

Source / Activities	Potential Emissions	Potential Pathway	Potential Receptors	Potential Impacts	Proposed Controls	Consequence	Likelihood	Risk Rating	Detailed Risk Assessment Required?
Construction of RSA 10									
Construction works (e.g., general earthworks, machinery mobile and equipment)	Dust	Air: Windborne Particulate Matter generated during construction activities	Residential: The nearest sensitive land users to the RSA 10 footprint are located 3 km west, north-west, north-east and east	Human health impacts – respiratory illness. Given the distance to the nearest receptors, impacts to public health or amenity from nuisance dust are not expected.	<ul style="list-style-type: none">A project specific construction dust management plan has been prepared and is included as Attachment 23.Temporary dust monitors will be installed near the RSA 10 construction site to monitor dust emissions in real time to facilitate the implementation of immediate dust control measures.Dust is monitored at the existing L6217/1983/15 permanent monitoring locations (refer Attachment 8) and managed in accordance with the following conditions, including (but not limited to):<ul style="list-style-type: none">A20: The licence holder shall operate a dust monitoring program to measure dust levels generated from the RDA’s. The dust monitoring program will incorporate the following features:<ul style="list-style-type: none">(i) use TEOM’s, or high-volume samplers that meet AS/NZS 3580.9.3:2003;(ii) have monitors of the following designations, located at the following locations - BRW, RE, RW, RNE and RNW in positions identified in Appendix B;(iii) have monitors located in accordance with AS/NZS 3580.1.1:2007 ;(iv) run continuously (with a response level of 95% availability for each calendar year for each monitor); and(v) where high volume samplers are used, renew filter papers daily.A21: The licence holder shall have analysed, the filter paper from at least one of the high-volume samplers from the dust monitoring program (located downwind at the time of sampling), that can be demonstrated to be representative of dust emissions from the RDA’s [RSAs] in accordance with Table 12 of Appendix A.Dust will be managed in accordance with Alcoa’s existing standard operating procedures and dust suppression methods.Maintain watercart, or similar, onsite to dampen roads, tracks, and stockpiles during construction to minimise dust lift off.Speed limits will be implemented on site to minimise dust generation from vehicle movements.	Minor	Unlikely	Medium	Yes – complete (refer to Attachment 23)
		Air: Transport through air then deposition	Nearby Environmentally Sensitive Areas (ESAs), General native vegetation. Native fauna	Reduced vegetation health Dust may degrade habitats which represent shelter, foraging and dispersal habitats for native fauna.					
	Noise	Air: windblown noise generated through construction activities	Residential: The nearest sensitive land users to the RSA 10 footprint are located 3.5 km west	Potential public health and amenity to nearest sensitive receptors. Given the distance to the nearest receptors, impacts to public health or amenity from noise are not expected.	<ul style="list-style-type: none">Construction and operational noise assessment complete (refer to Attachment 19)Noise generating construction works will be conducted between the hours of 0700 and 1900Monday to Saturday, excluding public holidays. Should out of hours works be required a Noise Management Plan (NMP) will be submitted to DWER for approval in accordance with Regulation 13 of the Noise Regulations.Works will be carried out in accordance with Section 6 of AS 2436-1981 “Guide to Noise Control on Construction, Maintenance and Demolition Sites”.Any new Alcoa vehicles or mobile equipment to be added into Alcoa’s existing vehicle and mobile equipment maintenance programme.All heavy and light vehicles, mobile machinery and mobile equipment will be maintained in accordance with manufacturers’ specifications and all records kept.Speed limits will be implemented onsite to reduce engine noise emissions.	Slight	Unlikely	Low	No
Hydrocarbon spills during fuel storage, refuelling activities, contaminated stormwater	Hydrocarbons	Hydrocarbon spill from machinery or storage containers	Land/soils.	Soil contamination.	<ul style="list-style-type: none">Contaminated material disposal shall be in accordance with DWER Part V Licence L6217/1983/15 condition S1(a).Existing Alcoa procedures are expected to effectively mitigate the risk of hydrocarbon spills during construction.Groundwater management will be in accordance with the DWER Part V Licence L6217/1983/15 conditions.Follow existing inspection and maintenance program for site drainage / stormwater management to assess and maintain integrity and operation.	Slight	Possible	Low	No
		Seepage of hydrocarbon spill to groundwater causing contamination.	Groundwater	Groundwater contamination outside of prescribed premises boundary directly related to RSA 10 construction.					
		Overland runoff of contaminated stormwater	Samson South Drain is located directly adjacent to RSA 10 footprint	Decreased water quality within South Samson Drain. Given the					

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		(hydrocarbon spill) to surface water.	ESAs	Reduced vegetation health.	<ul style="list-style-type: none"> Stormwater drainage has been designed to be captured and fed into the existing RSA drainage network, which would prevent any spills from reaching Samson South Drain. Ensure refuelling is within designated and bunded refuelling areas. 				
Waste Generation	General and putrescible wastes	Overland / windblown Soil/groundwater / surface water contamination from inappropriate disposal of solid waste during construction	Residential: The nearest sensitive land users to the RSA 10 footprint are located 3 km west, north-west, north-east and east	Health and amenity: Given the distance to the nearest receptor, impacts to public health or amenity from generated wastes are not expected.	<ul style="list-style-type: none"> General wastes will be managed in accordance with the following DWER Part V Licence L6217/1983/15 conditions: <ul style="list-style-type: none"> <i>S1(a) The licence holder may dispose of the following types of waste(s) to the RDA's (depicted in Appendix B), that have been generated at the premises, the licence holder's Willowdale Minesite and Bunbury Rail Terminal and Port Loading Facility or the Alinta Wagerup Cogeneration Power Plant:</i> <ul style="list-style-type: none"> (i) waste meeting acceptance criteria specified for class II landfills in the document titled "Landfill Waste Classifications and Waste Definitions 1996", or hydrocarbon contaminated wastes; and (ii) wastes generated from alumina production and associated activities, excluding: <ul style="list-style-type: none"> (a) elemental mercury collected as waste stream; (b) asbestos materials; (c) packaged laboratory chemical waste; and (d) clinical waste. <i>S2(a) The licence holder shall accept and bury waste referred to in condition S1(a)(i) by:</i> <ul style="list-style-type: none"> (i) placing the waste in a defined trench or within an area enclosed by earthen bunds; and (ii) covering the waste with clean fill, residue or sand (or other similar material) on a weekly basis. <i>S2(b) The licence holder shall not burn or allow the burning of waste referred to in condition S1(a) on the premises.</i> Recyclable materials will be separated from other waste and recycled wherever possible. Non-recyclable materials will be disposed of in the on-site landfill facility. Any potential hazardous and/or controlled waste will be managed in accordance with existing hazardous and/or controlled waste management processes. <p>The proposed works are unlikely to produce any additional putrescible wastes on the site. Therefore, existing waste management procedures are expected to effectively mitigate the risk of general wastes during construction.</p> 	Slight	Unlikely	Low	No
Stormwater	Overland runoff	Sediment laden runoff	Samson South Drain is located directly adjacent to RSA 10 footprint Downstream populations of Carter's Freshwater Mussels are located approximately 1.3 km away	Reduced water quality within the Samson South Drain. Decrease in the size of CFM population.	<ul style="list-style-type: none"> Implement the Surface Water Management Plan (included as Attachment 24). Stormwater drainage has been designed to be captured and fed into the existing RSA drainage network. Existing inspection and maintenance program for site drainage / stormwater management to assess and maintain integrity and operation. Install culverts during low water flow and minimise clearing of all vegetation overhanging and within drain. 	Major	Rare	Medium	Yes - refer to Attachments 13, 14, and 24.
Operation of trucks, mobile equipment and machinery	Exhaust emissions	Air: Transport through air	Residential: The nearest sensitive land users to the RSA 10 footprint are located 3 km west, north-west, north-east and east	Human health impacts. Given the distance to the nearest receptors, impacts to public health or amenity from exhaust emissions are not expected. Increased greenhouse gas emissions.	<ul style="list-style-type: none"> Alcoa HVs, LVs, and mobile equipment installed with standard emission control devices. Alcoa vehicles, mobile machinery, and mobile equipment to be maintained in accordance with manufacturers' specifications and records kept. 	Slight	Unlikely	Low	No

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Operation of RSA 10									
Operation of RSA 10	Dust	Air: Windborne Particulate Matter generated from dried residue mud	Residential: The nearest sensitive land users to the RSA 10 footprint are located 3 km west, north-west, north-east and east.	Human health impacts – respiratory illness. Impacts to amenity from nuisance dust .	<ul style="list-style-type: none"> Dust is monitored at the existing L6217/1983/15 permanent monitoring locations and managed in accordance with the following conditions, including (but not limited to): <ul style="list-style-type: none"> A20: The licence holder shall operate a dust monitoring program to measure dust levels generated from the RDA's. The dust monitoring program will incorporate the following features: <ul style="list-style-type: none"> (i) use TEOM's, or high-volume samplers that meet AS/NZS 3580.9.3:2003; (ii) have monitors of the following designations, located at the following locations - BRW, RE, RW, RNE and RNW in positions identified in Appendix B; (iii) have monitors located in accordance with AS/NZS 3580.1.1:2007 ; (iv) run continuously (with a response level of 95% availability for each calendar year for each monitor); and (v) where high volume samplers are used, renew filter papers daily. A21: The licence holder shall have analysed, the filter paper from at least one of the high-volume samplers from the dust monitoring program (located downwind at the time of sampling), that can be demonstrated to be representative of dust emissions from the RDA's [RSAs] in accordance with Table 12 of Appendix A. The RSA 10 sprinkler system will be used to spray water over stored residue mud to minimise dust generation. Dust will be managed in accordance with Alcoa's existing standard processes. Maintain watercart, or similar, onsite to dampen roads, tracks, and stockpiles to minimise dust lift off. Material exiting the premises managed by third party transporters will be in vehicles suited to transport the load (e.g. covered loads). Speed limits will be implemented on site to minimise dust generation from vehicle movements. 	Moderate	Possible	Medium	No
		Air: Transport through air then deposition	Nearby Environmentally Sensitive Areas (ESAs), General native vegetation	Reduced vegetation health					
			TECs located approximately 3 km east and 3.5 km north-east of RSA 10.						
			Native fauna	Dust may degrade habitats which represent shelter, foraging and dispersal habitats for native fauna.					
	Odour	Air: odour generated from evaporation of liquor in stored residue	Residential: The nearest sensitive land users to the RSA 10 footprint are located 3 km west, north-west, north-east and east	Potential public health and loss of amenity to nearest sensitive receptors.	<ul style="list-style-type: none"> An Odour Detailed Analysis for Existing Premises has been prepared for RSA 10 using the DWER template (refer Attachment 20). No significant increase in odour emissions to nearby residents is anticipated. 	Minor	Rare	Low	Yes – complete (refer to Attachment 20)
Operation of pumps	Noise	Air: windblown noise generated through plant operation	Residential: The nearest sensitive land users to the RSA 10 footprint are located 3.5 km west.	Potential public health and loss of amenity to nearest sensitive receptors.	<ul style="list-style-type: none"> A noise assessment was conducted for the operation of RSA 10 (refer Attachment 19) which demonstrates that Alcoa's objective of no net increase in noise emissions at sensitive receivers can be achieved without noise controls. Operational noise monitoring will continue in accordance with Licence L6217/1983/15. 	Minor	RareD	Low	Yes – complete (refer to Attachment 19)
Operation of vehicles and equipment (e.g., trucks and loader engines, reverse alarms)	Exhaust emissions (i.e., CO ₂ , CO, NO _x , SO ₂ , hydrocarbons , particulates, etc.)				<ul style="list-style-type: none"> No truck movements are planned to be undertaken at night. Should night truck be considered in the future a noise assessment will be undertaken prior and no night trucking will be permitted unless the objective of no net increase in noise emissions can be demonstrated. Any new Alcoa vehicles and mobile equipment will be added to Alcoa's existing vehicle and equipment maintenance programme. Speed limits will be implemented onsite to reduce engine noise emissions. In accordance with Alcoa's existing procurement and operational controls vehicles, mobile machinery, and equipment will be installed with standard emission control devices. All heavy and light vehicles, mobile machinery and mobile equipment will be maintained in accordance with manufacturers' specifications and all records kept. 				

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Stormwater Surface Water quality	Overland runoff	Sediment laden runoff	Samson South Drain is located directly adjacent to RSA 10 footprint Downstream populations of Carter's Freshwater Mussels are located approximately 1.3 km away	Reduced water quality within the Samson South Drain. Decrease in the size of CFM population.	<ul style="list-style-type: none">Stormwater drainage within the RSA 10 footprint has been designed to be captured and fed into the existing RSA drainage and recovery network (refer to Attachment 7). No drainage from Alcoa infrastructure will be allowed to drain directly into any waterway whether modified or natural.Stormwater will be managed in accordance with Alcoa's existing procedures and operating strategies for the residue management area.With the exception of the existing ROWS (Run Off Water Storage) Pond emergency spillway (L6217/1983/15 condition W5 and W6) for extreme rainfall events, the residue management area has been designed to contain rainfall runoff from operational areas through a drainage system and surge ponds. This enables stormwater to be captured and reused.Existing inspection and maintenance program for site drainage / stormwater management to assess and maintain integrity and operation.	Major	Rare	Medium	Yes - refer to Attachments 14 and 24.

Table 8: Risk* Rating Matrix

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost Certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

Note *: Risk = consequence x likelihood

Table 9: Consequence Matrix

Consequence	Consequence Description	
	Environment	Health
Severe	On-site impacts: catastrophic Off-site impacts (local scale): high level Off-site impacts (wider scale): mid-level Mid to long term or permanent impact to an area of high conservation value or special significance	Loss of life Adverse health effects: high level or ongoing medical treatment Local scale impacts: permanent loss of amenity
Major	On-site impacts: high level Off-site impacts (local scale): mid-level Off-site impacts (wider scale): low level Short term impact to an area of high conservation value or special significance	Adverse health effects: mid-level or frequent medical treatment Local scale impacts: high level impact to amenity
Moderate	On-site impacts: mid-level Off-site impacts local scale: low level Off-site impacts wider scale: minimal	Adverse health effects: low level or occasional medical treatment Local scale impacts: mid-level impact to amenity
Minor	On-site impacts: low level Off-site impacts (local scale): minimal Off-site impacts (wider scale): not detectable	Local scale impacts: low level impact to amenity
Slight	On-site impacts: minimal	Local scale impacts: minimal impacts to amenity

Table 10: Likelihood Matrix

Likelihood	Likelihood Description
Almost certain	The risk event is expected to occur in most circumstances.
Likely	The risk event will probably occur in most circumstances.
Possible	The risk event could occur at some time.
Unlikely	The risk event will probably not occur in most circumstances.
Rare	The risk event may only occur in exceptional circumstances.