + TBD * HL)
    (TBD)                                   Default: 0.5    ! TBD = 0.5 !
       TBD <0   ==> always use Huber-Snyder
       TBD = 1.5 ==> always use Schulman-Scire
       TBD = 0.5 ==> ISC Transition-point

    Range of land use categories for which
    urban dispersion is assumed
    (IURB1, IURB2)                          Default: 10     ! IURB1 = 10 !
                                                    19     ! IURB2 = 19 !

    Site characterization parameters for single-point Met data files ---------
    (needed for METFM = 2,3,4,5)

       Land use category for modeling domain
       (ILANDUIN)                           Default: 20     ! ILANDUIN = 20 !

       Roughness length (m) for modeling domain
       (Z0IN)                               Default: 0.25   ! Z0IN = .25 !

       Leaf area index for modeling domain
       (XLAIIN)                             Default: 3.0    ! XLAIIN = 3.0 !

       Elevation above sea level (m)
       (ELEVIN)                             Default: 0.0    ! ELEVIN = .0 !

       Latitude (degrees) for met location
       (XLATIN)                             Default: -999.  ! XLATIN = -999.0 !

       Longitude (degrees) for met location
       (XLONIN)                             Default: -999.  ! XLONIN = -999.0 !

    Specialized information for interpreting single-point Met data files -----

       Anemometer height (m) (Used only if METFM = 2,3)
       (ANEMHT)                             Default: 10.    ! ANEMHT = 10.0 !

       Form of lateral turbulance data in PROFILE.DAT file
       (Used only if METFM = 4,5 or MTURBVW = 1 or 3)
       (ISIGMAV)                            Default: 1      ! ISIGMAV = 1 !
           0 = read sigma-theta
           1 = read sigma-v

       Choice of mixing heights (Used only if METFM = 4)
       (IMIXCTDM)                           Default: 0      ! IMIXCTDM = 0 !
           0 = read PREDICTED mixing heights
           1 = read OBSERVED mixing heights

    Maximum length of a slug (met. grid units)
    (XMXLEN)                                Default: 1.0    ! XMXLEN = 1 !

    Maximum travel distance of a puff/slug (in
    grid units) during one sampling step
    (XSAMLEN)                               Default: 1.0    ! XSAMLEN = 1 !

    Maximum Number of slugs/puffs release from
    one source during one time step
    (MXNEW)                                 Default: 99     ! MXNEW = 99 !

    Maximum Number of sampling steps for
    one puff/slug during one time step
    (MXSAM)                                 Default: 99     ! MXSAM = 99 !

    Number of iterations used when computing
    the transport wind for a sampling step
    that includes gradual rise (for CALMET
```



```
    and PROFILE winds)
    (NCOUNT)                                Default: 2      ! NCOUNT = 2 !

    Minimum sigma y for a new puff/slug (m)
    (SYMIN)                                 Default: 1.0    ! SYMIN = 1 !

    Minimum sigma z for a new puff/slug (m)
    (SZMIN)                                 Default: 1.0    ! SZMIN = 1 !

    Default minimum turbulence velocities sigma-v and sigma-w
    for each stability class over land and over water (m/s)
    (SVMIN(12) and SWMIN(12))

                 ----------  LAND  ----------       ---------  WATER  ----------
       Stab Class :  A    B    C    D    E    F        A    B    C    D    E    F
                    ---  ---  ---  ---  ---  ---      ---  ---  ---  ---  ---  ---
    Default SVMIN : .50, .50, .50, .50, .50, .50,     .37, .37, .37, .37, .37, .37
    Default SWMIN : .20, .12, .08, .06, .03, .016,    .20, .12, .08, .06, .03, .016

          ! SVMIN = 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.37, 0.37, 0.37, 0.37, 0.37, 0.37 !
          ! SWMIN = 0.2, 0.12, 0.08, 0.06, 0.03, 0.016, 0.2, 0.12, 0.08, 0.06, 0.03, 0.016 !

    Divergence criterion for dw/dz across puff
    used to initiate adjustment for horizontal
    convergence (1/s)
    Partial adjustment starts at CDIV(1), and
    full adjustment is reached at CDIV(2)
    (CDIV(2))                               Default: 0.0,0.0  ! CDIV = 0, 0 !

    Minimum wind speed (m/s) allowed for
    non-calm conditions. Also used as minimum
    speed returned when using power-law
    extrapolation toward surface
    (WSCALM)                                Default: 0.5    ! WSCALM = 0.5 !

    Maximum mixing height (m)
    (XMAXZI)                                Default: 3000.  ! XMAXZI = 3000 !

    Minimum mixing height (m)
    (XMINZI)                                Default: 50.    ! XMINZI = 50 !

    Default wind speed classes --
    5 upper bounds (m/s) are entered;
    the 6th class has no upper limit
    (WSCAT(5))                      Default   :
                                    ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

                                Wind Speed Class :  1     2     3     4     5
                                                    ---   ---   ---   ---   ---
                                       ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

    Default wind speed profile power-law
    exponents for stabilities 1-6
    (PLX0(6))                       Default   : ISC RURAL values
                                    ISC RURAL : .07,  .07, .10,  .15,  .35,  .55
                                    ISC URBAN : .15,  .15, .20,  .25,  .30,  .30

                                 Stability Class :  A     B     C     D     E     F
                                                    ---   ---   ---   ---   ---   ---
                                       ! PLX0 = 0.07, 0.07, 0.1, 0.15, 0.35, 0.55 !

    Default potential temperature gradient
    for stable classes E, F (degK/m)
    (PTG0(2))                       Default: 0.020, 0.035
                                       ! PTG0 = 0.02, 0.035 !

    Default plume path coefficients for
    each stability class (used when option
    for partial plume height terrain adjustment
    is selected -- MCTADJ=3)
    (PPC(6))                        Stability Class :  A     B     C     D     E     F
                                       Default  PPC : .50,  .50,  .50,  .50,  .35,  .35
                                                      ---   ---   ---   ---   ---   ---
                                          ! PPC = 0.5, 0.5, 0.5, 0.5, 0.35, 0.35 !

    Slug-to-puff transition criterion factor
    equal to sigma-y/length of slug
    (SL2PF)                                 Default: 10.        ! SL2PF = 10 !

    Puff-splitting control variables ------------------------

      VERTICAL SPLIT
      --------------

      Number of puffs that result every time a puff
      is split - nsplit=2 means that 1 puff splits
```



```
      into 2
      (NSPLIT)                              Default:   3        ! NSPLIT = 3 !

      Time(s) of a day when split puffs are eligible to
      be split once again; this is typically set once
      per day, around sunset before nocturnal shear develops.
      24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
      0=do not re-split    1=eligible for re-split
      (IRESPLIT(24))                        Default:  Hour 17 = 1
      ! IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

      Split is allowed only if last hour's mixing
      height (m) exceeds a minimum value
      (ZISPLIT)                             Default: 100.       ! ZISPLIT = 100 !

      Split is allowed only if ratio of last hour's
      mixing ht to the maximum mixing ht experienced
      by the puff is less than a maximum value (this
      postpones a split until a nocturnal layer develops)
      (ROLDMAX)                             Default: 0.25       ! ROLDMAX = 0.25 !


      HORIZONTAL SPLIT
      ----------------

      Number of puffs that result every time a puff
      is split - nsplith=5 means that 1 puff splits
      into 5
      (NSPLITH)                             Default:   5        ! NSPLITH = 5 !

      Minimum sigma-y (Grid Cells Units) of puff
      before it may be split
      (SYSPLITH)                            Default:  1.0       ! SYSPLITH = 1 !

      Minimum puff elongation rate (SYSPLITH/hr) due to
      wind shear, before it may be split
      (SHSPLITH)                            Default:  2.        ! SHSPLITH = 2 !

      Minimum concentration (g/m^3) of each
      species in puff before it may be split
      Enter array of NSPEC values; if a single value is
      entered, it will be used for ALL species
      (CNSPLITH)                            Default:  1.0E-07   ! CNSPLITH = 0 !

    Integration control variables -------------------------

      Fractional convergence criterion for numerical SLUG
      sampling integration
      (EPSSLUG)                             Default:   1.0e-04  ! EPSSLUG = 0.0001 !

      Fractional convergence criterion for numerical AREA
      source integration
      (EPSAREA)                             Default:   1.0e-06  ! EPSAREA = 1E-006 !

      Trajectory step-length (m) used for numerical rise
      integration
      (DSRISE)                              Default:   1.0      ! DSRISE = 1.0 !

      Boundary Condition (BC) Puff control variables ------------------------

      Minimum height (m) to which BC puffs are mixed as they are emitted
      (MBCON=2 ONLY).  Actual height is reset to the current mixing height
      at the release point if greater than this minimum.
      (HTMINBC)                             Default:   500.     ! HTMINBC = 500 !

      Search radius (km) about a receptor for sampling nearest BC puff.
      BC puffs are typically emitted with a spacing of one grid cell
      length, so the search radius should be greater than DGRIDKM.
      (RSAMPBC)                             Default:   10.      ! RSAMPBC = 10 !

      Near-Surface depletion adjustment to concentration profile used when
      sampling BC puffs?
      (MDEPBC)                              Default:   1        ! MDEPBC = 1 !
         0 = Concentration is NOT adjusted for depletion
         1 = Adjust Concentration for depletion

!END!


-------------------------------------------------------------------------------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
---------------------------------

--------------
```

```
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  ! NPT1 = 6 !

     Units used for point source
     emissions below                (IPTU)  Default: 1  ! IPTU = 1 !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  ! NSPT1 = 0 !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  ! NPT2 = 0 !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                             a
          POINT SOURCE: CONSTANT DATA
          -----------------------------
                                                                             b          c
  Source       X           Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
              (km)       (km)      (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------  ------   -------- ----- -------- ----- --------
   1 ! SRCNAM = SRC_1 !
   1 ! X =  539.176, 6120.335,    15.0, 244.87,      0.75,  15.1, 303.15,  1.0,       0,       0,
   0,
 9.0157E-06,   0.029,       0, 3.3355E-06 !
   1 ! ZPLTFM =      0.0 !
   1 ! FMFAC =      1.0 !   !END!

   2 ! SRCNAM = SRC_2 !
   2 ! X =  539.096, 6120.291,    20.0, 244.9,       1.6,  22.8, 353.15,  1.0,    13.9,       0,
3.5E-09,
   0.017,    0.17,    0.17, 2.751E-005 !
   2 ! ZPLTFM =      0.0 !
   2 ! FMFAC =      1.0 !   !END!

   3 ! SRCNAM = SRC_3 !
   3 ! X =  539.105, 6120.240,    15.0, 246.15,       0.6,   9.0, 453.15,  1.0,       0,    0.37,
   0,
       0,       0,       0,       0 !
   3 ! ZPLTFM =      0.0 !
   3 ! FMFAC =      1.0 !   !END!

   4 ! SRCNAM = SRC_4 !
   4 ! X =  539.176, 6120.380,    15.0, 243.4,      0.45,  11.2, 473.15,  1.0,       0,   0.216,
  0,
       0,       0,       0,       0 !
   4 ! ZPLTFM =      0.0 !
   4 ! FMFAC =      1.0 !   !END!

   5 ! SRCNAM = SRC_5 !
   5 ! X =  539.178, 6120.395,    15.0, 243.14,      0.35,   9.1, 353.15,  1.0,       0,       0,
   0,
       0,   0.006,       0,       0 !
   5 ! ZPLTFM =      0.0 !
   5 ! FMFAC =      1.0 !   !END!

   6 ! SRCNAM = SRC_8 !
   6 ! X =  539.152, 6120.299,    20.0, 245.62,       1.0,  19.5, 313.15,  1.0,       0,       0,
   0,
 2.01E-005, 0.06565,       0, 7.6576E-06 !
   6 ! ZPLTFM =      0.0 !
   6 ! FMFAC =      1.0 !   !END!


--------
```



```
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

     SRCNAM  is a 12-character name for a source
             (No default)
     X       is an array holding the source data listed by the column headings
             (No default)
     SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
             (Default: 0.,0.)
     ZPLTFM  is the platform height (m) for sources influenced by an isolated
             structure that has a significant open area between the surface
             and the bulk of the structure, such as an offshore oil platform.
             The Base Elevation is that of the surface (ground or ocean),
             and the Stack Height is the release height above the Base (not
             above the platform).  Building heights entered in Subgroup 13c
             must be those of the buildings on the platform, measured from
             the platform deck.  ZPLTFM is used only with MBDW=1 (ISC
             downwash method) for sources with building downwash.
             (Default: 0.0)
     FMFAC   is a vertical momentum flux factor (0. or 1.0) used to represent
             the effect of rain-caps or other physical configurations that
             reduce momentum rise associated with the actual exit velocity.
             (Default: 1.0  -- full momentum used)

    b
     0. = No building downwash modeled
     1. = Downwash modeled for buildings resting on the surface
     2. = Downwash modeled for buildings raised above the surface (ZPLTFM > 0.)
     NOTE: must be entered as a REAL number (i.e., with decimal point)

    c
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IPTU
     (e.g. 1 for g/s).

---------------
Subgroup (13c)
---------------

          BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
          -------------------------------------------------------
Source                                                                   a
 No.      Effective building height, width, length and X/Y offset (in meters)
          every 10 degrees.  LENGTH, XBADJ, and YBADJ are only needed for
          MBDW=2 (PRIME downwash option)
------    --------------------------------------------------------------------

   1 ! SRCNAM = SRC_1 !
   1 ! HEIGHT  =   13.00,   13.00,   13.00,   13.00,   13.00,   13.00,
                   13.00,   16.00,   16.00,   16.00,   13.00,   13.00,
                   13.00,   13.00,   16.00,   16.00,   16.00,   13.00,
                   13.00,   13.00,   13.00,   13.00,   13.00,   13.00,
                   13.00,   13.00,   13.00,   13.00,   13.00,   13.00,
                   13.00,   13.00,   16.00,   16.00,   16.00,   13.00 !
   1 ! WIDTH   =   14.67,   31.31,   37.00,   41.56,   44.87,   46.89,
                   50.87,   12.60,   11.88,   11.32,   69.91,   71.66,
                   71.24,   68.66,   21.71,   18.33,   14.39,   23.64,
                   14.67,   18.88,   27.07,   34.80,   41.47,   46.89,
                   50.87,   63.82,   64.60,   53.92,   55.62,   55.62,
                   71.24,   68.66,   21.71,   18.33,   14.39,   23.64 !
   1 ! LENGTH  =   53.92,   45.21,   47.02,   47.39,   46.33,   45.76,
                   39.51,   10.45,    8.86,    7.38,   33.74,   42.64,
                   50.24,   56.32,   25.26,   26.90,   27.73,   54.14,
                   53.92,   55.62,   55.62,   53.94,   50.62,   45.76,
                   39.51,   49.01,   39.16,   14.67,   18.88,   27.07,
                   50.24,   56.32,   25.26,   26.90,   27.73,   54.14 !
   1 ! XBADJ   =   -0.48,  -90.17,  -91.43,  -89.92,  -85.68,   -9.17,
                  -10.25,  -62.31,  -62.53,  -60.85,  -63.11,  -69.16,
                  -73.11,  -74.84,  -48.43,  -51.98,  -53.96,  -53.38,
                  -53.43,  -53.13,  -51.21,  -47.74,  -42.82,  -36.59,
                  -29.26,   13.30,   23.37,   -3.11,   -3.10,   -3.00,
                   22.87,   18.52,   23.16,   25.08,   26.23,   -0.76 !
   1 ! YBADJ   =    4.23,    7.32,   -4.52,  -16.22,  -27.43,   21.28,
                   23.69,   10.89,    0.87,   -9.34,    9.62,    0.93,
                   -7.79,  -16.27,   18.38,   11.87,    5.00,    0.35,
                   -4.23,   -6.34,  -10.54,  -14.60,  -18.21,  -21.28,
                  -23.69,  -34.62,  -27.23,  -26.47,  -25.32,  -23.40,
                    7.79,   16.27,  -18.38,  -11.87,   -5.00,   -0.35 !
!END!
   2 ! SRCNAM = SRC_2 !
   2 ! HEIGHT  =   16.00,   16.00,   16.00,   16.00,   16.00,   16.00,
                   13.00,   13.00,   13.00,   13.00,   13.00,   13.00,
                   16.00,   16.00,   16.00,   16.00,   16.00,   16.00,
```



```
                   16.00,   16.00,   16.00,   16.00,   16.00,   16.00,
                   13.00,   13.00,   13.00,   13.00,   13.00,   13.00,
                   13.00,   16.00,   16.00,   16.00,   16.00,   16.00 !
   2 ! WIDTH   =   11.05,   11.66,   12.22,   12.41,   12.23,   11.67,
                   18.69,   18.15,   17.06,   16.15,   17.77,   18.85,
                   11.58,   12.46,   12.96,   13.07,   12.78,   12.10,
                   11.05,   11.66,   12.22,   12.41,   12.23,   11.67,
                   18.69,   46.40,   44.07,   42.03,   45.21,   47.02,
                   47.39,   12.46,   12.96,   13.07,   12.78,   12.10 !
   2 ! LENGTH  =    7.00,    8.81,   10.35,   11.58,   12.46,   12.96,
                   17.38,   15.62,   13.39,   11.21,   13.14,   15.26,
                   12.41,   12.23,   11.67,   10.76,    9.52,    7.99,
                    7.00,    8.81,   10.35,   11.58,   12.46,   12.96,
                   17.38,   35.03,   28.94,   24.67,   31.31,   37.00,
                   41.56,   12.23,   11.67,   10.76,    9.52,    7.99 !
   2 ! XBADJ   =  -12.44,  -12.02,  -11.24,  -10.12,   -8.70,   -7.01,
                   -5.10,   -3.04,   -0.89,    1.29,    0.96,    0.31,
                    4.16,    4.85,    5.39,    5.77,    5.97,    5.99,
                    5.44,    3.21,    0.89,   -1.46,   -3.77,   -5.96,
                  -12.28,  -63.22,  -63.84,  -64.54,  -68.46,  -70.30,
                  -70.00,  -17.08,  -17.06,  -16.53,  -15.49,  -13.98 !
   2 ! YBADJ   =   -6.82,   -8.26,   -9.46,  -10.37,  -10.97,  -11.23,
                   -7.18,   -6.41,   -5.45,   -4.36,   -3.14,   -1.82,
                   -4.33,   -2.47,   -0.52,    1.43,    3.35,    5.16,
                    6.82,    8.26,    9.46,   10.37,   10.97,   11.23,
                    7.18,   25.39,   16.96,    7.92,   -1.15,  -10.18,
                  -18.90,    2.47,    0.52,   -1.43,   -3.35,   -5.16 !
!END!
   3 ! SRCNAM = SRC_3 !
   3 ! HEIGHT  =   10.00,   10.00,   10.00,   10.00,   10.00,   10.00,
                   10.00,   10.00,   10.00,   10.00,   10.00,   10.00,
                   10.00,   10.00,   10.00,   16.00,   16.00,   16.00,
                   16.00,   10.00,   13.00,   13.00,   13.00,   13.00,
                   13.00,   13.00,   10.00,   10.00,   10.00,   10.00,
                   10.00,   10.00,   10.00,   10.00,   10.00,   10.00 !
   3 ! WIDTH   =   65.14,   72.01,   77.02,   79.68,   88.51,   99.42,
                  107.32,  111.95,  113.18,  112.75,  114.51,  112.80,
                  107.66,   99.24,   87.81,   12.95,   12.78,   12.10,
                   11.05,   72.01,   37.00,   41.56,   44.87,   46.81,
                   47.32,   46.40,  113.18,  112.75,  114.51,  112.80,
                  107.66,   99.24,   87.81,   77.15,   73.10,   68.62 !
   3 ! LENGTH  =  112.75,  114.51,  112.80,  107.66,   99.24,   87.81,
                   77.15,   73.10,   68.62,   65.14,   72.01,   77.02,
                   79.68,   88.51,   99.42,   10.76,    9.52,    7.99,
                    7.00,  114.51,   47.02,   47.39,   46.33,   43.85,
                   40.05,   35.03,   68.62,   65.14,   72.01,   77.02,
                   79.68,   88.51,   99.42,  107.32,  111.95,  113.18 !
   3 ! XBADJ   =  -17.82,  -17.26,  -16.18,  -14.60,  -12.59,  -10.18,
                   -7.47,   -9.88,  -13.78,  -18.32,  -29.45,  -40.01,
                  -49.35,  -59.72,  -71.39,  -45.23,  -45.82,  -45.01,
                  -43.22,  -97.25,  -73.35,  -75.88,  -76.10,  -74.01,
                  -69.67,  -63.22,  -54.84,  -46.82,  -42.56,  -37.01,
                  -30.33,  -28.79,  -28.03,  -26.42,  -24.01,  -20.87 !
   3 ! YBADJ   =  -14.25,   -6.55,    1.50,    9.51,   15.46,   21.68,
                   27.23,   31.96,   35.72,   38.55,   39.99,   40.22,
                   39.22,   37.04,   33.72,   10.42,    3.34,   -3.84,
                  -10.90,    6.55,   18.51,    9.55,    0.29,   -8.97,
                  -17.95,  -26.39,  -35.72,  -38.55,  -39.99,  -40.22,
                  -39.22,  -37.04,  -33.72,  -31.10,  -26.67,  -20.53 !
!END!
   4 ! SRCNAM = SRC_4 !
   4 ! HEIGHT  =   13.00,   16.00,   16.00,   16.00,   16.00,   16.00,
                   16.00,   16.00,   16.00,   16.00,   16.00,   16.00,
                   16.00,   16.00,   16.00,   16.00,   16.00,   13.00,
                   13.00,   16.00,   16.00,   16.00,   16.00,   16.00,
                   16.00,   16.00,   16.00,   16.00,   16.00,   16.00,
                   16.00,   16.00,   16.00,   16.00,   16.00,   13.00 !
   4 ! WIDTH   =   14.67,   11.85,   16.05,   19.75,   22.85,   25.26,
                   26.90,   27.73,   27.71,   27.41,   27.92,   27.59,
                   26.41,   24.43,   21.71,   18.33,   14.39,   23.64,
                   14.67,   11.85,   16.05,   19.75,   22.85,   25.26,
                   26.90,   27.73,   27.71,   27.41,   27.92,   27.59,
                   26.41,   24.43,   21.71,   18.33,   14.39,   23.64 !
   4 ! LENGTH  =   53.92,   27.92,   27.59,   26.41,   24.43,   21.71,
                   18.33,   14.39,   10.02,    7.30,   11.85,   16.05,
                   19.75,   22.85,   25.26,   26.90,   27.73,   54.14,
                   53.92,   27.92,   27.59,   26.41,   24.43,   21.71,
                   18.33,   14.39,   10.02,    7.30,   11.85,   16.05,
                   19.75,   22.85,   25.26,   26.90,   27.73,   54.14 !
   4 ! XBADJ   =  -44.80,  -19.09,  -18.89,  -18.12,  -16.80,  -14.97,
                  -12.69,  -10.02,   -7.04,   -4.37,   -5.81,   -7.07,
                   -8.12,   -8.92,   -9.45,   -9.70,   -9.64,   -8.38,
                   -9.12,   -8.84,   -8.70,   -8.29,   -7.63,   -6.74,
                   -5.65,   -4.38,   -2.98,   -2.93,   -6.04,   -8.97,
                  -11.63,  -13.93,  -15.81,  -17.21,  -18.08,  -45.76 !
   4 ! YBADJ   =   -3.59,   -0.12,   -0.95,   -1.75,   -2.50,   -3.18,
```



```
                   -3.76,   -4.22,   -4.56,   -5.00,   -5.12,   -5.10,
                   -4.92,   -4.59,   -4.12,   -3.52,   -2.82,    0.35,
                    3.59,    0.12,    0.95,    1.75,    2.50,    3.18,
                    3.76,    4.22,    4.55,    5.00,    5.12,    5.10,
                    4.92,    4.59,    4.12,    3.52,    2.82,   -0.35 !
!END!
   5 ! SRCNAM = SRC_5 !
   5 ! HEIGHT  =   13.00,   16.00,   16.00,   16.00,   16.00,   16.00,
                   16.00,   16.00,   16.00,   16.00,   16.00,   16.00,
                   16.00,   16.00,   16.00,   16.00,   16.00,   13.00,
                   13.00,   16.00,   16.00,   16.00,   16.00,   16.00,
                   16.00,   16.00,   16.00,   16.00,   16.00,   16.00,
                   16.00,   16.00,   16.00,   16.00,   16.00,   13.00 !
   5 ! WIDTH   =   14.67,   11.85,   16.05,   19.75,   22.85,   25.26,
                   26.90,   27.73,   27.71,   27.41,   27.92,   27.59,
                   26.41,   24.43,   21.71,   18.33,   14.39,   23.64,
                   14.67,   11.85,   16.05,   19.75,   22.85,   25.26,
                   26.90,   27.73,   27.71,   27.41,   27.92,   27.59,
                   26.41,   24.43,   21.71,   18.33,   14.39,   23.64 !
   5 ! LENGTH  =   53.92,   27.92,   27.59,   26.41,   24.43,   21.71,
                   18.33,   14.39,   10.02,    7.30,   11.85,   16.05,
                   19.75,   22.85,   25.26,   26.90,   27.73,   54.14,
                   53.92,   27.92,   27.59,   26.41,   24.43,   21.71,
                   18.33,   14.39,   10.02,    7.30,   11.85,   16.05,
                   19.75,   22.85,   25.26,   26.90,   27.73,   54.14 !
   5 ! XBADJ   =  -59.92,  -33.87,  -32.88,  -30.90,  -27.98,  -24.20,
                  -19.70,  -14.59,   -9.04,   -3.74,   -2.56,   -1.31,
                   -0.01,    1.28,    2.54,    3.71,    4.78,    6.62,
                    6.00,    5.94,    5.30,    4.49,    3.54,    2.49,
                    1.36,    0.19,   -0.98,   -3.57,   -9.29,  -14.74,
                  -19.74,  -24.13,  -27.80,  -30.62,  -32.51,  -60.76 !
   5 ! YBADJ   =   -4.22,   -3.37,   -6.72,   -9.86,  -12.71,  -15.17,
                  -17.17,  -18.64,  -19.56,  -20.12,  -19.90,  -19.09,
                  -17.69,  -15.76,  -13.35,  -10.53,   -7.39,   -1.65,
                    4.22,    3.37,    6.72,    9.86,   12.71,   15.17,
                   17.17,   18.64,   19.56,   20.12,   19.90,   19.09,
                   17.69,   15.76,   13.35,   10.53,    7.39,    1.65 !
!END!
   6 ! SRCNAM = SRC_8 !
   6 ! HEIGHT  =   13.00,   13.00,   13.00,   13.00,   13.00,   16.00,
                   13.00,   13.00,   13.00,   13.00,   13.00,   13.00,
                   16.00,   16.00,   16.00,   13.00,   13.00,   13.00,
                   13.00,   13.00,   13.00,   13.00,   13.00,   13.00,
                   13.00,   13.00,   13.00,   13.00,   13.00,   13.00,
                   13.00,   13.00,   13.00,   13.00,   13.00,   13.00 !
   6 ! WIDTH   =   24.67,   31.31,   37.00,   41.56,   44.87,   11.67,
                   47.32,   46.40,   44.07,   42.03,   45.21,   47.02,
                   13.30,   13.17,   12.64,   40.05,   35.03,   28.94,
                   24.67,   31.31,   37.00,   41.56,   44.87,   46.81,
                   47.32,   46.40,   44.07,   42.03,   45.21,   47.02,
                   47.39,   46.33,   43.85,   40.05,   35.03,   28.94 !
   6 ! LENGTH  =   42.03,   45.21,   47.02,   47.39,   46.33,   12.96,
                   40.05,   35.03,   28.94,   24.67,   31.31,   37.00,
                   11.60,   12.43,   12.88,   47.32,   46.40,   44.07,
                   42.03,   45.21,   47.02,   47.39,   46.33,   43.85,
                   40.05,   35.03,   28.94,   24.67,   31.31,   37.00,
                   41.56,   44.87,   46.81,   47.32,   46.40,   44.07 !
   6 ! XBADJ   =  -46.54,  -48.13,  -48.26,  -46.92,  -44.15,  -59.50,
                  -34.72,  -28.34,  -21.10,  -13.89,  -12.74,  -11.20,
                  -55.38,  -56.17,  -55.26,   -2.25,    0.35,    2.93,
                    4.51,    2.92,    1.24,   -0.47,   -2.17,   -3.81,
                   -5.33,   -6.69,   -7.84,  -10.78,  -18.57,  -25.80,
                  -32.25,  -37.71,  -42.03,  -45.08,  -46.75,  -47.00 !
   6 ! YBADJ   =    1.55,   -2.92,   -7.30,  -11.47,  -15.28,    9.84,
                  -21.41,  -23.55,  -24.97,  -25.53,  -25.52,  -24.75,
                    6.24,   -2.49,  -11.15,  -14.70,  -10.83,   -6.63,
                   -1.55,    2.92,    7.30,   11.47,   15.28,   18.63,
                   21.41,   23.55,   24.97,   25.53,   25.52,   24.75,
                   23.22,   20.99,   18.12,   14.70,   10.83,    6.63 !
!END!


--------

    a
     Building height, width, length, and X/Y offset from the source are treated
     as a separate input subgroup for each source and therefore must end with
     an input group terminator.  The X/Y offset is the position, relative to the
     stack, of the center of the upwind face of the projected building, with the
     x-axis pointing along the flow direction.


---------------
Subgroup (13d)
---------------
                                                      a
```

POINT SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission rates given in 13b. Factors entered multiply the rates in 13b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

----

[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters

Subgroup (14a)

Number of polygon area sources with parameters specified below (NAR1) No default ! NAR1 = 0 !

Units used for area source emissions below (IARU) Default: 1 ! IARU = 1 !

- 1 = g/m**2/s
- 2 = kg/m**2/hr
- 3 = lb/m**2/hr
- 4 = tons/m**2/yr
- 5 = Odour Unit * m/s (vol. flux/m**2 of odour compound)
- 6 = Odour Unit * m/min
- 7 = metric tons/m**2/yr

Number of source-species combinations with variable emissions scaling factors provided below in (14d) (NSAR1) Default: 0 ! NSAR1 = 0 !

Number of buoyant polygon area sources with variable location and emission parameters (NAR2) No default ! NAR2 = 0 !
(If NAR2 > 0, ALL parameter data for these sources are read from the file: BAEMARB.DAT)

!END!

Subgroup (14b)

[a]
AREA SOURCE: CONSTANT DATA

Source No.	Effect. Height (m)	Base Elevation (m)	Initial Sigma z (m)	Emission Rates [b]
-------	------	------	--------	---------

----

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

[b]

An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IARU (e.g. 1 for g/m**2/s).

Subgroup (14c)

[a]
COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON

Source No.	Ordered list of X followed by list of Y, grouped by source [a]
------	----------

----

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

Subgroup (14d)

[a]
AREA SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission rates given in 14b. Factors entered multiply the rates in 14b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

----

[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters

Subgroup (15a)

Number of buoyant line sources with variable location and emission parameters (NLN2) No default ! NLN2 = 0 !

(If NLN2 > 0, ALL parameter data for these sources are read from the file: LNEMARB.DAT)

Number of buoyant line sources (NLINES) No default ! NLINES = 0 !

Units used for line source emissions below (ILNU) Default: 1 ! ILNU = 1 !

- 1 = g/s
- 2 = kg/hr
- 3 = lb/hr
- 4 = tons/yr
- 5 = Odour Unit * m**3/s (vol. flux of odour compound)
- 6 = Odour Unit * m**3/min
- 7 = metric tons/yr

Number of source-species combinations with variable emissions scaling factors provided below in (15c) (NSLN1) Default: 0 ! NSLN1 = 0 !

Maximum number of segments used to model each line (MXNSEG) Default: 7 ! MXNSEG = 7 !

The following variables are required only if NLINES > 0. They are used in the buoyant line source plume rise calculations.

Number of distances at which transitional rise is computed Default: 6 ! NLRISE = 6 !

Average building length (XL) No default * XL = * (in meters)

Average building height (HBL) No default * HBL = * (in meters)

Average building width (WBL) No default * WBL = * (in meters)

Average line source width (WML) No default * WML = * (in meters)

Average separation between buildings (DXL) No default * DXL = * (in meters)

Average buoyancy parameter (FPRIMEL) No default * FPRIMEL = * (in m**4/s**3)

!END!

Subgroup (15b)

[a]
BUOYANT LINE SOURCE: CONSTANT DATA

Source No.	Beg. X Coordinate (km)	Beg. Y Coordinate (km)	End. X Coordinate (km)	End. Y Coordinate (km)	Release Height (m)	Base Elevation (m)	Emission Rates [a]
------	----------	----------	---------	----------	--------	---------	---------

----

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by ILNTU (e.g. 1 for g/s).

Subgroup (15c)

[a]
BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission rates given in 15b. Factors entered multiply the rates in 15b. Skip sources here that have constant emissions.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

----

[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters

Subgroup (16a)

Number of volume sources with parameters provided in 16b,c (NVL1) No default ! NVL1 = 0 !

Units used for volume source emissions below in 16b (IVLU) Default: 1 ! IVLU = 1 !

- 1 = g/s
- 2 = kg/hr
- 3 = lb/hr
- 4 = tons/yr
- 5 = Odour Unit * m**3/s (vol. flux of odour compound)
- 6 = Odour Unit * m**3/min
- 7 = metric tons/yr

Number of source-species combinations with variable emissions scaling factors provided below in (16c) (NSVL1) Default: 0 ! NSVL1 = 0 !

Number of volume sources with variable location and emission parameters (NVL2) No default ! NVL2 = 0 !

(If NVL2 > 0, ALL parameter data for these sources are read from the VOLEMARB.DAT file(s))

!END!

Subgroup (16b)

[a]
VOLUME SOURCE: CONSTANT DATA

X Coordinate (km)	Y Coordinate (km)	Effect. Height (m)	Base Elevation (m)	Initial Sigma y (m)	Initial Sigma z (m)	Emission Rates [b]
----------	----------	------	------	--------	--------	--------

----

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IVLU (e.g. 1 for g/s).

Subgroup (16c)

[a]
VOLUME SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission rates given in 16b. Factors entered multiply the rates in 16b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors,

where first group is DEC-JAN-FEB)
4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

---

a Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information

---

Subgroup (17a)

Number of non-gridded receptors (NREC) No default ! NREC = 7 !

!END!

Subgroup (17b)

NON-GRIDDED (DISCRETE) RECEPTOR DATA [a]

Receptor No.	X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height Above Ground [b] (m)	
1 ! X =	539.23946,	6120.47875,	242.7,	0.0 !	!END!
2 ! X =	540.35800,	6119.80100,	202.1,	0.0 !	!END!
3 ! X =	540.67000,	6119.59200,	196.2,	0.0 !	!END!
4 ! X =	538.06100,	6121.82600,	214.4,	0.0 !	!END!
5 ! X =	537.75600,	6121.80700,	211.5,	0.0 !	!END!
6 ! X =	538.14400,	6122.80500,	225.1,	0.0 !	!END!
7 ! X =	541.11400,	6123.21700,	254.1,	0.0 !	!END!

---

a Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

Appendix C – Pollutant concentration plots

LEGEND

Project boundary
Receivers
ug/m³
1
2

Paper Size A4
0 250 500 1,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Enirgi Power Storage Recycling Consolidation Plant EIS

PM10 (24 hour average)

Job Number 23-15946
Revision A
Date 18 Jun 2018

Figure C-1

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

N:\AU\Wagga Wagga\Projects\23\15946\GIS\Maps\Deliverables\23_15946_Z006_Air_SMA.mxd (SMA record: 2)

Data source: Aerial Imagery & Topographic Data: Sixmaps 2015, 2017. Created by:mking3

LEGEND

Project boundary
Receivers

ug/m³
0.0008
0.001

Paper Size A4
0 250 500 1,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Enirgi Power Storage Recycling Consolidation Plant EIS

Type 1 and 2 Substances (Beryllium) concentration contour (1 hour average)

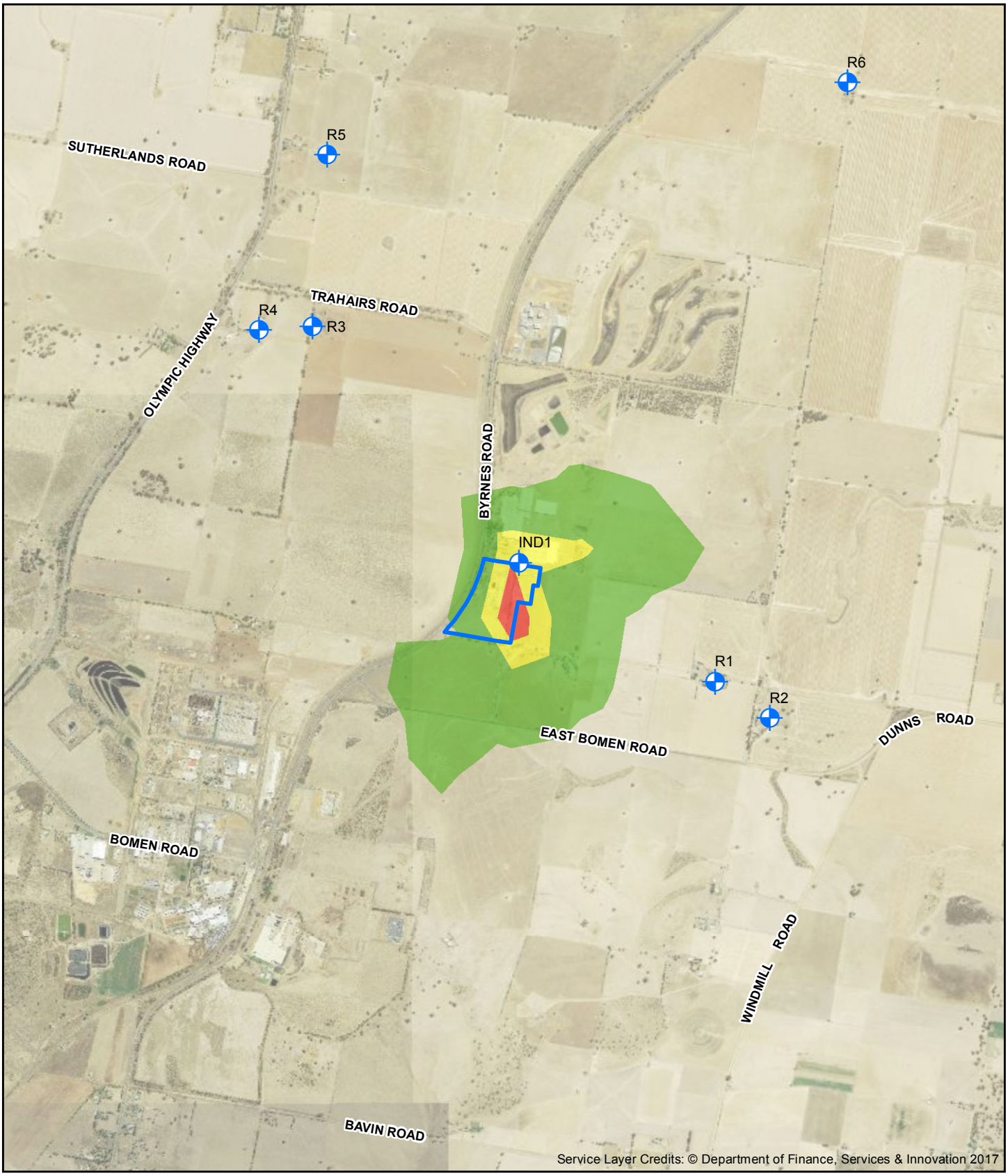
Job Number 23-15946
Revision A
Date 18 Jun 2018

Figure C-2

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

N:\AU\Wagga Wagga\Projects\23\15946\GIS\Maps\Deliverables\23_15946_Z006_Air_SMA.mxd (SMA record: 3)

Data source: Aerial Imagery & Topographic Data: Sixmaps 2015, 2017. Created by:mking3



LEGEND

Project boundary

Receivers

ug/m³

0.002

0.004

0.005

Paper Size A4

0 250 500 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Enirgi Power Storage Recycling Consolidation Plant EIS

Job Number 23-15946
Revision A
Date 18 Jun 2018

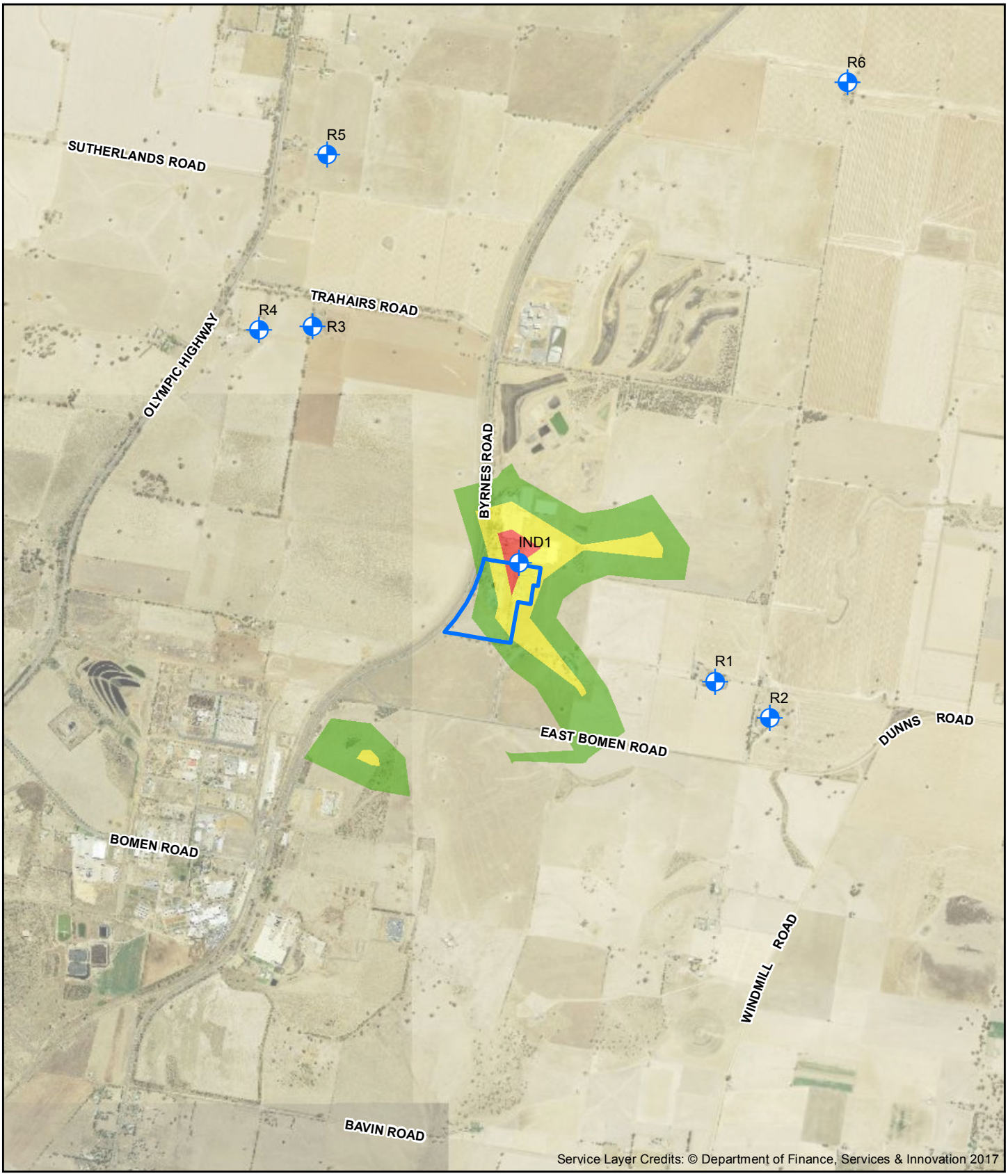
Lead concentration contour (annual average)

Figure C-3

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

N:\AU\Wagga Wagga\Projects\23\15946\GIS\Maps\Deliverables\23_15946_Z006_Air_SMA.mxd (SMA record: 4)

Data source: Aerial Imagery & Topographic Data: Sixmaps 2015, 2017. Created by:mking3



LEGEND

Project boundary

Receivers

ug/m³

3

4

5

Paper Size A4

0 250 500 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Enirgi Power Storage Recycling Consolidation Plant EIS

Sulfuric acid (SO_3)
concentration contour (1 hour average)

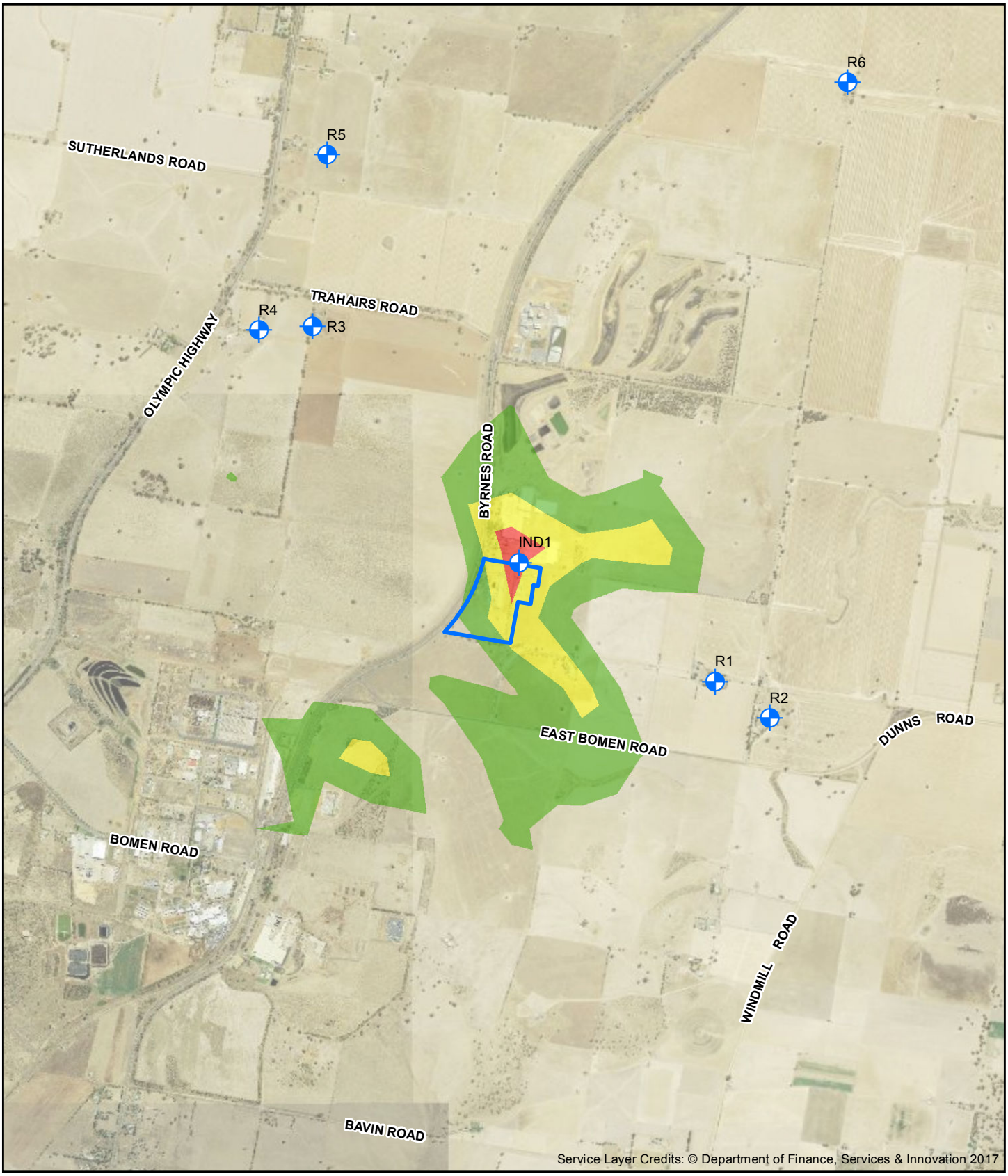
Job Number 23-15946
Revision A
Date 18 Jun 2018

Figure C-4

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

N:\AU\Wagga Wagga\Projects\23\15946\GIS\Maps\Deliverables\23_15946_Z006_Air_SMA.mxd (SMA record: 5)

Data source: Aerial Imagery & Topographic Data: Sixmaps 2015, 2017. Created by:mking3



LEGEND

Project boundary

Receivers

ug/m³

200

300

400

Paper Size A4

0 250 500 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Enirgi Power Storage Recycling Consolidation Plant EIS

Job Number 23-15946
Revision A
Date 18 Jun 2018

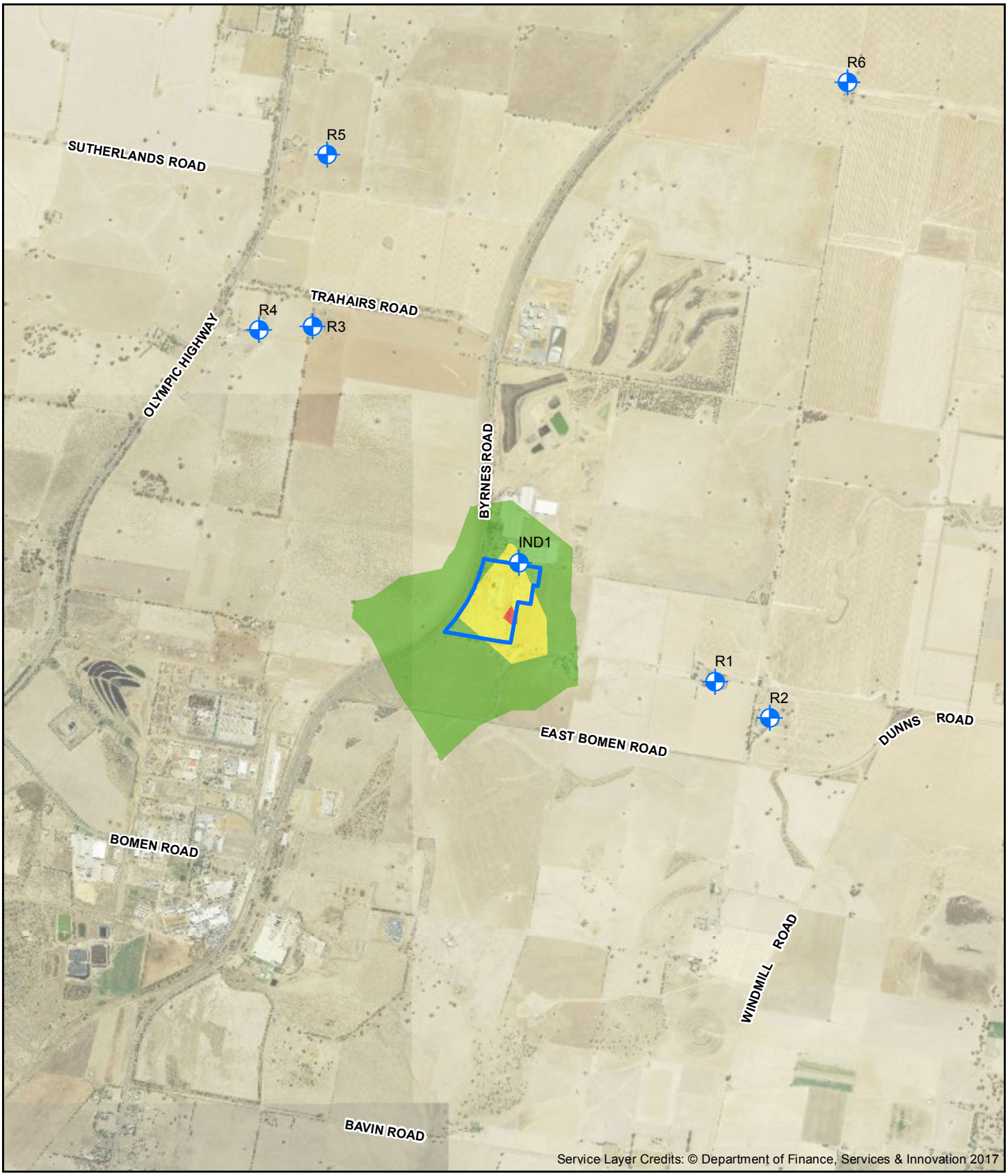
Sulphur dioxide (SO_2) concentration contour (1 hour average)

Figure C-5

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

N:\AU\Wagga Wagga\Projects\23\15946\GIS\Maps\Deliverables\23_15946_Z006_Air_SMA.mxd (SMA record: 6)

Data source: Aerial Imagery & Topographic Data: Sixmaps 2015, 2017. Created by:mking3



LEGEND

Project boundary

Receivers

ug/m³

30

50

70

Paper Size A4

0 250 500 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Enirgi Power Storage Recycling Consolidation Plant EIS

Sulphur dioxide (SO_2) concentration contour (24 hour average)

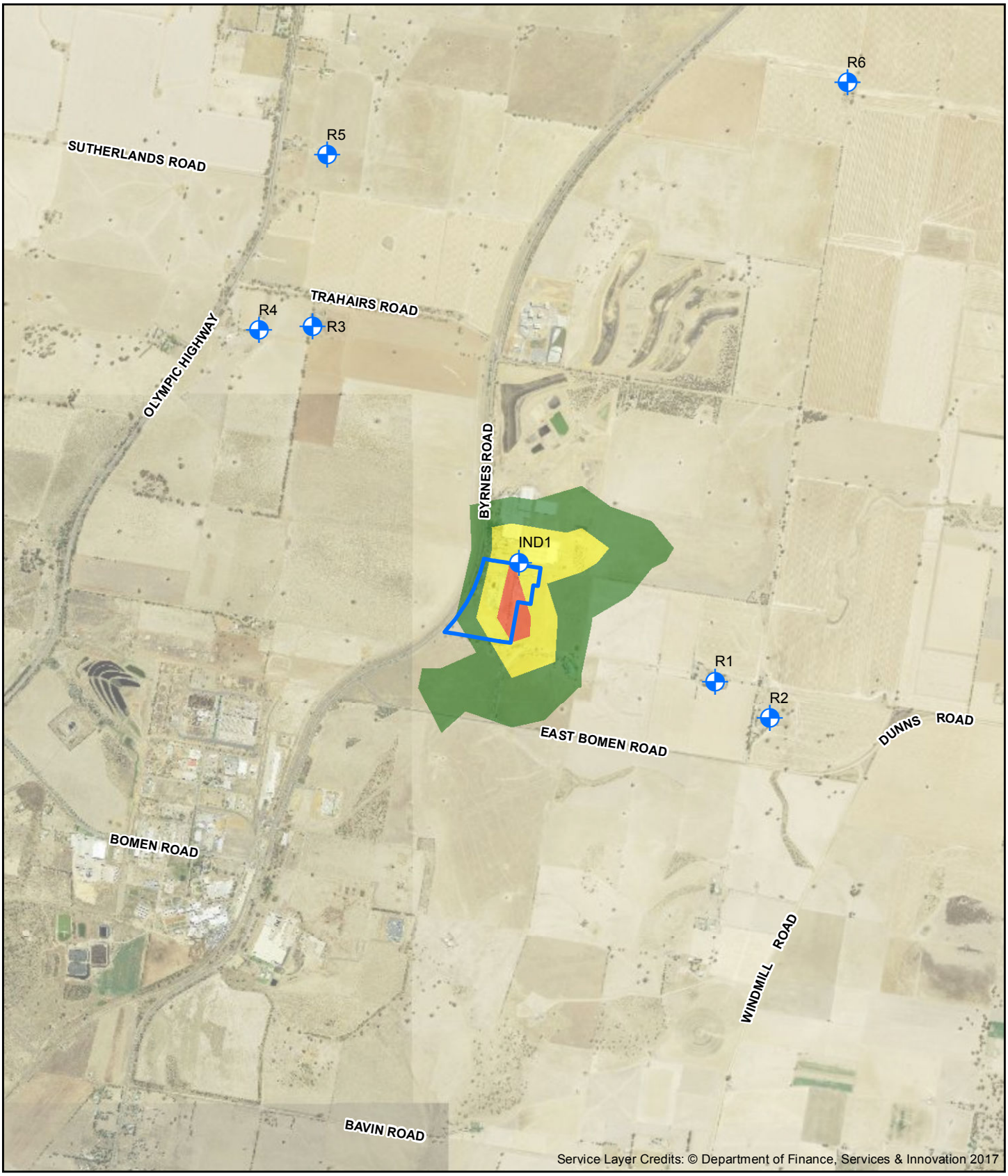
Job Number 23-15946
Revision A
Date 18 Jun 2018

Figure C-6

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

N:\AU\Wagga Wagga\Projects\23\15946\GIS\Maps\Deliverables\23_15946_Z006_Air_SMA.mxd (SMA record: 7)

Data source: Aerial Imagery & Topographic Data: Sixmaps 2015, 2017. Created by:mking3



LEGEND

Project boundary

Receivers

ug/m³

2

3

4

Paper Size A4

0 250 500 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Enirgi Power Storage Recycling Consolidation Plant EIS

Job Number 23-15946
Revision A
Date 18 Jun 2018

Sulphur dioxide (SO_2) concentration contour (annual average)

Figure C-7

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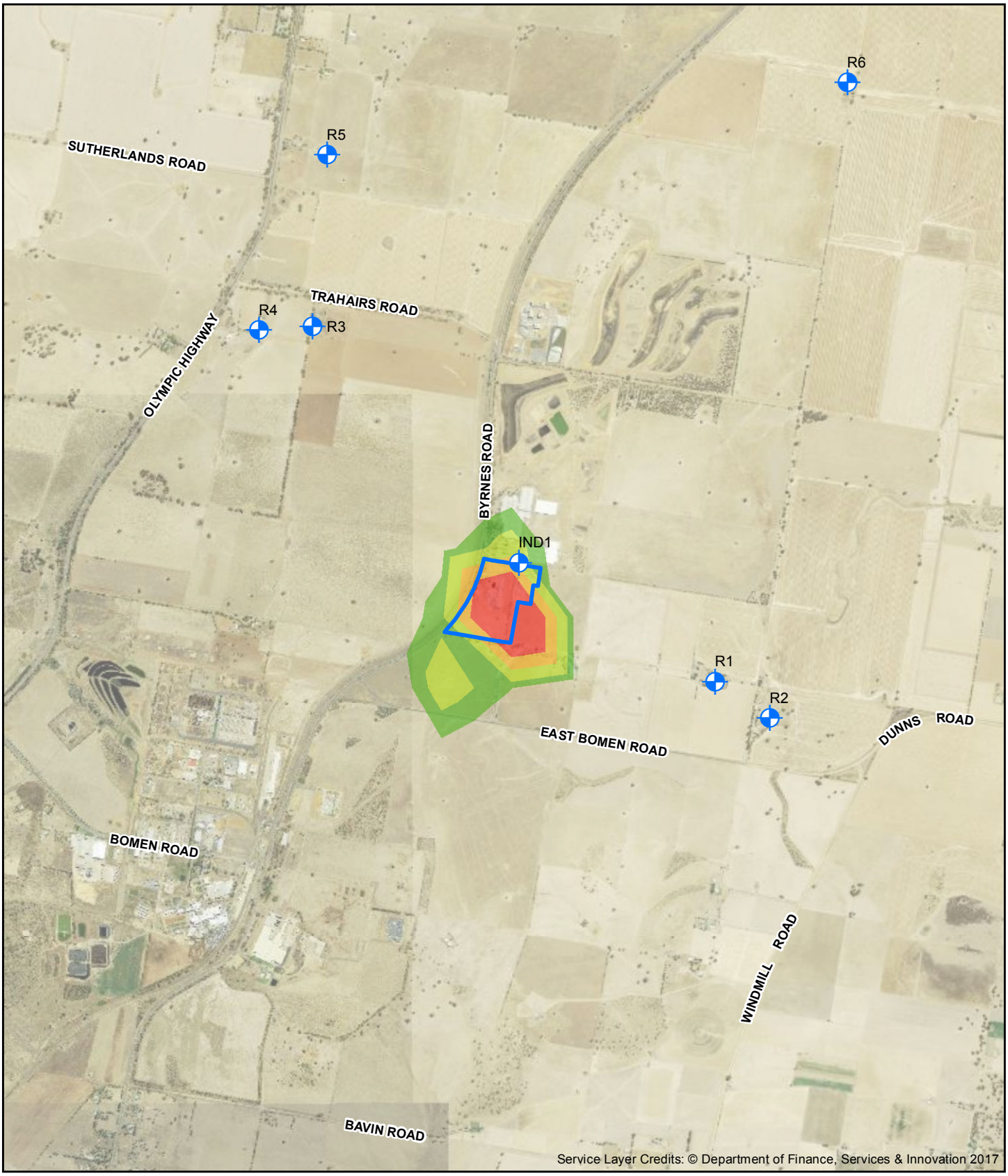
Data source: Aerial Imagery & Topographic Data: Sixmaps 2015, 2017. Created by:mking3



LEGEND

Project boundary

Receivers

ug/m³

50

60

80

100

Paper Size A4

0 250 500 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

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Nitrogen dioxide (NO_2) concentration contour (1 hour average)

Job Number 23-15946
Revision A
Date 18 Jun 2018

Figure C-8

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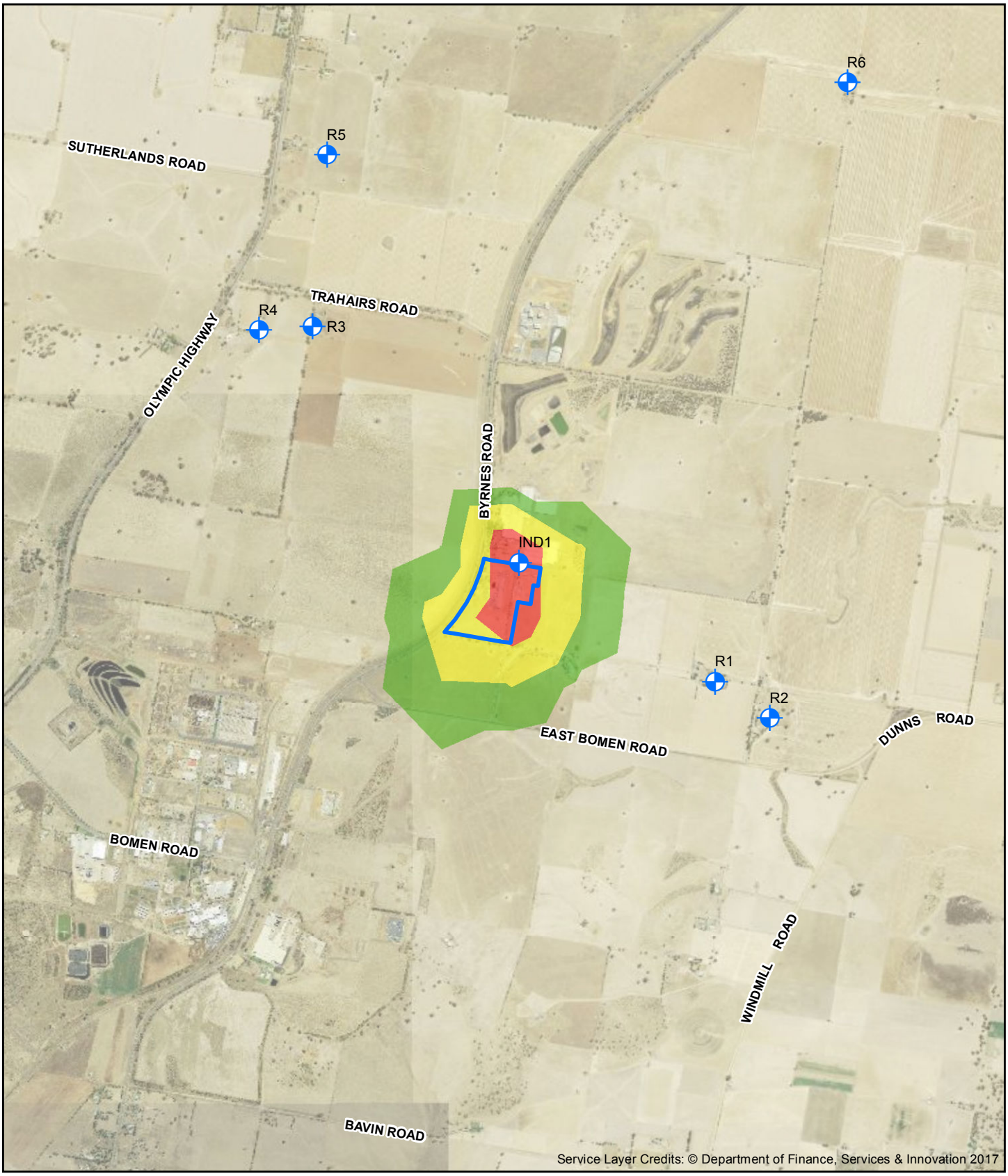
Data source: Aerial Imagery & Topographic Data: Sixmaps 2015, 2017. Created by:mking3



LEGEND

Project boundary

Receivers

ug/m³

0.3

0.5

0.8

Paper Size A4

0 250 500 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Enirgi Power Storage Recycling Consolidation Plant EIS

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Date 18 Jun 2018

Nitrogen dioxide (NO_2) concentration contour (annual hour average)

Figure C-9

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Data source: Aerial Imagery & Topographic Data: Sixmaps 2015, 2017. Created by:mking3

LEGEND

Project boundary

Receivers

ug/m³

0.00000007

0.00000008

0.00000009

0.0000001

Paper Size A4

0 250 500 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Enirgi Power Storage Recycling Consolidation Plant EIS

Dioxins and furans
concentration contour (1 hour average)

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Revision A
Date 18 Jun 2018

Figure C-10

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Data source: Aerial Imagery & Topographic Data: Sixmaps 2015, 2017. Created by:mking3

LEGEND

Project boundary
Receivers

ug/m³
0.5
1

Paper Size A4
0 250 500 1,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

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PM2.5
(24 hour average)

Job Number 23-15946
Revision A
Date 18 Jun 2018

Figure C-11

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Data source: Aerial Imagery & Topographic Data: Sixmaps 2015, 2017. Created by:mking3

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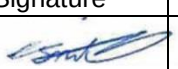
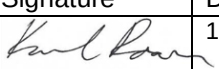
Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	C Georgiou / N Spurrett	E Smith		K Rosen		19/06/2018

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