Kurri Kurri Battery Recycling Facility

Response to Submissions

Prepared for Pymore Recyclers International Pty Ltd | February 2017

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Battery Recycling Facility | 129 Mitchell Avenue, Kurri Kurri | SSD 7520

Prepared for Pymore Recyclers International Pty Ltd | 24 February 2017

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Response to Submissions

Final

Report J15156RP1 | Prepared for Pymore Recyclers International Pty Ltd | 24 February 2017

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1 Introduction

1.1 Project overview

Pymore Recyclers International Pty Ltd (Pymore) proposes to construct and operate a battery recycling facility in Kurri Kurri (the project). The project would recycle approximately 60,000 tonnes per annum (tpa) of used lead-acid batteries (ULABs) and would convert a ULAB into materials which can be recycled for use in new products. The project represents a significant investment in the Hunter region, with a capital investment value of approximately $39.8 million, and would provide direct employment for approximately 60 people.

The project would provide an opportunity for the recycling of ULABs within Sydney, the Hunter region and the NSW east coast, as well as nationwide. The facility would convert ULABs into materials which can be recycled for use in new batteries. Lead bullion from lead paste, grids and poles and polypropylene plastics from the ULAB cases would be used in the manufacture of new batteries. Dry sodium sulphate crystals, which are a by-product of the ULAB recycling process, would be readily used in other industries. The facility would utilise Engitec Technologies S.p.A (Engitec) technology, which is operational in over 60 facilities globally and is recognised as the best available technology by a number of the world's regulatory bodies.

The project has many benefits from an economic, social and environmental perspective. Specifically, the project would:

- divert hazardous, recyclable and reusable wastes from landfill;
- preserve space in existing landfills for less recyclable materials, thereby extending the life of landfills;
- provide an alternative to the transport of ULABs to overseas recycling facilities, thereby eliminating the environmental and safety concerns associated with the international movement of a recognised hazardous waste item;
- produce recycled materials that can be used in the manufacture of new batteries and other industries;
- reduce demand for virgin materials and the environmental impacts associated with the mining and manufacturing of these materials;
- reduce the level of contamination in existing recycling programs for organic materials;
- provide a commercial return, with an expected annual revenue of over $50 million at full operation, thereby contributing to the economy of NSW;
- provide direct employment for 60 people within the facility; and
- provide indirect benefits to the community generated by job creation.

1.2 Development application

Approval for the project is being sought under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) as a state significant development (SSD).

Secretary's Environmental Assessment Requirements (SEARs, SSD 7520) for the project were first issued by the NSW Department of Planning and Environment (DPE) on 18 March 2016.

The *Kurri Kurri Battery Recycling Facility Environmental Impact Statement* (EIS) was prepared by EMM Consulting Pty Ltd (EMM 2016), with input from a range of specialists. It was prepared in accordance with the requirements of DPE and other government agencies, including Cessnock City Council (CCC) as provided in the SEARs.

The EIS was placed on public exhibition for four weeks from 17 November to 16 December 2016.

1.3 Submissions received

Nine submissions were received from the following government agencies, company and individual:

- NSW government agencies and organisations:
  - Environment Protection Authority (EPA);
  - Department of Primary Industries (DPI);
  - Office of Environment and Heritage (OEH);
  - NSW Health;
  - Roads and Maritime Services (RMS); and
  - NSW Rural Fire Service (RFS);
- CCC;
- Weston Aluminium Pty Ltd (Weston); and
- a community member.

It is noted that none of the submissions objected to the project and one submission (Weston) was in support of the project.

On 22 December 2016, DPE requested a report be prepared that responds to the matters raised in the submissions regarding the project. This Response to Submissions (RTS) report has been prepared to address this requirement. Responses to matters raised by DPE in its letter have also been addressed in this report.

This RTS was prepared in consultation with government agencies and CCC, where required.

2 Government agency submissions

Responses to the government agency and organisation submissions, including CCC, are provided in Table 2.1.

Table 2.1 Government agency submissions

Matters to be addressed	Response
Department of Planning and Environment	
Waste	
Please provide further details of the length of time that process waste materials (slag, PE separators) would be stored on site before disposal. An estimate of the maximum amount of each waste material that would be on site at any one time is also required.	• Slag would be stored for up to 30 days to stabilise the material before collection and off-site disposal. Up to 330 tonnes (t) would be stored at any one time. • PE separators would be stored for up to three days with a maximum of 56 t on site. • Lead dross/crucible skimmings would be stored for up to 15 days with a maximum of 80 t on site.
The location of storage of process waste materials and process output materials (lead, sodium sulphate and shredded plastic) is indicated in the EIS, however please provide details of the type and size of receptacles in which these items are held eg skips, bunkers.	<u>Outputs</u> • Lead bullion would be stored on the shop floor of Building 5. The storage capacity of this area is 1,700 t on a 211 square metre (m^2) floor area. • Sodium sulphate would be stored in the 60 cubic metre (m^3) silo and chamber besides the Crystallizer Building (Building 5) and/or Flexible Intermediate Bulk Containers (FIBC) bags (ie jumbo bags) on the shop floor of Building 5. The combined storage capacity is 200 t. • Ground Polypropylene would be stored in the chamber and/or FIBC bags on the first layers of the ULAB racks in Building 5. The combined storage capacity is 106 t. <u>Wastes</u> • Slag would be stored in the slag storage room which has a 660 t capacity and will be encased with reinforced concrete walls and weir gates on the egress/ingress doors which will inhibit the movement of materials during a Probable Maximum Flood (PMF) event. • PE separators are to be stored in a 42 m^3 output box and/or FIBC bags on the first layers of the ULAB racks in Building 5. • Lead dross/crucible skimmings would be stored in a 22 m^3 Lead Dross Box in the Charge Preparation Area prior feeding back to the rotary furnace.

Table 2.1 Government agency submissions

Matters to be addressed	Response
Air quality	
An odour assessment has not been provided for the proposed development. An odour assessment is required to address the possibility of failure of the wet scrubber system proposed to treat air from potentially odorous activities (see also point 10 below). As such, the odour assessment should include an analysis of a 'worst case scenario'.	The plant system manufacturer, Engitec, has advised that the only potentially odorous emissions from the plant may be trace releases of hydrogen sulphide (H_2S) during the final stages of the process of the liquid solution. However, the liquid solution is transported to a wet scrubber system where caustic soda is added, neutralising potentially odorous emissions. The wet scrubber system is designed in such a way that any failure of the scrubber (ie fan motor stop or liquor circulation pump failure or low pH) triggers an automatic shutdown of the breaker and paste desulphurization units. The risk of uncontrolled emissions is, therefore, mitigated. Odorous emissions from the facility are, therefore, considered negligible and a detailed assessment is not considered to be warranted.
Biodiversity	
The EIS notes that a survey for the presence of the New Holland Mouse was planned for November 2016. Please provide the results of this survey, as well as details of any impact these may have on the outcomes of the Biodiversity Assessment Report.	The methods and results from targeted surveys conducted during November 2016 are provided in our response to OEH below, see section titled *Impact Assessment (Biodiversity Values).*
Water	
Confirmation is required that the project would not extract water from Swamp Creek, in line with the information to be provided to the Department of Environment and Energy (federal).	The project will not extract water from Swamp Creek. All process water will be sourced from the stormwater basins (following treatment), or mains water when stormwater is not available.
It is noted that the stormwater detention basin is located below the level of the 1 % AEP flood. This is not considered to be an appropriate position for such infrastructure, and the Department requires that the detention basin be relocated to an area above the 1 % AEP flood level.	A stormwater detention basin is one of the proposed stormwater management measures for the project. With reference to Figure 5 in the Surface Water Assessment (Appendix J to the EIS), the detention basin will receive runoff from the site only when the stormwater capture basin is full. The detention basin has been sized to maintain peak flows from the site at existing levels for all events up to and including the 1% Average Exceedance Probability (AEP) event. Relevant calculations are provided in Appendix B of the Surface Water Assessment. The basin is proposed to be constructed in cut to remove any potential for flood impacts associated with a reduction in flow conveyance or flood storage. A section concept is provided in Figure 8 of the Surface Water Assessment. As noted in comments from OEH, DPI and CCC, the basin is located on the Swamp Creek Floodplain, within the 1% AEP flood extent. In some cases this would be considered inappropriate as a detention basin will not provide its intended peak flow reduction function if it is inundated by floodwaters. However, in the case of this project, detention storage will not provide any material flood mitigation benefit for the following reasons:

Table 2.1 Government agency submissions

Matters to be addressed	Response
	• The 1% AEP peak flow in Swamp Creek adjacent to the site is estimated to be 397 cubic metres per second (m^3/s). The 24 hour duration event was adopted as the governing duration event in the *Swamp Creek Floodplain Risk Management Study* (Worley Parsons 2013). Peak flows from the site for the 1% AEP 24 hour duration event are estimated by RHDHV to be 0.31 m^3/s for existing conditions and 0.33 m^3/s for developed conditions (with no detention). Accordingly, detention storage designed to mitigate any increase in peak flows from the site for the 1% AEP 24 hour duration event, would reduce peak flows from 0.33 to 0.31 m^3/s, a 0.02 m^3/s reduction. This reduction is equivalent to 0.005% of the peak 1% AEP peak flow in Swamp Creek. This analysis demonstrates that detention storage would provide no material flood mitigation benefit. • Section 5.1 of the Surface Water Assessment established that Hunter River flood levels are higher than Swamp Creek flood levels downstream of the Hunter Expressway Bridge. The Hunter Expressway Bridge is located 600 m downstream of the site. Accordingly, any peak flow increase in Swamp Creek associated with the project could only potentially impact flood risk between the site and the Hunter Expressway. There is currently no development established within this 600 m reach of the Swamp Creek Floodplain. It is also noted that detention storage is not listed as a recommended development control in the *Swamp Creek Floodplain Risk Management Study* or Plan (Worley Parsons, 2013). Locating the detention basin above the 1% AEP flood extent would require the basin to be built within the fill pad either as underground storage or, if space permits, a surface basin located adjacent to the stormwater capture and untreated water storage basins. Both of these alternative options would be substantially more expensive to construct than the proposed basin and are not considered to be warranted due to the reasons explained above. The proposed detention basin is expected to provide the following water management benefits: • the basin will maintain peak flows from the site at existing levels. This will mitigate any impacts the project may have on erosion of the Swamp Creek Channel, which predominately occurs in 0.5 to 5 year Average Recurrence Interval events;the basin will provide some additional water quality treatment of runoff leaving the site; and • the basin will provide a last resort containment facility that could be utilised to capture and contain any accidental spill or fire water that leaves the site. It is noted that this

Table 2.1 Government agency submissions

Matters to be addressed	Response
	would only occur if the stormwater capture basin is full and bypass flows occur. In summary the detention basin is expected to have a neutral impact on Swamp Creek flooding, but will provide the abovementioned water management benefits. An alternative basin configuration that is located above the 1% AEP flood extent would be substantially more expensive to construct and would not provide any material flood mitigation benefit. Accordingly, it is considered that the currently proposed basin is appropriate. The location of the stormwater detention basin has been discussed with both OEH and CCC who have accepted the above justification. This consultation is detailed further below.
Traffic	
Provide a preliminary design of the proposed upgrade to the intersection of Mitchell Avenue and the proposed driveway, including a swept path analysis. The design should be prepared by a suitably qualified professional. It must demonstrate that the upgraded intersection would be capable of accommodating the largest heavy vehicles proposed to access the site.	Preliminary design plans are provided in Appendix A.
Please provide clarification of the calculations used to derive the number of daily truck movements predicted during operation of the facility as these do not appear to be consistent with the proposed maximum daily ULAB throughput of 200 tonnes per day.	ULABs will be delivered in either B-Doubles or semi-trailers which have a capacity of 36 and 24 t, respectively. Assuming an average capacity of 30 t per truck then this would equate to 7 truck loads per day (for 200 t per day (tpd)) or 2,000 truck loads per year (for 60,000 tpa). The traffic assessment undertaken has assumed 10 trucks loads per day of ULABs and other raw materials being brought to site and, therefore, can be considered conservative.
Hazards	
The accumulation of flammable or explosive mixtures, enriched with oxygen, within the rotary furnaces, due to failure of primary and secondary (pilot) burners, has not been identified as a hazard in the PHA. As such, please provide further information on the consequences (with detailed analysis), risk, safeguards and recommendations relevant to this hazard, including consideration for both furnaces operating simultaneously and accident propagation. The comment in item 25, Table A.1 of the PHA states "furnace explosion localised". However, the consequence analysis for furnace explosion resulting in overpressure and heat radiation is not detailed in Section 6.4 of the PHA.	Refer to the Preliminary Hazard Analysis Addendum prepared by Sherpa Consulting provided in Appendix B.
HAZID No. 15 and 17 - Failure of gas scrubbing system has not been carried forward for detailed consequence analysis. As such, please provide further information on the detailed analysis for this hazard, given that it has not been sufficiently demonstrated that failure of the gas scrubbing system will not lead to immediate off-site impacts.	Refer to the Preliminary Hazard Analysis Addendum prepared by Sherpa Consulting provided in Appendix B.

Table 2.1 Government agency submissions

Matters to be addressed	Response
The analysis should consider the maximum emission rate and concentration of toxic compounds leaving the battery breaking process without gas scrubber operation, taking into account the gas collected from other processes as indicated in Appendix B of the PHA.	
Appendix B of the PHA shows that 3.2 tonnes per day of "crucible skimmings" will leave the lead smelting process. In this context, "crucible skimmings" is generally consistent with lead dross, which may be a dangerous good. As such, please provide: a) confirmation if "crucible skimmings" is a dangerous good; b) further information on the maximum storage quantity for "crucible skimmings"; c) further information on the storage arrangements for "crucible skimmings"; and d) further information on the hazards and safeguards for the storage of "crucible skimmings".	Refer to the Preliminary Hazard Analysis Addendum prepared by Sherpa Consulting provided in Appendix B.
Please provide further information on the hazards and safeguards for the storage and use of hydrogen peroxide within the development. Table D.1 of the PHA shows that up to 21 tonnes of hydrogen peroxide aqueous 8–20% (UN 2984) will be stored in 10 kg containers (on average). However, the hazards and safeguards for the storage and use of this material is not listed in Appendix A - Hazard Identification of the PHA.	Refer to the Preliminary Hazard Analysis Addendum prepared by Sherpa Consulting provided in Appendix B.
Please revise Table D.1 of the PHA to ensure that the classification of hazardous chemicals (including dangerous goods) is consistent with the information in Appendix C of the PHA.	Refer to the Preliminary Hazard Analysis Addendum prepared by Sherpa Consulting provided in Appendix B.
Operational details	
Provide clear and detailed justification for the need for 24 hour operations based on the proposed waste stream and hourly ULAB processing rate. It is noted that there is only one ULAB delivery predicted during the evening and night-time hours (6 pm-6 am).	In order to meet the full capacity of the project, which is 200 tpd, the plant will have to operate 20 hours a day at 10 tph. Four (4) hours a day is reserved for maintenance works. Due to the high heat and energy requirements in cooling down and starting up of the furnace, plus the very long time required for each heat up and cool down procedure, it is advised that the furnace should run continuously and will stop only during regular and scheduled maintenance, or bricks replacement. The crystallizer also requires continuous operation as it is also heat and energy dependent supplied by a boiler which also operates continuously. Further, the material feed for the crystallizer is the brine solution extracted from the filtration of the paste. If the crystallizer

Table 2.1 Government agency submissions

Matters to be addressed	Response
	stops, then the brine solution will eventually end up as liquid waste. Therefore, continuous operation of the crystallizer is very important to ensure the plant produces no liquid waste.
Provide details of the maximum number/weight of ULABs that would be present on site at any one time awaiting processing.	The maximum ULAB storage capacity of the plant is 5,082 t (3,192 t in Building 8 and 1,890 t in building 5). It is noted that full storage capacity of ULABs would likely only occur at the start of the operations to build up an initial battery stock prior to commencement of processing. Once processing commences, the maximum ULAB storage will reduce to around 3,000 t.
NSW Office of Environment and Heritage	
Aboriginal cultural heritage	
OEH has reviewed the Aboriginal Cultural Heritage Assessment (ACHA) contained in Appendix L of the EIS. The ACHA report titled *Aboriginal Cultural Heritage Report: Battery Recycling Facility, 129 Mitchell Avenue Kurri Kurri,* prepared for Pymore Recyclers International Pty Ltd (EMM 2016) does not effectively address the Secretary's Environmental Assessment Requirements (SEARs) issued on 18 March 2016 which specifically require an assessment of Aboriginal cultural heritage values that exist across the whole area that will be affected by the development. Specifically: • the proponent did not provide evidence of adequate consultation with either of the two Native Title claimant groups identified by the Native Title Tribunal (EMM 2016: 17); • the proponent failed to contact/invite one of the Native Title claimant groups (identified by the Native Title Tribunal) to register an interest in the project; and • no evidence was provided in the EIS to determine the connection to Country by each of the registered Aboriginal parties. OEH is concerned that the lack of cultural values/information detailed in the ACHA (EMM 2016) is due in part to the lack of consultation with the registered Native Title claimants for the area. Based on this review OEH requires that the abovementioned concerns be addressed prior to issuing any recommended conditions of consent for the Aboriginal cultural heritage management of the project area. OEH requires the proponent to consult with both Native Title claimant groups in regard to the Aboriginal cultural values that may be associated with the project area and to submit any relevant consultation material as an addendum to the ACHA provided in the EIS.	Contact was made between EMM Project Archaeologist Andrew Crisp and OEH Archaeologist Peter Saad to discuss the RTS at length on both the 16 and 25 January 2017. Discussion was had pertaining to which Native Title Claimant group required consultation as well as the issue of cultural information/connection to Country provided in the ACHA. The topic of connection to Country and detail of cultural information was discussed at length with a conclusion being reached that no detailed cultural information had been provided by the Registered Aboriginal Parties involved in the project. As a result of the lack of specific cultural information provided for the study area the level of cultural information/connection to Country provided in the ACHA was considered sufficient. OEH explained that evidence of consultation is required specifically regarding the Awabakal and Guringai Native Title Claimant group. Clarification was made to OEH that an oversight resulted in the Awabakal and Guringai Native Title Claimant group being overlooked during the initial consultation process. The high number of Aboriginal groups supplied during Stage 1 of consultation (over 100) in addition to similarities in group names contributed to oversight. EMM agreed with OEH that the appropriate consultation would therefore be conducted for the Awabakal and Guringai Native Title Claimant group. OEH was informed that contact would be made between EMM and Michael Owens, the lawyer representing the Awabakal and Guringai Native Title Claimant group. On Wednesday 25 January 2017 contact was made via phone and email between EMM and Mr Owens. Following from these conversations a copy of the ACHA was sent to Mr Owens who confirmed he would pass it on to the respective members of the Claimant group. The Claimants were provided 28 days to supply comment and/or cultural information pertaining to the ACHA. At the close of the 28 day period (22 February 2017) no cultural information had been provided by any member of the Awabakal and Guringai Native Title Claimant group.

Table 2.1 Government agency submissions

Matters to be addressed	Response
Flooding and floodplain management OEH has reviewed the flooding and flood risk assessments for the project which comprise the *Surface Water Assessment* prepared by Royal HaskoningDHV (Dated October 2016) and the *Preliminary Hazard Analysis* prepared by Sherpa Consulting (dated 28 October 2016). They are presented in Appendix J and Appendix E respectively of the EIS. Both reports nominated different floor and racking levels for the project based on their varying assessment of the flood risks for the site; and this discrepancy will need to be resolved before OEH can complete its assessment. The Royal HaskoningDHV report has nominated a probable maximum flood (PMF) level of 17.6 metres (Australian Height Datum - AHD). To deal with this flood risk, with a 1 in 10,000,000 probability of occurring, they proposed that the both fill and retaining walls to 4.4 metres in height could be used to raise the finished floor level of Buildings 5 and 8 of the battery recycling plant to 15.6 metres AHD. They also proposed that the on-site detention flood water detention basin is located within the flood plain below the retaining walls. The impact of the proposed fill on adjoining properties has been modelled and shown to have a maximum of 14 mm increase in flood level for the 1 % annual exceedance probability flood (AEP). Minimal impacts are also demonstrated for the 0.5% and PMF event. The impact assessment is considered to be acceptable. The proposed use of fill has elevated much of the facility well above the 1 % AEP flood level which minimises the likelihood of floodwaters entering the facility. The impact assessment has been carried out as requested in the SEARs for floods of up to the PMF event. The *Preliminary Hazard Analysis* prepared by Sherpa Consulting, in contrast, recommended that the flood mitigation levels were in place in the event that flood levels exceed 16.6 metres AHD. They propose having a concrete encasement with weir gates for the material preparation and slag room set at a level of 18.1 metres AHD. In addition they propose that the lower 1.5 metre of racking remain vacant to minimise the risk of mobilisation of hazardous goods. The flood mitigation levels nominated in the Risk Assessment are one (1) metre higher than those recommended in the Surface Water Assessment report. The inconsistencies between the two reports will need to be resolved so that OEH can complete its assessment and prior to approval of the facility.	The proposed finished floor level of the plant is 15.6 m Australian Height Datum (AHD). Flood mitigation measures are incorporated into the design of the plant and, therefore, will permanently be in place regardless of actual flood levels. Should flood levels exceed 15.6 m AHD then these flood mitigation measures will ensure that hazardous goods will not be mobilised in flood waters. The finished floor level of 16.6 m AHD quoted in the *Preliminary Hazard Analysis* (Sherpa Consulting 2016) is a typographical error and should read 15.6 m AHD. The change in finished floor level does not have any impact on the results of the *Preliminary Hazard Analysis*. Refer also to the Preliminary Hazard Analysis Addendum prepared by Sherpa Consulting provided in Appendix B.

Table 2.1 Government agency submissions

Matters to be addressed	Response
Detention basin An on-site flood water detention basin is proposed to be located on the floodplain. This will be ineffective in mitigating the full range of events required by Cessnock City Council because the basin is proposed to be located with a crest below the 1 % AEP flood level. OEH recommends that the need for this flood water detention basin is discussed with council officers. If it is required to be installed then the detention basin will need to be relocated above the 1 % AEP level. Such a move may change the extent of fill and site disturbance currently proposed for this project. Significant stormwater storage, treatment and reuse is proposed on site however this system has long draw down times if filled by a large or extended rainfall event. The effectiveness of stormwater storage does not form part of this assessment but should form part of the Environment Protection Authority's licensing requirements. Based on the review of the flood risk assessment for this project OEH is unable to complete its assessment until the difference in probably maximum flood height levels in resolved. Once this is completed OEH will be in a position to provide recommended conditions of consent.	Refer to the above response regarding the proposed detention basin location. This justification was accepted by OEH's Senior Natural Resource Officer (Floodplain) Angela Halcrow in correspondence to Chris Kuczera from Royal HaskoningDHV on 14 February 2017. The stormwater capture and untreated water storage basins will have a collective storage capacity of 1,412 m^3. This is equivalent to 41.5 millimetres (mm) of runoff from the 3.4 hectare (ha) site. The ULAB recycling process will use an average of 46 m^3 of water a day. This water will be sourced from the untreated water storage basin, which will enable the stormwater capture basin to be progressively dewatered at a similar rate. Water balance modelling that is documented in the Surface Water Assessment estimates that, on average, 60% of runoff will be captured and used in the ULAB recycling process and 40% of runoff will discharge from site, following treatment in the detention basin.
Threatened species OEH has undertaken a review of the Biodiversity Assessment Report (BAR) prepared for this project by EMM Environmental Consulting Pty Ltd (dated 28 October 2016) that was presented as Appendix N of the EIS. The BAR was prepared to meet requirements of the Framework for Biodiversity Assessment (FBA) (OEH, 2014a), and that the offset package is to be provided in accordance with the *Biodiversity offsets policy for major projects in NSW* (OEH, 2014b). The development footprint for the project is about 3.4 hectares (ha), of which about 1.48 ha is mapped as Parramatta Red Gum - Narrow Leaved Apple shrubby woodland (HU 592) in either moderate-good (0.87 ha) or poor condition. The remainder of the site is mapped as either exotic grassland or cleared land (Figure 3.3 of Appendix N of the EIS). 37 plants of Earp's Gum *(Eucalyptus parramattensis* subsp. *decadens)* over 1.56 ha of habitat was also recorded. The proponent ran a credit calculator report on 27 September 2016 based on available information which generated 59 ecosystem credits and 518 ecosystem credits to be retired. Section 7.1 of the BAR provides a list of four options for the biodiversity offset strategy being considered for this project, and that after searching the BioBanking credit register on 10 October 2016 that there were no suitable credits available for the required credits to be retired, and so the	No response required.

Table 2.1 Government agency submissions

Matters to be addressed	Response
proponent was likely to pursue applying for a variation to the FBA (Sections 10.5.4.2 and 10.5.7.2) for the types of credits that may be used to match the credit requirements for this project. The FBA (OEH, 2014a) has very specific requirements about the type of information to be provided in the BAR; which is summarised in Table 20, in Appendix 7 of that document. The BAR makes reference to planned targeted surveys in November 2016 for threatened species were identified in FBA for which there appeared to be suitable habitat on the development site - it is not known if such surveys have occurred, and thus whether all threatened species have been assessed for this project. In relation to the Biodiversity Offset Strategy the need to show that reasonable efforts have been made to find either appropriate land, or appropriate credits requires more time and effort that what has been described so far in the BAR. These matters are described below. **Biodiversity Assessment Report** A BAR has been included as part of the EIS as Appendix N. As required, the BAR assessment was undertaken by an accredited person under section 142B(1)(c) of the *Threatened Species Conservation Act 1995.*Upon reviewing the BAR against the requirements summarised in Table 20 there are many areas of the BAR that appear to be incomplete. These include the following:	
1. Introduction - shape files not provided; Site and Location maps not fully prepared as per Section 3.2 of the FBA;	Shape files have now been provided to OEH. Site and location maps have been updated with the following changes (refer Appendix C); • Layers have been cropped to the 100 ha or 1,000 ha buffers respectively, for increased clarity of viewing. • Riparian buffers have been added to the waterways in accordance with the Appendix 2 of the FBA. • The scale of each of the figures is displayed (ie 1:10,000) on the figure.
2. Landscape Features - connectivity value; and patch size and landscape value score;	The landscape features of the project area are described below. • Connectivity Value: The connectivity value of the project area is 10.00. • Patch Size: The project area is adjacent to large forested area. The patch size of this area was calculated to be in excess of 1,001 ha, which is the largest value included within the BioBanking calculator. For this reason, the exact patch size was not determined. • Landscape score: The landscape score calculated for the project area, based on a single

Table 2.1 Government agency submissions

Matters to be addressed	Response
	assessment circle is 22.60.
3. Native Vegetation - provision of copies of plot and transect field data sheets;	Native vegetation data was collected digitally on a tablet computer. These electronic field sheets are presented in Appendix D. A summary table (Table A2 in the original BAR) has also been updated to include non-native vegetation and plots conducted outside of the project area (Table D.1 in Appendix D).
4. Threatened Species - a discussion of threatened species unable to withstand further loss; consideration of an expert report if the window to survey all threatened species to be considered for this development has been missed; and a species credit polygon for threatened species considered for this project; and	Threatened species, their occurrence and potential to be impacted are discussed in Table B1, Appendix B, of the BAR. A single threatened species credit species was recorded within the project area; *Eucalyptus parramattensis subsp. decadens.* This species is readily detectable and the exact number of individuals (37) was counted within the project area; therefore, species credit polygons are not required. This species is listed by BioNet as being able to sustain loss within the Hunter-Central Rivers catchment management area (CMA). The clearance of 37 *Eucalyptus parramattensis subsp. decadens* has resulted in the generation of 518 species credit. No other species credit species were recorded within the project area or are considered as having potential to occur based on the degraded habitat present and the lack of detection during targeted surveys. Corresponding, no species polygons are required or consideration of further requirement was threatened species unable to withstand further loss.
5. Submission of the credit calculator files to OEH.	The credit calculator has been updated to include recent survey effort for threatened mammals. This did not alter any of the credits originally generated and presented in the BAR. However, an updated credit report is provided in Appendix E to this RTS. The electronic credit calculator files were submitted to OEH on 16 February 2017.
The list above is not complete, and OEH recommends that the proponent prepares a table based on Table 20 in the FBA in which cross-references to the BAR are included. This process will help guide the development of a package of supplementary information that will enable OEH to complete its assessment.	A table based on Table 20 of the FBA is provided in Appendix F to this RTS.
OEH acknowledges that most, if not all of the data not yet provided in the BAR was generated in order to run the assessment. Therefore, it appears likely that the provision of such data would be a relatively quick and straight-forward process.	No response required.
Impact Assessment (Biodiversity Values)	**Impact assessment (biodiversity values)**
The proponent has identified in Section 2.2.1 of the BAR that not all threatened species that required survey had been surveyed by the time the BAR had been put together. And that targeted surveys were planned for the development site in November 2016. It is not known if those planned surveys have been undertaken. Alternatively, section 6.6.2 of the FBA allows for the preparation and submission of	1 Introduction At the time of the BAR submission several species had not had targeted surveys conducted, due to the project schedule. These species were assessed on a habitat basis only within the BAR. These species are listed below with their corresponding required survey timing as required by the calculator;

Table 2.1 Government agency submissions

Matters to be addressed	Response
Expert Reports to be done instead of undertaking threatened species survey at a development site, provided all requirements for an Expert Report are met. In the absence of either the results of the planned survey, or an Expert Report, OEH considers the biodiversity assessment for the development site to be incomplete, and awaits further details from the proponent, and, if required, a re-running of the credit calculation with all affected threatened species included.	• Eastern Pygmy-possum (*Cercartetus nanus*) (All year); • Common Planigale (*Planigale maculata*) (All year); • New Holland Mouse (*Pseudomys novaehollandiae*) (N/A); • Green and Golden Bell Frog (*Litoria aurea*) (Aug-March); • Leafless Tongue-orchid (*Cryptostylis hunteriana*) (Nov-Feb); and • Small Snake Orchid (*Diuris pedunculata*) (Sept-Nov). All of the above species are species credit species, with the exception of the new Holland Mouse which is only listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Vulnerable). All of the above species were considered unlikely to occur within the project area based on habitat assessment and/or their known range (Appendix B, Table B1 of the BAR). However, for completeness, targeted surveys were conducted for all of the above species, with the exception of the Green and Golden Bell Frog. Additional habitat based surveys were undertaken for the Green and Golden Bell Frog which confirmed a lack of any suitable habitat for the species and as such no targeted survey were necessary. 2 Method Targeted seasonal surveys were completed from 21 to 24 November 2016. The following provides the results of the surveys, targeted to detect the presence or absence of the species. a) Mammals The following methods was designed to survey for three species; Eastern Pygmy-possum, Common Planigale and the New Holland Mouse. Thirty Elliot A traps were deployed in potential habitat for the threatened mammal species (ie woodland and shrubby parts of the project area), which occupies 0.87 ha (refer to Figure 2.1). The exotic grassland in the south of the project area was not targeted as it does not have the potential to support any of the target species. The traps were deployed over three nights; therefore effort was equivalent to 90 trap nights, which exceeds the effort outlined in survey guidelines for Australia's threatened mammals (DSEWPC 2011). The traps were baited with a honey, oat and peanut butter mix and rebaited as frequently as required. Crushed dry leaves were placed at the end of each trap to act a bedding material. The traps were set over a period of three nights with all of the traps checked prior to 8.00 am each morning, in accordance with EMM's animal ethics license. Traps were

Table 2.1 Government agency submissions

Matters to be addressed	Response
	placed to optimise capture success, by situating adjacent to small mammals 'runs', natural debris such as logs, and artificial structure including discarded machinery parts. After the traps were checked each morning the doors were closed, then reopened just prior to dusk, in accordance with EMM's animal ethics license. This avoided capture of diurnal species which may have led to mortality due to overheating. b) Orchids Two ecologists conducted threatened flora transects across all potential habitat within the project area including woodland and patches of derived native grassland. The total survey effort was 6 person hours, conducted on the 21 and 22 November 2016. This is in accordance with the BioBanking survey time matrix for both the Rough Doubletail and the Leafless Tongue Orchid. The maximum transect spacing was 4 m where visibility was good, reducing to 2 m spacing in areas of dense ground cover. c) Green and Golden Bell Frog The dam north west of the project area were revisited to gain further understanding of the habitat potential for the species and to detect any seasonal changes which may have occurred since it was last observed during winter 2016. 3 Results a) Mammals No mammals were captured during the during the targeted field survey, including a lack of any exotic mammals species. None of the baits were removed from the traps and there was no evidence of any partial consumption of the bait. This indicates a true absence of mammals entering the traps rather than any problems with trap sensitivity (ie traps not closing). Furthermore there were very few false triggers recorded (when the trap is found closed but no capture was recorded). If too many traps are falsely triggered this may indicate that the trigger is too sensitive. The lack of captures during the survey, which exceeded the required survey effort in accordance with the survey guidelines for Australia's threatened mammals (DSEWPC 2011), supports the previous habitats assessment which indicates that that the Common Planigale, Pygmy Possum and New Holland Mouse is absent from the project area. Moreover the lack of any mammalian captures in general, indicates a habitat of low ecological value to small mammal species. b) Orchids No orchid species were recorded during the targeted surveys, nor were any other additional threatened flora species recorded.

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Matters to be addressed	Response
	c) Green and Golden Bell Frog A shallow dam exists, north east of the project area. The dam was found to be in similar condition to when it was previously assessed. It is shallow and relatively homogenous in depth with Cumbungi (*Typha sp.)* growing in a dense stands throughout the entire dam. No frogs or tadpoles were observed and no open water present. The dam was not considered suitable breeding habitat for the Green and Golden Bell Frog as it was too heavily shaded by Cumbungi with no open water areas present. For this reason no further targeted surveys were undertaken. 4 Impact assessment a) Mammals Previous habitat assessments conducted for the Planigale, Pygmy Possum and New Holland Mouse concluded that the project area contained only sub-optimal habitat for the species, given the high levels of fragmentation, abundance of groundcover weeds and small patch size. The project area is also outside of the current known range for both the New Holland Mouse and the Common Planigale. The recent targeted survey did not record any of the above species and it unlikely that they occur within the project area, supporting prior habitat based assessment. b) Orchids The field results support previous habitat based assessment provided in the BAR, that the project area does not contain suitable habitat for either the Small Snake Orchid or the Leafless Tongue Orchid. It is unlikely that these species occur within the project area and therefore no impact on these species is anticipated. c) Green and Golden Bell Frog A shallow dam exists, north east of the project area. The dam was found to be in similar condition to when it was previously assessed. It is shallow and relatively homogenous in depth with Cumbungi (*Typha sp.)* growing in a dense stands throughout the entire dam. No frogs or tadpoles were observed and no open water were present. The dam was not considered suitable breeding habitat for the Green and Golden Bell Frog as it was too heavily shaded by Cumbungi with no open water areas present. For this reason no further targeted surveys were undertaken. 5 Conclusion The targeted surveys support the previous habitat based assessment presented in the BAR, that none of the subject species considered above, are likely to occur within the project

Table 2.1 Government agency submissions

Matters to be addressed	Response
	area. Therefore, no species credits have been generated by the BioBanking Calculator and no species offsets are required. EMM have also prepared a referral to the Commonwealth Department of Environment and Energy (DoEE) under the EPBC Act on behalf of Pymore, which was submitted on 23 September 2016 (reference number 2016/7782). At the time the referral was submitted, targeted seasonal surveys for the New Holland Mouse had not been completed. They have been since informed by letter (dated 12 December 2016) of the targeted survey results for the species. DoEE have since assessed the project, concluding that the proposed action is not a controlled action. The referral notice for the project is included as Appendix I to this RtS.
Biodiversity Offset Strategy Section 7 of the BAR includes a Biodiversity Offset Strategy in which four offset options are listed: 1. Buying and retiring ecosystem credits and species credits from the open market; or 2. Buying land that contains vegetation that generates the required type and amount of ecosystem credits and species credits needed, and retiring those credits; or 3. If options 1 and 2 are unavailable the proponent will apply to the consent authority for a variation under Sections 10.5.4.2 or 10.5.7.2, or both, to seek to vary the allowable range of credits to be broadened so that the offset obligation can be met; or 4. Payment into the BioBanking Trust Fund. The proponent searched the BioBanking credit register on 10 October 2016, and upon not finding the required type and amount of credits available to retire for this project, decided to follow option 3 (above), which could include the purchase of land nearby, which contains Earp's Gum, or if that land is not available to seek to vary the Plant Community Type that may be traded for the Kurri Sand Swamp Woodland on-site, such as with Warkworth Sands Woodland, and if that is not available, to discuss payment of the appropriate sum of money into the BioBanking Trust Fund. OEH is of the view that the proponent has not yet undertaken enough to demonstrate that it has taken all reasonable steps to look for available credits on the registers. A single search of the available credits register done before the final credit requirement	EMM have noticed an inconsistency in Section 6.2 of the BAR. The 58 ecosystem credits as stated in paragraph three is correct, however there is a typographic error in Table 1. The sum of the credits required to offset impact should also be 58 rather than '8'. In order to progress the biodiversity offset strategy the following steps have occurred/are proposed. 1. All threatened species surveys have now been conducted as outlined above. No further species credit species were identified. 2. The credit calculator has been re-run with several species confirmed as absent from the project area. As these species were previously presumed absent the credits calculated have not changed. 3. The credit calculations will be submitted as part of this RTS and ready for verification by OEH. The following approach to secure offsets is proposed, with the first offset option exhausted prior to moving down the hierarchy. 1. The credit register will be checked on a monthly basis for a period of five months; 2. Two credit searches have been conducted to date for both the required ecosystem credits and species credits, on the 10 January 2017 and 1 February 2017; and 3. An expression of interest for the required credits was listed on 6 February 2017 and will remain active for a period of six months. It is considered that the supplied information in this RtS will provide the required information in order for OEH assess the BAR. In order to avoid delays to the project, may we request that OEH assess the BAR whilst investigations are ongoing to secure suitable

Table 2.1 Government agency submissions

Matters to be addressed	Response
for the development site has been prepared, before all targeted surveys have been done, and before the credit calculation has been checked and verified by OEH does not constitute a reasonable basis on which to argue that Option '3' (above) is now able to be pursued. At the very least the following would need to happen: 1. Completion of all required threatened species surveys, or the provision of an Expert Report for species unable to be surveyed, to determine the total impact of the development site that requires offsetting; 2. The re-running of the credit calculator if final site surveys find additional species; 3. Verification of the biodiversity credit calculations by OEH for which the provision of information in the BAR, as spelt out in Table 20 of the FBA is required; and 4. Once the credit yield of the development site has been finalised then the proponent will need to demonstrate that they have checked the available credits register on multiple occasions, and also that they have lodged an expression of interest for the required credits on the 'credits wanted' register, which is available at: www.environment.nsw.gov.au/biobanking/index.htm for a period of at least 6 months. OEH acknowledges that the proposed development site is a small area, and that it generates a small number of ecosystem and species credits. However, at present it is not possible for OEH to complete its assessment of threatened biodiversity impacts for this project. Therefore, OEH cannot recommend any conditions of consent until the proponent has been able to address points 1 to 4 inclusive (above).	offsets, in accordance with Section 7 of the BAR. Otherwise, the requirement to have a six month duration expression of interest will result in significant and costly delays.
NSW Roads and Maritime Services	
Roads and Maritime has reviewed the information provided and raises no objection to or requirements for the proposed development as it is considered there will be no significant impact on the nearby classified (State) road network. Roads and Maritime recommends that the following matters should be considered by the DPE in determining this development.	No response is required.
• DPE should ensure that an appropriate intersection design for the proposed new access is considered before development consent is issued. The location of the access is in close proximity to the existing intersection of Johnson Avenue and traffic counts within the traffic assessment revealed that this intersection is used	A preliminary intersection design is provided in Appendix A.

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Matters to be addressed	Response
by a high percentage of heavy vehicles. Any future new access to the subject battery recycling development should ensure that it is capable of accommodating the design vehicle and that the existing intersection into Johnson Avenue is not compromised for use by heavy vehicles (including semi-trailers). It is noted that any intersection upgrade will be required to be approved by Cessnock City Council as part of a s.138 application as Council is the roads authority for Mitchell Avenue and as such, it is recommended that DPE consult directly with Council about this matter. Consideration should be given to the provision of suitable intersection upgrade treatment consistent with the warrants in section 4.8 of *Austroads Guide to Road Design - Part 4A Unsignalised and Signalised Intersections.*	
• Consideration should be given to ensure appropriate sight line distances are available at the entry / exit from the subject site, in accordance with the relevant Australian Standards (ie AS2890:1 :2004). The consent authority should be satisfied that the location of the proposed driveway promotes safe vehicle movements.	This has been considered in the preliminary intersection design provided in Appendix A.
• DPE should ensure that appropriate traffic measures are in place during the construction phase of the project to minimise the impacts of construction vehicles on traffic efficiency and road safety within the vicinity.	Implementation of a construction stage traffic management plan is included in the statement of commitments for the project as detailed in Table 8.1 of the EIS. This construction stage traffic management plan would include appropriate traffic measures to minimise the impacts of construction vehicles on traffic efficiency and road safety within the vicinity of the project site.
• All matters relating to internal arrangements on-site such as traffic/pedestrian management, parking, manoeuvring of service vehicles and provision for people with disabilities are matters for DPE to determine.	No response is required.
• Should any work need to be undertaken outside the property boundaries of the subject site including works associated with altering the existing driveway, the developer is to engage with Roads and Maritime Services. All such works shall be undertaken at full cost to the developer and no cost to Roads and Maritime or Council.	No works are to be undertaken outside the property boundaries of the subject site.
• Roads and Maritime has no proposal that requires any part of the property.	No response is required.
NSW Rural Fire Service	
A bush fire hazard assessment should be prepared from suitably qualified consultants and provided for further assessment of the proposal against the provisions of *Planning for Bush Fire Protection 2006.* It will then be submitted, as part of the final EIS, which considers the bush fire risk to and from the site to surrounding vegetated areas during	A bush fire hazard assessment from a qualified consultant is provided in Appendix M of the EIS. It is considered that the assessment satisfies the requirements of the NSW Rural Fire Service.

Table 2.1 Government agency submissions

Matters to be addressed	Response
any demolition, remediation or construction works and which provides appropriate bush fire protection measures to address the type and level of risk.	
NSW Department of Primary Industries	
All works to be carried out on waterfront land should be undertaken in accordance with *DPI Water Guidelines for Controlled Activities on Waterfront Land (2012).*	The DPI Water *Guidelines for Controlled Activities on Waterfront Land (2012)* (the guideline) provides information on design and construction methods for work on waterfront land. For this project, waterfront land includes all land within 40 m of the top of the Swamp Creek channel bank. Swamp Creek is a fourth order watercourse. Table 1 from the guideline recommends that fourth order watercourses have a 40 m Vegetated Riparian Zone (VRZ). Figure 7 in the Surface Water Assessment shows the estimated location of the top of the Swamp Creek channel bank and the associated 40 m VRZ offset. It is noted that the top of bank location has been estimated from LiDAR levels. Figure 7 also shows that the following infrastructure is located in the 40m VRZ: • The north-western corner of the basin is located within the outer 10m of the VRZ. • A small portion of the fill pad is located within the outer 2-3 m of the VRZ. • There is some floodplain area outside of the 40m VRZ that could be used as a Riparian Corridor (RC offset). Table 2 of the guideline specifies that for fourth order watercourses: • Offline detention basins are appropriate within the outer 50% of the VRZ provided that they are dry basins (ie don't hold permanent water). The proposed basin will be a dry basin. • Non-riparian corridor land-uses are appropriate within the outer 50% of the VRZ, provided that they are offset in accordance with the RC offset averaging rules described in the guideline. Figure 7 shows there would be adequate space available outside of the VRZ to offset any fill pad encroachment into the VRZ. Accordingly, proposed works on waterfront land will be consistent with the DPI Water's *Guidelines for Controlled Activities on Waterfront Land (2012)*.
Prior to project approval the proponent should: • confirm and clarify the ability of the project design to satisfy riparian buffer widths set out in the above mentioned guidelines; and • provide additional detail on the proposal to access water from Swamp Creek including proposed pumping works, potential impacts for construction and operation, and on the ability to purchase the necessary water entitlement in the	The project will not extract water from Swamp Creek. All process water will be sourced from the stormwater basins (following treatment), or mains water when stormwater is not available.

Table 2.1 Government agency submissions

Matters to be addressed	Response
relevant water source.	
The proponent should prepare a water management plan in consultation with DPI Water to include: • erosion and sediment control; • stormwater management; • water balance and water management strategy; • water monitoring; and • riparian management.	As noted in Table 7-3 of the Surface Water Assessment, a Water Management Plan (WMP) will be prepared following project approval and prior to the commencement of construction. The WMP will detail construction, operational commitments to soil and water management and detail where necessary commitments to fortnightly inspections of retention structures, including chemical storages and bund walls for their structural integrity.
The proponent should drill and construct a suitable number of monitoring bores (up gradient and down gradient) to establish baseline conditions for the site in accordance with *Minimum Construction Requirements for Water Bores in Australia (2012)*.	A preliminary contamination assessment is provided in Appendix K of the EIS. A strategic soil sampling program was undertaken for the assessment, involving shallow auguring to depths of approximately 1 m below ground level (BGL). Sampling locations were sited up and down-gradient of the proposed activity. Moist ground (interflow) was intercepted at depths of between 0.4-1 mBGL during the sampling program. EMM do not believe this to represent the local groundwater level. The project construction will involve shallow sub-surface excavation of material, within the unsaturated zone of the unconsolidated fill. During construction, Pymore will establish best practice Water Sensitive Urban Design measures. These are likely to consist of the temporary installation of silt fencing, turkey nests and sheeting to prevent discharge of construction material (ie soil, water) to the local environment. The project operation will be a fully enclosed system, and located on a concrete hard standing. Concrete bunding will be located along the perimeter of the hard standing areas. Storage of fuels, oils, solvents and grease will also be located within hard stand, bunded areas. Given the proposed construction and operational activities are highly unlikely to intercept groundwater or interact with the local surface water environment the construction and installation of a groundwater monitoring network is not considered justified for the project. If it is determined during detailed design that the project is likely to impact on the local water environment either through construction or operational activities, then Pymore will open consultation with DPI Water and consider the installation of a groundwater monitoring network. However, as stated before, it is highly unlikely that groundwater will be intercepted during construction.
The proponent should install an appropriately designed liner to mitigate impacts to groundwater from the: • flow diversion pit; • stormwater capture basin; and	The listed structures would be concrete pits or appropriately engineered/lined thus mitigating the risk of runoff infiltrating the shallow groundwater. This will be detailed in the WMP.

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Matters to be addressed	Response
• untreated water storage basin.	
The conceptual hydrogeology of the site should be adequately described and sampled for water levels and quality by a suitably qualified and experienced groundwater consultant. A suitable groundwater monitoring program (water levels and quality) is to be included in the Water Management Plan for the site.	A review of the local and regional groundwater environment has been provided in Section 3.1 of the Preliminary Contamination Assessment. This assessment included a review of the local geology, groundwater potential, local/regional recharge and discharge characteristics, groundwater flow direction, local groundwater users (including landholder bores, groundwater dependent ecosystems). This assessment was completed by an EMM Senior Hydrogeologist. As per comments made above, a groundwater monitoring network will not be included as part of this plan (see comment above for detail).
The proponent should capture baseline water quality to determine runoff contamination loads of the first rinse off the site, pre-activity (but post-construction) in both the flow diversion pit and the detention storage. The suite of analytes that should be tested includes those listed within the 'comprehensive analysis' category, excluding isotopes (refer to Figure 1, Attachment B of the EIS).	A program to monitor and report on surface water quality and stage levels within each of the retention structures will be developed post-approval in the WMP. A comprehensive and standard ('routine') analytical suite will be developed, with sampling frequencies proposed for the various stages of the project. Pymore will have the opportunity to vary the analytical suite, sampling frequency and sites throughout the construction and operational phases in consultation with DPI Water.
The proponent should ensure that the stormwater capture basin has sufficient capacity, at all times, to contain the first rinse volume of runoff water for the site, immediately following a dry period.	The stormwater capture and untreated water storage basins will have a collective storage capacity of 1,412 m^3. This is equivalent to 41.5 mm of runoff from the 3.4 ha site. 510 m^3 (equivalent to 15 mm of runoff) of this storage will be reserved for first flush storage. This first flush storage volume will be maintained empty at all times except for when sufficient rainfall occurs to fill the entire combined basin volume. The ULAB recycling process will use an average of 46 m^3 of water a day. This water use will progressively dewater the stormwater basins, with the first flush storage being fully dewatered within 11 days of being full. Accordingly, it is expected that the first flush storage will be empty for any rainfall event that follows a dry period.
The stormwater capture basin should be continuously monitored by a water level logger. Trigger Action Response Plans should be developed to ensure sufficient capacity to contain the first rinse volume of runoff water for the site.	A continuous water level logger will be added to the proposed surface water monitoring program.
The proponent should re-issue maps to a suitable scale, clearly showing the flooding depths and extents, and also a legible map of the surface topography of the site.	The flood maps included in the Surface Water Assessment clearly show the flood depth, flood level (via flood level contours), flood extent and velocity depth product relative to the site boundary and proposed fill extents. The flood level difference maps show the predicted change in flood levels associated with the proposed filling. A site survey showing surface topography is provided in Appendix B of the EIS.
On an annual basis the proponent should sample for the suite of 'comprehensive analytes' in the first rinse off the site within the flow diversion pit and the detention	As detailed in Table 8.1 of the EIS and Section 7.1 of the Surface Water Assessment, Pymore will implement a surface water monitoring program that comprises quarterly monitoring of

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Matters to be addressed	Response
storage. Sampling should coincide with a heavy rainfall event following an extended dry period.	a full suite of analytes during wet weather conditions. The objective of the monitoring program is to establish the typical range in quality of stormwater runoff from the site. This information can be used to estimate the likely quality of any site discharge, which is expected to occur for only short periods of time with little notice and would be difficult to effectively monitor. This monitoring will be undertaken on a quarterly basis and will comprise two samples taken 1 hour apart during a runoff event. The samples will be tested for a comprehensive range of analysts, including pH, EC, TSS, nutrients (full suite), oil and grease and a full suite of metals. Refer to Section 7.1 in the Surface Water Assessment for further details on the proposed water quality monitoring program.
All water quality results should be compared against the baseline runoff contamination loads from the first rinse and reported within the annual environmental management report (AEMR). The AEMR should include prescriptive detail on the site generated surface water contamination loads following heavy rainfall demonstrating the dissipation efficiency of this load throughout the treatment system.	A water quality monitoring results will be reported and analysed in the AEMR. The AEMR will compare water quality results to previous results and ANZECC (2000) trigger values were relevant.
At approximately 6 monthly intervals or minimum twice yearly for the first two years of operations and annual thereafter, the proponent should sample for the 'comprehensive analytes' suite in groundwater at the monitoring bores. Results should to be reported within the AEMR showing an assessment against the baseline results and *Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)*.	As detailed above, given the proposed construction and operational activities are highly unlikely to intercept groundwater or interact with the local surface water environment, the construction and installation of a groundwater monitoring network is not considered justified for the project. If it is determined during detailed design that the project is likely to impact on the local water environment either through construction or operational activities, then Pymore will open consultation with DPI Water and consider the installation of a groundwater monitoring network.
NSW Environment Protection Authority	
The EPA's Air Technical Advisory Services Unit (ATASU) has reviewed the Air Quality Impact Assessment (AQIA), *Kurri Kurri Battery Recycling Facility Air Quality and Greenhouse Gas Assessment*, October 2016, prepared by Ramboll Environ. Based on ATASU's assessment of the report EPA has noted the following: • pollutant emissions from the proposed process, especially sulfur dioxide, have been estimated using stack testing data from other facilities but no detailed supporting information has been provided, such as, the manufacturers design specifications; • estimated emissions of sulfur dioxide, as noted in the report, have the potential to be variable during operation of the plant but no robust justification of the estimated emission rates or performance guarantees at upper bounds of	Detailed responses to these issues are provided in the following sections.

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Matters to be addressed	Response
operational variability have been provided; • emissions estimates for arsenic, dioxin and furan discharges require more robust justification and clarification; • emission estimates for the purposes of cumulative assessment with other sources of the developing Industrial Area and a variety of compounds have not been robustly justified; and • the mitigation and management measures have not been benchmarked against Best Management Practice (BMP) principles fugitive emission capture and control mechanisms. The EPA advises that: • the assessment does not include sufficient supporting documentation to verify emission assumptions, especially for sulfur dioxide, but also for particulates, arsenic, dioxin, and furans. On this basis, validity on the model results and conclusions of the assessment are not able to be confirmed; and • to ensure that the assessment is robust for decision making purposes, detailed comments provided as Attachment A should be addressed prior to project approval.	
Description of the process lacks clarity. Section 6.1 of the Air Quality Impact Assessment (AQIA) advises there are five proposed point source emissions. The AQIA makes reference to point source discharges (stacks), C-720, C-729A, C-530, PK-520 and U-421/PK420. Section 9.1 of the AQIA makes reference to mitigation measures and pollution control equipment, including: • bag house filtration system (PK-721); • bag house system (PK-720) for collection of process fumes from the rotary furnace; • a pack tower scrubber (FL-530) where air collection is ducted to for removal of acid gas and mist; and • operation of the charge preparation building under negative pressure. However, in some instances it is unclear which unit operations, and which pollution control equipment are associated with each point source discharge. A flow chart outlining each unit operation, the associated discharge point, and the associated	<u>The emissions from each point source comprise from the following plant operations:</u> • C-720 – serves the operation of the rotary furnace (KL 710) and ancillary equipment (crucibles and crucibles train) and charge preparation area, charge machine (PK 710), foundry building and charge preparation building. Emission through PK-720 baghouse. • C-720a – serves the operation of rotary furnace (KL 720a) and ancillary equipment (crucibles and crucibles train). Emission through PK-720a baghouse. • C-530 – serves the operation of the battery breaker and components separation (Unit 200), paste desulpherisation, filtration and sodium sulphate purification (Unit 300) and sodium sulphate crystalliser (Unit 400). • PK-520 – serves the operation of the steam boiler. • U-421/PK-420 – serves the sodium sulphate crystals drying and discharge to the storage silo SI 421. It is noted that all point sources of emissions include pollution control equipment (with the exception of the steam boiler PK-520, which is designed to comply directly with the emissions limits). Each individual source of fugitive emission is connected to the relevant

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Matters to be addressed	Response
pollution control equipment would be helpful in further understanding the proposal. This is an important consideration to ensure all sources, and substances are adequately characterised and assessed. *The AQIA should be revised to include information:* • *that describes which point source emissions serve which process or unit operations;* • *that describes which pollution control equipment service which process or unit operations;* • *that describes which point sources include pollution control equipment; and* • *that describes which process areas are proposed to operate under negative pressure and which unit operations are contained in those process areas.*	ventilation network and emission control equipment. The pollution control equipment that are proposed for the project are described below in relation to the relevant process or unit operation: • FL 530 packed scrubber and relevant chimney C 530: collects all emissions from operations that take place under wet conditions with the possible production of acid mist; the circulating water kept under pH control with NaOH in order to neutralize the traces of acidity that may be present in the gas stream, including: – Unit 200: Battery breaking and separation that take place in wet conditions, with use of sink and float tanks, wet screening, liquid transfer by pump or gravity flow with consequent production of acidic mist – Unit 300: Paste desulphurization, filtration and sodium sulphate purification unit. These operations involve the production of CO2 from the reaction between Sulphuric acid and Sodium carbonate, pumping of paste slurry to the filter press FL 310, drying of the solid paste cake by compressed air blowing and production of lead contaminated water mist. The reactor tanks for the purification of the Sodium sulphate solution release CO2. – Unit 400: Sodium sulphate crystallizer. This operation is not going to produce pollutants, but takes place at high temperature (boiling water), thus any possible vapor release is kept under suction and connected to the ventilation network controlled by the scrubber FL 530. • FL 140 soda silo top deduster: this deduster is solely dedicated to the soda silo SI 140 filling from tanker by a blower. The operation takes place every 3-5 days and usually takes 1 hour or so. It is noted that this emissions source was considered minor and not incorporated into the AQIA. • FL 421 bag house and relevant fan U 430: this bag house is solely dedicated to the dedusting of the hot air used for the sodium sulphate crystals drying and conveying to the silo SI 421. Once the crystals have been transported to the silo, the hot air shall be dedusted before being released to the atmosphere. • PK 720 bag house and relevant section of chimney C 720: this bag house is dedicated to the filtration of the blend of sanitary air and process fumes produced by the lead bearing material smelting at high temperature. The rotary furnace KL 710 is enclosed in a main canopy dedicated to the capture of the fugitive gases from the rotary furnace during the various steps, such as furnace feed, smelting, lead pouring, slag tapping. The system is kept under strong negative pressure and all the gases captured are sent

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Matters to be addressed	Response
	to this bag house. • PK 720a bag house and relevant chimney C 720a: this bag house is dedicated to the filtration of the blend of sanitary air and process fumes produced by the lead bearing material smelting at high temperature. The rotary furnace KL-710a is enclosed in a main canopy dedicated to the capture of the fugitive gases from the rotary during the various steps, such as furnace feed, smelting, lead pouting, slag tapping. The system is kept under strong negative pressure and all the gases captured are sent to this bag house. • PK 721 and relevant section of chimney C 720: this bag house is dedicated to the areas in which the handling of dry lead bearing material may generate dust, like furnace charge preparation, charge machine PK 710 feeding, fugitive emissions from furnaces canopies and crucibles. Included in this system are either a dedicated ventilation at certain areas where hoods are placed (charge machine feeding, oxides storage boxes) or general ventilation of the buildings (charge preparation, slag temporary storage and demolition, foundry section) keeping them under negative pressure in order to prevent any fugitive emissions outside the buildings. • PK 520 steam boiler: the pollution control for the fumes of the steam boiler involves the installation of a burner designed to comply with the emissions standard rules in terms of NOx and CO. As the burner will be natural gas fired, there will be limited particulate emissions. <u>Which process areas are proposed to operate under negative pressure and which unit operations are contained in those process areas:</u> All the process buildings will be kept closed during the operation and maintained under negative pressure, thus all the units other than the dedicated ventilation devices are placed in a negative pressure to collect internal fugitive emissions to transport to the applicable pollution control device (as above). Specifically: • the Units 200, 300, 400 where the process gases generated are in a negligible quantity, are placed inside the wet operation building kept under negative pressure by the scrubber FL 530 that by sucking air from the surrounding area of each equipment connected causes the whole building to be under negative pressure. • the Unit 700, where there is a strong generation of process gases is served either by dedicated process bag house (PK 720-720a) or by the sanitary air bag house PK 721 that, separate to the dedicated ventilation to specific areas (hoods of PK 710 and oxides boxes), provides the air suction from outside to keep the buildings involved

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Matters to be addressed	Response
	(charge preparation area, foundry and slag room) under negative pressure.
Assessment scenarios may not reflect approvals being sort or potential worst case emissions. Section 3.4.3 of the Environmental Impact Statement (EIS) advises that there are two proposed development phases, being: • Phase 1 (one furnace) – 100 tonnes per day (tpd), 30,000 tonnes per annum (tpa); and • Phase 2 (two furnaces) – 200 tpd, 60,000 tonnes per annum (tpa). The Air Quality Impact Assessment does not contain sufficient information to understand: • which development phases have been assessed and at what processing rate; and • if two furnaces have been assessed. Hence it is unclear if potential worse case emissions have been considered in the AQIA methodology and assessed. *The AQIA should be revised to include:* • *an assessment scenario for each phase of the project approval being sort;* • *information and assessment that adequately demonstrates that potential worst case emissions have been assessed, with consideration to the throughputs articulated within the EIS; and* • *information to clarify that two furnaces have been included within the assessment scenarios.*	The AQIA assesses Phase 2 (two furnaces). Two rotary furnace emission sources, namely C-720 and C-720a, have been included in the dispersion modelling undertaken in the AQIA. Therefore, the predicted impacts should be viewed as representative of worst case operations and emissions. Emissions intensity for Phase 1 is lower than Phase 2. Therefore, associated air quality impacts are lower than those presented in the AQIA.
Supporting information for emission estimations have not been provided. Section 6 of the AQIA advises that: • "*Emission are derived based on stack testing data from identical facilities operating the Engitec CX system*"; and • "*The emission rates (in grams per second) are derived from the expected in-stack concentrations provided by the proponent based on similar facilities*". No detailed supporting information, including the stack testing report or manufactures' specifications, has been included. As per Section 3.3 of the *Approved Methods of the Modelling and Assessment of Air Pollutants in NSW* (the Approved Methods), the EPA's preferred methods for	The in-stack concentrations presented in Table 6-1 of the AQIA were provided by the manufacturer (Engitec). These represent the upper limit emissions concentration expected for each emissions source based on the manufacturer's calculations and emissions monitoring from similar facilities. To support the adopted emission rates, stack monitoring from the operational Renewed Metal Technology (RMT) battery recycling facility located in Bomen, NSW has been sourced. With the exception of a refinery, the RMT facility uses the same technology (Engitec) as that proposed for the project (see below). The information comes from RMT's September 2016 Monthly Monitoring Report published on 5 October 2016 and submitted to the NSW EPA. The results of the stack monitoring (for the rotary furnace at the RMT facility) are presented in the following table:

Table 2.1 Government agency submissions

Matters to be addressed	Response
estimating emissions rates are direct measurement for existing sources and manufacturer's design specifications for proposed sources. *The AQIA should be revised to provide a robust justification of estimated emissions. As a minimum, reference and inclusion should be made to manufacturers' specification, emission guarantees and/or stack test data reports.*	

Pollutant	**Comparison of stack monitoring from RMT Bomen facility with adopted emission rates in AQIA**		
	Unit	**AQIA Table 6.1**	**Monitoring result RMT Bomen**
Solid particles	mg/m^3	1 (C-720), 2.5 (C-720a) and 5 (C-530/U-421)	0.88
Lead	mg/m^3	0.2 (C-720) and 0.5 (C-720a/ C-530)	0.048
Acid mist as SO_3	mg/m^3	0.7 (C-720) and 2 (C-720a)	0.41
Type 1 and Type 2	mg/m^3	1 (stack limit)	0.061
Dioxins and Furans	ng/m^3	0.04 (C-720) and 0.1 (C-720a)	0.0027
SO_2	mg/m^3	50 (C-720) and 125 (C-720a)	Max: 293.2 Min: 0 Mean: 40.5 Median: 30.8

It can be seen that, with the exception of SO_2, the measured emission rates at the RMT facility rotary furnace stack are lower than the emissions adopted in the AQIA.

The project does not include a refinery for the conversion of furnace bullion to soft and alloy lead (whereas the RMT facility includes a refinery). Refinery processing steps involve multiple operations that result in the formation and storage of an intermediate material broadly termed 'dross'. Dross contains oxidized forms of lead and other metals (typically antimony, arsenic, copper, tin, selenium, bismuth and nickel), as well as sulphur. Refining of lead bullion is a feature of the RMT facility.

The absence of a refinery process for the project will significantly reduce sulphur input to the process, thereby minimising SO_2 emissions relative to the RMT facility.

On the basis of the provided emission rates from the RMT facility, it is considered that the emission rates adopted in the AQIA are appropriate for the assessment of air quality

Table 2.1 Government agency submissions

Matters to be addressed	Response
Emissions of sulfur dioxide (SO_2) has the potential to be variable. Section 2.1.4 of the AQIA describes the desulphurisation process which involves the use of soda ash to convert the lead sulphates to sodium sulphate. Post filtration the resulting "*desulphurised*" lead paste is introduced into the rotary furnace to recover lead. The performance of the desulphurisation process step has the potential to effect the mass of sulfur entering the rotary furnace and hence the emission performance of sulfur based compounds (i.e. SO_2) from the rotary furnace(s). Section 3.3.4 of the Approved Methods includes the items that should be considered when accounting for potential variability in emissions rates. Included within Section 3.3.4 are the following items that should be considered: • manufacturers' design specifications or performance guarantees can establish the upper bounds of likely operational variability; • if no data is available to describe the distribution of emission rates, use the maximum measured or calculated emission rate; and • where practicable, emission rate data should be constructed using an averaging period that is the lesser of one hour or the sampling time used in the concentration calculations. *The AQIA should be revised to provide a robust justification of the estimated emission rates including a demonstration that any potential emission variability has adequately been accounted for. This must include:* • *a demonstration that SO2 emission rates reflect a maximum over a one hour averaging period;* • *the measures that will be implemented to minimise sulfur entering the rotary furnace; and* • *the measures that will be implemented to minimise process emission variability.*	impacts from the proposed facility. <u>Demonstration that SO_2 emission rates reflect a maximum over a one hour averaging period</u> As presented above, stack monitoring of SO_2 from the RMT facility shows that maximum measured SO_2 in-stack concentration is higher than the adopted SO_2 concentration adopted in the AQIA, while the mean and median concentrations are lower. It is reiterated that the project differs from the RMT facility in that no dross recycling will occur due to the absence of lead bullion refining activities. As a result, input sulphur and associated SO_2 emissions from the furnace will be significantly lower than the RMT facility. It is, therefore, considered that the adoption of the maximum SO_2 emission rate from the RMT facility is not appropriate for the assessment of the facility. The proponent commits to the installation of in-stack SO_2 monitoring equipment with alarms to the rotary furnace stacks. <u>Measures that will be implemented to minimise sulphur entering the rotary furnace:</u> The proponent commits to the following measures to minimise sulphur entering the furnace: • following commissioning, establish an achievable sulphur in-paste target level. • establish a quality control system whereby reject sulphur content paste is recycled to the CX system. • investigate options for CX in-stream sulphur analysis for prediction and early warning of process issues. • Employ low sulphur/high sulphur paste blending to achieve mixed on-grade material. <u>Measures implemented to minimise process emission variability:</u> The project does not feature a refinery for the conversion of furnace bullion to soft and alloy lead. Refinery processing steps involve multiple operations that result in the formation and storage of an intermediate material broadly termed 'dross'. Dross contains oxidized forms of lead and other metals (typically antimony, arsenic, copper, tin, selenium, bismuth and nickel), as well as sulphur. The absence of a refinery process at the proposed facility will significantly reduce sulphur input to the process, thereby minimising SO_2 emissions. Potential emission variability of SO_2 will be reduced to a minimum level through the routine analysis of paste sulphur content. The sulphur content of the paste will be checked through chemical analysis for each filtration batch prior to processing by the rotary furnace to make

Table 2.1 Government agency submissions

Matters to be addressed	Response
	sure that every batch performed at the rotary will have the same composition and weight (the charge in each component is weighed before being introduced into the furnace). Additionally, the operation methodology for the rotary furnace (temperatures, burner firing rate, negative pressure, rotation speed) are kept constant as much as practicable. By keeping the slag chemistry and the rotary operating parameters constant, the potential for process emissions variability is significantly reduced.
Emission estimates for arsenic have not been robustly justified. Section 6.1 of the assessment advises that "*Emission of arsenic from the project have been quantified based on the estimated arsenic content of the lead slag of 0.2%. This percentage has been applied to the estimate particulate matter emission rate to conservatively estimate arsenic emissions*". Presumable the lead slag being referred to is the remaining material post smelting in the rotary furnace. Hence the 0.2% may only account for the residual quantity of arsenic that remains after smelting and not the emissions (both particulate bound and gaseous) that occur during the smelting. *The AQIA should be revised to provide a robust justification for the emission estimation of arsenic.*	As stated previously, the project does not feature a refinery for the conversion of furnace bullion to soft and alloy lead. Refinery processing steps involve multiple operations that result in the formation and storage of an intermediate material broadly termed 'dross'. Dross contains oxidized forms of lead and other metals (typically antimony, arsenic, copper, tin, selenium, bismuth and nickel), as well as sulphur. The proposed nil refinery configuration eliminates the need to return recycle refinery drosses to the furnace. The produced bullion becomes the major outlet of all impurity inputs. As a result, the load on the smelter to meet stack emissions and solid waste environmental regulations is considerably relieved. Therefore, due to the process proposed for the facility the potential for emissions of arsenic is very low. It is noted that the emission rates for arsenic in Table 6-2 for C-720 and C-720a should read 8.71E-5 and 9.01e-5 and 7.13kg/annum in Table 6-4. The previous tables only included natural gas combustion related arsenic emissions, not process emissions from the rotary furnace stacks. The arsenic modelling was therefore revised, with a summary of predictions listed in the following table. It can be seen that with the revised emission rates, the change in predicted arsenic impacts does not differ significantly from the AQIA.
The proposed dioxin and furan discharge concentrations require clarification. Table 6-1 and 8-1 of the AQIA provide the estimated discharge concentrations for the project in mg/m^3. The estimated discharge concentration for dioxins and furans for point sources C-720 and C-720A are 0.04 mg/m^3 and 0.1 mg/m3. The *Protection of the*	The stack concentrations for dioxins and furans are indeed in units of ng/m^3, not mg/m^3 as labelled in Table 6-1 and 8-1 the AQIA. This was a typographical error.

	Predicted 99.9th percentile 1-hour average concentrations (µg/m^3)	
	AQIA	**Revised results**
Maximum across surrounding receptor locations	6.78E-03	9.85E-03
Maximum at site boundary	8.33E-02	8.37E-02
EPA criteria	**9.00E-02**	

Table 2.1 Government agency submissions

Matters to be addressed	Response
Environment Operations (Clean Air) Regulation prescribed concentration limits for dioxins and furans is 0.1 ng/m^3 (ie orders of magnitude difference with the units used for emission estimation). This is potentially a typographic error, but should be confirmed. *The AQIA should be revised to clarify the estimated discharge concentrations of dioxins and furans, and confirm that the proposal will meet the prescribed limits within the Clean Air Regulation for dioxins and furans.*	
Emission estimates for the purposes of cumulative assessment with other sources have not been robustly justified. Section 5.1 Air Quality Impact Assessment advises that cumulative impacts with neighbouring Weston Aluminium facility have been considered. The assessment advises that "*emissions data has been provided by Weston Aluminium for the inclusion in cumulative modelling of PM_{10}, $PM_{2.5}$, lead, NO_2 and SO_2*". The AQIA does not provide detailed discussion or demonstration that the emission estimates utilised are appropriate for assessing cumulative impacts. It is not clear that the recent Weston Aluminium proposal (SSD-15-7396) has been considered in conducting the cumulative assessment. Additionally the Air Quality Impact Assessment advises that the proposal will occupy part of the lot on which the West Aluminium Dross Recycling Plant is located. ATASU considers that given the proposed location of the proposal the cumulative assessment should not be limited to those criteria pollutants currently included within the cumulative assessment (particulates, lead, NO2 and SO_2). *The AQIA should be revised to:* • *include a robust justification for the emission estimates adopted from other sources on nearby premises;* • *include additional information and assessment that robustly assesses potential cumulative impacts with the recent Weston Aluminium proposal; and* • *include cumulative assessment of other compounds.*	Emissions from the Westons Aluminium facility were taken from the air quality impact assessment (AECOM 2016) for the Thermal Waste Processing Project (SSD-15-7396). For conservatism, the limit based emissions rates were adopted in the AQIA for cumulative modelling analysis. It is, therefore, considered that cumulative impacts with this proposed modification to adjacent operations has been robustly and conservatively addressed in the AQIA. In addition to the pollutants that have been cumulatively assessed (particulates, lead, NO_2 and SO_2) as per the Approved Methods, the only other pollutants that are listed for emission by both facilities are VOCs, arsenic and dioxins and furans. The Westons Aluminium facility air quality report assumed that 100% VOC emitted from the facility was benzene. Stack limit based emission rates presented in AECOM (2016) were adopted for cumulative modelling with emissions from the project. The results of the cumulative modelling, presented as the maximum 99.9th percentile 1-hour average concentration across the surrounding receptors and the maximum 99.9th percentile 1-hour average concentration at site boundary are presented in the below table. **Predicted cumulative (project + Westons) 99.9th percentile 1-hour average concentrations (µg/m³)** **Dioxins and Furans** / **Arsenic** / **Benzene** Maximum across surrounding receptor locations: 1.48E-07 / 1.02E-02 / 5.40E+00 Maximum at site boundary: 3.76E-07 / 8.37E-02 / 6.74E+00 **EPA criteria: 2.00E-06 / 9.00E-02 / 2.90E+01** The results show that, despite the highly conservative assumptions for arsenic and benzene (stack limit emission rates, 100% VOC as benzene), the cumulative concentrations are

Table 2.1 Government agency submissions

Matters to be addressed	Response
	predicted to comply with applicable EPA assessment criterion at both surrounding receptors and site boundary.
The mitigation and management measures have not been benchmarked against Best Management Practice principles. Section 3.2 of the AQIA advises "*Best Management Practice (BMP) as a guiding principle in the Protection of the Environment Operations Act, and requires that all necessary practicable means are used to prevent or minimise air pollution in NSW*". However, the assessment does not discuss or benchmark the proposal against this principle. The AQIA makes reference to similar facilities, for example in Section 6.1, for the purposes of estimating emissions. However, no comparison of control technology with other similar plants is included. Additionally, the AQIA does not discuss other control technologies including end of pipe controls which may be feasible for implementation. *The AQIA should be revised to include additional information that demonstrates the adoption of best management practice mitigation measures, including but not necessary limited to end of pipe controls.*	The mitigation measures proposed for the facility are in accordance with many of the Best Available Technology listed in the European Commission Integrated Pollution Prevention and Control (IPPC) Reference Document on Best Available Techniques in the Non Ferrous Metals Industries (IPPC, December 2001). These include: • desulphurisation of lead paste prior to processing in the rotary furnace, significantly reducing the potential for SO_2 emissions; • routine checking of the sulphur content of the rotary furnace feed; • pollution control devices fitted with triggers to automatically shut down processes in the event of control failure; • complete process enclosure and ducting to control technologies under negative pressure to eliminate fugitive emissions; • use of oxyfuel burner technology to thermally destruct potential dioxins and furans and VOC emissions from the furnaces; and • routine sweeping of sealed surfaces at the project site (access roads, hardstand, etc).
Hunter New England Local Health District *Air Quality* The Air Quality Impact Assessment (AQIA) determined that the Battery Recycling Facility has the potential to emit a range of air pollutants including dust, particulate matter (PM_{10} and $PM_{2.5}$), lead, nitrogen dioxide, sulphur dioxide, sulphur trioxide and sulphuric acid mist, volatile organic compounds, arsenic, dioxins and furans. The EIS identifies the emission control technology to be implemented to manage these pollutants. HNEPH understands that emission limits will be provided by the Environmental Protection License. The EIS assesses a range of predicted emissions including particulates and toxics as described in Tables 8-2; 8-3; 8-4; 8-5 and 8-6 respectively of the AQIA. The predictions all fall well below NSW EPA criteria. The process has been used in other facilities and the emission profile is well understood. There appears to be minimal incremental air impact on the surrounding community, however, it will be important to factor in potential emissions from the proposed Thermal Waste Processing Facility at Weston Aluminium and continue to decrease the emissions to air. During the construction phase, dust management strategies should be implemented to minimise health impacts to the surrounding community.	Comments are noted. Emissions adopted in the cumulative modelling of the Weston Aluminium facility account for the proposed Thermal Waste Processing Facility as detailed above.

Table 2.1 Government agency submissions

Matters to be addressed	Response
Noise	
Environmental noise can have negative impacts on human health and well-being. Receivers in the locality surrounding the industrial area are primarily residential and commercial. During Construction of the ULAB Recycling Facility, noise modelling indicates there is unlikely to be significant exceedances. Once the Facility is built, noise emissions are not anticipated to significantly exceed guideline levels.	The noise and vibration assessment (Appendix H to the EIS) prepared for the project undertook a sleep disturbance assessment for night time operations (10 pm to 7 am). The assessment found that night time operations were unlikely to cause sleep disturbance at any of the assessment locations and with noise levels meeting the Industrial Noise Policy sleep disturbance screening criteria at all but one assessment location.
Noise management measures as identified in the EIS such as the enclosed acoustic chamber in the crushing plant are to be utilised to ensure there are no exceedances.	It should be noted that the sleep disturbance assessment was undertaken for worst case operating and meteorological conditions and can be considered highly conservative. Under normal operating conditions, exceedances of the sleep disturbance criteria is unlikely even during worst case meteorological conditions.
In order to reduce sleep disturbance, truck movements should be limited to between the hours of 7am to 10pm, since sections of the vehicle route are still proximal to residences.	Further, work practices during the night period will be appropriately managed to minimise the impact and number of potential sleep disturbance events with the commitments in Table 8.1 of the EIS to be adopted. Therefore, it is considered unwarranted to restrict truck movements to a site operating in a heavy industrial area between 7 am and 10 pm.
Surface water	
The operator should ensure there is minimal impact from the proposed development on the water quality of surrounding natural waterways, particularly from stormwater runoff. All wash down water and water collected in sumps is to be separated from the stormwater system. The stormwater control system should be monitored for potential contaminants.	The stormwater management strategy documented in the Surface Water Assessment has been established to mitigate water quality impacts. Refer to Table 4.1 of the Surface Water Assessment for an overview of the proposed stormwater management measures. All wash-down water will be separated from stormwater and treated in the water treatment plant prior to being used onsite in the ULAB recycling process. Surface water quality monitoring will be undertaken on a quarterly basis, during wet weather. Refer to Section 7.1 of the Surface Water Assessment for further details on the proposed water quality monitoring program.
Soil and groundwater	
HNEPH understands that the land to be developed is heavily disturbed with disused industrial equipment and fill from other sites. Some contaminants such as petroleum hydrocarbon compounds below guideline criteria were identified on site. Construction on the land is to occur so that the fill is managed to minimise impact on surrounding areas.	As detailed in Section 2.4 of the Preliminary Contamination Assessment (Appendix K of the EIS) fill from the neighbouring aluminium recycling facility was placed in the northern area of the site periodically since 2010. The fill material was removed from the site in April 2016 and the excavated area re-filled with natural material from the south-eastern end of the site. Therefore, no further management of the fill is required.
Soil contamination with ULAB materials could occur as a result of failure of containment processes such as spills and stormwater ingress. Containment and spill response planning should be part of the site management and emergency response	Containment and spill response measures are included in the proposed statement of commitments for the project (refer to Table 8.1 of the EIS).

Table 2.1 Government agency submissions

Matters to be addressed	Response
plan.	
Lead	
Battery processing will result in significant lead dust levels. Compliance measures and engineering controls as identified in the EIS should be strictly adhered to so that the risk of lead exposure to employees and their close household contacts is minimised.	The proponent is committed to providing a safe and healthy workplace for its employees and would implement the compliance measures and engineering controls identified in the EIS and in the Human Health Risk Assessment (Appendix D of the EIS).
Cessnock City Council	
Air quality	
Council recognises that the Air Quality Impact Assessment provided presents results of dispersion modelling conducted. These results indicate that the operation would be highly unlikely to result in exceedances of the relevant assessment criteria at surrounding sensitive receivers. Information on pollution control equipment has been provided. Ongoing monitoring of discharge points and other areas on site should be included as a requirement on the Environmental Protection Licence.	The comments are noted and the proponent raises no objection to the inclusion of monitoring requirements on the Environment Protection Licence.
Human health	
The Human Health Risk Assessment identified exposure to dust through site operations as a health impact with dermal contact, incidental ingestion and inhalation in indoor areas as the exposure pathways with particular focus on lead. It is important that this report be reviewed by NSW Health and Safe Work NSW with regards to the health impact on workers, and that any recommendations from those government departments be adopted.	No response required. It is noted that NSW Health and Safe Work NSW were consulted during preparation of the EIS.
Contamination	
The EIS provides a preliminary investigation and the recommendation of a construction environmental management plan in lieu of a detailed investigation. The project may warrant a detailed investigation to be conducted, including the sampling of groundwater. Depending on the results of the detailed investigation, remediation and validation may be required. In any case and noting the heavy industrial use, the site should be suitable for the intended use.	Clause 7(2) of the State Environmental Planning Policy No. 55 Remediation of Land (SEPP 55) requires a consent authority to consider a report specifying the findings of a preliminary investigation of the land concerned carried out in accordance with the contaminated land planning guidelines. Clause 7(3) of SEPP 55 requires a detailed investigation (as referred to in the contaminated land planning guidelines) if the consent authority considers that the findings of the preliminary investigation warrant such an investigation. The *Preliminary Contamination Investigation* (Appendix K of the EIS) undertaken for the project was prepared in accordance with the *Managing Land Contamination Planning Guidelines: SEPP 55 – Remediation of Land* (Department of Urban Affairs and Planning (DUAP) 1998). The *Preliminary Contamination Investigation* was supported by onsite soil investigations. It did not identify significant contamination issues that would preclude the proposed future land use as an industrial facility. Therefore, preparation of a detailed

Table 2.1 Government agency submissions

Matters to be addressed	Response
investigation is not warranted in accordance with SEPP 55.	
Car parking In accordance with *Chapter* C1 *Parking and Access* of the *Cessnock Development Control Plan 2010* (DCP), car parking is required at the following rates: **Land use** / **Parking requirement** / **Site area/employee** / **Parks required** Industrial premises (Building 5 only) / 1 space per 75 m^2 of gross floor area, or 1 space per 2 employees whichever is greater / 4,752 m^2 73 employees / 63.36 spaces or 36.5 spaces Office premises (Building 3 only) / 1 space per 30 m^2 of gross floor area / 216 m^2 / 7.2 spaces From the table above, a total of 71 car parking spaces are required to be provided on site in conjunction with the proposed development. It is noted that the plans identify the provision of 46 car parking spaces. Therefore, based on Council's car parking requirements we would recommend a further 25 car parking spaces be provided on site.	Section 3.3 of the Traffic Assessment (Appendix G of the EIS) considers the parking requirements of the *Cessnock Development Control Plan 2013*. It was considered that these requirements are excessive and unwarranted for the project as the actual site car parking demand, based on the proposed workforce and contractor numbers, will be significantly lower than the 71 car spaces as suggested by CCC. The proposed car parking provision of 46 car spaces was determined to be adequate for the proposed employment numbers and use of the site. Further, it is noted that development control plans do not apply to SSD projects.
Vehicular access The Hart Road and Government Road intersection is an existing intersection which was upgraded by line marking a CHR(s) type turning treatment and constructing a concrete median on the Hart Road leg of the intersection. Additional detail is required to show that a B double is able to turn onto Hart Road from Government Road without mounting the medium and entering the road shoulder.	The Hart Road and Government Road intersection is currently designated by RMS as a 26 m B-Double route. This designation is a result of investigations by RMS and, accordingly, it can be safely assumed that the turning paths at the Hart Road and Government Road intersection are adequate. Therefore, additional investigation of this intersection is not warranted for the project.
An assessment of the intersection into the development using Figure 4.9 of *"Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections"* indicates that a Basic Right and Basic Left turn treatment is required for the development.	Preliminary intersection design plans are provided in Appendix A.
If the secondary access is to be used, the following should be required: • details showing the location of the access on site; • a formal letter signed by all parties confirming the land owners consent to use their land for access; • a condition to be included requiring a suitable easement be created to formalise the access way; and • the existing gravel access road and crossover to be required to be upgraded to a	Use of the secondary access is still undergoing investigation. Should the necessary land access arrangements be made, then the proponent would commit to undertaking the proposed requirements. These would be undertaken prior to construction of a secondary access.

Table 2.1 Government agency submissions

Matters to be addressed	Response
sealed two lane two way access road to Council standards.	
Transport routes to and from the proposed facility should be via the most direct route to the State Road network with a preference to the Hunter Expressway (M15 wherever possible) and minimise impacts on surrounding local road networks.	As detailed in the EIS, the use of the Hunter Expressway is the preferred route for project related traffic. However, it may be necessary for some heavy vehicles and light vehicles to use local roads to access areas not accessible via the Hunter Expressway. The traffic assessment for the project (Appendix G of the EIS) determined that these traffic movements would not have a significant impact the local road network.
Where local road networks are proposed to be used, Council would like to discuss appropriate developer contributions arrangements to be applied to any approval to ensure local road networks servicing the development can be maintained and or upgraded where required.	Pymore has consulted with CCC on this matter, including a holding a meeting on 1 February 2017. Based on those discussions, Pymore, has agreed to enter into a voluntary planning agreement (VPA) with CCC for the provision of monetary contributions to be allocated towards road infrastructure projects on either Mitchell Avenue, Government Road and Hart Road. On 20 February 2016, EMM on behalf of Pymore, wrote to CCC stating that Pymore has consented to the following essential terms of a proposed VPA to be made pursuant to section 93F of the EP&A Act): 1. Upon taking a final decision to proceed with the construction of the project, Pymore will enter into a VPA with CCC before the commencement of construction; 2. Within one month of the commencement of operations with the first furnace, an amount of $50,000 for allocation towards road infrastructure projects on either Mitchell Avenue, Government Road and Hart Road; and 3. Within one month of the installation of the second furnace, an amount of $50,000 for allocation towards road infrastructure projects on either Mitchell Avenue, Government Road and Hart Road. The offer made to CCC is subject to a formal offer to enter into a VPA in accordance with the EP&A Act, Ministerial directions and relevant VPA Practice Notes. It is envisaged that should the DPE, as delegate to the NSW Minister for Planning, grant development consent to the project, a condition will be imposed on the consent requiring that Pymore to enter into a VPA with the CCC before the commencement of construction in accordance with the above terms. A copy of the letter to CCC providing the essential terms of a VPA is provided in Appendix J.
Storm water	
With the proposed embankment batters being steeper than the 1V:6H, suitable basin safety measures are to be provided such as fencing around the basin.	As detailed in Section 3.4.8 and shown in Appendix B of the EIS, a 2.5 m boundary fence would be constructed around the permitter of the site which would prevent public access to the basin.
The onsite detention basin has been positioned below the 1 % AEP flood level. As a	Justification was provided to CCC regarding the detention basin location as detailed above.

Table 2.1 Government agency submissions

Matters to be addressed	Response
result, the site will not adequately attenuate the pre and post developed flows for the 1 % AEP and potentially the 2% AEP flood events. The basin should be relocated to be outside the 1 % AEP flood plain and to ensure the outlet pipe is above the 1 % AEP flood level.	This justification was accepted by CCC's Consultant Senior Development Engineer Craig Maher in correspondence to Chris Kuczera from Royal Haskoning DHV on 10 February 2017 (refer Appendix K of this RtS).
Visual impact	
The development includes buildings with elongated walls and roof lines that present significant building mass. The use of architectural features/articulation for the purpose of reducing building bulk should be considered in the context of the site, noting this is a heavy industrial zone.	The design of proposed buildings is considered appropriate for an industrial complex and the intended use. Proposed architectural features and articulation are shown in 3D drawings provided in Appendix G to this RTS. Additional signage is proposed on Building 5 as shown in Appendix H. This signage is considered to be compliant with the relevant provisions of State Environmental Planning Policy No. 64 – Advertising and signage.
Rooftop plant or equipment should not be avoided on the buildings. Alternatively, well designed screening should be used to reduce the visual impact of the development.	It is assumed that the submission should state "Rooftop plant or equipment should be avoided on the buildings". As shown in Appendix B of the EIS and in the 3D drawings, no rooftop plant or equipment is proposed with the exception of emission stacks. Placement of these stacks elsewhere is not considered appropriate. Further, the plant will be well screened from public viewpoints by existing and proposed vegetation and the AllightSykes building to the south.

3 Community submissions

Responses to the community submissions (individual and businesses) received during exhibition of the EIS are provided in Table 3.1.

Table 3.1 Response to matters raised in community submissions

Submission	Response
Ben Clibborn, Weston NSW	
Air quality	
A number of proposals are going through the assessment process (ie neighbouring dross plant and Kurri hydro) at current all with air quality impacts. The department should consider an independent cumulative assessment of air quality impacts prior to approval of any of the developments including a recommended best practice monitoring network. If the projects are assessed individually it could lead to significant air quality impacts.	The air quality and greenhouse gas assessment (Appendix I of the EIS) included a cumulative assessment of existing and proposed industrial operations including the neighbouring Weston Aluminium Recycling Facility and the former Hydro Aluminium smelter. The assessment found that cumulative emissions would satisfy relevant EPA criteria at all assessment locations. The preparation of an independent cumulative assessment is at the discretion of DP&E and no response is required.
Noise	
A condition of consent should be to employ best practice noise mitigation measures. At my residence in close proximity to the site, my sleep has been disturbed in the past by reversing beepers from nearby activities. A condition of consent to use broadband reversing alarms should be imposed. They are relatively low cost and would be very helpful in reducing noise impacts upon the local community.	The noise and vibration assessment (Appendix H to the EIS) prepared for the project undertook a sleep disturbance assessment for night time operations (10 pm to 7 am). The assessment found that night time operations were unlikely to cause sleep disturbance at any of the assessment locations and with noise levels meeting the Industrial Noise Policy sleep disturbance screening criteria at all but one assessment location. It should be noted that the sleep disturbance assessment was undertaken for worst case operating and meteorological conditions and can be considered conservative. Further, work practices during the night period will be appropriately managed to minimise the impact and number of potential sleep disturbance events with the commitments in Table 8.1 of the EIS to be adopted. These include the use of broadband reversing alarms (growlers) on site equipment.
Traffic	
The traffic assessment completed suggests `minimal' impact upon the local road network. In my opinion the current road network is overloaded with local government struggling to maintain let along improve the road network in particular the intersection of Hart road, Government road, Gingers land and Swayers gully road. Once the bridge works on frame drive are completed commuters travelling from Cessnock to Newcastle will use this road and add further traffic to the previously mentioned intersection. The traffic counts were carried out in March 2016 with the Frame Drive bridge still closed, therefore the traffic assessment does not reflect traffic volumes following the bridge being reinstated. The assessment needs to include the following: • consideration of predicted traffic volumes following	Although future road improvements may be warranted at the intersection of Hart Road, Government Road, Sawyers Gully Road and Gingers Lane, the need for these works would be related to recent changes to traffic patterns in the locality following the capacity improvement to the Frame Drive Bridges, which allows for more traffic travelling between the Cessnock area and the Hunter Expressway to use the route via Gingers Lane and Hart Road to access the expressway. For improved traffic management of the future regional traffic movements at this intersection, it may be more appropriate to replace the existing four way Give Way sign controlled cross intersection with a roundabout. It is considered that this future need for a change to the

Table 3.1 Response to matters raised in community submissions

Submission	Response
Frame drive bridge reinstatement; and • consideration of council contribution to road upgrades in particular the intersection of Hart Road, Government Road, Gingers Lane and Sawyers gully road. Suggested conditions on consent/further works: • contribute to the upgrade to the Gingers Lane, Sawyers Gully Road, Hart Road and Government Road intersection to the satisfaction of Cessnock City Council.	intersection priority at this location is not related to the project. Nevertheless, Pymore has agreed to enter into a VPA with CCC to provide contributions to road upgrades including intersections used by project traffic on Hart Road, Government Road, and Mitchell Avenue.
Weston Aluminium Pty Ltd	
In support of the project	No response required.

4 Updated commitments

Chapter 8 of the EIS (EMM 2016) summarises the commitments made by Pymore to manage potential environmental impacts resulting from the project. These commitments, along with additional commitments as described in this RTS (highlighted in bold) are summarised in Table 4.1.

Table 4.1 Summary of mitigation measures described in the EIS and this RTS

Key issue	Management measure
Waste management	Management of construction wastes would be detailed in a Construction Management Plan. An operational waste management plan would be prepared and implemented during the project.
Human health	To reduce employee's lead dust exposure during the operation of the facility, a number of control measures would be implemented. These would include: • compliance with WHS Regulation 2011 requirements to control exposure; • implementation of specific engineering controls; • provision of PPE; • conducting health monitoring and blood level monitoring of all employees; and • provision of employee education and awareness campaigns.
Hazards and risk	An automatic slam shutoff valve should be provided for the natural gas supply to ensure that leaks can be isolated. The following safety systems (maintained by the transport contractors) would be provided for the proposed transport operations, in compliance with the ADG Code and relevant Australian standards: • induction training for drivers including training in emergency response, fire fighting, first aid and handling procedures for materials; • appropriate dangerous goods licenses for transport of hazardous materials; • mobile phones and/or radios for communication to emergency services and to the transport company base; • fire extinguishers on trucks, where applicable; • covering slag during transport; • an ERP provided to drivers including emergency services contact numbers and safety data sheets; • regular maintenance and inspection of trucks for roadworthiness and containment integrity; • contract requirements for loading and handling procedures; and • DG driver licensing requirements. **To mitigate the risk of contamination during the removal and transportation of lead dross, an access door shall be provided from the foundry section to the charge preparation section. The access door will be included on detailed design plans submitted for the construction certificate.**
Traffic and transport	A construction stage traffic management plan would be required for the management of the project site access (including any travel requirements for oversize vehicles) during the construction stage. This plan would be prepared prior to construction commencing. Additional site traffic management measures (including a code of conduct for the site truck drivers) would be considered to help specify preferred transport routes which would minimise the potential future traffic safety, noise and residential amenity impacts of the site truck traffic in the vicinity of other nearby urban areas of Kurri Kurri.

Table 4.1 Summary of mitigation measures described in the EIS and this RTS

Key issue	Management measure
Noise and vibration	Management measures that would be implemented during construction and operation to minimise noise impacts would include: • properly maintaining plant to ensure rated noise emission levels are not exceeded; and • undertaking construction activities guided by AS2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites; Universal work practices to minimise noise and vibration emissions include: • regular reinforcement (such as at toolbox talks) of the need to minimise noise and vibration; • regular identification of noisy activities and adoption of improvement techniques; • avoiding the use of portable radios, public address systems or other methods of site communication that may unnecessarily impact upon residents; • minimising the use of equipment that generates impulsive noise; • minimising the movement of materials and plant and unnecessary impacts; • minimising truck movements; and • scheduling respite periods for intensive works. Measures to minimise noise emissions from plant and equipment include: • choosing quieter plant and equipment, including installing best-practice noise suppression equipment, based on the optimal power and size to most efficiently perform the required tasks; • using temporary noise barriers (in the form of plywood hoarding or similar) to shield intensive construction noise activities from residences if required; • operating plant and equipment in the quietest and most efficient manner; and • regularly inspecting and maintaining plant and equipment to minimise noise and vibration level increases, to ensure that all noise and vibration reduction devices are operating effectively; • low-frequency reversing alarms (“growlers”) would be used rather than the standard high frequency beepers; • plant and equipment would be switched off when not in use; • any vehicle queuing would be on site rather than on public roads; and • material drop heights and materials dragging along the ground would be minimised. Work scheduling to minimise the impact of noise include: • scheduling construction activities such that the concurrent operation of plant is limited; • scheduling activities to minimise impacts by undertaking all possible work during hours that would least adversely affect sensitive receivers and by avoiding conflicts with other scheduled events; • scheduling work to coincide with non-sensitive periods; • scheduling noisy activities to coincide with high levels of neighbourhood noise so that noise from the activities is partially masked and not as intrusive; • planning deliveries and access to the site to occur quietly and efficiently and organising parking only within designated areas located away from the sensitive receivers; • optimising the number of deliveries to the site by amalgamating loads where possible and scheduling arrivals within designated hours; • designating, designing and maintaining access routes to the site to minimise impacts; and • conducting high vibration generating activities in continuous blocks, with appropriate respite periods as determined through consultation with potentially affected neighbours.
Contamination and soils	It is recommended that a Construction Environmental Management Plan is prepared for the development of the site, which should include an unexpected finds protocol to ensure that as yet undiscovered contamination, if encountered, can be appropriately managed.

Table 4.1 Summary of mitigation measures described in the EIS and this RTS

Key issue	Management measure
	If evidence of contamination is encountered during the construction phase of works, advice should be sought from an appropriately qualified environmental consultant. In addition the construction phase of works should ensure no contamination is introduced to the site.
Surface water	A surface water monitoring program will be implemented that comprises quarterly monitoring of a full suite of analytes during wet weather conditions **and installation of a continuous water level logger**. Water quality monitoring data will be reviewed annually as part of the Annual Environmental Monitoring Report. A flood evacuation procedure will be established as part of the site's Emergency Management Plan. The following management measures have been proposed to mitigate potential flood impacts associated with increases to peak flows and filling, respectively: • detention storage will be provided to reduce developed conditions peak flows to existing rates for the 100 year ARI and lower magnitude rainfall events; • the detention basin and embankment will be established in cut to avoid any localised increases in surface levels; and • any fences established to the north of the retaining wall will be low profile to minimise any impacts to flow conveyance. The following flood risk management measures will be implemented: • all hazardous materials are to be stored and processed in fully enclosed and bunded buildings that have a minimum FFL of 15.6 m AHD. This provides 4.1 m freeboard to the peak 1% AEP and 3.1 m freeboard to the peak 0.5% AEP levels; and • site staff will be able to take refuge in building 3 if required.
Aboriginal heritage	If unexpected Aboriginal objects or sites are uncovered during the course of development, work will cease and a qualified archaeologist will be contacted to conduct a preliminary assessment. If the find is confirmed to be a relic, the Heritage Council must be notified. In the event that known or suspected human skeletal remains are encountered during the activity, the procedures detailed in Appendix L will be followed.
Historic heritage	If unexpected historical archaeology is discovered during construction, work in the immediate area must cease and an archaeologist would be contacted to make an assessment of the find. If it is determined to be a relic under the Heritage Act, further investigation may be required.
Fire and incident management	The following spill response and management measures would be implemented: • spilled materials would not be touched and walking through spilled material would be prohibited; • the extent of each spill would be assessed. If significant and hazardous, the alarm would be activated, emergency services would be contacted and personnel would be evacuated to the designated Emergency Assembly Point; • appropriate PPE would be selected and implemented dependent on the type of spilt material; • first aid would be delivered (if necessary); • all ignition sources within the immediate area would be eliminated; • all combustible materials would be kept away from spilled materials; • entry of spilled materials into waterways, sewers and confined areas would be prevented; • small spills would be contained using spill kits, absorbent pads, sand or other non-combustible absorbent material and placed into appropriate containers for disposal; • for large spills, temporary bunding would be installed ahead of the liquid spill for later disposal; • sulphuric acid spills would be neutralised with lime or soda ash; • dry lead spills would be vacuumed using a high efficiency particulate arrester vacuum; • once the bulk of the spilled material has been removed, spill areas would be appropriately cleaned; and

Table 4.1 Summary of mitigation measures described in the EIS and this RTS

Key issue	Management measure
	• waste materials would be disposed of in accordance with EPA requirements.
Visual	The site entrance on Mitchell Avenue is to be landscaped and kept tidy.
Biodiversity	Management and mitigation measures that would be implemented during construction and operations to minimise biodiversity impacts would include: • clearing limits would be clearly delineated in the field, which would be especially pertinent to the northern area of the site where, as described above, all direct impacts on RFEF EEC would be avoided; • the final design would be reviewed to determine if any Earps Gum can be retained. If any Earps Gum can be retained, an ecologist would mark them in the field and they would be fenced for the duration of the construction period; • a clearing procedure will be prepared which details the methods to be implemented during clearing. This procedure will include detailed instruction on the two-stage clearing protocol for felling of hollow-bearing trees in the site boundary, as well as, a requirement for a suitably trained fauna handler to be present during hollow-bearing tree clearing to rescue and relocate any displaced fauna. The clearing procedure should also mandate the completion of preclearance surveys to determine whether nesting birds are present; and • appropriate sediment and erosion controls will be implemented to ensure that there are no off-site impacts resulting from the project, particularly to Swamp Creek. A biodiversity offset strategy will be prepared to identify offsets to compensate for the project's impacts. The biodiversity offset strategy will be finalised in consultation with OEH, DP&E and DPI – Lands within 12 months of obtaining project approval.
Socio-economic	Wherever possible, a preference for local employment would be made. Further, local contractors should be encouraged to tender for work, both during the construction and operations phase.

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Appendix A

Intersection Design Plans

SCALE 1:750 (A3)

TRANSPORT AND URBAN PLANNING
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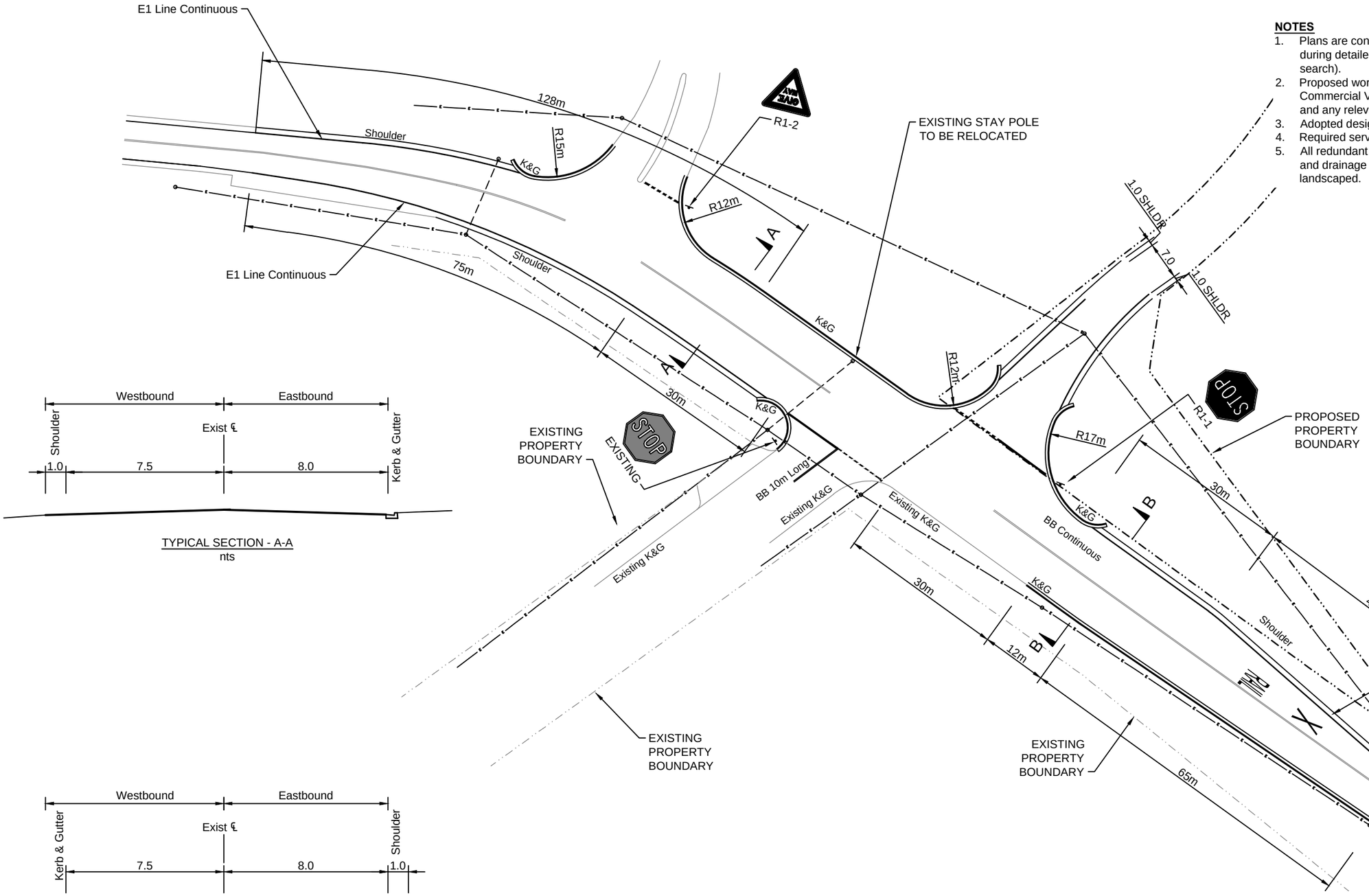
FIGURE 1

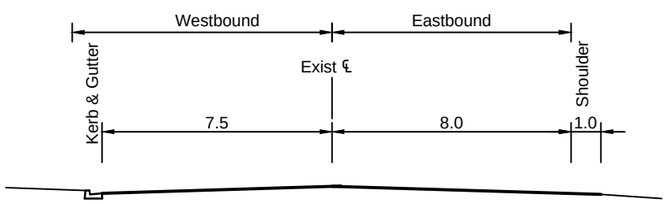
BATTERY RECYCLING FACILITY, KURRI KURRI
PRELIMINARY CONCEPT DESIGN
PROPOSED ACCESS DRIVEWAY

SITE PLAN

JOB NO.17018 09/02/17



TYPICAL SECTION - A-A
nts



TYPICAL SECTION - B-B
nts

NOTES

1. Plans are conceptual only with all proposed works to be confirmed during detailed design phase (including detailed survey and services search).
2. Proposed works shall be in accordance withAS 2890.2 Off-street Commercial Vehicle Facilities; AustRoads "Guide to Road Design" and any relevant RMS Supplements, standards and guidelines.
3. Adopted design vehicle - 25m B-Double
4. Required services relocations to be confirmed during detailed design.
5. All redundant pavement, kerb and gutter, guardrail, street furniture and drainage structures to be removed and area rehabilitated and landscaped.

SCALE 1:750 (A3)

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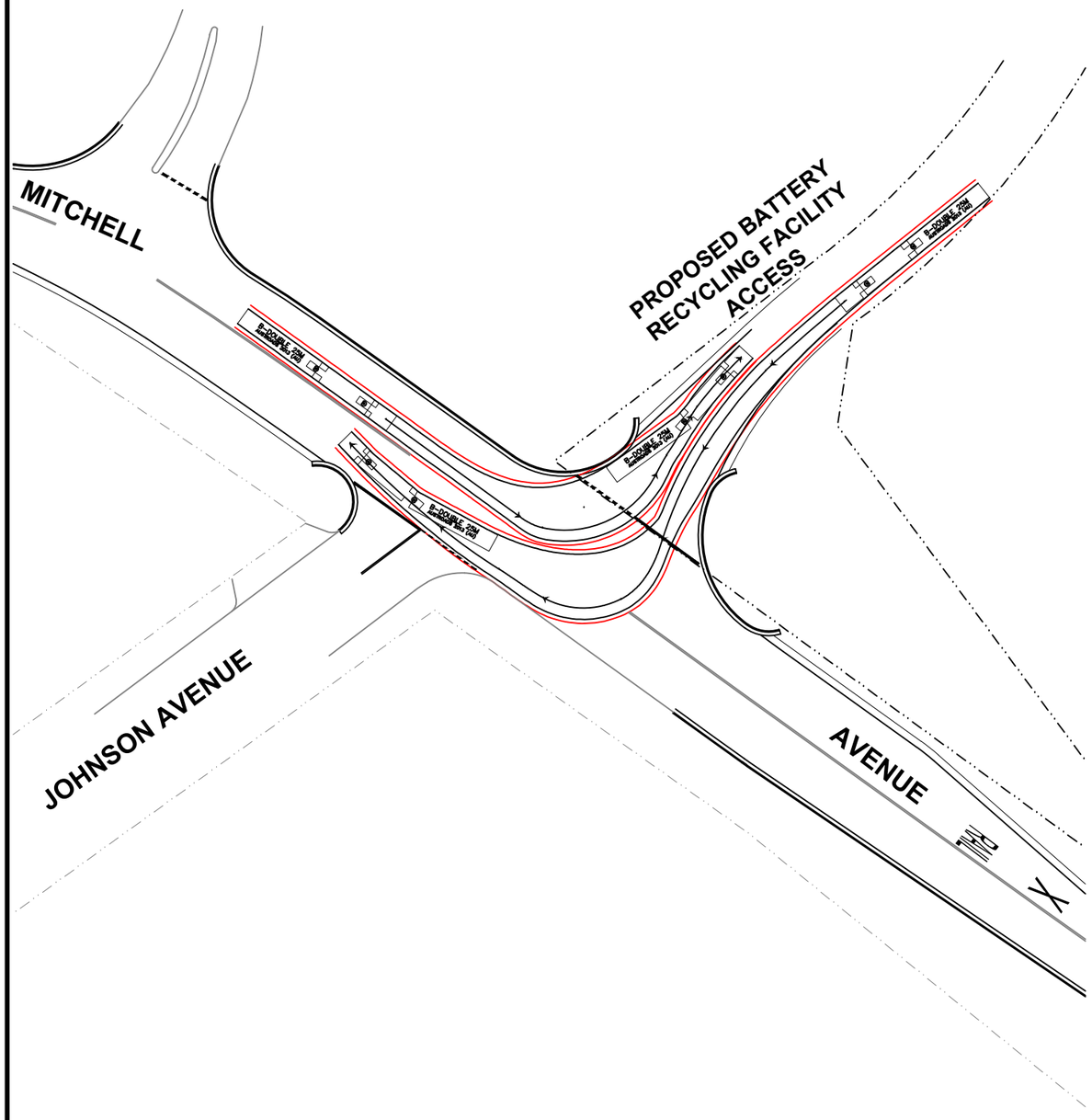
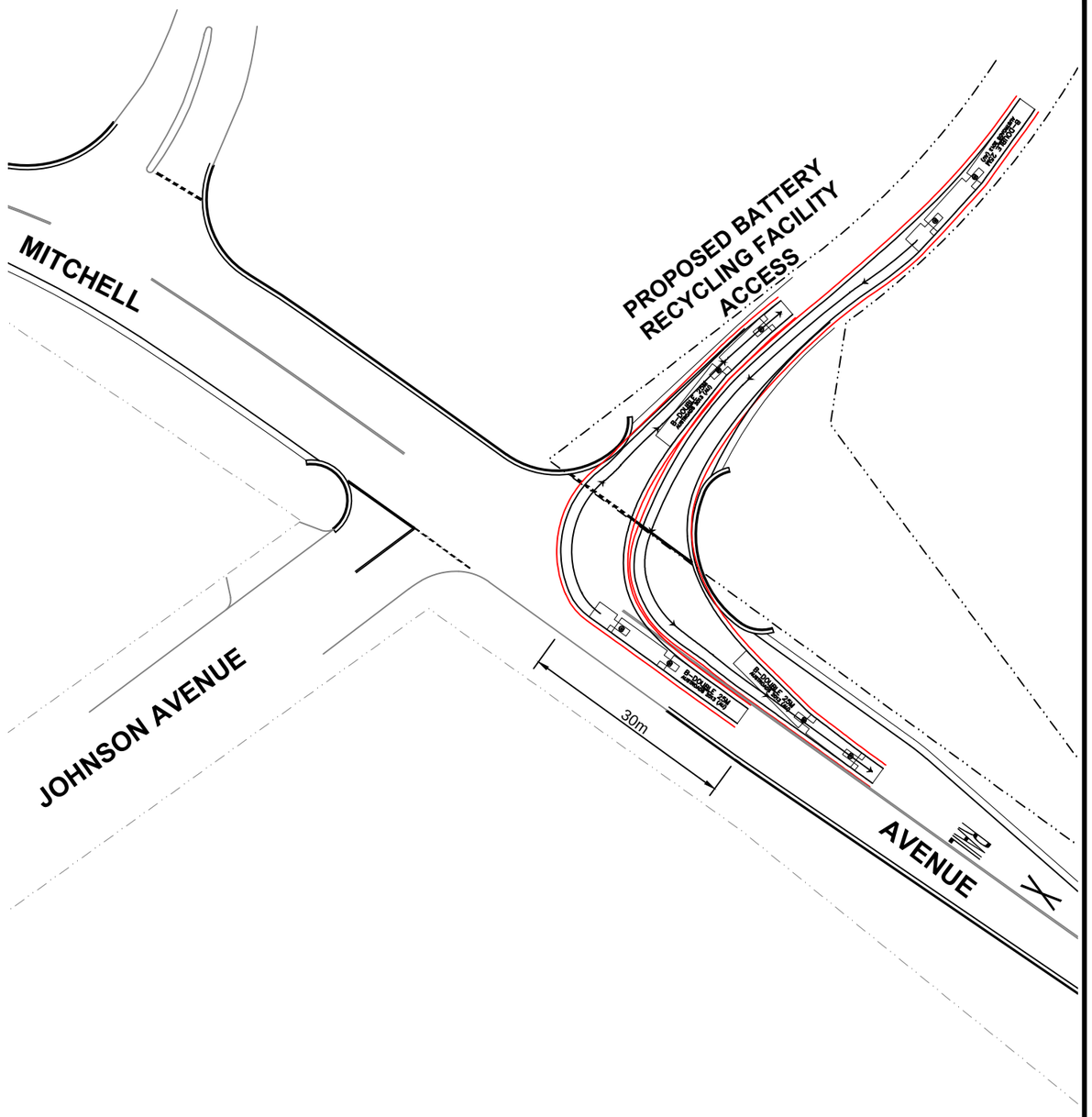
FIGURE 2

BATTERY RECYCLING FACILITY, KURRI KURRI
PRELIMINARY CONCEPT DESIGN
PROPOSED ACCESS DRIVEWAY

LAYOUT

JOB NO.17018 09/02/17





NOTES

1. Adopted design vehicle - 25m B-Double
2. RED line indicates 600mm clearance to vehicle body.

SCALE 1:750 (A3)

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FIGURE 3

BATTERY RECYCLING FACILITY, KURRI KURRI
PRELIMINARY CONCEPT DESIGN
PROPOSED ACCESS DRIVEWAY

TURNPATHS

JOB NO.17018 09/02/17

Appendix B

Preliminary Hazard Analysis Addendum

TECHNICAL NOTE

KURRI KURRI BATTERY RECYCLING FACILITY

RESPONSE TO NSW DPE COMMENTS ON PHA

EMM CONSULTING PTY LTD

Rev	Date	Description	Prepared	Checked	Approved	Method of issue
DRAFT	08-Feb-17	Draft for internal review	S. Chia			-
A	21-Feb-17	Issued to Client for comments	S. Chia P Johnson	G. Peach	G. Peach	Email [PDF]
0	24-Feb-17	Updated with client comments	P Johnson	G Peach	G Peach	Email [PDF]

QA verified	**H de Vries**
Date	**24-Feb-2017**

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CONTENTS

TABLES

FIGURES

ABBREVIATIONS

AHD	Australian Height Datum
(NSW) DPE	Department of Planning and Environment
EIS	Environmental Impact Statement
H_2S	Hydrogen Sulphide
H_2O_2	Hydrogen Peroxide
HAZID	Hazard Identification study
HAZOP	Hazard and Operability study
Na_2S	Sodium Sulphide
OEH	(NSW) Office of Environment and Heritage
PHA	Preliminary Hazard Analysis
PLC	Programmable Logic Controller
SSD	State Significant Development
STEL	Short Term Exposure Limit
ULAB	Used Lead Acid Battery

1. INTRODUCTION

1.1. Background

Pymore Recyclers International Pty Ltd (Pymore) is proposing to construct a Used Lead-Acid Battery (ULAB) recycling facility (the project) at 129 Mitchell Avenue, Kurri Kurri (the site). As a State Significant Development (SSD), EMM Consulting Pty Ltd (EMM) was commissioned by Pymore to prepare the Environmental Impact Statement (EIS). In turn, Sherpa Consulting Pty Ltd (Sherpa) was retained by EMM to prepare the Preliminary Hazard Analysis (PHA).

The EIS was placed on public exhibition for four weeks from 17 November to 16 December 2016. On 22 December 2016, the Department of Planning and Environment (DPE) requested a report be prepared that responds to the matters raised in submissions received during exhibition.

1.2. Purpose of Technical Note

This technical note has been prepared to address NSW DPE and the Office of Environment and Heritage (OEH) queries (9, 10, 11, 12 and 13) related to the PHA study (Document number: 21094-RP-001-Rev0, 28 October 2016).

The responses were prepared by Sherpa following consultation with Pymore and the technology vendor Engitec. The responses are provided in Section 2.

2. RESPONSES TO NSW DPE – PHA STUDY

2.1. DPE Query 9 – Accumulation of Flammable Explosive Mixtures

The accumulation of flammable explosive mixtures, enriched with oxygen, within the rotary furnaces, due to failure of primary and secondary (pilot) burners, has not been identified as hazard in the PHA. As such, please provide further information on the consequences (with detailed analysis), risk, safeguards and recommendations relevant to this hazard, including consideration for both furnaces operating simultaneously and accident propagation.

The comment in item 25, Table A.1 of the PHA states 'furnace explosion localised'. However, the consequence analysis for furnace explosion resulting in overpressure and heat radiation is not detailed in Section 6.4 of the PHA.

2.1.1. Response

Additional information on the furnace has been provided by Engitec, and the furnace hazardous scenarios have been updated into the Hazard Identification (HAZID) in Table 2.1.

In the case of extinguishment of the burners, continued operation of the rotary furnace is unlikely to happen as it is provided with flame detection systems that would automatically shut off the burner feed valves and remove the burner from the furnace. The likelihood of a furnace explosion was therefore considered unlikely.

With any gas-fired appliance, the potential for build-up of an explosive atmosphere within the appliance exists, followed by an ignition and explosion. For this facility a failure of the burner management system could allow natural gas to leak into the rotary furnace while offline.

Internal explosions have the potential to cause damage due to thermal radiation, overpressure effects and possibly projectiles. They can pose a significant hazard to operators in the vicinity. A search of rotary furnace explosions was carried out and the only incident found was in the USA[1], where a rotary furnace was filled with natural gas and then a vent opened. Although this was used for aluminium smelting, the furnace type and size is equivalent to that used in the Engitec process. The resulting consequence was described in the hearing decision as follows:

> *'When he opened the door, air from outside the furnace entered it and ignited the natural gas, causing an explosion. The explosion created a fireball that burst out of the furnace. The Contractor felt the heat of the fireball as he stood in the crow's nest, 20 feet away. The fireball left scorch marks on the furnace. The explosion traveled up through the ductwork and damaged several sections of the duct work as well as several duct support beams. No employees were injured (Exhs. C-4 through C-9; Tr. 64-65, 97-98).'*

[1] http://www.oshrc.gov/decisions/html_2013/12-1129.htm

The consequence of such an event would therefore appear to be a fairly localised fireball (effects 'felt' approximately 6 m from source) rather than a large overpressure event. The fire would be in the direction of the furnace opening; generally towards the towards the eastern wall of the building, vertically upwards or downwards.

Given the controls in place and relatively small impact area, off-site effects are considered unlikely and the residual risk from a PHA and surrounding land use perspective is low. In addition, it is not expected that this scenario would escalate to the adjacent furnace (to be installed in the future), due to both the transient nature of the fire and due to the direction of the furnace openings that do not point directly at the adjacent furnace.

It is recommended that this scenario, and associated safeguards, should be further investigated in the HAZOP when more detail on the design of the furnace is available.

Table 2.1: Updated HAZID Entry for Furnace

HAZID No	Hazardous Events	Potential Consequence / Effects	Threats / Causes	Safeguards			Assessment / Recommendations	Potential offsite impact?	Comments
				Prevention	Detection	Mitigation			
Recovery									
25a	Fuel gas (natural gas) release and ignition	Jet fire impact, potential fire impact, potential offsite impact	Regulator leak, mechanical failure, valve/gland leak, third party impact, corrosion	Inspection/ maintenance of equipment			Provision of bollards around pressure regulator equipment. Pipeline feed to be underground with marker signs	Yes (INC-003)	Jet fire impacts have been assessed in the PHA study report
25b	Loss of burner flame and build-up of flammable gases	Furnace explosion	See Item 25a (for loss of natural gas) Power failure	Burner management system (design in compliance with International & Australian safety standard, eg EN746). Burner management system (including valves) supplied with certification. Feed to air is PLC controlled to ensure efficient operations. Operating procedures on furnace operation and safeguarding systems. This includes start-up furnace ignition procedure.	Flame detection automatically initiates safe furnace shutdown (see mitigation)	Automatic trip of the burner feed valves (tight shut-off type) and burner stops Automatic initiation of the extraction system (pneumatic control) from furnace	Once the design has been finalized, undertake a hazard and Operability (HAZOP) review of the proposed process. Start-up (under normal and following plant trip) should also be investigated	No	
25c	Coal (reducing agent) has very low particle size (ie powder)	Furnace explosion	Coal is in powder form and charged during feed to the reactor.	Quality control in procurement and supply of anthracite coal. Coal is to be supplied in granules (3-5mm)	Quality control inspection of charge materials		See above action for Item 25b for conduct of HAZOP.	No	

2.2. DPE Query 10 – Gas Scrubbing System

HAZID No. 15 and 17 – Failure of gas scrubbing system has not been carried forward for detailed consequence analysis. As such, please provide further information on the detailed analysis for this hazard, given that it has not been sufficiently demonstrated that failure of the gas scrubbing system will not lead to immediate off-site impacts. The analysis should consider the maximum emission rate and concentration of toxic compound leaving the battery breaking process without gas scrubber operation, taking into account the gas collected from other processes as indicated in Appendix B of the PHA.

2.2.1. Response

Engitec has provided the following details regarding the scrubbing system. The proposed facility, using the CX Integrated System, does not release toxic gases substances in the main process. However, traces of hydrogen sulphide could be released during the 'Final Treatment' step. To prevent the release of hydrogen sulphide to atmosphere, a wet scrubber containing continuously circulating caustic soda is used to neutralise the trace hydrogen sulphide producing sodium sulphide. The wet scrubber system is designed in such a way that any failure of the scrubber (i.e. fan motor stop or liquor circulation pump failure or low pH) triggers an automatic shutdown of the breaker and paste desulphurization units. The likelihood of an uncontrolled emissions is, therefore, mitigated.

Engitec reported that if the scrubber did not operate, the maximum concentration of hydrogen sulphide in the air stream would be of the order 1-3 ppm. When compared with the criteria presented in Table 2.2, the source concentration of hydrogen sulphide at the stack would be well below AEGL-2 (injury) level, and very close to the AEGL-1 (irritation) level. On failure of the scrubber system, the release of hydrogen sulphide would therefore meet the toxic exposure criteria in HIPAP 4 (Ref (1)), as:

- the source concentration is below the injury criterion for residential and sensitive land uses (AEGL-2)
- the distance from the release point to the closest residential and sensitive land use is large (650 m), and thus the concentration at this location would be below the AEGL-1 (irritation level).

Table 2.2: Hydrogen sulphide toxic consequence criteria

Value (30 min exposure	Source [(a)]	Definition
0.6 ppm	Acute Exposure Guideline Level 1	Irritation
32 ppm	Acute Exposure Guideline Level 2	Injury
59 ppm	Acute Exposure Guideline Level 3	Fatality
(a) HIPAP 4, Ref (1) states that toxic impacts should be specified in terms of irritation, injury and fatality. For this study, AEGL values were used as the most appropriate source (https://cameochemicals.noaa.gov/chemical/3625).		

2.3. DPE Query 11 – Crucible Skimmings

Appendix B of the PHA shows that 3.2 tons per day of ''crucible skimmings'' will leave the lead smelting process. In this context, ''crucible skimmings'' is generally consistent with lead dross, which may be a dangerous good. As such, please provide:

a. confirmation if 'crucible skimmings' is a dangerous good;
b. further information on the maximum storage quantity for 'crucible skimmings'
c. further information on the storage arrangements for 'crucible skimmings' and
d. further information on the hazards and safeguards for the storage of 'crucible skimmings'.

2.3.1. Response

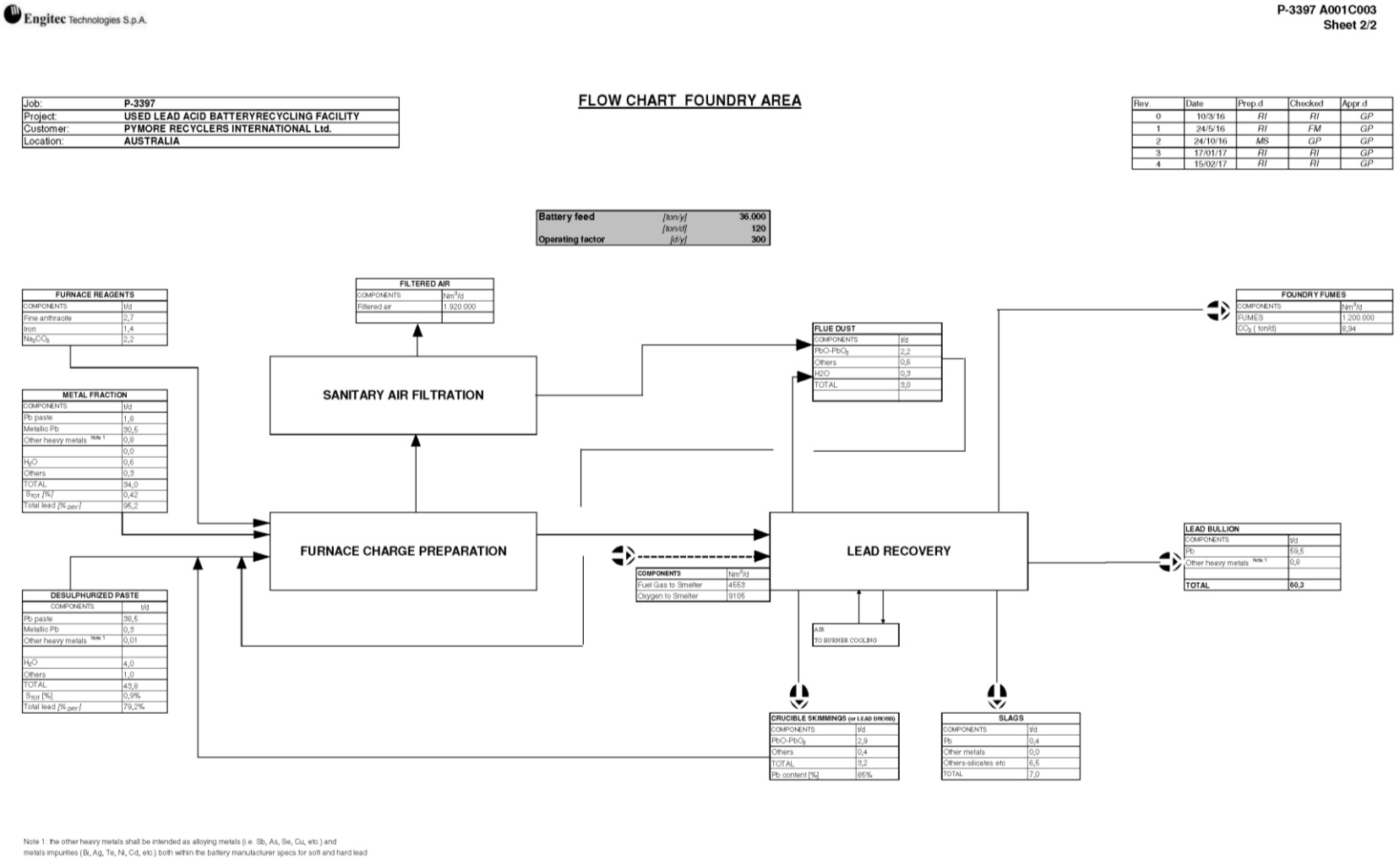
Pymore and Engitec confirmed that the term 'crucible skimmings' is incorrect and should be referred to as 'lead dross'. In response to DPE queries for this 'lead dross':

- Lead dross is classified as a dangerous good (Class 6.1).
- There should be no accumulation of lead dross, as it is would normally be mixed in the next feed charge into the furnace (refer to the revised process flowchart in Figure 2.1). However, storage space is available for up to 15 days production or 80 tonnes of lead dross.
- Temporary storage of lead dross will be in an allocated storage compartment[2] within in the charge preparation building area.
- A typical Safety Data Sheet for Lead Dross is attached in APPENDIX A. It can be seen that inhalation or ingestion is required to cause harm. A review of Section 11 of the SDS indicates that the impact of exposure would be chronic rather than acute. Therefore, as the lead dross would be handled accounting for the advice in the SDS and within a building, this would effectively limit the offsite release potential. As such, it would not present an immediate offsite risk on release.
- The Human Health Risk Assessment (HHRA) (Appendix D of the EIS) covers the engineering controls and personnel protection to manage the chronic exposure risks. The following safeguards are extracted from the HHRA:
  - Proper operator training and good housekeeping are identified as key in minimising lead emissions during mobile equipment operation associated with this activity. All surfaces to be paved to facilitate good housekeeping.
  - The charge preparation area will be completely closed, with paved surfaces and under strong ventilation. Any dust generated would be drawn off in a closed ducted system where it would be carried to a sanitary bag house filtration system (PK-721). Filtered air is released to atmosphere via a chimney (C-720).

[2] The storage compartment comprises an area with walls on three sides, but open at the top and one side to allow for easy transfer of material.

- Protective clothing: clean and dry coveralls or similar full-body work clothing. Dust mask or respirator: complete with a cloth pre-filter and a double exchangeable cartridge (lead and gas filter). Respirators must be cleaned and checked daily and filter cartridges must be substituted when necessary. Safety helmet. Safety shoes. Protective glasses/goggles/shield. Thermal insulated gloves. Ear protection when the noise level is over 85 dBA.

Figure 2.1: Process Flow Chart – Foundry Area



2.4. DPE Query 12 – Hydrogen Peroxide

Please provide further information on the hazards and safeguards for the storage and use of hydrogen peroxide within the development.

Table D.1 of the PHA shows that up to 21 tonnes of hydrogen peroxide aqueous 8-20% (UN 2984) will be stored in 10 kg containers (on average). However, the hazards and safeguards for the storage and use of this material is not listed in Appendix A – Hazard Identification of the PHA.

2.4.1. Response

Engitec has advised that the quantity of hydrogen peroxide (H_2O_2) required in the recycling process is much lower than reported in the PHA study. Engitec has confirmed that the ratio of hydrogen peroxide:lead bullion is 0.1 kg:1 tonne (1000 kg).

The maximum anticipated storage of hydrogen peroxide solution is 12 tonnes (well below the original reported figure of 21 tonnes).

The hazard associated with hydrogen peroxide has been updated into the Hazard Identification (HAZID) as shown in Table 2.3.

Table 2.3: Updated HAZID Entry for Hydrogen Peroxide

HAZID No	Hazardous Events	Potential Consequence / Effects	Threats / Causes	Safeguards			Assessment/ Recommendations	Potential offsite impact?	Comments
				Prevention	Detection	Mitigation			
Other									
28	Incompatible storage / handling of hydrogen peroxide (oxidising agent) together with other materials (eg corrosives, reducing agents)	Loss of containment and contact with reactive materials. Exothermic reaction, chemical reaction. Potential for injury Environmental issue	Mechanical failure, valve/gland leak, third party impact, spillage	Storage and separation of incompatible chemicals in separate bunded areas as per DG requirements. Dedicated pump, piping for handling and use of hydrogen peroxide. Inspection/ maintenance of chemical storage areas	Operator patrols	Bunded areas Storage areas are well ventilated. Safety showers and eye wash stations Emergency response plan Personnel PPE		No	Minimum storage to be kept on site.

2.5. DPE Query 13 – Classification of Hazardous Chemicals

Please revise Table D.1 of the PHA to ensure that the classification of hazardous chemical (including dangerous goods) is consistent with the information in Appendix C of the PHA.

2.5.1. Response

The revised Table D.1 showing the update (as highlighted in blue) is provided in Table 2.4.

Table 2.4: Revised Table D.1 (Summary of Chemicals Stored and Handled at the Proposed Facility)

ID	Classification	Class	Sub	PG	UN	Proper Shipping Name	Description	Storage methods	Quantity per unit	No	Total	Unit	Assessed in PHA?
1	**Flammable gas**	**2.1**	**-**	**-**	**1073**	OXYGEN, REFRIGERATED LIQUID	Liquid oxygen	Vertical vessel	25,000	1	25000	L	Yes[(a)]
2	**Oxidising substances**	**5.1**	**8**	**III**	2984	Hydrogen peroxide, aqueous solutions	Hydrogen Peroxide	Small plastic containers (various sizes, but assumed average of 10kg each)	10	**1,200**	**12,000**	kg	Yes
3	**Corrosive substances**	**8**	**-**	**II**	1832	SULPHURIC ACID, SPENT	Electrolyte	Vertical acid tanks	42000	2	84000	kg	Yes
4		8	-	II	1849	SODIUM SULFIDE, HYDRATED	Sodium Sulphide (62%)	25 kg bags	25	80	2000	kg	Yes
5		8	-	-	2794	BATTERIES, WET, FILLED WITH ACID, electric storage	ULAB (5,000 tonnes, assuming 20% of mass is acid, and 10kg per battery)	Palletised and stored in warehouse	2	500000	1000000	kg	Yes
6	Other materials	N/A	N/A	N/A	N/A	N/A	Lead carbonate	Designated chamber room	320000	1	320000	kg	No - not hazardous
		N/A	N/A	N/A	N/A	N/A	Activated carbon	25 kg bags	25	100	2500	kg	No - not hazardous
		N/A	N/A	N/A	N/A	N/A	Lead bullion	On shop floor	600 tonnes		N/A		No - not hazardous
		N/A	N/A	N/A	N/A	N/A	Iron Sinter	Jumbo bags – approx 1 tonne	60 tonnes		N/A		No - not hazardous
		N/A	N/A	N/A	N/A	N/A	Sodium Sulfate Anhydrous	Elevated silo tank	72 tonnes		N/A		No - not hazardous

ID	Classification	Class	Sub	PG	UN	Proper Shipping Name	Description	Storage methods	Quantity per unit	No	Total	Unit	Assessed in PHA?
6		N/A	N/A	N/A	N/A	N/A	Soda ash	60m^3 silo	690 tonnes		N/A		No - not hazardous
		N/A	N/A	N/A	N/A	N/A	Anthracite coal	Designated chamber room	120 tonnes		N/A		No - not hazardous
		N/A	N/A	N/A	N/A	N/A	Calcium Hydroxide	25 kg packaging bags	1 tonne per year (approx)		N/A		No - not hazardous
		N/A	N/A	N/A	N/A	N/A	Diesel Fuel	Vertical storage tanks	5,000 L tank		N/A		No - not hazardous
		N/A	N/A	N/A	N/A	N/A	Flocculant	25 kg packing bags	150 kg		N/A		No - not hazardous
		N/A	N/A	N/A	N/A	N/A	Polypropylene Plastics	**Ground polypropylene in jumbo bags**	**550 kg**	**100**	**55 tonnes**		No - not hazardous
		N/A	N/A	N/A	N/A	N/A	Anti-foam	Plastic containers – 25 kg per container	2.64 tonnes		N/A		No - not hazardous
		N/A	N/A	N/A	N/A	N/A	Polyethylene separators	Designated chamber room	**8 tonnes**		N/A		No - not hazardous
		N/A	**N/A**	**N/A**	**N/A**	**N/A**	**Slag**	**Designated chamber in the building (Slag Room)**	**330 tonnes**		N/A		No - not hazardous
		6.1	**N/A**	**III**	**2291**	**Lead compound, soluble, N.O.S.**	**Lead Dross**	**Charge preparation area**	**Temporary Storage**		N/A		No - not hazardous in terms of acute impact
(a) 700m^3/h of methane will be used.													

3. RESPONSES TO NSW OFFICE OF ENVIRONMENT AND HERITAGE

3.1. OEH Query – Flooding and Floodplain Management

OEH has reviewed the flooding and flood risk assessments for the project which comprise the Surface Water Assessment prepared by Royal Haskoning DHV (dated October 2016) and the Preliminary Hazard Analysis prepared by Sherpa Consulting (dated 28 October 2016). They are presented in Appendix J and Appendix E respectively of the EIS. Both reports nominated different floor and racking levels for the project based on their varying assessment of the flood risks for the site; and this discrepancy will need to be resolved before OEH can complete its assessment.

3.1.1. Response

Sherpa has reported flood mitigation levels and datums that have been supplied by Pymore. They are not linked to an assessment and are not recommendations.

The finished floor level of 16.6 m Australian Height Datum (AHD) quoted in the PHA is a typographical error and should read 15.6 m. The change in finished floor level does not have any impact on the results of the PHA and further revision is not required.

APPENDIX A. SAFETY DATA SHEET FOR LEAD DROSS

1. PRODUCT IDENTIFICATION

Product Name	LEAD DROSS
Other Names	Lead (Battery Manufacturing) - Dross
Use	Waste by-product of the manufacturing of Lead acid Batteries
Supplier Name and Address	Century Yuasa Batteries 37-65 Cobalt St Carole Park QLD 4300
Telephone	(07) 3361 6161
Emergency (24 Hours)	(07) 3361 6707
Relevant identified uses	Recycling

2. HAZARD(S) IDENTIFICATION

HAZARDOUS CHEMICAL DANGEROUS GOODS. According to the Model WHS Regulations and the ADG Code.

Poisons Schedule **S6** *Classified as S6:- Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP)*

Signal Word **DANGER**

GHS Classification Acute Toxicity (Oral) Category 4, Acute Toxicity (Inhalation) Category 4, Reproductive Toxicity Category 1B, STOT - RE Category 2, Acute Aquatic Hazard Category 1, Chronic Aquatic Hazard Category 1

GHS Label Elements

Harmful

Health Hazard

Environment

Hazard Statements

H302	Harmful if swallowed	**H373**	May cause damage to organs through prolonged or repeated exposure
H332	Harmful if inhaled	**H400**	Very toxic to aquatic life
H360	May damage fertility or the unborn child	**H410**	Very toxic to aquatic life with long lasting effects

Precautionary Statements

Prevention		***Response***	
P101	If medical advice is needed, have product container or label at hand.	**P308+P313**	IF EXPOSED: or concerned: Get medical advice / attention.
P102	Keep out of reach of children	**P314**	Get medical advice / attention if you feel unwell.
P103	Read label before use.	**P301+P312**	IF SWALLOWED: Call a POISON CENTER / doctor / physician / first aider / if you feel unwell.
P201	Obtain special instructions before use.	**P304+P340**	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P260	Do not breathe dust / fume / gas / mist / vapours / spray.	**P391**	Collect spillage.
P270	Do not eat, drink or smoke when using this product.	***Storage***	
P271	Use only outdoors or in a well-ventilated area.	**P405**	Store locked up.
P273	Avoid release to the environment	***Disposal***	
P280	Wear protective gloves / protective clothing / eye protection / face protection	**P501**	Dispose of contents, container to authorised chemical landfill or if organic, to high temperature incineration

3. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient	Identification	Content % weight
Lead (Pb)	CAS 7439-92-1	75-80%
Lead Monoxide (PbO)	CAS 1317-36-8	18-23%
Lead oxide (PbO_2)	CAS 1309-60-0	<2%

4. FIRST AID MEASURES

DESCRIPTION OF FIRST AID MEASURES

Eye contact

If this product comes in contact with the eyes:
- Wash out immediately with fresh running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Seek medical attention without delay; if pain persists or recurs seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin contact

If skin contact occurs:
- Immediately remove all contaminated clothing, including footwear.
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

Inhalation

If fumes or combustion products are inhaled:
- Remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

Ingestion

- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
- For advice, contact a Poisons Information Centre or a doctor.
- Urgent hospital treatment is likely to be needed.
- In the meantime, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
- If the services of a medical officer or medical doctor are readily available, the patient should be placed in his / her care and a copy of the SDS should be provided. Further action will be the responsibility of the medical specialist.
- If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the SDS.
- Where medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:
- INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- NOTE: Wear a protective glove when inducing vomiting by mechanical means.

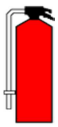
MEDICAL ATTENTION AND SPECIAL TREATMENT. Indication of any immediate medical attention and special treatment needed

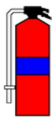
Treat symptomatically.

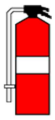
- Gastric acids solubilise lead and its salts and lead absorption occurs in the small bowel.
- Particles of less than 1 um diameter are substantially absorbed by the alveoli following inhalation.
- Lead is distributed to the red blood cells and has a half-life of 35 days. It is subsequently redistributed to soft tissue & bone-stores or eliminated. The kidney accounts for 75% of daily lead loss; integumentary and alimentary losses account for the remainder.
- Neurasthenic symptoms are the most common symptoms of intoxication. Lead toxicity produces a classic motor neuropathy. Acute encephalopathy appears infrequently in adults. Diazepam is the best drug for seizures.
- Whole-blood lead is the best measure of recent exposure; free erythrocyte protoporphyrin (FEP) provides the best screening for chronic exposure. Obvious clinical symptoms occur in adults when whole-blood lead exceeds 80 ug / dL.
- British anti-lewisite is an effective antidote and enhances faecal and urinary excretion of lead. The onset of action of BAL is about 30 minutes and most of the chelated metal complex is excreted in 4-6 hours, primarily in the bile. Adverse reaction appears in up to 50% of patients given BAL in doses exceeding 5 mg / kg. CaNa2EDTA has also been used alone or in concert with BAL as an antidote. D-penicillamine is the usual oral agent for mobilisation of bone lead; its use in the treatment of lead poisoning remains investigational. 2,3-dimercapto-1-propanesulphonic acid (DMPS) and dimercaptosuccinic acid (DMSA) are water soluble analogues of BAL and their effectiveness is undergoing review. As a rule, stop BAL if lead decreases below 50 ug / dL; stop; CaNa2EDTA if blood lead decreases below 40 ug / dL or urinary lead drops below 2 mg / 24hrs.

5. FIRE FIGHTING MEASURES

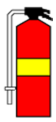
Recommended Extinguishing Media


Water spray or fog. ✓


Foam ✓


Dry chemical powder. ✓


Carbon dioxide. ✗


BCF\ Vaporising Liquid (Where regulations permit). ✓

Extinguishing Media Incompatibilities

- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

Specific Hazards Hazardous Decomposition

- Non-combustible.
- Not considered a significant fire risk, however containers may burn. Decomposition may produce toxic fumes of metal oxides, which may emit poisonous fumes

Fire Incompatibility

- None known.

Fire Fighting, Special Protective Equipment & Precautions

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water courses.
- Use fire fighting procedures suitable for surrounding area.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions

- Avoid contact with skin and eyes.

Environmental Precautions

- Prevent, by any means available, spillage from entering drains or water course.

Methods and materials for containment and cleaning up

- With a clean shovel, transfer spilled material into clean-labelled containers for disposal.
- Prevent from entering drains, sewers, streams or other bodies of water. If contamination of sewers or waterways has occurred, advise the local emergency services

Protective Equipment

- Personal Protective Equipment advice is contained in Section 8 of the SDS.

Emergency Procedures

Minor Spills

- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Control personal contact with the substance, by using protective equipment.
- Use dry clean up procedures and avoid generating dust.
- Place in a suitable, labelled container for waste disposal.

Major Spills

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Control personal contact with the substance, by using protective equipment.
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water courses.
- Stop leak if safe to do so.
- Contain or absorb spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean-up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services, other related regulatory authorities such as environmental protection and local council.

7. HANDLING AND STORAGE

Safe Handling

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- DO NOT allow material to contact humans, exposed food or food utensils.
- When handling, DO NOT eats, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately. Launder contaminated clothing before re-use.
- Use good occupational work practice.

- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Storage

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.

Suitable container

- Packing of Lead oxide product in light weight metal or plastic packages may result in container collapse with product release
- Lined metal can, lined metal pail / can.
- Plastic pail.
- Poly-lined drum.
- Check all containers are clearly labelled and free from leaks.
- For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):
- Removable head packaging;

Storage incompatibility

- Is incompatible with aluminium carbide, barium sulphide, silicon, sulphuryl chloride, hydrogen peroxide, chemical active metals, aluminium, combustible materials, lithium carbide, chlorinated rubber, chlorine, boron, hydrides, ethylene, fluorine, sulphides, acetylides and strong reducing agents.

✓ = May be stored together ⓘ = May be stored together with specific preventions ✗ = Must not be stored together

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

AUSTRALIAN EXPOSURE STANDARDS (Occupational Exposure Limits)

Ingredient	Material name	TWA	STEL
Lead (Pb)	Lead, inorganic dusts & fumes (as Pb)	0.15 mg / m3	Not Available
Lead Monoxide (PbO)	Lead, inorganic dusts & fumes (as Pb)	0.15 mg / m3	Not Available
Lead oxide (PbO_2)	Lead, inorganic dusts & fumes (as Pb)	0.15 mg / m3	Not Available

APPROPRIATE ENGINEERING CONTROLS

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are:

- Process controls which involve changing the way a job activity or process is done to reduce the risk.
- Enclosure and / or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.

PERSONAL PROTECTION

Respirator Type

- Where the concentration of gas / particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.
- Type E-P Filter of sufficient capacity.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	P1 Air-line*	- -	PAPR-P1 -
up to 50 x ES	Air-line**	P2	PAPR-P2
up to 100 x ES	-	P3	-
		Air-line*	-
100+ x ES	-	Air-line**	PAPR-P3

*** Negative pressure demand**
**** Continuous flow**

Other Protection

- Eyewash unit.
- Barrier cream.
- Skin cleansing cream.

Eye Protection

- Safety glasses with side shields Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.

Glove Type

- Wear chemical protective gloves, e.g. PVC

Clothing

- Overalls.

Foot wear

- Wear safety footwear or safety gumboots e.g. Rubber

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Pale yellow / bright yellow orange coloured, very dense, odourless powder. Does not mix with water but classed as "soluble" under the provisions of SP 199 of the UN Transport Code.		
Odour	Not Available	**Vapour pressure (kPa)**	1 mm Hg @ 973 °C
Odour threshold	Not Available	**Vapour density (Air = 1)**	Not Applicable
pH	Not Applicable	**Relative density (Water = 1)**	9.53-9.6
Melting point / freezing point (°C)	888 °C	**Solubility in water (g,L)**	Immiscible
Initial boiling point and boiling range (°C)	1472 °C	**Partition coefficient: n-octanol / water**	Not Available
Flash point	Not Applicable	**Molecular weight (g / mol)**	223.2 g / mol
Evaporation rate	Not Available	**Decomposition temperature (°C)**	>500-700 °C lead fumes given off
Flammability	Not Applicable	**Viscosity**	Not Available
Upper, lower flammability or explosive limits	Not Applicable		

10. STABILITY AND REACTIVITY

Reactivity

See section 7 and this section under Chemical stability
- Lead oxide:- is a strong oxidiser
- Attacks some plastics, rubber and coatings

Possibility of hazardous reactions

See section 5 & 7
- Reacts explosively with 90% performic acid, rubidium acetylide
- Reacts violently with strong oxidisers,
- Reacts violently with aluminium, sodium, zirconium, titanium, boron or silicon, when heated forms impact sensitive explosive mixtures with dichloromethylsilane

Incompatible materials

See section 7
- Is incompatible with aluminium carbide, barium sulphide, silicon, sulphuryl chloride, hydrogen peroxide, chemical active metals, aluminium, combustible materials, lithium carbide, chlorinated rubber, chlorine, boron, hydrides, ethylene, fluorine, sulphides, acetylides and strong reducing agents.

Chemical stability

- Product is considered stable
- Hazardous polymerisation will not occur.
- Unstable in the presence of incompatible materials

Hazardous decomposition products

See section 5
- Thermal decomposition may produce oxides of lead.

11. TOXICOLOGICAL INFORMATION ACUTE EFFECTS

No adverse health effects expected if the product is handled in accordance with this safety Data sheet and the product Label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:-

Inhaled

The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified by EC Directives using animal models). Nevertheless inhalation of dusts, or fumes, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress. Adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.
Inhalation of dusts, generated by the material, during the course of normal handling, may be harmful.
If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.

Ingestion

Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.

Skin contact

The material is not thought to be a skin irritant (as classified by EC Directives using animal models). Abrasive damage however, may result from prolonged exposures.
Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.
Open cuts, abraded or irritated skin should not be exposed to this material
Entry into the blood-stream, through for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.

Eye

Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may cause transient discomfort characterised by tearing or conjuctival redness (as with windburn). Slight abrasive damage may also result.

Chronic effects

An inorganic compound such as Lead is a cumulative harmful poison when exposed in small amounts can raise the body's content to toxic levels. Prolonged or repeated exposure to lead toxicity effects the nervous system (memory loss, tiredness, headaches, fatigue, irritability, decreased libido, dizziness, depression, encephalopathy (brain damage caused by altered brain function and structure), behavioural effects, altered mood states, disturbances in hand-eye coordination, reaction times, visual motor performance, and mental performance, disturbances to vision, changes in hearing, muscle and joint weakness of the arms and legs, (foot-drop and wrist-drop), heart / blood vessels (reduced haemoglobin synthesis and production, reduced life span and function of red blood cells, anaemia, increased blood

pressure), digestive system (loss of appetite, anorexia, with severe abdominal pain, diarrhoea, inflammation of the stomach walls (gastritis) and colic, cramps, nausea, vomiting, constipation, weight loss and decreased urination, deposition of blue lead-line on the gums), kidneys / urinary system (reversible / irreversible kidney damage) and endocrine system. Increased levels of lead result in increased brain damage, coma and death in extreme cases.

- Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.
- Ample evidence from experiments exists that there is a suspicion this material directly reduces fertility.
- Lead can cross the placenta, and cause miscarriage, stillbirths and birth defects. Exposure before birth can cause mental retardation, behavioural disorders and infant death.
- Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).
- Ample evidence exists that developmental disorders are directly caused by human exposure to the material.
- Lead can accumulate in the skeleton for a very long time.

Acute Toxicity	Skin Irritation / Corrosion	Serious Eye Damage / Irritation	Respiratory Or Skin Sensitisation	Mutagenicity	Carcinogenicity	Reproductivity	Stot - Single Exposure	Stot - Repeated Exposure	Aspiration Hazard
✓	ⓘ	ⓘ	ⓘ	ⓘ	ⓘ	✓	ⓘ	✓	ⓘ

✓= Data required to make classification available ✗= Data available but does not fill the criteria for classification
ⓘ= Data Not Available to make classification

12. ECOLOGICAL INFORMATION

Toxicity

- DO NOT discharge into sewer or waterways.
- Very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.
- Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.
- Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

For Lead:

- Environmental Fate: Lead is assessed as low hazard if it remains in its solid, massive, metallic form. Lead, in the form of alkyls, has been introduced to the environment primarily from leaded gasoline / petrol. These are converted to water-soluble lead compounds of high toxicity and availability to plants.
- Atmospheric Fate: Lead is primarily an atmospheric pollutant that enters soil and water as fallout, a process determined by the physical form involved and particle size. Lead, in the form of alkyls, has been introduced to the environment primarily from leaded gasoline / petrol. Lead is absorbed by mammals / humans via vapors, contaminated dust, and fumes.
- Terrestrial Fate: Soil - Lead alkyls easily leach from soil to contaminate water sources close to highways. Plants - Lead alkyls that have been converted to water soluble lead compounds have high toxicity / availability to plants.
- Aquatic Fate: Lead that has entered the aquatic system is expected to be found in sediments.
- Ecotoxicity: Soluble or insoluble lead may enter the environment and accumulate. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Fish	The following applies to lead compounds in general: fish: lethal from 1.4 mg / l up S. gairdnerii: LC50: 0.14 mg / l / 96h L. idus LC50: 546 mg / l fish test LC50: 236 mg / l (calc. as free lead).	**Daphnia**	The following applies to lead compounds in general: fish: lethal from 1.4 mg / l up S. gairdnerii: LC50: 0.14 mg / l / 96h L. idus LC50: 546 mg / l fish test LC50: 236 mg / l (calc. as free lead).
Algae	The following applies to lead compounds in general: algae: Sc. quadricauda toxic from 3.7 mg / l up M. aeruginosa 0.45 mg / l (calc. as free lead).	**Bacteria**	The following applies to lead compounds in general: algae: Sc. quadricauda toxic from 3.7 mg / l up M. aeruginosa 0.45 mg / l (calc. as free lead).
Other Organisms	The following applies to lead compounds in general: protozoa: E. sulcatum toxic from 0.02 mg / l up U. parduczi toxic from 0.07 mg / l up (calc. as free lead).		
Degradability	No Data available for all ingredients		
Bio-accumulative Potential	Lead Monoxide LOW (BCF = 43)		
Mobility in Soil	No Data available for all ingredients		
Other Adverse Effects	No Data available for all ingredients		

13. DISPOSAL CONSIDERATIONS

Safe Handling & Disposal

- Dispose in accordance with federal, state or local regulations.

Disposal of Contaminated Packaging

- Containers may still present a chemical hazard / danger when empty.
- Return to supplier for reuse / recycling if possible.

Otherwise:

- If container cannot be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, and then puncture containers, to prevent re-use, and bury at an authorised landfill.
- Where possible retain label warnings and SDS and observe all notices pertaining to the product.
- Legislation addressing waste disposal requirements may differ by country, state and / or territory. Each user must

refer to laws operating in their area. In some areas, certain wastes must be tracked.

- This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate. In most instances the supplier of the material should be consulted.
- DO NOT allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Management Authority for disposal.
- Bury residue in an authorised landfill.
- Recycle containers if possible, or dispose of in an authorised landfill.
- Observe all label safeguards until containers are cleaned and destroyed.

Environmental Regulations

- Dispose in accordance with federal, state or local regulations.
- Refer to section 15

14. TRANSPORT INFORMATION

REGULATED FOR TRANSPORT OF DANGEROUS GOODS ADG

UN Number	2291	
Proper Shipping Name	LEAD COMPOUND, SOLUBLE, N.O.S.	
Transport Hazard Class	Class: 6.1	**Sub risk:** Not Applicable
Packing group	III	
Environmental Hazards	No relevant data	
Special Precautions	Special provisions Limited quantity	199, 274 5 kg
Additional Information	Marine Pollutant: Yes	
Hazchem Code	2Z	

15. REGULATORY INFORMATION

SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS, LEGISLATION

Lead (Pb); Lead Monoxide (PbO) and Lead oxide (PbO2) are found on the following regulatory lists

Australia Exposure Standards", "Australia Inventory of Chemical Substances (AICS)","International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs", "International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft", "Australia Hazardous Substances Information System - Consolidated Lists"

Poisons Schedule (Australia)	6	**AICS Status**	All the constituents of this product are listed
APVMA Status	Not relevant	**AQIS Status**	Status not relevant
TGA Status	Not relevant		

Other References

ADG Code - Australian Transport of Dangerous Goods
Workplace Exposure Standard for Airborne Contaminants
Approved Criteria for Classifying Hazardous Substances NOHSC: 1008 (2004)
Hazardous Substances Information System (HSIS)
Model Work Health and Safety Regulations 2011, Chapter 7 Hazardous Chemicals, Part 7.2 Lead.
Labelling of Workplace Hazardous Chemicals- Code Of Practice
Preparation of Safety Data Sheets for Hazardous Chemicals- Code of Practice

16. OTHER RELEVANT INFORMATION

Revision Information

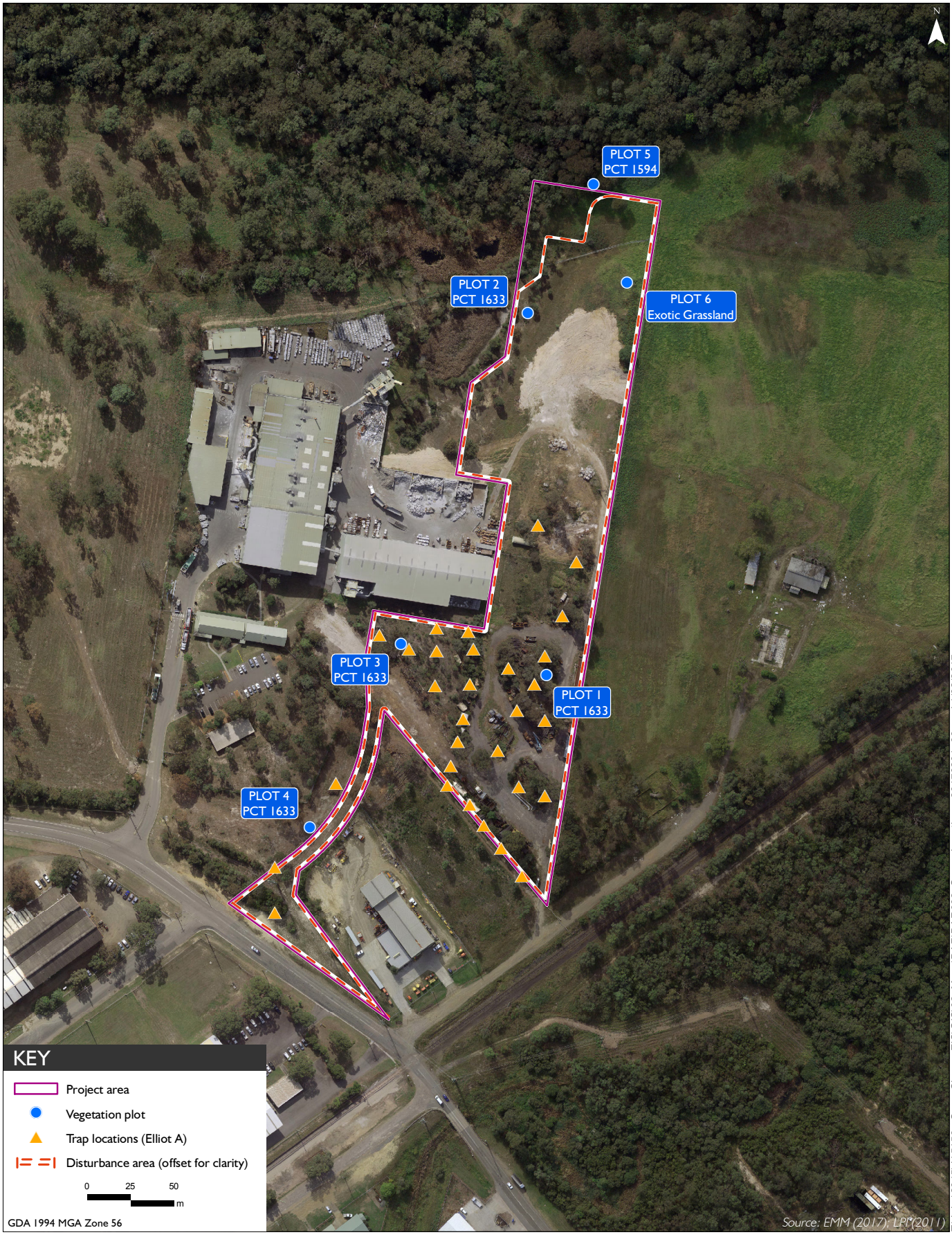
Revision No	Date	Description
1	28/10/15	Initial SDS creation

Abbreviations

AICS	Australia Inventory of Chemical Substances
APVMA	Australian Pesticides and Veterinary Medicines Authority
AQIS	Australian Quarantine and Inspection Service
CAS #	Chemical Abstract Service Number – *used to uniquely identify chemical compounds*
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration- *toxicity of the surrounding medium that will kill half of the sample population of a specific test-animal in a specified period through exposure via inhalation (respiration)*
SDS	Safety Data Sheet- *(SDS), previously called a Material Safety Data Sheet (SDS),*
TGA	Therapeutic Goods Administration

Appendix C

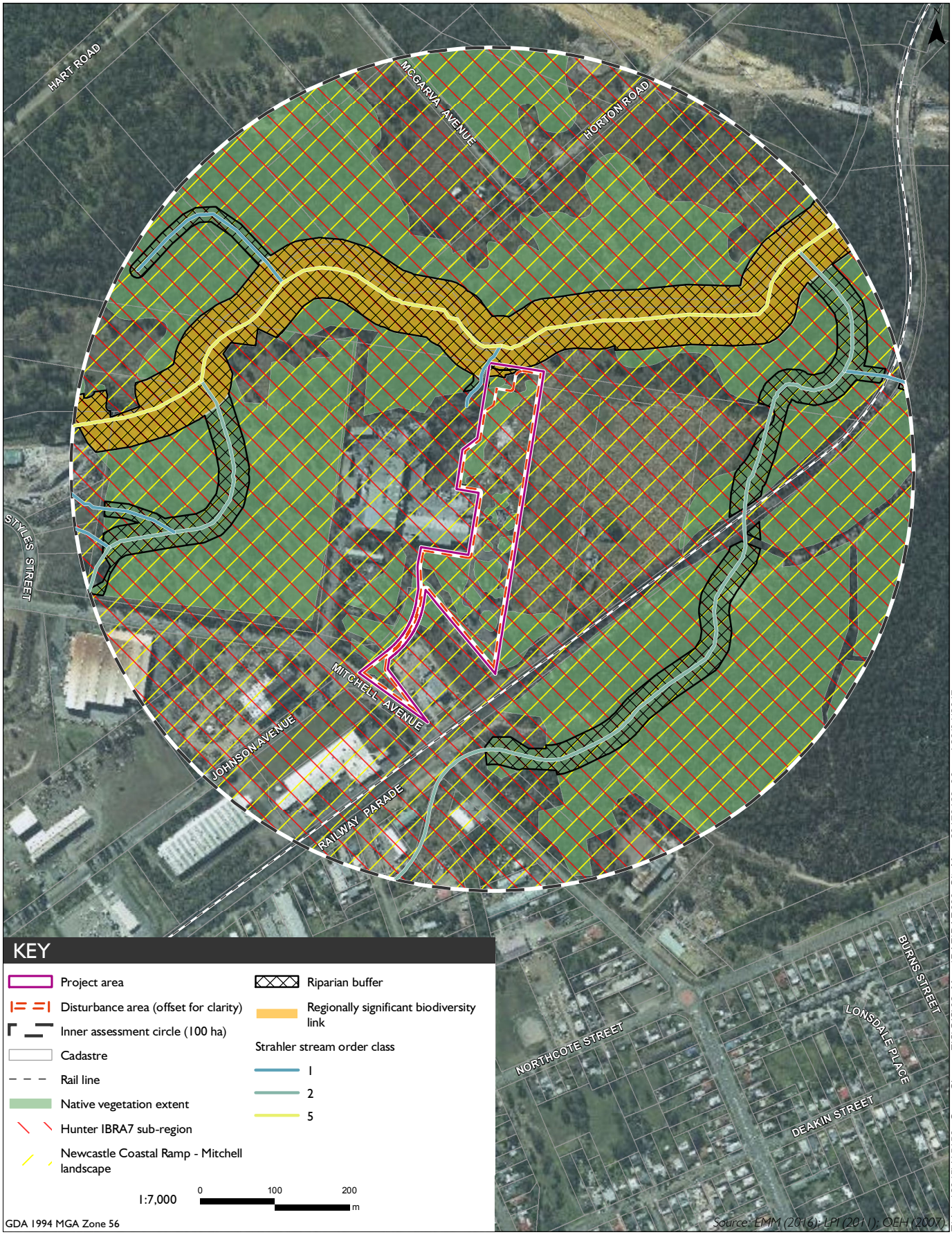
Updated BAR figures



Survey locations

Kurri Kurri Battery Recycling Facility
Biodiversity Assessment Report

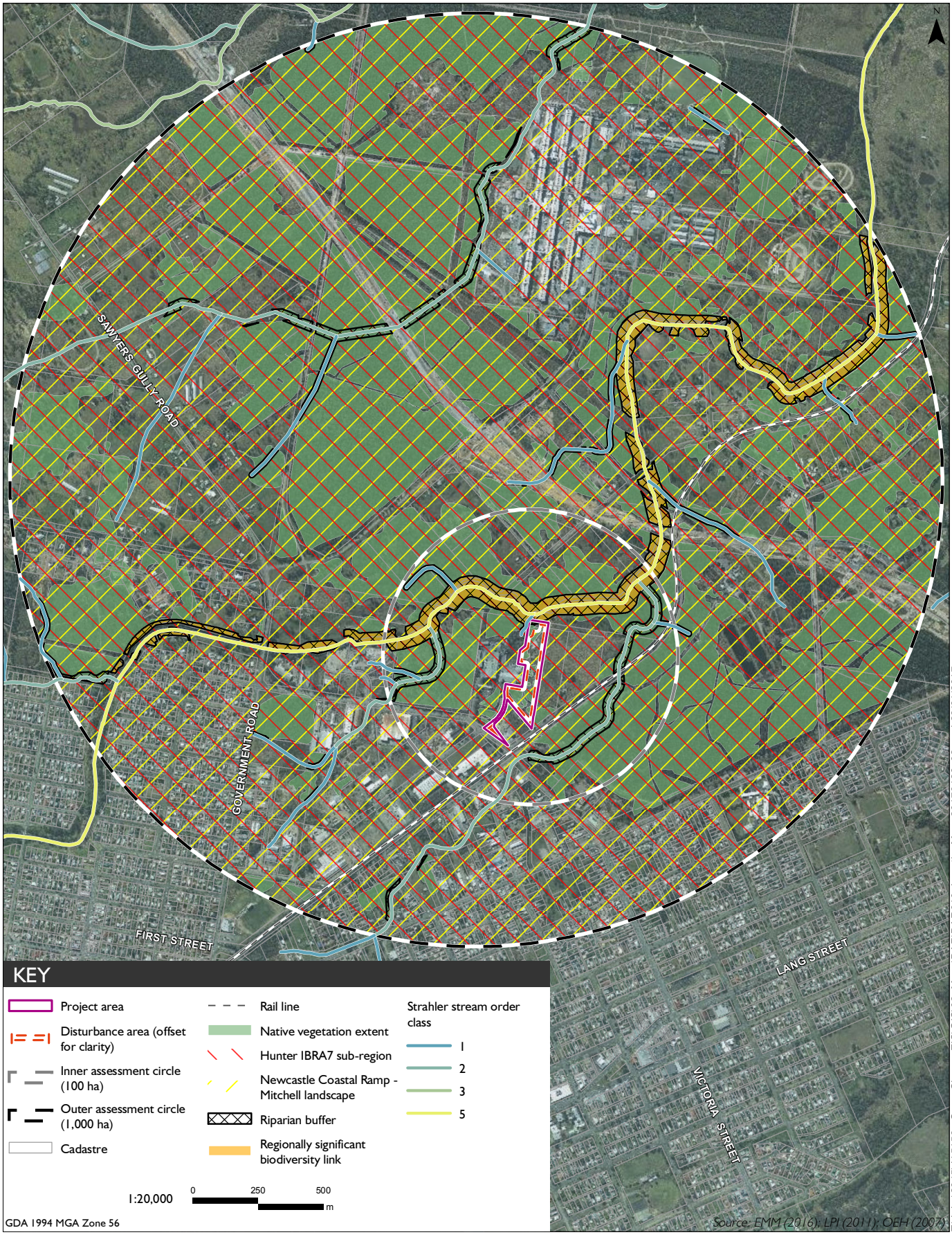
Figure 2.1



Site map

Kurri Kurri Battery Recycling Facility
Biodiversity Assessment Report

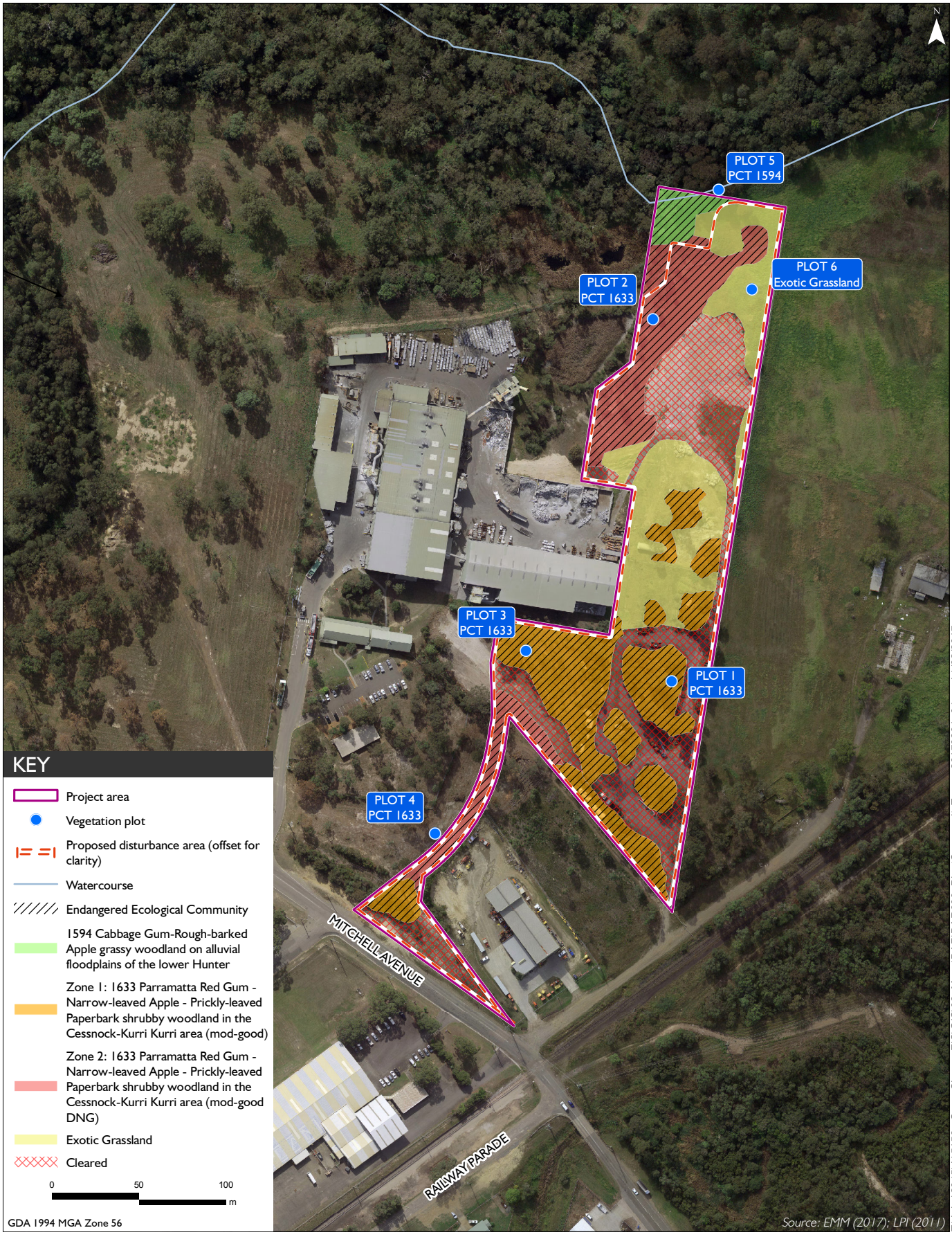
Figure 3.1



Location map

Kurri Kurri Battery Recycling Facility
Biodiversity Assessment Report

Figure 3.2



Plant community types

Kurri Kurri Battery Recycling Facility
Biodiversity Assessment Report

Figure 3.3

Appendix D

Plot and transect field data

Table D.1 Updated transect summary data

Transect / plot	Native plant species	Native canopy cover	Native midstorey cover	Native ground cover (grass)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Overstorey regeneration	Total length of fallen logs	Easting	Northing	Zone
1	22	5	0	60	0	10	10	0	1	4	357436	6369177	56
2	25	0	5	50	0	10	10	0	1	0	357425	6369384	56
3	21	11.5	4.4	40	0	10	50	0	1	0	357352	6369194	56
4	16	1	0	50	0	0	10	0	1	0	357300	6369090	56
5	21	28.5	1.5	20	10	30	100	2	0	0	357463	6369458	56
6	2	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	357482	6369402	56

Table D.2 Location 1 - Plot

Biobanking Plot Sheet

Proposal Name	Pymore	**Veg Type:**	KSSW	
Date	18/02/2016	**Easting**	56 H	357436
Proposal ID :	15156	**Northing**	56 H	6369177
Plot Number	1			

20 x 20 m plot - Survey species and provide cover abundance scores

Species	Common Name	CA
**Bidens pilosa*	Farmers Friend	1
**Briza maxima*	Quaking Grass	2
**Conyza sp.*		2
**Panicum capillare*	Witchgrass	2
**Paspalum dilatatum*	Paspalum	3
**Senecio madagascariensis*	Fireweed	1
**Setaria parviflora*	Pigeon Grass	4
Cheilanthes sieberi	Poison Rock Fern	3
Cynadon dactylon	Couch	4
Deyeuxia quadriseta		1
Dianella revoluta var. revoluta	Blueberry Lily	2
Digitaria ramularis		3
Dillwynia retorta	Bacon and Eggs	2
Eragrostis brownii	Brown's Lovegrass	2
Eucalyptus crebra	Narrow-leaved Ironbark	3
Eucalyptus parramattensis subsp. decadens	Earp's Gum	2
Grevillea sericea subsp. sericea	Silky Grevillea	2
Juncus usitatus		2
Lagenophora stipitata	Blue Bottle-daisy	1
Melaleuca nodosa	Prickly-leaved Paperbark	2
Notelaea ovata		2
Oxalis perennans		2
Oxalis thompsoniae		1
Ozothamnus diosmifolius	Sago Bush	1
Panicum simile	Two-colour Panic	3
Pratia purpurascens		3
Rytidosperma fulvum	Wallaby Grass	4
Rytidosperma pallidum	Silvertop Wallaby Grass	3
Velleia spathulata		1
Tally (natives):		22

COVER ABUNDANCE KEY

1	<5%, few individuals
2	<5%, many individuals
3	5-25%
4	26-50%
5	51-75%
6	76-100%

50 m x 20 m Plot

HBT's (count) (only hollows > 5 cm):	0
Fallen Logs length (> 10 cm, 0.5 m):	4
Whole Zone - Regen (% canopy regen zone)	
Number of species:	2
Number regenerating:	2
Regeneration:	1

Table D.3 Location 1 - Transect

Biobanking Plot Sheet - Transect

Proposal ID :	J15156	**Proposal Name:**	Pymore	**Date**	18/02/2016
Plot Number	1				
Veg Type:	KSSW				
Coordinates:	**Easting**	56 H	357436		
Coordinates:	**Northing**	56 H	6369177		

50 m Transect (every 5 m)	**5 m**	**10 m**	**15 m**	**20 m**	**25 m**	**30 m**	**35 m**	**40 m**	**45 m**	**50 m**	**Avg (%)**
Canopy Cover (% - see Specht)	20	20	5	5	0	0	0	0	0	0	5
Exotic Canopy Cover	0	0	0	0	0	0	0	0	0	0	0
Mid Storey Cover (shrubs > 1m)	0	0	0	0	0	0	0	0	0	0	0
Exotic Mid Storey Cover	0	0	0	0	0	0	0	0	0	0	0

50 m Transect	**Presence/absence (0/1)**										**Total / %**
Ground Cover (shrubs < 1m)	0	0	0	0	0	0	0	0	0	0	0
Exotic shrubs	0	0	0	0	0	0	0	0	0	0	0
Ground Cover (grasses)	0	1	0	1	1	0	1	1	0	1	60
Exotic grasses	0	0	1	0	0	0	0	0	0	0	10
Ground Cover (other)	1	0	0	0	0	0	0	0	0	0	10
Exotic other	0	0	0	0	0	0	0	0	0	0	0

Notes

Table D.2 Location 2 - Plot

Biobanking Plot Sheet

Proposal Name	Pymore	**Veg Type:**	KSSW-low		
Date	18/02/2015	**Easting**	56 H		357425
Proposal ID :	15156	**Northing**	56 H		6369384
Plot Number	2				

20 x 20 m plot - Survey species and provide cover abundance scores

Species	Common Name	CA
**Chloris gayana*	Rhodes Grass	3
**Conyza sp.*		2
**Coryeopsis lanceolata*	Tickseed	2
**Eragrostis curvula*	African Lovegrass	3
**Paspalum dilatatum*	Paspalum	2
**Plantago laceolata*	Narrow-leaved Plantain	1
**Richardia stellaris*		1
**Rubus fruticosus aggregate*	Blackberry	2
**Senecio madagascariensis*	Fireweed	1
**Setaria parviflora*	Pigeon Grass	4
Acacia implexa	Hickory Wattle	3
Allocasuarina littoralis	Black She-oak	3
Allocasuarina luehmannii	Bulloak	3
Aristida warburgii		3
Callistemon pinifolius	Pine-leaved Bottlebrush	1
Cassinia uncata	Sticky Cassinia	2
Cassytha glabella	Devils Twine	1
Casuarina glauca	Swamp Oak	3
Cheilanthes sieberi	Poison Rock Fern	1
Cymbopogon refractus	Barbed Wire Grass	2
Cynadon dactylon	Couch	3
Dianella revoluta var. revoluta	Blueberry Lily	1
Eragrostis brownii	Brown's Lovegrass	2
Eucalyptus amplifolia	Cabbage Gum	1
Hakea sericea	Needlebush	2
Lagenophora stipitata	Blue Bottle-daisy	1
Leptospermum morrisonii		1
Lomandra confertifolia	Mat-rush	2
Melaleuca linariifolia	Narrow-leaved Paperbark	2
Melaleuca nodosa	Prickly-leaved Paperbark	2
Panicum simile	Two-colour Panic	3
Pimelea linifolia	Slender Rice Flower	1
Pomax umbellata		1
Rytidosperma fulvum	Wallaby Grass	3
Tricoryne elatior	Yellow Autumn-lily	1
Tally (natives):		25

COVER ABUNDANCE KEY	
1	<5%, few individuals
2	<5%, many individuals
3	5-25%
4	26-50%
5	51-75%
6	76-100%

50 m x 20 m Plot

HBT's (count) (only hollows > 5 cm):	0
Fallen Logs length (> 10 cm, 0.5 m):	0
Whole Zone - Regen (% canopy regen zone)	
Number of species:	1
Number regenerating:	1
Regeneration:	1

Table D.3 Location 2 - Transect

Biobanking Plot Sheet - Transect

Proposal ID : **Plot Number**	J15156 2	**Proposal Name:**	Pymore	**Date**	18/02/2015
Veg Type:	KSSW-low				
Coordinates:	**Easting**	56 H	357425		
Coordinates:	**Northing**	56 H	6369384		

50 m Transect (every 5 m)	**5 m**	**10 m**	**15 m**	**20 m**	**25 m**	**30 m**	**35 m**	**40 m**	**45 m**	**50 m**	**Avg (%)**
Canopy Cover (% - see Specht)	0	0	0	0	0	0	0	0	0	0	0
Exotic Canopy Cover	0	0	0	0	0	0	0	0	0	0	0
Mid Storey Cover (shrubs > 1m)	0	0	0	20	0	30	0	0	0	0	5
Exotic Mid Storey Cover	0	0	0	0	0	0	0	0	0	0	0

50 m Transect	**Presence/absence (0/1)**										**Total / %**
Ground Cover (shrubs < 1m)	0	0	0	0	0	0	0	0	0	0	0
Exotic shrubs	0	0	0	0	0	0	0	0	0	0	0
Ground Cover (grasses)	1	1	0	0	1	0	1	0	0	1	50
Exotic grasses	0	0	0	0	0	0	0	0	0	0	0
Ground Cover (other)	0	0	1	0	0	0	0	0	0	0	10
Exotic other	0	0	0	1	0	0	0	0	0	0	10

Notes

Table D.2 Location 3 - Plot

Biobanking Plot Sheet

Proposal Name	Pymore		**Veg Type:**	KSSW	
Date		25/05/2016	**Easting**	56 H	357352
Proposal ID :	15156		**Northing**	56 H	6369194
Plot Number	3				

20 x 20 m plot - Survey species and provide cover abundance scores

Species	Common Name	CA
**Ambrosia tenuifolia*	Lacey Ragweed	3
**Chloris gayana*	Rhodes Grass	1
**Cinnamomum camphora*	Camphor Laurel	1
**Coryeopsis lanceolata*	Tickseed	1
**Hypochaeris radicata*	Catsear	2
**Ligustrum sinense*	Small-leaved Privet	2
**Olea europaea subsp. europaea*	European Olive	4
**Paspalum dilatatum*	Paspalum	3
**Plantago laceolata*	Narrow-leaved Plantain	2
**Senecio madagascariensis*	Fireweed	1
**Senna pendula var. glabrata*	Easter Cassia	1
**Setaria sp.*	Pigeon Grass	1
Acacia ulicifolia	Prickly Moses	2
Banksia integrifolia	Coastal Banksia	3
Casuarina glauca	Swamp Oak	2
Cotula australis	Carrot Weed	1
Cyathochaeta diandra		1
Cynadon dactylon	Couch	1
Dianella revoluta var. revoluta	Blueberry Lily	3
Dillwynia retorta	Bacon and Eggs	1
Eucalyptus agglomerata	Blue-leaved Stringybark	2
Eucalyptus canaliculata intermediate Eucalyptus punctata	Grey Gum	2
Eucalyptus parramattensis subsp. decadens	Earp's Gum	4
Juncus usitatus		3
Lomandra longifolia	Spiny-headed Mat-rush	2
Melaleuca armillaris	Bracelet Honey-myrtle	3
Melaleuca linariifolia	Narrow-leaved Paperbark	2
Melaleuca nodosa	Prickly-leaved Paperbark	2
Melaleuca sieberi	Siebers Paperbark	1
Melaleuca thymifolia	Thyme Honey-myrtle	2
Parsonsia straminea	Monkey Rope	1
Pteridium esculentum	Bracken	1
Rytidosperma fulvum	Wallaby Grass	1
Tally (natives):		21

COVER ABUNDANCE KEY

1	<5%, few individuals
2	<5%, many individuals
3	5-25%
4	26-50%
5	51-75%
6	76-100%

50 m x 20 m Plot

HBT's (count) (only hollows > 5 cm):	0
Fallen Logs length (> 10 cm, 0.5 m):	0

Whole Zone - Regen (% canopy regen zone)

Number of species:	3
Number regenerating:	3
Regeneration:	1

Table D.3 Location 3 - Transect

Biobanking Plot Sheet - Transect

Proposal ID :	J15156	**Proposal Name:**	Pymore	**Date**	25/05/2016
Plot Number	3				
Veg Type:	KSSW				
Coordinates:	**Easting**	56 H	357352		
Coordinates:	**Northing**	56 H	6369194		

50 m Transect (every 5 m)	**5 m**	**10 m**	**15 m**	**20 m**	**25 m**	**30 m**	**35 m**	**40 m**	**45 m**	**50 m**	**Avg (%)**
Canopy Cover (% - see Specht)	5	15	5	15	5	10	15	25	15	5	11.5
Exotic Canopy Cover	0	0	0	0	0	0	0	0	0	0	0
Mid Storey Cover (shrubs > 1m)	15	0	0	5	5	2	0	5	2	10	4.4
Exotic Mid Storey Cover	0	0	0	0	0	0	0	0	0	2	0.2

50 m Transect	**Presence/absence (0/1)**										**Total / %**
Ground Cover (shrubs < 1m)	0	0	0	0	0	0	0	0	0	0	0
Exotic shrubs	0	0	0	0	0	0	0	1	0	0	10
Ground Cover (grasses)	1	1	1	0	0	0	0	0	1		40
Exotic grasses	0	0	1	1	1	1	0	0	0	0	40
Ground Cover (other)	0	0	0	0	0	0	0	0	0	1	10
Exotic other	0	0	0	0	0	0	0	0	0	0	0

Notes

Table D.2 Location 4 - Plot

Biobanking Plot Sheet

Proposal Name	Pymore		**Veg Type:**		KSSW_Low
Date		25/05/2016	**Easting**	56 H	357300
Proposal ID :	15156		**Northing**	56 H	6369090
Plot Number	4				

20 x 20 m plot - Survey species and provide cover abundance scores

Species	Common Name	CA
**Cestrum nocturnum*	Lady-of-the-Night	1
**Cinnamomum camphora*	Camphor Laurel	1
**Hypochaeris radicata*	Catsear	2
**Senecio madagascariensis*	Fireweed	1
Acacia ulicifolia	Prickly Moses	2
Aristida ramosa	Purple Wiregrass	3
Aristida vagans	Three-awned Wiregrass	3
Cheilanthes sieberi	Poison Rock Fern	1
Chrysocephalum apiculatum	Yellow buttons	1
Cynadon dactylon	Couch	2
Dianella revoluta var. revoluta	Blueberry Lily	2
Entolasia stricta	Wiry Panic	3
Eragrostis sp	Lovegrass	3
Eucalyptus agglomerata	Blue-leaved Stringybark	2
Hibertia sp		1
Lasiopetalum parviflorum	Scaly Phebalium	1
Lomandra brevis	Tufted Mat-rush	2
Melaleuca linariifolia	Narrow-leaved Paperbark	2
Melaleuca sieberi	Siebers Paperbark	2
Pimelea linifolia	Slender Rice Flower	1
Tally (natives):		16

COVER ABUNDANCE KEY	
1	<5%, few individuals
2	<5%, many individuals
3	5-25%
4	26-50%
5	51-75%
6	76-100%

50 m x 20 m Plot

HBT's (count) (only hollows > 5 cm):	0
Fallen Logs length (> 10 cm, 0.5 m):	0
Whole Zone - Regen (% canopy regen zone)	
Number of species:	0
Number regenerating:	0
Regeneration:	0

Table D.3 Location 4 - Transcet

Biobanking Plot Sheet - Transect

Proposal ID :	J15156	**Proposal Name:**	Pymore	**Date**	25/05/2016
Plot Number	4				
Veg Type:	KSSW_Low				
Coordinates:	**Easting**	56 H	357300		
Coordinates:	**Northing**	56 H	6369090		

50 m Transect (every 5 m)	**5 m**	**10 m**	**15 m**	**20 m**	**25 m**	**30 m**	**35 m**	**40 m**	**45 m**	**50 m**	**Avg (%)**
Canopy Cover (% - see Specht)	0	0	0	0	0	10	0	0	0	0	1
Exotic Canopy Cover	0	0	0	0	0	0	0	0	0	0	0
Mid Storey Cover (shrubs > 1m)	0	0	0	0	0	0	0	0	0	0	0
Exotic Mid Storey Cover	0	0	0	0	0	0	0	0	0	0	0

50 m Transect	**Presence/absence (0/1)**										**Total / %**
Ground Cover (shrubs < 1m)	0	0	0	0	0	0	0	0	0	0	0
Exotic shrubs	0	0	0	0	0	0	0	0	0	0	0
Ground Cover (grasses)	0	0	1	0	0	1	0	1	1	1	50
Exotic grasses	0	0	0	0	0	0	0	0	0	0	0
Ground Cover (other)	0	0	0	0	0	0	0	0	0	0	0
Exotic other	0	0	0	1	0	0	0	0	0	0	10

Notes

Table D.2 Location 5 - Plot

Biobanking Plot Sheet

Proposal Name	Pymore		**Veg Type:**	RFEF	
Date		26/05/2016	**Easting**	56 H	357463
Proposal ID :	15156		**Northing**	56 H	6369458
Plot Number	5				

20 x 20 m plot - Survey species and provide cover abundance scores

Species	Common Name	CA
**Ambrosia tenuifolia*	Lacey Ragweed	2
**Anagallis arvensis*	Scarlet Pimpernel	1
**Bidens pilosa*	Farmers Friend	2
**Cestrum parqui*	Green Cestrum	2
**Cinnamomum camphora*	Camphor Laurel	3
**Cyperus sp.*		2
**Eraharta erecta*	Panic Veldtgrass	3
**Hydrocotle bonariensis*	Largeleaf Pennywort	2
**Ligustrum sinense*	Small-leaved Privet	1
**Onopordum acanthium*	Scotch Thistle	1
**Panicum sp.*	Panic Grass	2
**Passiflora sp.*	Passionvine species	2
**Phytolacca octandra*	Inkweed	1
**Sida rhombifolia*	Paddy's Lucerne	2
**Solanum mauritianum*	Tree Tabacco	2
**Tradescantia fluminensis*	Trad	5
**Verbena bonariensis*	Purpletop	3
Acacia longifolia	Sydney Golden Wattle	1
Adiantum sp.	Maidenhair Fern	2
Alternanthera denticulata	Lesser Joyweed	2
Angophora floribunda	Rough-barked Apple	3
Bursaria spinosa	Native Blackthorn	2
Casuarina cunninghamiana	River Sheoak	2
Centella asiaticus		2
Clematis glycinoides	Headache Vine	1
Desmodium varians	Slender Tick Trefoil	1
Dianella caerulea	Blue Flax-lilly	1
Dichondra repens	Kidney Weed	1
Echinopogon sp	Hedgehog Grass	2
Eucalyptus teretecornis	Forest Red Gum	2
Glycine tabacina	Variable Glycine	2
Hydrocotyle sibthorpioides		1
Leptospermum polygalifolium	Tantoon	1
Lomandra longifolia	Spiny-headed Mat-rush	2
Oplismenus sp.	Basket Grass	3
Persicaria decipiens	Slender Knotweed	1
Pteridium esculentum	Bracken	4
Rubus parvifolius	Native Raspberry	1
Tally (natives):		21

COVER ABUNDANCE KEY

1	<5%, few individuals
2	<5%, many individuals
3	5-25%
4	26-50%
5	51-75%
6	76-100%

50 m x 20 m Plot

HBT's (count) (only hollows > 5 cm):	2
Fallen Logs length (> 10 cm, 0.5 m):	0

Whole Zone - Regen (% canopy regen zone)

Number of species:	1
Number regenerating:	0
Regeneration:	0

Table D.3 Location 5 - Transect

Biobanking Plot Sheet - Transect

Proposal ID :	J15156	**Proposal Name:**	Pymore	**Date**	26/05/2016
Plot Number	5				
Veg Type:	RFEF				
Coordinates:	**Easting**	56 H	357463		
Coordinates:	**Northing**	56 H	6369458		

50 m Transect (every 5 m)	**5 m**	**10 m**	**15 m**	**20 m**	**25 m**	**30 m**	**35 m**	**40 m**	**45 m**	**50 m**	**Avg (%)**
Canopy Cover (% - see Specht)	45	25	30	30	25	40	40	20	10	20	28.5
Exotic Canopy Cover	0	0	0	0	0	0	0	0	0	0	0
Mid Storey Cover (shrubs > 1m)	0	5	10	0	0	0	0	0	0	0	1.5
Exotic Mid Storey Cover	0	5	5	5	10	5	2	5	2	5	4.4

50 m Transect	**Presence/absence (0/1)**										**Total / %**
Ground Cover (shrubs < 1m)	0	0	0	0	0	0	0	0	0	1	10
Exotic shrubs	0	0	0	1	0	0	0	0	0	0	10
Ground Cover (grasses)	0	0	0	0	1	0	1	0	0	0	20
Exotic grasses	0	0	0	0	0	0	0	0	1	0	10
Ground Cover (other)	0	0	0	0	1	1	1	0	0	0	30
Exotic other	1	1	1	1	1	1	0	1	1	1	90

Notes

Table D.2 Location 6 - Plot

Biobanking Plot Sheet

Proposal Name	Pymore		**Veg Type:**		Exotic Grassland
Date		26/02/2016	**Easting**	56 H	357482
Proposal ID :	15156		**Northing**	56 H	6369402
Plot Number	6				

20 x 20 m plot - Survey species and provide cover abundance scores

Species	Common Name	CA
**Ambrosia tenuifolia*	Lacey Ragweed	3
**Cestrum parqui*	Green Cestrum	1
**Cestrum nocturnum*	Lady-of-the-Night	1
**Paspalum dilatatum*	Paspalum	6
**Plantago laceolata*	Narrow-leaved Plantain	2
**Rubus fruticosus aggregate*	Blackberry	1
**Setaria sp.*	Pigeon Grass	2
**Sida rhombifolia*	Paddy's Lucerne	1
**Solanum nigrum*	Black Nightshade	1
**Verbena bonariensis*	Purpletop	2
Cynadon dactylon	Couch	3
Pteridium esculentum	Bracken	4
Tally (natives):		16

COVER ABUNDANCE KEY	
1	<5%, few individuals
2	<5%, many individuals
3	5-25%
4	26-50%
5	51-75%
6	76-100%

50 m x 20 m Plot

HBT's (count) (only hollows > 5 cm):	0
Fallen Logs length (>10 cm, 0.5 m):	0

Whole Zone - Regen (% canopy regen zone)

Number of species:	0
Number regenerating:	0
Regeneration:	0

Appendix E

Biobanking Credit Calculator Report

Biodiversity credit report

This report identifies the number and type of biodiversity credits required for a major project.

Date of report: 16/02/2017 Time: 12:08:38PM Calculator version: v4.0

Major Project details

Proposal ID:	191/2016/3928MP
Proposal name:	Battery Recycling Facility
Proposal address:	129 Mitchell Avenue Kurri Kurri NSW 2327
Proponent name:	Pymore Recyclers International Pty Ltd
Proponent address:	Level 40 1 Farrer Place Sydney NSW 2000
Proponent phone:	
Assessor name:	Eugene Dodd
Assessor address:	LEVEL 4 45 WATT ST Newcastle NSW 2300
Assessor phone:	0427 566 396
Assessor accreditation:	191

Summary of ecosystem credits required

Plant Community type	Area (ha)	Credits created
Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area	1.48	59.00
Total	1.48	59

Credit profiles

1. Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area, (HU847)

Number of ecosystem credits created	59
IBRA sub-region	Hunter

Offset options - Plant Community types	Offset options - IBRA sub-regions
Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area, (HU847) Rough-barked Apple - Narrow-leaved Ironbark - Blakely's Red Gum - Bull Oak - Coast Banksia woodland on sands of the Warkworth area, (HU872)	Hunter and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

Summary of species credits required

Common name	Scientific name	Extent of impact Ha or individuals	Number of species credits created
Eucalyptus parramattensis subsp. decadens	Eucalyptus parramattensis subsp. decadens	37.00	518

BioBanking Credit Calculator

Ecosystem credits

Proposal ID :	191/2016/3928MP
Proposal name :	Battery Recycling Facility
Assessor name :	Eugene Dodd
Assessor accreditation number :	191
Tool version :	v4.0
Report created :	16/02/2017 12:23

Assessment circle name	Landscape score	Vegetation zone name	Vegetation type name	Condition	Red flag status	Management zone name	Management zone area	Current site value	Future site value	Loss in site value	Credit required for bio diversity	Credit required for TS	TS with highest credit requirement	Average species loss	Species TG Value	Final credit requirement for management zone
1	22.60	HU847_Moderate/Good	Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area	Moderate/Good	Yes	1	0.87	50.67	0.00	50.67	38	38	Barking Owl	33.33	3.00	38
1	22.60	HU847_Moderate/Good_Poor	Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area	Moderate/Good_Poor	Yes	1	0.61	37.33	0.00	37.33	21	21	Barking Owl	20.00	3.00	21

BioBanking Credit Calculator

Species credits

Proposal ID :	191/2016/3928MP
Proposal name :	Battery Recycling Facility
Assessor name :	Eugene Dodd
Assessor accreditation number :	191
Tool version :	v4.0
Report created :	16/02/2017 12:23

Scientific name	Common name	Species TG value	Identified population?	Can Id. popn. be offset?	Area / number of loss	Negligible loss	Red flag status	Number of credits
Eucalyptus parramattensis subsp. decadens	Eucalyptus parramattensis subsp. decadens	1.40	No		37.00	0.00	Yes	518

Appendix F

FBA Table

Table F 1 Information requirements and reference for the biodiversity assessment report

Report section and FBA reference (Figures and data)	Maps and data	BAR reference
Introduction: Chapter 3 and Section 3.1	Site map	Figure 3.1 (refer to updated RTS version)
	Location map	Figure 3.2 (refer to updated RTS version)
	Digital shape files for all maps and spatial data	Attached in the RTS submission
Landscape features: Section 4.1, Appendix 4 and Appendix 5	IBRA bioregions and subregions (as described in Paragraphs 4.1.1.3–4)	Figure 3.1 & 3.2 (refer to updated RTS version)
	NSW landscape regions (as described in Paragraphs 4.1.1.5– 6)	Figure 3.1 & 3.2 (refer to updated RTS version)
	Rivers and streams (as described in Paragraphs 4.1.1.8–10	Figure 3.1 & 3.2 (refer to updated RTS version)
	Wetlands (as described in Paragraphs 4.1.1.11–13)	N/A. No wetlands exist within the outer assessment circle
	Other landscape features (as required by SEARs)	N/A. No other landscape features are required by the SEARs
	Native vegetation extent (as described in Paragraphs 4.1.1.12–15)	Figure 3.1 & 3.2 (refer to updated RTS version)
	State, regional and local biodiversity links (as described in Paragraphs 4.1.1.16–17)	Figure 3.1 & 3.2 (refer to updated RTS version)
	Regional vegetation used to calculate patch size	Figure 3.2 (refer to updated RTS version)
Native vegetation : Chapter 5	Map of native vegetation extent within the development site (as described in Section 5.1)	Figure 3.3
	Map of PCTs within the development site	Figure 3.3
	Map of condition class and subcategory (where relevant)	Figure 3.4
	Map of plot and transect locations relative to PCTs and condition class	Figure 2.1 and 3.3
	Map of EECs	Figure 3.3 (refer to updated RTS version)
	Plot and transect field data sheets	Appendix C , in RTS
	Table of current site value scores for each vegetation zone within the development site	Table 3.2
	Map of vegetation zones with a current site value score of <17.	Figure 3.3 (refer to updated RTS version)

Table F 1 Information requirements and reference for the biodiversity assessment report

Report section and FBA reference (Figures and data)	Maps and data	BAR reference
Threatened species: Chapter 6	Table of vegetation zones and landscape Tg values, particularly indicating where these have changed due to species exclusion	Table 2.3
	Targeted survey locations	Figure 2.1 (Refer to updated RTS version)
	Table detailing the list of species credit species and presence status on site as determined by targeted survey, indicating also where presence was assumed and/or where presence was determined by expert report	Table 2.4, Table 3.3 and Appendix B (BAR) and point 4 (RTS)
	Species credit species polygons (as described in Paragraph 6.5.1.19)	N/A. No species polygons required, individual counts were recorded for threatened flora.
	Table detailing species and habitat feature/component associated with species and its abundance on site (as described in Paragraph 6.5.1.19)	N/A
	Species polygons for species that cannot withstand a loss	N/A. No species which cannot stand a loss, were either recorded or have potential to occur.
Report section and FBA reference (Report)	**Information**	**BAR reference**
Introduction: Chapter 3 and Section 3.1	Introduction to the biodiversity assessment including:	Chapter 1
	• identification of development site footprint, including:	Section 1.2
	- operational footprint; and	Section 1.2
	- construction footprint indicating clearing associated with temporary construction facilities and infrastructure.	Section 1.4
	• general description of development site; and	Section 1.3
	• sources of information used in the assessment, including reports and spatial data.	Section 2.1
Landscape features: Section 4.1, Appendix 4 and Appendix 5	Identification of landscape features at the development site, including:	Section 3
	• IBRA bioregions and subregions, NSW landscape region and area (ha);	Section 3.3.1
	• native vegetation extent in the outer assessment circle or buffer area;	Table 3.1
	• cleared areas;	Section 3.5
	• evidence to support differences between mapped vegetation extent and aerial imagery;	N/A
	• rivers and streams classified according to stream order;	Figures 3.1 & 3.2

Table F 1 Information requirements and reference for the biodiversity assessment report

Report section and FBA reference (Figures and data)	Maps and data	BAR reference
	• wetlands within, adjacent to and downstream of development site; and	N/A. No wetlands exist within the outer assessment circle
	• landscape value score components, including:	Section 3.6
	- identification of method applied (i.e. linear or site-based);	A site -based development
	- percent native vegetation cover in the landscape;	Section 3.2
	- connectivity value;	Point 2, bullet point 1 in RTS
	- patch size; and	Point 2, bullet point 2 in RTS
	- area to perimeter ratio.	N/A. Not a linear development
	• landscape value score.	Point 2, bullet point 3 in RTS
Native vegetation: Chapter 5	Identify native vegetation extent within the development site, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery.	Section 3.4
	Describe PCTs within the development site, including:	Section 3.4
	• vegetation class	Section 3.4
	• vegetation type	Section 3.4
	• area (ha) for each vegetation type	Section 3.4
	• species relied upon for identification of vegetation type and relative abundance	Section 3.4
	• justification of evidence used to identify a PCT (as outlined in Paragraph 5.2.1.8)	Section 3.4
	• EEC status (as outlined in Subsection 5.2.1)	Section 3.4
	• estimate of percent cleared value of PCT.	Section 3.4
	Describe vegetation zones within the development site, including:	Section 3.4. Table 3.2
	• condition class and subcategory (where relevant)	Section 3.4. Table 3.2
	• area (ha) for each vegetation zone	Section 3.4. Table 3.2
	• survey effort as described in Paragraphs 5.2.1.5–7 (number of plots/transects).	Section 2.2, 3.6
	Where use of local data is proposed:	N/A

Table F 1 Information requirements and reference for the biodiversity assessment report

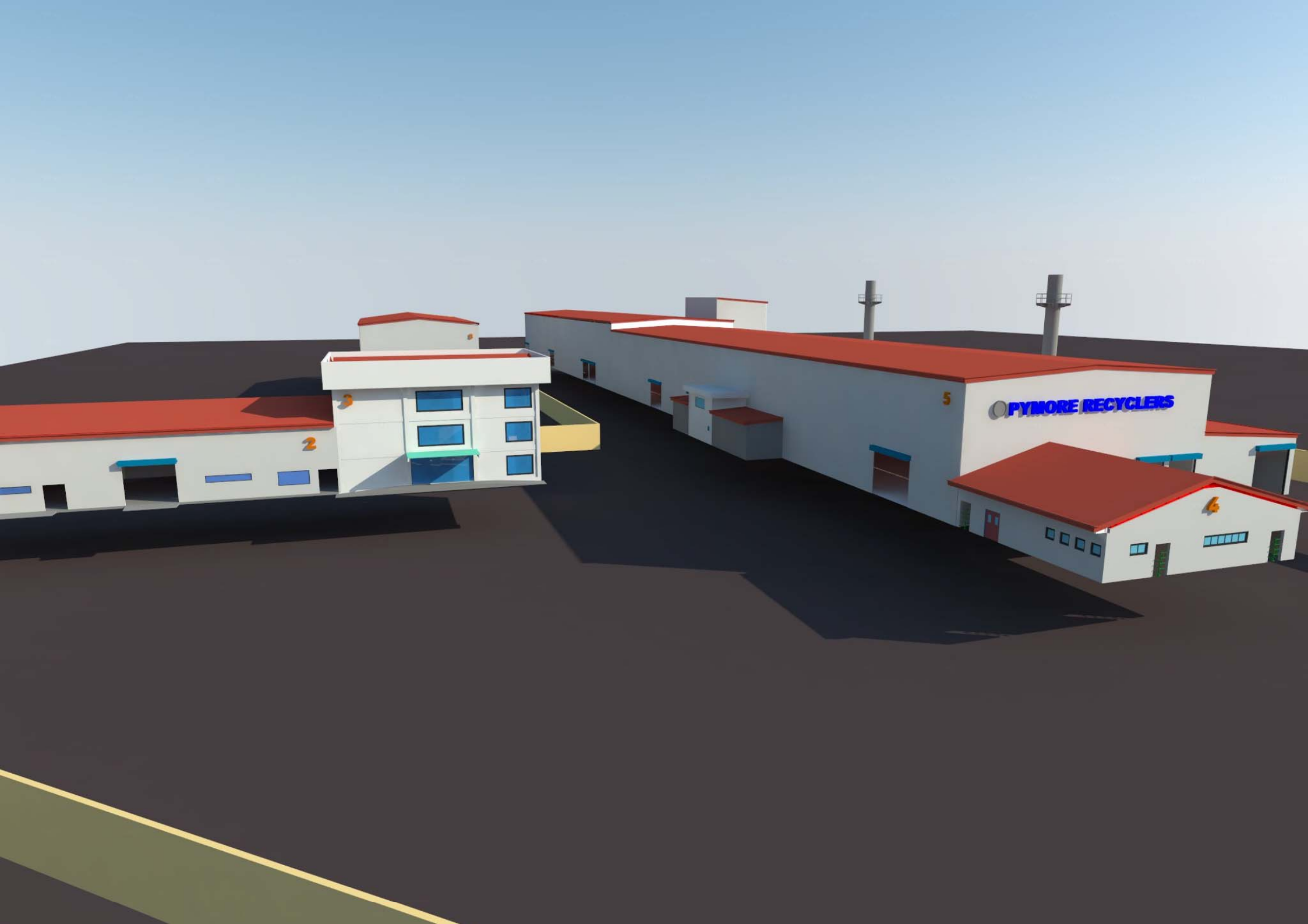
Report section and FBA reference (Figures and data)	Maps and data	BAR reference
	• identify relevant vegetation type	N/A
	• identify source of information for local benchmark data	N/A
	• justify use of local data in preference to database values.	N/A
Threatened species: Chapter 6	Identify ecosystem credit species associated with PCTs on the development site as outlined in Section 6.3, including:	Section 2.2.3(a), Table 2.3
	• list of species derived	Table 2.3
	• justification for exclusion of any ecosystem credit species predicted above.	3.10.2 and Appendix C
	Identify species credit species on the development site as outlined in Sections 6.5 and 6.6, including:	3.10.3, Table 3.3 and Appendix C
	• list of candidate species	2.2.3(b), Table 2.4, Table 3.3 and Appendix C
	• justification for inclusions and exclusions based on habitat features	Appendix C
	• indication of presence based on targeted survey or expert report	Appendix C
	• details of targeted survey technique, effort, timing and weather	Section 2.2
	• species polygons	N/A. Refer to Point 4, RTS for further explanation.
	• species that cannot withstand a further loss.	Point 4, RTS
	Where use of local data is proposed:	N/A
	• identify relevant species or population	N/A
	• identify aspect of species/population data	N/A
	• identify source of information for local data	N/A
	• justify use of local data in preference to database values.	N/A
	Where expert reports are used in place of targeted survey:	N/A
	• identify the relevant species or population	N/A
	• justify the use of an expert report	N/A

Table F 1 Information requirements and reference for the biodiversity assessment report

Report section and FBA reference (Figures and data)	Maps and data	BAR reference
	• indicate and justify the likelihood of presence of the species or population and information considered in making this assessment	N/A
	• estimate the number of individuals or area of habitat (whichever unit of measurement applies to the species/individual) for the development site, including a description of how the estimate was made	N/A
	• identify the expert and provide evidence of their expert credentials.	N/A

Appendix G

3D Drawings

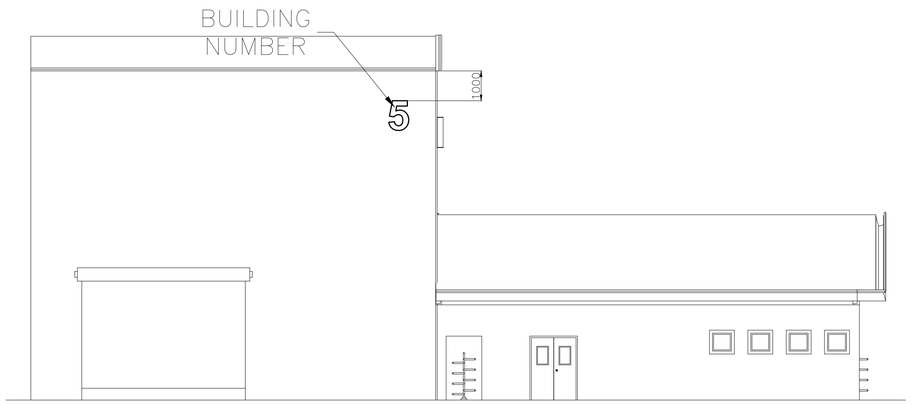

PYMORE RECYCLERS
1
2
3
4
5

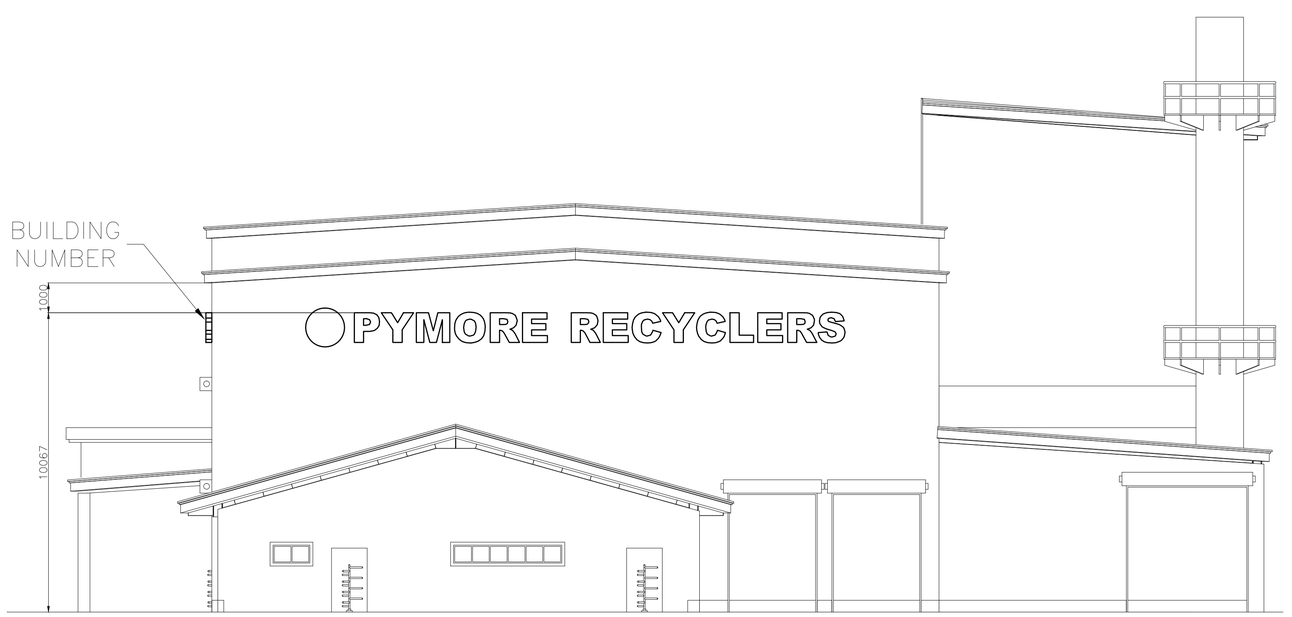

3
2


5
PYMORE RECYCLERS

Appendix H

Signage Plans

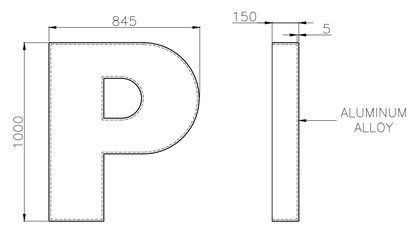


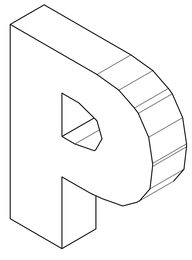


COMPANY
LOGO

PYMORE RECYCLERS

18100





RAISE LETTER
MATERIAL: ALUMINUM ALLOY

Note:

All text to be centered vertically
& horizontally with sign illumination.

REVISION	NO.	DATE	DESCRIPTION	DRAWN	CHECK'D	APPR'D
	0	02/16/17	First issue	AAM	LCC	
	1	02/17/17	RELOCATE BUILDING NUMBER	AAM	LCC	

EVERGREEN ENVIRONMENTAL RESOURCES INC.

PROJECT: KURRI-KURRI BATTERY RECYCLING PROJECT		DESIGN BY:	LCC
CLIENT: PYMORE RECYCLERS INTERNATIONAL PTY. LTD.		DRAWN BY:	MDB
TITLE: BUILDING FACADE SIGN		CHECKED BY:	LCC
DRAWING NO: KKBR-0041	REV.1	APPROVED BY:	MW
NOTE: THIS DRAWING IS PROPERTY OF EVERGREEN ENVIRONMENTAL RESOURCES INC. AND SUCH MUST NOT BE REPRODUCED COPIED IN PART OR IN WHOLE WITHOUT CONSENT.		DATE:	02.17.17
		SCALE:	SHT NO: 1/1

ALL DIMENSION ARE IN MILLIMETER UNLESS OTHERWISE SPECIFIED.

Appendix I

EPBC Act referral notice

Australian Government
Department of the Environment and Energy

EPBC Ref: 2016/7782

Eugene Dodd
EMM Consulting Pty Ltd
PO Box 506
NEWCASTLE NSW 2300

Dear Mr Dodd

Decision on referral
Battery Recycling Facility, Kurri Kurri, NSW

Thank you for submitting a referral under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This is to advise you of my decision about the proposed action to construct and operate a facility to recycle used lead acid batteries (ULABs) in Kurri Kurri, NSW.

As a delegate of the Minister for the Environment and Energy, I have decided that the proposed action is not a controlled action. This means that the proposed action does not require further assessment and approval under the EPBC Act before it can proceed.

A copy of the document recording this decision is enclosed. This document will be published on the Department's website.

Please note that this decision relates only to the specific matters protected under Chapter 2 of the EPBC Act. This decision does not affect any requirement for separate state or local government environment assessment and approvals of the proposed action.

The Department has an active audit program for proposals that have been referred under the EPBC Act. The audit program aims to ensure that proposals are implemented as planned. Please note that your project may be selected for audit by the Department at any time and all related records and documents may be subject to scrutiny. Information about the Department's compliance monitoring and auditing program is enclosed.

I have written separately to Mr Mario Alba of Pymore Recyclers International Pty Ltd advising of this decision.

If you have any questions about the referral process or this decision, please contact the project manager, Katie Lowe, by email to katie.lowe@environment.gov.au, or telephone 02 6274 1431 and quote the EPBC reference number shown at the beginning of this letter.

Yours sincerely

Mike Smith
Acting Assistant Secretary
Assessments (NSW, ACT) and Fuel Branch
13 December 2016

Notification of

REFERRAL DECISION – not controlled action

Battery Recycling Facility, Kurri Kurri, NSW (EPBC 2016/7782)

This decision is made under Section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

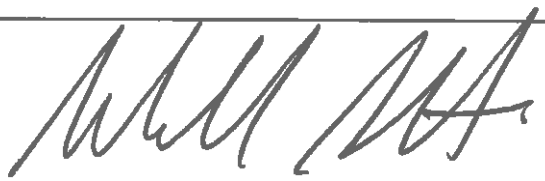
Proposed action

person named in the referral	Pymore Recyclers International Pty Ltd ACN 610 544 235
proposed action	To construct and operate a facility to recycle used lead acid batteries (ULABs) in Kurri Kurri, NSW [see EPBC Act referral 2016/7782]

Referral decision: Not a controlled action

status of proposed action	The proposed action is not a controlled action.

Person authorised to make decision

Name and position	Mike Smith Acting Assistant Secretary Assessments (NSW, ACT) and Fuel Branch
signature	
date of decision	13 December 2016

Australian Government
Department of the Environment and Energy

COMPLIANCE MONITORING AND AUDITING

This fact sheet provides an overview of the compliance monitoring and auditing program in place for projects referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and permits granted under the *Environment Protection (Sea Dumping) Act 1981* (the Sea Dumping Act).

What is the EPBC Act?

The EPBC Act is Australia's key national environment law. Under the EPBC Act, proposals which are likely to have a significant impact on matters of national environmental significance must be referred, assessed, and a decision made by the Minister or his delegate on whether to approve the proposal.

What is the Sea Dumping Act?

The Sea Dumping Act regulates the loading and dumping of waste at sea. The Sea Dumping Act fulfils Australia's international obligations under the London Protocol to prevent marine pollution by dumping of wastes and other matter. Permits are required from the Department for all ocean disposal activities.

What is compliance monitoring and auditing for?

The Department has implemented a program to monitor and audit projects that have been referred under the EPBC Act and the Sea Dumping Act to ensure they are complying with their approval/permit conditions or particular manner requirements and the legislation.

Compliance monitoring activities, including inspections and audits, aim to ensure projects with the potential to impact on nationally protected matters are implemented as planned. Monitoring and audits help the Australian Government to understand how well conditions or requirements are being understood and applied, and contribute to improving the effectiveness of the Department's operations.

All compliance monitoring activities, and any subsequent enforcement activities, are conducted in accordance with the Department's Compliance and Enforcement Policy.

What is a monitoring inspection?

Approved projects are subject to monitoring inspections to ensure and verify compliance with the conditions or requirements of the approval or permit. Projects are selected for a monitoring inspection based on a risk-based process informed through a number of factors, including sector, location, compliance history and the potential impact on listed matters (such as threatened species and ecological communities).

What is a compliance audit?

A compliance audit is an objective assessment of a project's compliance against selected criteria. Projects are audited against conditions or requirements. A compliance audit usually takes the form of a desktop document review and may include a site inspection, if necessary. In some cases, the document review provides the Department with enough information to verify that a project is compliant.

Projects can be chosen for audit based on a random selection process or a risk-focused selection process. If your project is selected for an audit, you will be contacted by a Departmental officer who will explain the process. All audit report summaries are posted on the Department's website. The results of audits may also be publicised through the general media.

Further information

For further information on the compliance monitoring and auditing program, please visit the Department's website at www.environment.gov.au or contact:

The Director, Monitoring and Assurance Section
Department of the Environment and Energy
GPO Box 787 CANBERRA ACT 2601
Telephone: (02) 6274 1111
Email: EPBCmonitoring@environment.gov.au

Appendix J

Letter to Cessnock City Council regarding VPA

Ground Floor, Suite 01, 20 Chandos Street
St Leonards, NSW, 2065
PO Box 21
St Leonards, NSW, 1590

T +61 2 9493 9500
F +61 2 9493 9599
E info@emmconsulting.com.au

www.emmconsulting.com.au

20 February 2017

Wonona Fuzzard
Principal Strategic Land Use Planner
Cessnock City Council
62-78 Vincent Street
Cessnock NSW 2325

Re: Proposed voluntary planning agreement for proposed battery recycling facility at 129 Mitchell Avenue, Kurri Kurri

Dear Wonona,

I refer to our meeting on 1 February 2017 on the above matter and subsequent discussions on Friday 17 February 2017. Based on the discussions I confirm that our client, Pymore Recyclers International Pty Ltd (Pymore), has consented to the following essential terms of the proposed voluntary planning agreement (VPA) to be made pursuant to section 93F of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act):

1. Upon taking a final decision to proceed with the construction of the proposed battery recycling facility, Pymore will enter into a VPA with Cessnock City Council (the Council) before the commencement of construction;

2. Within one month of the commencement of operations with the first furnace, an amount of $50,000 for allocation towards road infrastructure projects on either Mitchell Avenue, Government Road and Hart Road; and

3. Within one month of the installation of the second furnace, an amount of $50,000 for allocation towards road infrastructure projects on either Mitchell Avenue, Government Road and Hart Road.

This offer to Council is subject to a formal offer to enter into a VPA in accordance with the EP&A Act, Ministerial directions and relevant VPA Practice Notes.

It is envisaged that should the NSW Department of Planning and Environment, as delegate to the NSW Minister for Planning, grant development consent to the proposed battery recycling facility, a condition will be imposed on the consent requiring that Pymore to enter into a VPA with the Council before the commencement of construction in accordance with the above terms.

Please do not hesitate to contact me on 02 9493 9500 should you have any queries regarding this matter.

Yours sincerely

Brett McLennan
Director
bmclennan@emmconsulting.com.au

Appendix K

Correspondence from Cessnock City Council regarding detention basin

From: Craig Maher [mailto:Craig.Maher@cessnock.nsw.gov.au]
Sent: Friday, 10 February 2017 2:25 PM
To: Chris Kuczera
Cc: Martin Johnson; Brett McLennan; Janine McCarthy; Stephen Long; Sarah Anderson
Subject: RE: Kurri Kurri Battery Recycling Facility – Detention Basin

Hi Chris,

The information contained in the Surface Water Assessment and your emails below has been assessed by Council.

It is considered that in light of the information supplied, it is acceptable to locate the basin within the area affected by the 1% AEP flood and as such Council's previous request to relocate the basin can be disregarded.

Regards,

Craig Maher | Consultant Senior Development Engineer to Cessnock City Council
Cessnock City Council
62-78 Vincent St | PO Box 152 | Cessnock NSW 2325
p 02 4993 4135
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From: Chris Kuczera [mailto:Chris.Kuczera@rhdhv.com]
Sent: Friday, 3 February 2017 11:28 AM
To: Craig Maher
Cc: Martin Johnson; Brett McLennan
Subject: RE: Kurri Kurri Battery Recycling Facility – Detention Basin

Hi Craig,

With reference to the section concept provided in Figure 8 of the Surface Water Assessment (pg 20), the basin will have:

- An embankment crest level of approximately 10.5 m AHD.
- A spillway crest level of approximately 10.0 m AHD.
- The inlet level of the low flow control would be approximately 9m AHD.

Please note that as explained in my email below, the intention is to build a low profile embankment in cut, to remove any potential impacts on flow conveyance and loss of flood storage.

With reference to the flood maps provided in the Swamp Creek Floodplain Risk Management Study or Plan (Worley Parsons, 2013). The

- The 20% AEP (or 1 in 5 year) flood level at the site is 10 m AHD.
- The 10% AEP (or 1 in 10 year) flood level at the site is 10.4 m AHD.

- The 5% AEP (or 1 in 20 year) flood level at the site is 10.8 m AHD.

Accordingly, the functionality of the basin's outflow controls can be described as follows:

- The low flow outlet will function when flows in Swamp Creek are at or below bank full. This is expected to be the case for all short duration events (i.e. the 2 hour duration storm) up to and beyond the 1%AEP (or 1 in 100 year) event and flow conditions during general wet weather periods (the key focus for water quality controls).
- The high flow weir control will function unimpeded during a 20% AEP (or 1 in 5 year event) Swamp Creek Flood event.
- For events greater than the 20% AEP (or 1 in 5 year event) event, Swamp Creek floodwaters will begin to impeded outflows from the basin (during the peak of the event). However the basin is still expected to provide flow attenuation until the embankment becomes inundated. This will occur during the peak of the 10% AEP (or 1 in 10 year) event.

This functionality would enable the basin to achieve the three water management that are described in my email below.

Please let me know if you require any further information.

Regards,

Chris Kuczera
Senior Water Resources Engineer – Rivers & Water Management

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From: Chris Kuczera
Sent: Thursday, 2 February 2017 9:33 AM
To: 'Craig.Maher@cessnock.nsw.gov.au'
Cc: 'Martin.Johnson@cessnock.nsw.gov.au'
Subject: FW: Kurri Kurri Battery Recycling Facility – Detention Basin

Hi Craig,

Yesterday I sent the email below to your old email address, so I'm sending it again to your current address.

Thanks,

Chris

Hi Craig,

We had a meeting with Martin Johnston today to discuss Council's comments on the Kurri Kurri Battery Recycling EIS. One of the key issues raised by Council is the location of the detention basin within the 1% AEP flood extent. I explained the rationale for the proposed basin location to Martin, who asked that I discuss it directly with yourself. I have drafted a response (see text below) that reiterates what I explained to Martin today. Could you please review and call me to discuss.

I have also attached a copy of our Surface Water Assessment for reference.

I have CCed Martin and Brett McLennan from EMM. Brett is managing the EIS for the project.

Draft Response

A stormwater detention basin is one of the proposed stormwater management measures for the project. With reference to Figure 5 in the Surface Water Assessment, the detention basin will receive runoff from the site only when the Stormwater Capture Basin is full. The detention basin has been sized to maintain peak flows from the site at existing levels for all events up to and including the 1% AEP event. Relevant calculations are provided in Appendix B of the Surface Water Assessment. The basin is proposed to be constructed in cut to remove any potential for flood impacts associated with a reduction in flow conveyance or flood storage. A section concept is provided in Figure 8 of the Surface Water Assessment.

As noted in comments from OEH, DPI and Council, the basin is located on the Swamp Creek Floodplain, within the 1% AEP flood extent. In some cases this would be considered inappropriate as a detention basin will not provide its intended peak flow reduction function if it is inundated by floodwaters. However, in the case of this project, detention storage will not provide any material flood mitigation benefit for the following reasons:

- The 1% AEP peak flow in Swamp Creek adjacent to the site is estimated to be 397 m^3/s. The 24 hour duration event was adopted as the governing duration event in the Swamp Creek Floodplain Risk Management Study (Worley Parsons, 2013). Peak flows from the site for the 1% AEP 24 hour duration event are estimated by RHDHV to be 0.31 m^3/s for existing conditions and 0.33 m^3/s for developed conditions (with no detention). Accordingly, detention storage designed to mitigate any increase in peak flows from the site for the 1% AEP 24 hour duration event, would reduce peak flows from 0.33 to 0.31 m^3/s, a 0.02 m^3/s reduction. This reduction is equivalent to 0.005% of the peak 1% AEP peak flow in Swamp Creek. This analysis demonstrates that detention storage would provide no material flood mitigation benefit.
- Section 5.1 of the Surface Water Assessment established that Hunter River flood levels are higher than Swamp Creek flood levels downstream of the Hunter Expressway Bridge. The Hunter Expressway Bridge is located 600m downstream of the site. Accordingly, any peak flow increase in Swamp Creek associated with the project could only potentially impact flood risk between the site and the Hunter Expressway. There is currently no development established within this 600m reach of the Swamp Creek Floodplain.

It is also noted that detention storage is not listed as a recommended development control in the Swamp Creek Floodplain Risk Management Study or Plan (Worley Parsons, 2013).

Locating the detention basin above the 1% AEP flood extent would require the basin to be built within the fill pad, either as underground storage or if space permits, a surface basin located adjacent to the Stormwater Capture and Untreated Water Storage Basins. Both of these alternative options would be substantially more expensive to construct than the proposed basin and in RHDHV's opinion are not warranted due to the reasons explained above.

The proposed detention basin is expected to provide the following water management benefits:

- The basin will maintain peak flows from the site at existing levels. This will mitigate any impacts the project may have on erosion of the Swamp Creek Channel, which predominately occurs in 0.5 to 5 year Average Recurrence Interval events.
- The basin will provide some additional water quality treatment of runoff leaving the site; and
- The basin will provide a last resort containment facility that could be utilised to capture and contain any accidental spill or fire water that leaves the site. It is noted that this would only occur if the Stormwater Capture Basin is full and bypass flows occur.

In summary the detention basin is expected to have a neutral impact on Swamp Creek flooding, but will provide the abovementioned water management benefits. An alternative basin configuration that is located above the 1% AEP flood extent would be substantially more expensive to construct and would not provide any material flood mitigation benefit. Accordingly, in RHDHV's opinion, the currently proposed basin is appropriate.

Regards,

Chris Kuczera
Senior Water Resources Engineer – Rivers & Water Management

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