Simcoa Operations

Kemerton Silicon Smelter

Annual Environmental Report

2024

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ACRONYMS used in this document:

- **AER**: Annual Environmental Report
- **CPR**: "Configurable Plant Reporting". Simcoa's computer database system that records/reports all production data across site.
- **DWER**: Department of Water and Environmental Regulation
- **GBRS**: Greater Bunbury Region Scheme
- **GHG**: Greenhouse Gas
- **KIP**: Kemerton Industrial Park
- **NATA**: National Association of Testing Authorities, Australia
- **NEPM**: National Environmental Protection Measure
- **NPI**: National Pollution Inventory
- **RO**: Reverse Osmosis
- **TDS**: Total Dissolved Solids
- **TSP**: Total Suspended Particulate
- **TSS**: Total Suspended Solids

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1. INTRODUCTION

1.1 Purpose

This document has been prepared by Simcoa Operations Pty Ltd in order to fulfill its reporting obligations under the Environmental Protection Act 1986 and the Silicon (Kemerton) Agreement Act 1987.

The intent of the report is to provide information on Simcoa's environmental performance in 2024.

1.2 Company Background

Simcoa Operations Pty Ltd (Simcoa) is a wholly owned subsidiary of Shin-Etsu Chemical Co. Ltd and operates the only fully integrated silicon metal production plant in the world. The modern plant uses high quality raw materials to produce a product which is unique in terms of its consistency and quality. The high-quality quartzite for the silicon smelter is quarried from a mine owned and operated by Simcoa at Moora, 180 kms north of Perth.

The primary sources of wood used to manufacture charcoal are plantation timbers, timber from ecological thinning for forest health, sawmilling off-cuts and wood residue (previously burnt as waste) recovered by Simcoa from mine clearing and development.

Simcoa commenced production in December 1989 as Barrack Silicon. Simcoa currently has the capacity to produce approximately 53,000 tonnes of high purity silicon per annum. The silicon produced by Simcoa is exported to chemical and metallurgical customers within Australia and overseas.

2. PREMISES DETAILS

2.1 Key Contacts

The primary contacts in relation to environmental management at the premises are:

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2.2 Premises Location

Simcoa's silicon production facility (smelter) is located approximately 160 km south of Perth and approximately 20 km north of Bunbury, in the local government area of the Shire of Harvey. Figure 1 shows the regional location of the smelter (premises).

The smelter is located on Lot 5548 on deposited plan 188562 within the industrial core of the Kemerton Industrial Park (KIP). The Shire of Harvey District Planning Scheme No. 1 and the Greater Bunbury Region Scheme (GBRS) both provide a zoning of "Industrial" for the core area of the KIP.

The premises (Lot 5548) on which the smelter is situated covers 115.6 hectares, although only approximately 75 hectares of this property is being used operationally Figure 2.

Non-operation areas are generally comprised of bushland. Simcoa owns both Lot 5548 and the adjacent property, Lot 5549 on deposited plan 188561. Figure 2 shows the site layout. Lot 5549 will be used to accommodate future expansion of plant.

The Shire of Harvey District Planning Scheme No. 1 and the GBRS provide a buffer to the KIP comprising of a special control area surrounding the industrial core. The distance between the premises boundary and the nearest residential premises outside the buffer (zoned special residential) is approximately 2 km.

2.3 Regulatory Background

The Kemerton smelter is licenced (L6341/1988) under Part V of the Environmental Protection Act 1986. The smelter is considered a 'prescribed premises', meeting the criteria for Char Manufacturing (Category 37) and Metal Smelting or Refining (Category 44). This Licence was renewed on 9 October 2014, and most recently amended on 5 May 2020.

The 2020 amendments modified conditions relating to stack monitoring and monitoring of settling pond water quality.

The project is also subject to Part IV Conditions detailed in Ministerial Statement No. 813.

A copy of the Annual Audit Compliance Report for 2024 as required by Simcoa's Environmental Licence, can be found in APPENDIX A.

A cross-reference between Simcoa's environmental licence conditions and applicable sections of the Environmental Report is provided in APPENDIX B.

Figure 1: Regional Location of the Simcoa Site

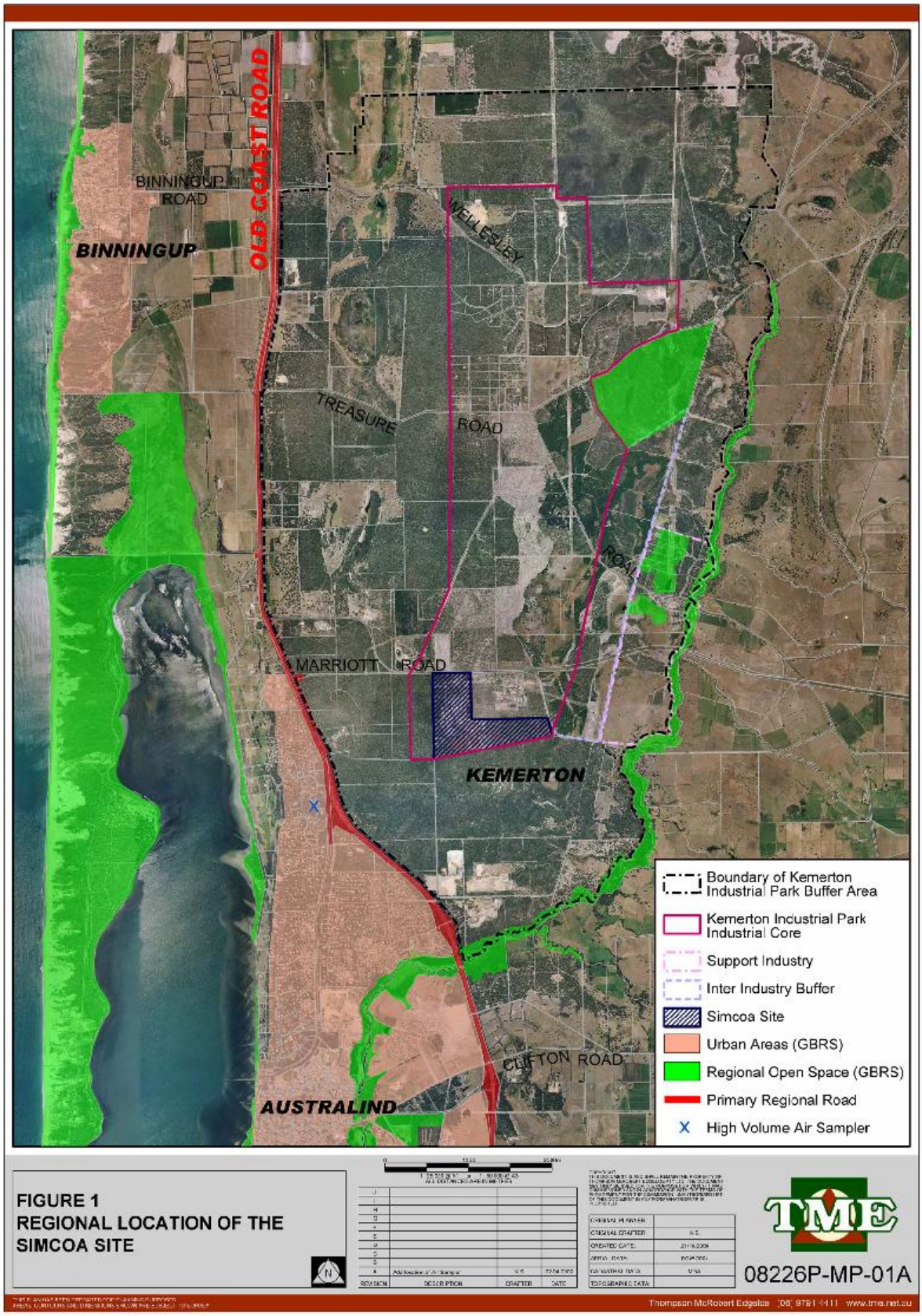
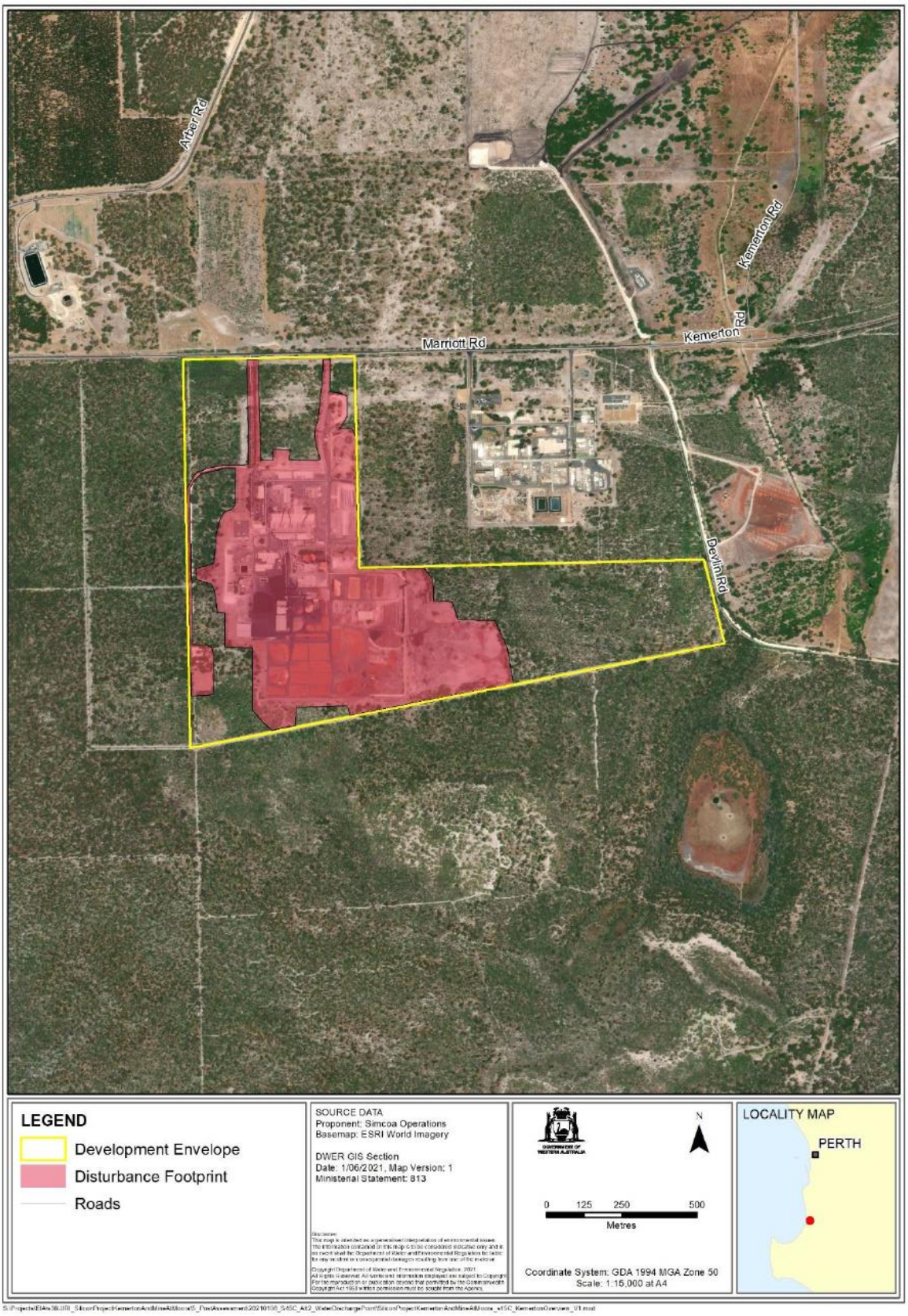


Figure 2: Kameron Silicon Smelter Site Layout



2.4 Process and Product Overview

2.4.1 Product Overview

Silicon is an inert, solid, silver-grey metalloid that is an important ingredient in many high technology products and materials.

Some of the most notable uses of silicon include:

- Silicon is an important ingredient in aluminium alloys. The addition of silicon produces a metal that is exceptionally light and strong. In the automobile industry this alloy replaces heavier cast iron and steel components such as car wheels, cylinder heads, and engine blocks. These lighter components produce much lighter vehicles, which use less fuel and produce less greenhouse gas emissions.
- Silicon based polymers, known as silicones, provide an alternative to environmentally harmful hydrocarbon based products. Silicones are used in lubricants, greases, resins, skin and hair care products, antiperspirants, polishes, anti-foam agents and fabric softeners.
- Silicon chips, made from silicon wafers, are an integral component of electronic products and semi-conductor chips.
- Optical fibre and liquid crystal displays are made using silicon. Optical fibre is used in fibre-optic communications, which permits transmission over long distances and at high bandwidths. Liquid crystal displays form the basis of many entertainment and electronic products.
- Photovoltaic cells are manufactured from silicon. Solar panels, made from silicon, use sunlight to generate renewable energy, offsetting the use of fossil fuels.

2.4.2 Silicon Production Process

The production of silicon at Simcoa is carried out in submerged arc furnaces by the carbothermic reduction of silica, either as quartz or quartzite.

The reduction of quartzite to silicon is metallurgically complex but can be summarised by:

$$SiO2 + 2C \rightarrow Si + 2CO$$

Most of the carbon monoxide emitted from the process reacts with oxygen gas in the atmosphere to form carbon dioxide gas.

The Simcoa plant at Kemerton is an integrated plant comprising of a wood processing facility, 2 vertical gas rinsing charcoal retorts, 3 submerged arc furnaces and packaging and dispatch facilities.

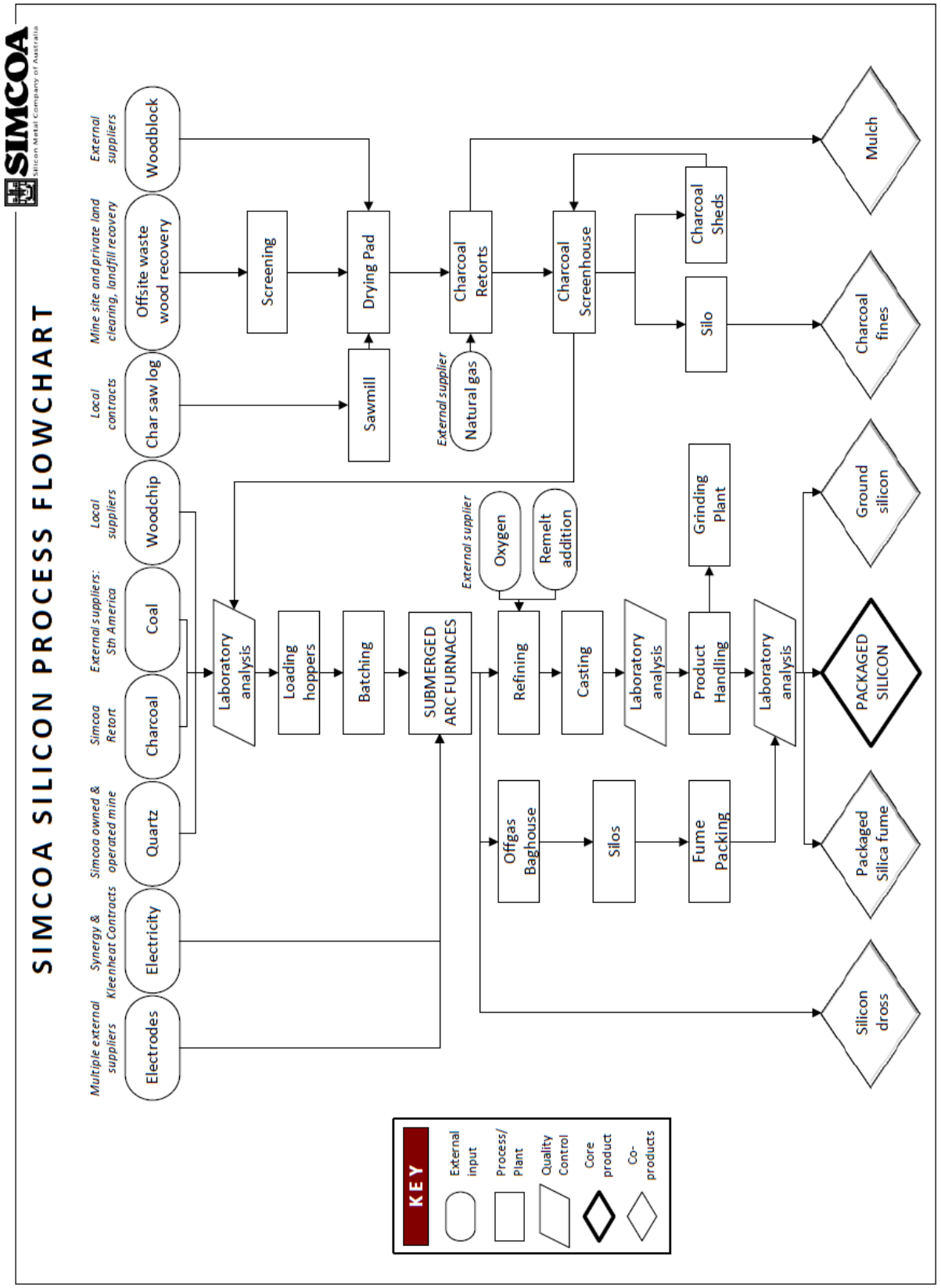
In 2012 Simcoa completed construction of a silicon grinding plant located at its existing Kemerton premises. The plant has the capacity to process, to a coarse powder, up to 10,000 tonnes per annum of silicon. The feed for the plant is sourced from the existing crushing plant. The product from the plant is highly sought after by photovoltaic silicon manufacturers.

The quartz for the silicon process is mined at Moora, north of Perth.

The carbon source for the reaction is a combination of coal and charcoal. The charcoal used is produced at the site by pyrolysis of plantation timber, wood waste residues. During pyrolysis the wood is subjected to elevated temperatures in a low oxygen environment. The charcoal that Simcoa produces has very low levels of impurities and allows Simcoa to produce some of the highest purity silicon in the world.

Figure 3 shows a simplified flow diagram of the process.

Figure 3: Process Diagram



3. PRODUCTION SUMMARY

3.1 Silicon

Simcoa produced 43,770 tonnes of saleable silicon in 2024. This level of production is less than the licensed nominal rated throughput of the plant of 53,000 tonnes per annum.

Production from 2019 to 2024 is summarised in Table 1. The 43,770 tonnes produced in 2024 was more than previous production year.

Table 1: Annual Product and By Product Production (2019-2024)

Product and By-products	Tonnes per annum					
	2019	2020	2021	2022	2023	2024
Silicon	46,826	44,087	43,802	45,270	43,424	43,770
Charcoal	25,076	25,692	22,024	23,556	23,175	20,412
Silicon Dross	3,646	3,294	4,620	4,578	4,357	4,228
Charcoal fines	3,185	3,270	2,800	2,999	2,864	3,014
Silica Fume	16,613	18,324	17,782	17,657	19,659	19,734
Sawdust and mulch	19,319	18,457	15,678	11,798	9,510	15,765
Waste fume	3,275	4,691	1,536	429	34.16	1,185

3.2 Charcoal

Simcoa produced 20,412 of charcoal in 2024, which was below the licensed nominal rated throughout of the plant of 26,000 tonnes per annum. The production level was less than previous years.

Production from 2019 to 2024 is summarised in Table 1.

3.3 By-products

The silicon production process produces a range of by-products that traditionally would be regarded as waste materials. Simcoa however, has pursued a philosophy of developing markets for these materials and consequently the bulk of Simcoa's waste streams, such as silica fume, silicon dross, wood mulch and fines, sawdust and charcoal fines, are sold as by-products. This generates revenue for the company, reduces solid waste disposal costs and minimises the environmental impact of landfill.

A breakdown of by-products production is summarised in Table 1.

3.4 Raw Materials

In 2024 the plant consumed 115,819 tonnes of quartz, 21,370 tonnes of charcoal, 38,572 tonnes of coal and 4,105 tonnes of carbon electrode.

The total annual consumption of the main raw materials can be found in Table 2.

Table 2: Annual Raw Material Consumption (2019-2024)

Raw Material	Tonnes per annum					
	2019	2020	2021	2022	2023	2024
Quartz	122,919	118,212	113,564	122,513	119,732	115,819
Carbon electrode	4,393	4,454	3,860	4,051	4,094	4,105
Coal	38,111	35,227	36,123	41,724	39,313	38,572
Charcoal	25,201	24,467	23,000	22,434	23,279	21,370
Woodchip	61,799	56,713	53,752	53,084	49,475	53,653

4. KEY ENVIRONMENTAL ASPECTS

4.1 Noise

4.1.1 Plant Noise Profile

The operation of the plant and its various ancillary activities generate noise. Generally, the noise from the plant is at a minimum during the night and on weekends because crushing and packaging, and truck loading/unloading are largely undertaken on weekdays during normal business hours.

The main noise sources at the plant, ranked by sound power, are the loading and unloading of wood block at the retorts (Figure 4), the retort stack, combustion fans and baghouse fans.

An independent noise assessment carried out by Herring Storer Acoustics in 2017 demonstrated compliance with the requirements of the Environmental Protection (Noise) Regulations 1997 during operation of the plant. The study concluded that noise from Simcoa's Kemerton Smelter is unlikely to have an impact on noise emissions on nearby premises.

Figure 4: Charcoal Retorts: a source of noise from the Kemerton plant

4.1.2 Noise Complaints

Community noise complaints are recorded as incident reports in Simcoa's Configurable Plant Reporting System (CPR). Each incident report is investigated and wherever possible the meteorological conditions, plant conditions, and noise monitoring that was undertaken around the time of the complaint, is recorded. Simcoa did not record any noise complaints 2024, the fifth year in a row with zero complaints. The frequency of complaints from 2011 to 2024 can be found in

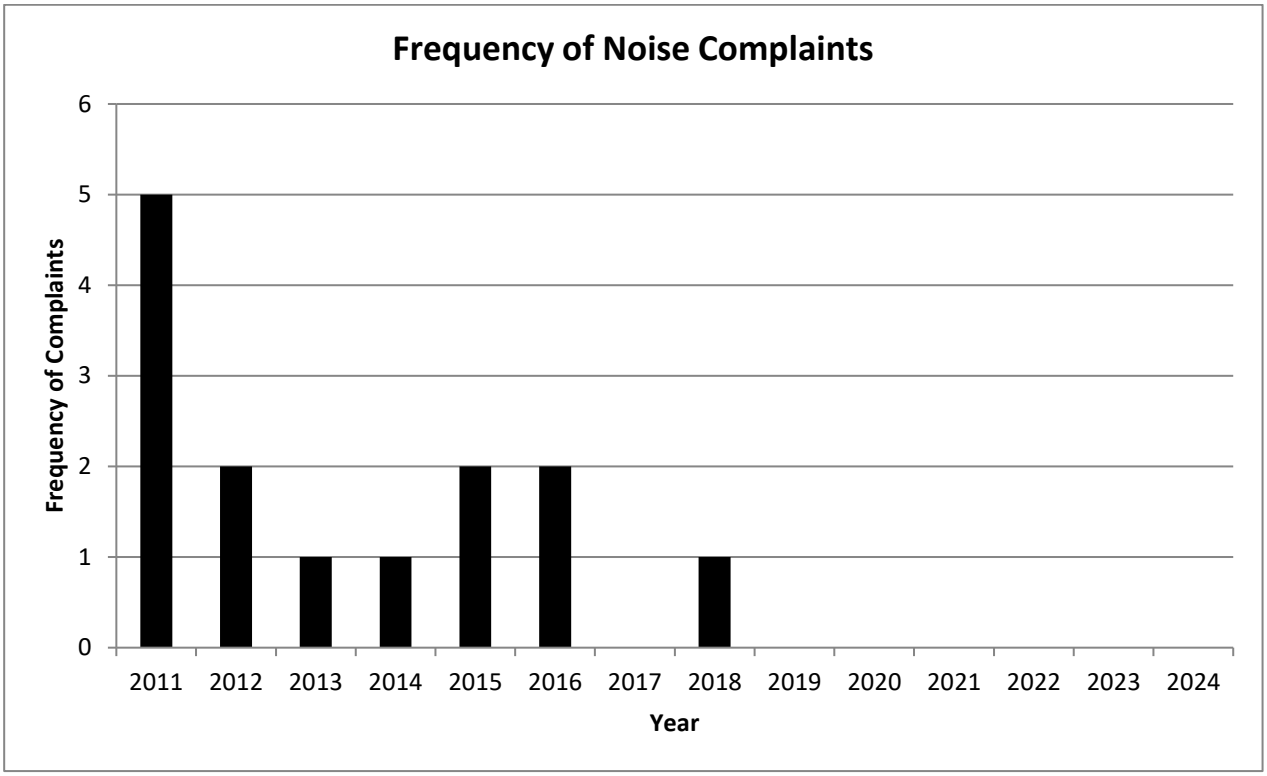


Figure 5. Simcoa has received 2 or less noise complaints each year since 2011 when 5 complaints were received.

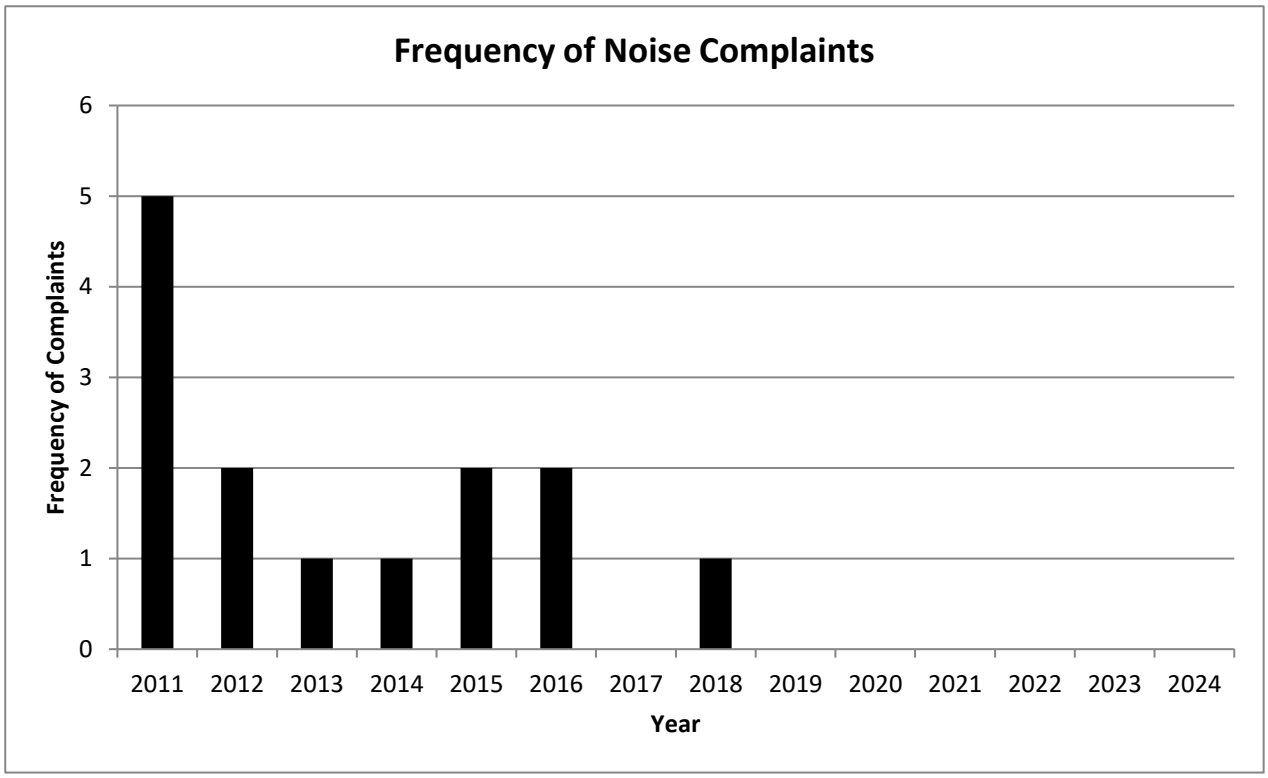


Figure 5: Frequency of Community Noise Complaints (2011 – 2024)

Despite the decrease in noise complaints directed at the Kemerton Smelter, Simcoa continues to be vigilant in ensuring that noise levels associated with operations are kept as low as practicable.

4.1.3 Noise Monitoring

Simcoa maintains a NV1509 "Yellow Brick" One-Touch Noise Complaint Recorder, utilising a Brüel & Kjær Type 2250 sound logger (Figure 6). This sophisticated environmental noise monitoring equipment gives Simcoa the ability to accurately measure noise levels in the community and assist it to maintain plant audibility as low as possible.

Figure 6: The "Yellow Brick" noise logger and complaint recorder

Additionally, Simcoa also maintains a permanently mounted Rion NA-83 Sound Level Meter and logger with outdoor microphone on the top floor of the charcoal retorts (Figure 7). This logs noise output from the charcoal retorts, which remains Simcoa's most significant noise source. The output from this equipment is directly linked via an alarmed display in the retort control room. This allows operators to respond in real time to elevated noise levels at the retort, thus minimising the impact on the community.

Since this initiative was introduced, noise complaints from the community have dropped significantly.

Figure 7: The fixed Rion NA-83 Sound Level Meter sound level meter located at the top of the charcoal plant

4.2 Air Emissions

4.2.1 Stack Monitoring

Simcoa engaged the services of NATA approved consultants Emission Assessments Pty Ltd in March and September 2024, to conduct emission sampling of the charcoal retort stack and Furnace 3 baghouse stack (Report No. 2324-135 April and Sept 2024).

The results of the most recent emission testing, including a comparison to previous testing, can be found in Table 3 and

Table 4.

Table 3: Retort Stack (Emission point reference A3) Emission Testing

Parameter	Method	UOM#	2022	2023	2024/Mar	2024/Sep
TSP	USEPA Method 5	mg/m^3	81	14	34	67
		g/s	1.7	0.28	0.71	1.4
PM10	USEPA Method 5^	mg/m^3	45	6.0	13	37
		g/s	0.94	0.12	0.28	0.76
Carbon Monoxide	USEPA Method 10	mg/m^3	1.6	19	1.3	<1.3
		g/s	0.032	0.38	0.026	<0.026
Nitrogen Oxides	USEPA Method 7E	mg/m^3	50	33	44	34
		g/s	1	0.67	0.90	0.69
Sulphur Dioxide	USEPA Method 6C	mg/m^3	9.9	14	2.9	2.9
		g/s	0.21	0.28	0.059	0.059
Stack velocity	USEPA Method 2	m/s	45.1	40	40	42
Stack flow rate	USEPA Method 2	m^3/s	21.9	20.4	20.7	20.5

Table 4: Furnace 3 Baghouse (Emission point reference A2) Emission Testing

Parameter	Method	UOM#	2022	2023	2024/Mar	2024/Sep
TSP	USEPA Method 5	mg/m^3	1.8	3.7	1.3	5.8
		g/s	0.074	0.19	0.064	0.42
PM10	USEPA Method 5^	mg/m^3	0.98	2.1	0.69	3
		g/s	0.04	0.11	0.036	0.22
Carbon Monoxide	USEPA Method 10	mg/m^3	49.5	58	61	58
		g/s	2.1	3.0	3.2	4.2
Nitrogen Oxides	USEPA Method 7E	mg/m^3	79	88	190	100
		g/s	3.2	4.6	9.9	7.5
Sulphur Dioxide	USEPA Method 6C	mg/m^3	33	21	8.8	9.1
		g/s	1.4	1.1	0.45	0.66
Stack velocity	USEPA Method 2	m/s	9.9	13	13	16

Stack flow rate	USEPA Method 2	m^3/s	40.8	51.9	51.4	72.5

**All units are referenced to STP dry*

^Simcoa's environmental licence was amended in 2020 to allow use of Method 5 for measurement of PM10.

Both the charcoal retort stack (Figure 8) and Furnace 3 baghouse stack (Figure 9) maintain emission sampling points, platforms, and access ways that are maintained in accordance with AS1657 and AS4323.1.

The full stack emission report can be found in APPENDIX C

Figure 8: Sampling platform at the Charcoal Retorts

Figure 9: Sampling platform compliant with AS4323.1 constructed on the 3rd Furnace Baghouse stack

4.2.2 Odour Management

The charcoal retort is a potential source of offensive vapours and odours. During normal operation the incinerator prevents the escape of vapours and offensive odours by combusting fuel gas with natural gas. During plant trips there is a risk of odours as the fuel gas from the wood feed is no longer combusted. To overcome this, a natural gas flare is used to burn fuel gas when the incinerator is not operational (Figure 10).

Figure 10: Flare stack used to flare off-gases during an incinerator trip

4.2.3 Dust Monitoring and Management

The handling and transfer of raw materials, particulate emissions from the charcoal plant stack and amorphous silica fume, generated in the smelting process, have the potential to contribute to the ambient dust levels in the environment surrounding the plant and nearby community. Dust has the potential to adversely affect human health, visual amenity, and surrounding vegetation and fauna.

Simcoa minimises dust emissions from the plant using several methods, including:

- Wetting down raw material stockpiles using fixed and mobile sprinklers prior to loading or handling raw materials that could generate dust
- Bituminising high traffic areas
- Washing quartz during crushing (at the Moora mine) and prior to offloading at Kemerton
- Mulching non-traffic areas of the plant
- Using covered conveyors
- Enclosing raw material transfer points
- Using mist sprinklers on the charcoal loading hopper at the charcoal retorts and transfer points in the smelter
- Storing materials such as silica fume, charcoal fines and charcoal in sheds, silos and bunkers.
- Performing regular preventative maintenance on dust control equipment such as the baghouses and dust collectors
- Conducting monthly ventilation audits to ensure proper operation of dust control equipment

The total suspended particulate (TSP) concentration in the environment was monitored in accordance with the conditions of Simcoa's Environmental Licence during May and November 2024. In 2024 monitoring was undertaken using a calibrated, high-volume dust sampler located in the special residential area of Leschenault Parklands (see Figure 1) and near the plant's western boundary.

Table 5: Ambient Dust Monitoring – 24-hour Averages (2024)

Location	Method	Date	Concentration (ug/m^3)
West boundary (AQ1)	AS3580.9.3	17/05/2024	290.7
*West boundary (AQ1)	AS3580.9.3	9/07/2024	32
West boundary (AQ1)	AS3580.9.3	14/11/2024	35.9
Leschenault Parklands (AQ2)	AS3580.9.3	17/05/2024	27.2
*Leschenault Parklands (AQ2)	AS3580.9.3	9/07/2024	36
Leschenault Parklands (AQ2)	AS3580.9.3	14/11/2024	35.8

*Re-tested sample were conducted in July due to the high results in May.

Table 6: Simcoa Boundary and Leschenault Ambient Dust Monitoring – Annual Averages (2020-2024)

Year	Average Concentration (ug/m^3)	
	West Boundary (AQ1)	Leschenault Parklands (AQ2)
2022	32	21

2023	26	10
2024	34	36

*Annual average calculated using the 24-hour total from both July and November.

The results of the monitoring can be found in Table 5. The results for the previous 3 years are shown in *Re-tested sample were conducted in July due to the high results in May.

Table 6.

Ambient air quality monitoring at locations AQ1 and AQ2 in 2024 were completed in the months of May, July and November, with additional monitoring completed in July after high abnormal values in May.

4.2.4 Sulphur Dioxide Emissions

Sulphur dioxide is a common pollutant in both urban and industrial environments. Exposure to high levels of sulphur dioxide can cause irritation of the eyes and respiratory system of humans, and harm flora and fauna.

Sulphur dioxide is emitted by the plant during the smelting of silicon and the production of charcoal. The source of emissions from the smelter is the sulphur in reductants (coal, charcoal, char, woodchips and carbon electrodes) which is oxidised during smelting, extracted from the furnaces and emitted from the baghouse. The pyrolysis of wood in the charcoal retorts is also a source of sulphur dioxide, which is discharged into the atmosphere via the retort stack.

Simcoa assesses the impact of its sulphur dioxide emissions by:

- Conducting ambient sulphur dioxide monitoring on a triennial basis
- Comparison between calculated annual emission rates and the emission rates modelled in air dispersion modelling – which predicts the maximum ground level concentration of sulphur dioxide outside of the KIP.

4.2.4.1 Ambient Sulphur Dioxide Monitoring

Simcoa's environmental licence specifies limits for sulphur dioxide at location AQ3 (Leschenault community location) of 572 µg/m3 (1 hour average) and 229 µg/m3 (24-hour average). No limits are specified for location AQ1 (Simcoa Boundary).

Sulphur dioxide ambient monitoring is required to be conducted on a triennial basis. During October/December 2022 an external consultant undertook the triennial sulphur dioxide monitoring. The sulphur dioxide results at both locations in 2022 were well below 572 µg/m3 (1 hour average) and 229 µg/m3 (24-hour average). During the monitoring period, the highest 1-hour sulphur dioxide concentration at AQ3 was 41.2 µg/m3, and the highest 24-hour sulphur dioxide concentration was 5.5 µg/m3.

The next scheduled ambient SO2 monitoring will occur in the Leschenault community and at the Simcoa boundary in 2025.

4.2.4.2 Calculated Emission Rates and Modelling

Emission rates for sulphur dioxide can be determined through direct measurement at the source of emissions, such as the furnace baghouse and charcoal plant stack, or by mass balance calculations. Mass balance calculations are based on the sulphur content of raw materials and products and assume that the net difference in total sulphur is lost as sulphur dioxide.

The sulphur content of raw materials and products used to estimate emissions can be found in Table . In compliance with Simcoa's Part V Environmental Licence, coal reductants were tested quarterly (if utilised in the period). All other materials and products were tested annually. Comparison to previous periods can be found in Table 7.

Materials were analysed by external laboratories.

Table 7: 2024 Sulphur Testing of Key Raw Materials and Products

	Sulphur (% Wt.)				
Sampling Period	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sept 2024**	**Oct-Dec 2024**	**Average**
Columbian Coal	0.37	0.39	0.37	0.39	0.39
New Zealand Coal	NA	NA	NA	NA	NA

Table 8: Historical Sulphur Testing of Key Raw Materials and Products

	Sulphur (% Wt.)				
	2020	**2021**	**2022**	**2023**	**2024**
Woodblock	0.016	<0.01	<0.01	<0.01	<0.01
Woodchip	<0.01	<0.01	0.04	0.02	0.02
Charcoal	<0.01	<0.01	0.01	0.03	0.03
Columbian Coal	0.39	0.43	0.38	0.39	0.37
New Zealand Coal	0.28	0.26	0.26	NA	NA
Electrode Paste	0.63	NA	NA	NA	NA
Silica fume	0.03	0.03	0.07	0.06	0.06
Silicon	<0.01	<0.01	<0.01	0.02	0.02

Note: Since mid-2020, Electrode paste is no longer used at Simcoa, no New Zealand coal was used in 2024.

^Average result of 9 woodblock types

Average result of 2 woodchip types

*Average result of 2 fume typesTable 7: Historical Sulphur Testing of Key Raw Materials and Products

4.2.5 Direct Venting

The submerged arc furnaces generate large volumes of particulates in the form of amorphous silica fume, which are entrained in the furnace off-gases. During normal operation these off-gases are cleaned by passing them through fabric filter bags in the smelter baghouse. On rare occasions the off gases bypass the baghouse and vent directly to atmosphere. This may occur if there is a power failure, high temperature alarm in the baghouse or failure of the baghouse fans. In these circumstances venting from the smelter building is necessary to protect workers that could be engulfed by dust. When this occurs interlocks immediately cut power to the furnaces and prevent prolonged discharge of dust. After several minutes, without power supplied to the furnaces, emissions are negligible.

The frequency of direct venting has fallen significantly since the cooling radiators of the baghouse fans were upgraded in 2007 (refer to Figure 11). This upgrade has eliminated most incidents of fan overheating, the most frequent cause of direct venting.

In 2024 Simcoa had zero incidences of venting.

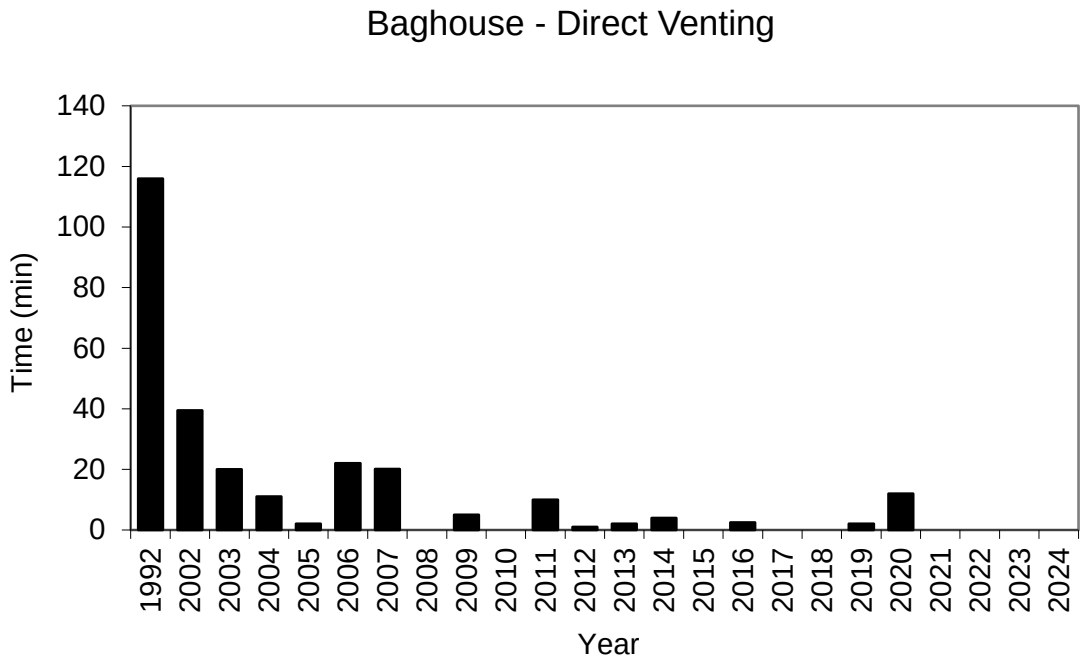


Figure 11: Total Venting Time

4.3 Wastewater

The plant generates wastewater from two main sources:

- Storm water run-off from the large hardstand area within the plant
- Process wastewaters.

In order to protect hydrocarbons from entering the stormwater system, an oil water separator system treats wastewater generated from around the refuelling, machinery servicing, and washdown areas. Additionally, any hydrocarbon or chemical spills on unprotected ground (outside of designated bunds) are rapidly contained and cleaned up in accordance with a standard operating procedure. Any spills greater than 5 litres in volume are investigated via Simcoa's incident reporting system.

4.3.1 Block Pad Dam

Storm water is captured in a series of open channels and underground drains. Run-off from the wood block drying pad is directed to an infiltration drain and pond (Block Pad Dam), which captures mulch and wood dust before

allowing the water to infiltrate into the ground

Figure 12).

Figure 12: Infiltration drain and pond, which prevents erosion caused by stormwater runoff from the block pad

In extreme rainfall events the infiltration drain can reach capacity, and water is subsequently released via a lined spillway. When this occurs, as per the conditions of Simcoa's environmental licence, a sample of the overflow (emission point L2) is required to be taken weekly and analysed in the Simcoa laboratory for pH, Total suspended solids, and total dissolved solids.

A summary of results from the block pond for 2019 to 2024 can be found in Table .

Table 9: Block Pond Overflow (L2) Quality – Annual Average (2019-2024)

Year	Block Pad Dam (L2)		
	pH	TDS (mg/L)	TSS (mg/L)
2019	5.7	116	9.1
2020	6.9	211	31.5
2021	6.1	127	43.1
2022	N/A	N/A	N/A
2023	5.9	108	16.5
2024	6.4	981	31.6

4.3.2 Wastewater Transfer System

Simcoa transfers clarified brackish wastewater to the adjacent titanium dioxide pigment plant for disposal via an existing ocean outfall.

These brackish wastewaters are sourced from the Reverse osmosis (RO) plant and the Settling Pond. Wastewater transferred for ocean outfall disposal is continuously monitored (input/output reference point W1) for a variety of parameters, including volumetric flow rate, volume, pH, conductivity and turbidity. The monitoring station (Figure 13) ensures that wastewater that does not comply with strict quality parameters is not allowed to reach the ocean outfall.

Figure 13: Continuous monitoring station for quality monitoring of transferred wastewater (input/output reference point W1)

During 2024 Simcoa diverted 39,493m^3 of brackish process wastewater for ocean outfall disposal that would normally be disposed of to land.

A summary of transferred wastewater volume and quality can be found in Table 10 and detailed data at APPENDIX DD.

The volume of wastewater transferred has been lower since 2022.

Table 10: Wastewater discharged to Kemerton Titanium Dioxide Processing Plant (W1) Volume & Quality – Annual Average (2020 – 2024)

Year	Wastewater Transfer (W1)				
	Volume (m^3)	Volumetric Flow rate (m^3/h)	pH	Conductivity (uS/cm)	Turbidity (NTU)
2020	39,385	4.7	7.8	5,117	6.9
2021	46,137	5.0	8.0	4,804	9.3
2022	40,229	4.5	7.8	5,544	4.9
2023	39,493	5.5	7.8	5,404	7.6
2024	39,633	4.9	7.8	5,700	7.1

4.3.3 Settling Pond

The settling pond (

Figure 14) collects wastewater streams from the laboratory, retort cooling system and treated water from an oil/water separator unit. The pond also accepts wastewater from the RO plant when transfers to the adjacent titanium dioxide pigment plant are interrupted. The settling pond has historically discharged clarified wastewater via an overflowing weir into an adjacent drain where it was allowed to infiltrate into the local superficial aquifer. Due to the brackish nature of this wastewater, this was considered to be unviable as a long-term disposal solution.

Figure 14: Sampling from the lined settling pond, which removes suspended solids (charcoal fines) from wastewater

For this reason, disposal of clarified settling pond water is undertaken using a hierarchy of methods. The primary method is transfer to the adjacent titanium dioxide pigment plant via the continuous monitoring station (see section 4.3.2), for ocean outfall disposal. If this method is unavailable, to prevent the pond overflowing and to allow measurement of volume disposed to land, water is pumped into the nearby drain where it is allowed to infiltrate to the superficial aquifer (Emission Point reference L3). If the settling pond pump is unavailable, water is allowed to overflow via the pre-existing weir (Emission Point reference L1)

As per Simcoa's environmental licence, the pond must be sampled weekly during overflow events via Emission Point reference L1 for pH, Total Dissolved Solids (TDS) and Total Suspended Solids (TSS). Note that the frequency of monitoring was previously daily (during overflow events) and was amended to weekly in 2020.

Disposal to land using emission point L3 also necessitates weekly sampling (when flowing) for pH, TDS and TSS, as well as monitoring of volumetric flow rate. Again, the frequency of monitoring was previously daily (during flow events) and was amended to weekly in 2020.

Settling pond water was periodically discharged via emission point L3 during 2024 to prevent pond overflows. This may occur as a consequence of:

- Unavailability of the wastewater transfer line due to maintenance outages and faults.
- Heavy inflows of water to the pond such as after heavy rainfall.

In 2024, 27,515m^3 of clarified wastewater was disposed of to land via emission point L3.

Monitoring results for emission points L1 (the overflow weir) and L3 (contingency disposal) have been summarised in Table .

Table 11: Settling Pond Wastewater Quality – Annual Average (2020-2024)

Year	Pond Weir (L1)			Contingency Discharge (L3)				
	pH	TDS (mg/L)	TSS (mg/L)	Volume (m^3)	Volumetric Flow rate (m^3/h)#	pH	TDS (mg/L)	TSS (mg/L)
2020*	7.8	2,571	20	13,496	10.6	8.1	2,341	29
2021^	-	-	-	11,532	11.5	8.3	2,269	26
2022#	-	-	-	18,367	12.2	8.1	2,355	13
2023	8.1	1,806	22	32,379	12.2	8.1	2,228	19
2024	8.1	2,319	28	27,515	12.2	8.0	2,417	26

*Single overflow event in Oct 2020

^No discharge via emission point L1 in 2021

No monitoring data available for L1 in 2022

4.4 Groundwater

4.4.1 Groundwater Abstraction

Simcoa has two groundwater licences issued under the *Rights in Water and Irrigation Act 1914*, GWL 61185 sourced from the Cattamarra Coal Measures and GWL 61186 sourced from the Superficial Formation. These licences have annual entitlements of 312,000 kL and 30,000 kL respectively, based on a July 1 to June 30 water year. Both licences were renewed in 2020, with the allocation for GWL 61185 being increased from the previous entitlement of 292,000 kL.

To monitor the impact of extraction on the local groundwater resources Simcoa maintains a series of monitoring bores in the Superficial Formation and monitors the water quality of two production bores. Water quality in the area beneath the Simcoa property is generally fresh (less than 500 mg/L TDS) to marginal (500 to 1000 mg/L TDS) for the Superficial Aquifer and between 1,100 to 1,300 mg/L TDS for the Cattamarra Coal Measures Formation. Monitoring bores are capped when not in use.

The plant's water requirements are supplied by bores into the Cattamarra Coal Measures Formation and Superficial Formation. The Cattamarra bore (PB2) is the primary bore and the superficial bore (PB1) is generally maintained as a standby bore. In late 2023, Simcoa replaced the flow meters on both PB1 and PB2. The water branch of DWER was notified of these changes and the new flow meter details.

Water extraction from both production bores for the 2023-24 reporting period was below annual groundwater licence entitlements (refer

Table12).

Table12: Annual Groundwater Extraction vs. Licenced Entitlement (2019/20 – 2022/24)

Year	Annual Extraction (kL)		Licenced Entitlement (kL)	
	PB1	PB2	PB1	PB2
2019/20	238	304,919	30,000	312,000
2020/21	66	282,945	30,000	312,000
2021/22	297	295,282	30,000	312,000
2022/23	1,315	262,192	30,000	312,000
2023/24	562	253,130	30,000	312,000

In 2024, Saprolite Environmental prepared an independent hydrogeological report for the Simcoa wellfield (Report No. E0126-ver C). This was submitted to the Department of Water and Environmental Regulation (DWER) in accordance with the conditions of Simcoa's Groundwater Licences. The underlying summary from the review is that the data indicates that no significant depletion of aquifer storage in the upper unit of the Cattamarra Coal Measures and Superficial Formation has occurred during the review period due to wellfield operations.

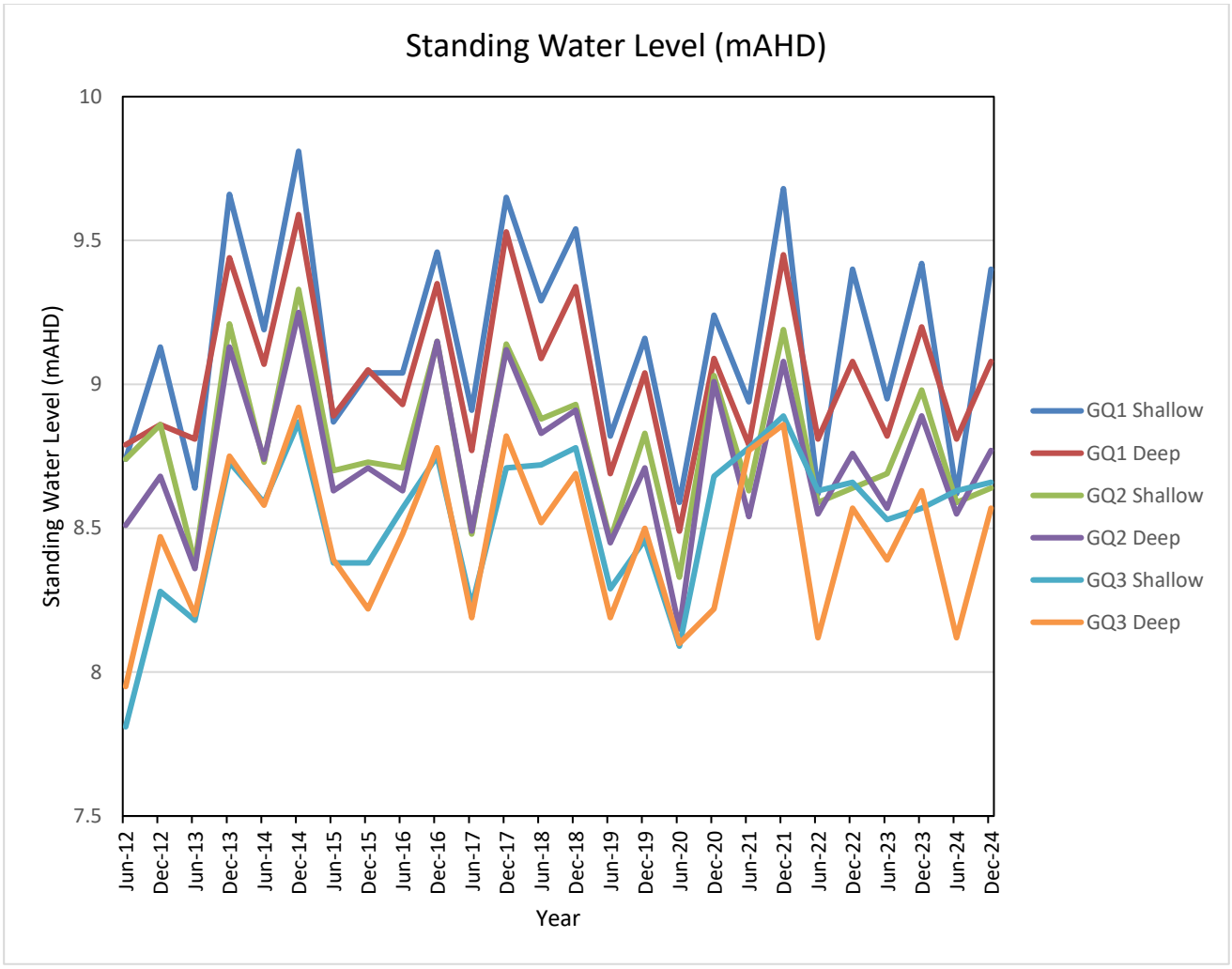
The Kemerton Silicon Smelter wellfield should continue to sustain the current rates of production; assuming bore efficiency does not decline.

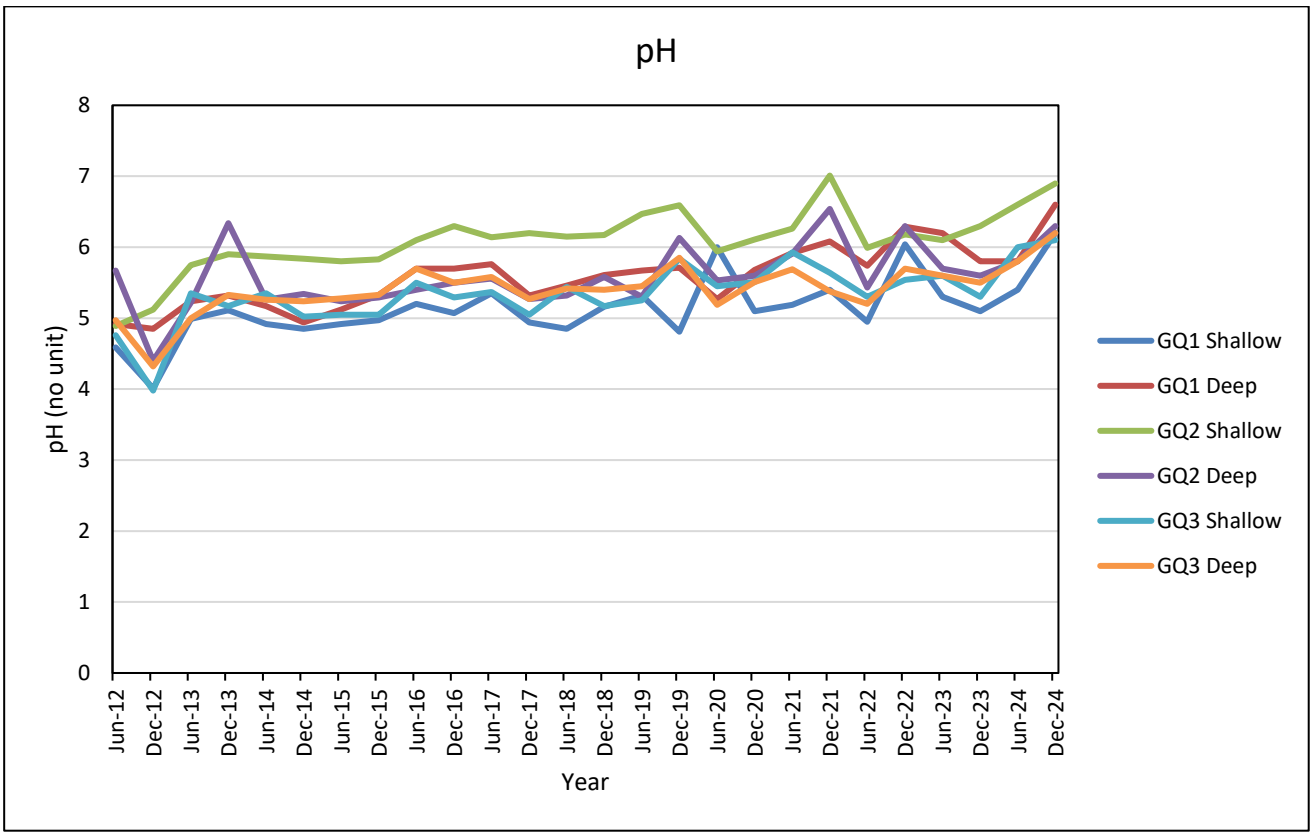
4.4.2 Groundwater Monitoring

Simcoa assesses ambient groundwater quality via monitoring of three pairs of monitor bores. Groundwater samples were analysed by MPL Laboratories, a NATA accredited testing laboratory. Sampling was conducted in a manner consistent with the relevant requirements of AS5667.1. The test methods employed are based on the Standard Methods for Examination of Water and Wastewater.

Annual mean monitoring for standing water level, pH, electrical conductivity, total dissolved solids, and total organic carbon from 2012 to 2024 for the monitoring bores can be found in Figure 15.

Biannual bore monitoring results for 2024 can be found in APPENDIX E


Standing Water Level (mAHD)
Standing Water Level (mAHD)
10
9.5
9
8.5
8
7.5
Jun-12
Dec-12
Jun-13
Dec-13
Jun-14
Dec-14
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
Dec-22
Jun-23
Dec-23
Jun-24
Dec-24
Year
GQ1 Shallow
GQ1 Deep
GQ2 Shallow
GQ2 Deep
GQ3 Shallow
GQ3 Deep


pH
pH (no unit)
8
7
6
5
4
3
2
1
0
Jun-12
Dec-12
Jun-13
Dec-13
Jun-14
Dec-14
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
Dec-22
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Dec-24
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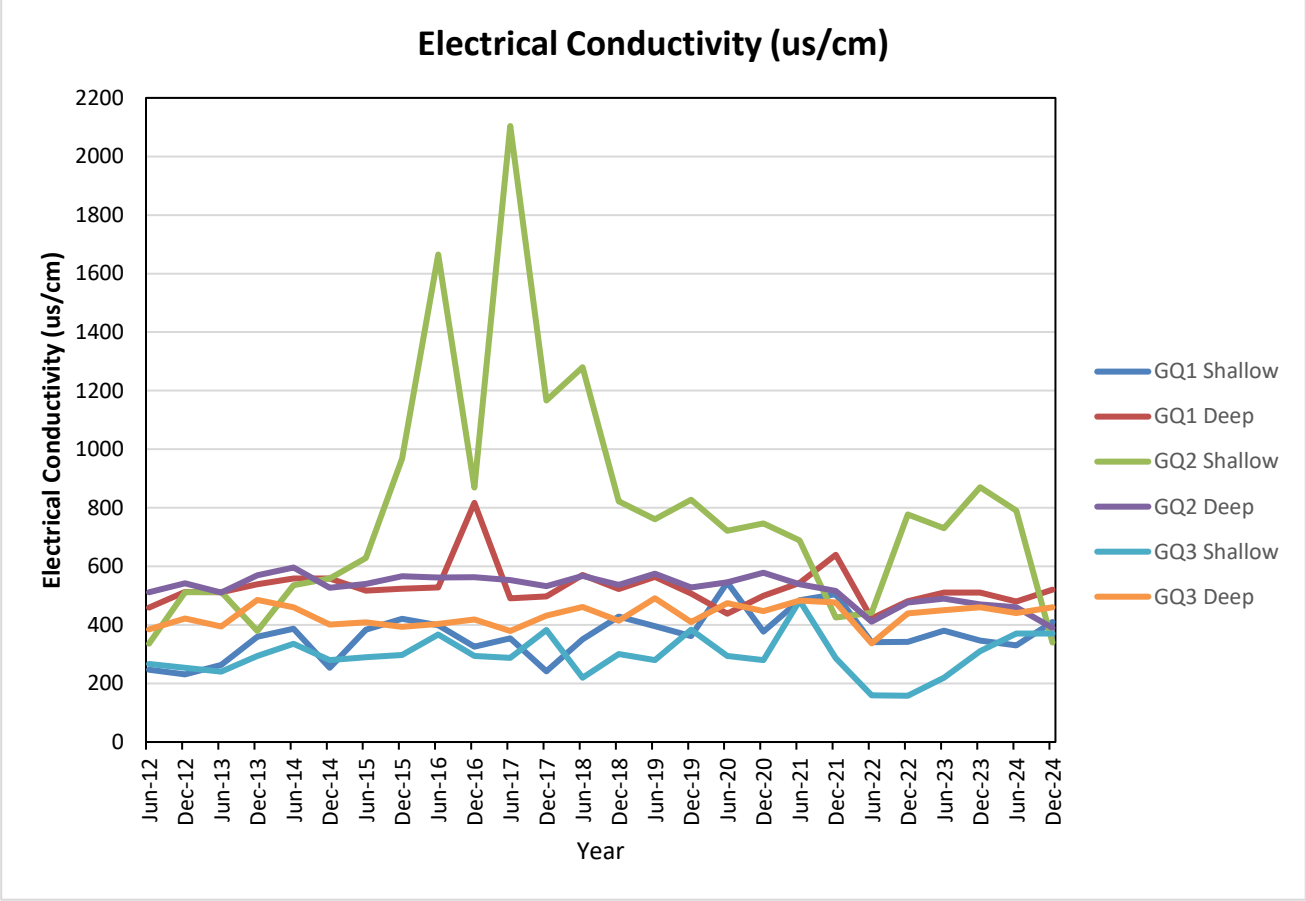
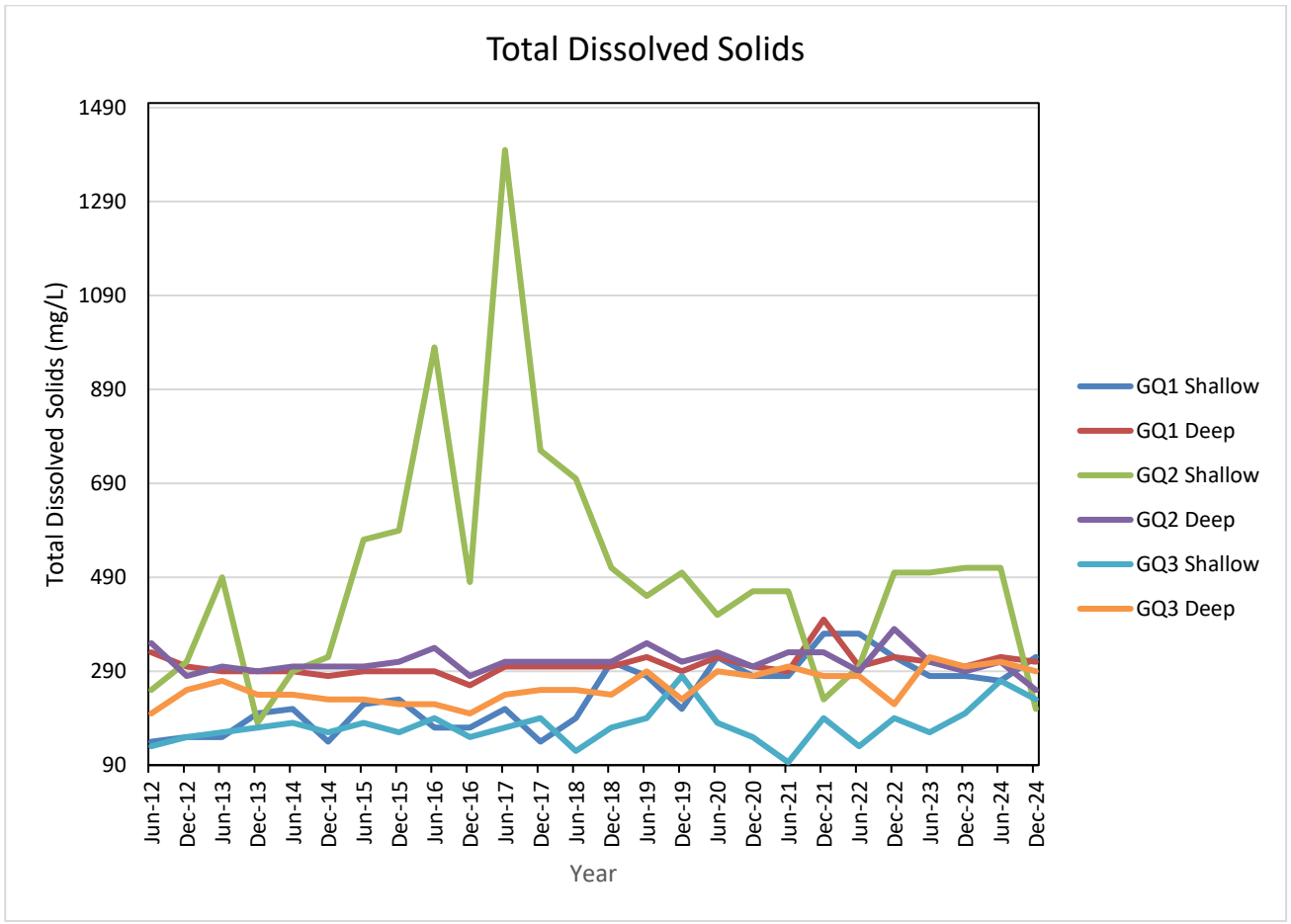
GQ2 Shallow
GQ2 Deep
GQ3 Shallow
GQ3 Deep


Electrical Conductivity (us/cm)
Electrical Conductivity (us/cm)
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Jun-12
Dec-12
Jun-13
Dec-13
Jun-14
Dec-14
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
Dec-22
Jun-23
Dec-23
Jun-24
Dec-24
Year
GQ1 Shallow
GQ1 Deep
GQ2 Shallow
GQ2 Deep
GQ3 Shallow
GQ3 Deep


Total Dissolved Solids
Total Dissolved Solids (mg/L)
1490
1290
1090
890
690
490
290
90
Jun-12
Dec-12
Jun-13
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Jun-14
Dec-14
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
Dec-22
Jun-23
Dec-23
Jun-24
Dec-24
Year
GQ1 Shallow
GQ1 Deep
GQ2 Shallow
GQ2 Deep
GQ3 Shallow
GQ3 Deep

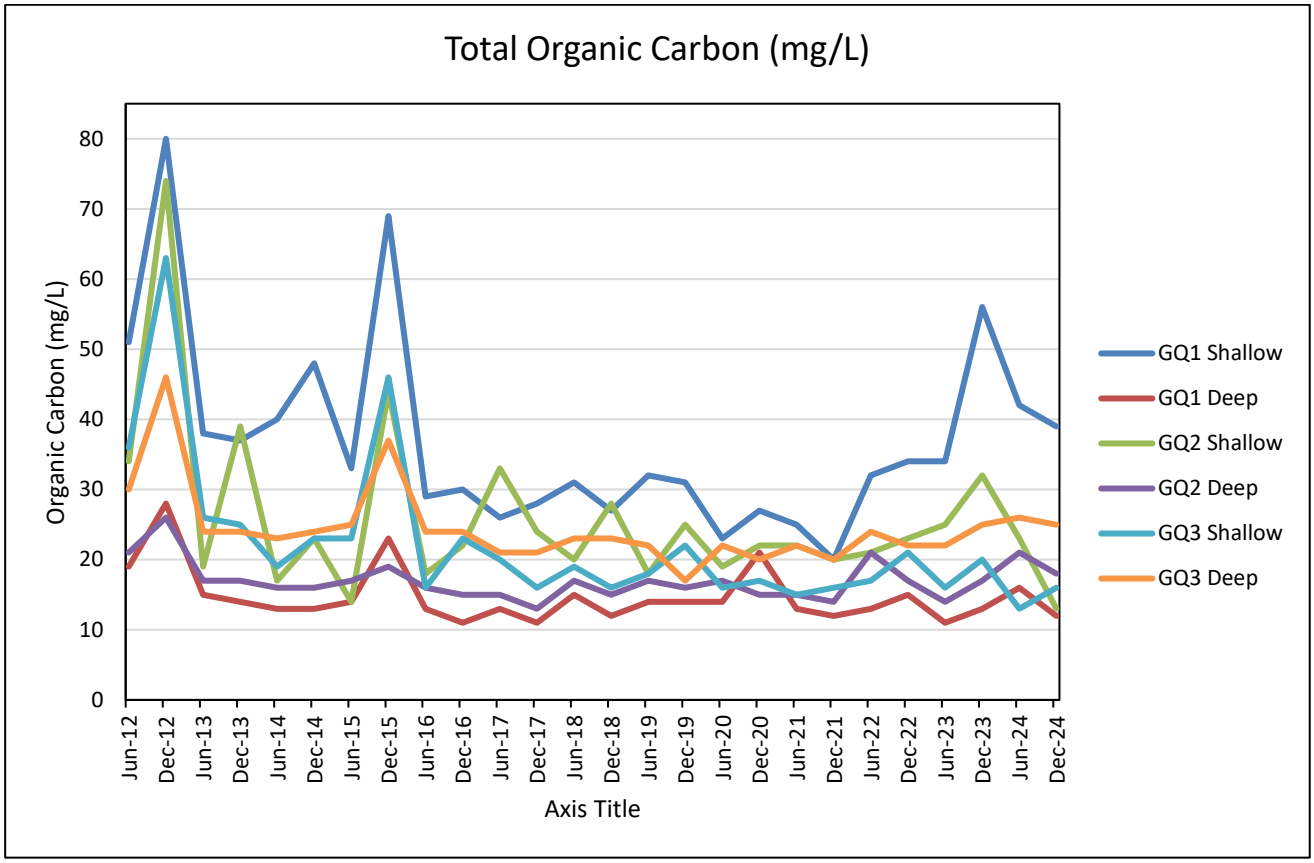


Figure 15: Ambient groundwater monitoring. Annual averages 2012 – 2024 Results from June and December

The results in general were consistent with historical readings. A noticeable feature in the historical data is a spike in Electrical conductivity (EC) and Total dissolved solids in monitor bore GQ2 Shallow, which first became noticeable in 2015. This occurrence was reported in 2016 as an environmental incident to the Department of Environmental Regulation (now Department of Water and Environmental Regulation (DWER).

During the investigation of this incident, it was discovered small volumes of brackish wastewater from the charcoal retort plant cooling system may have been inadvertently entering the stormwater infiltration drain near the southern boundary. The proximity of this contamination source to bore GQ2 Shallow indicated that this had possibly contributed to the issue.

Corrective actions were implemented which prevented wastewater from the retorts entering stormwater drains. This, combined with the transfer of brackish wastewaters to the nearby Titanium pigment plant for ocean outfall disposal has seen salinity levels in the bore gradually decline.

In September 2023, in GQ2 Shallow, Simcoa recorded a conductivity reading that was slightly above the Groundwater Monitoring Plan trigger level. This exceedance was reported to the water branch of DWER and will be included in the annual groundwater compliance review to the DWER for the abstraction year 2023 to 2024. Subsequent sampling of GQ2 Shallow indicated that the conductivity had dropped to below the trigger level. No reason could be identified for the temporary exceedance of conductivity trigger.

Figure 16 shows the monthly trend of conductivity in GQ2 Shallow between June 2015 and December 2024. Since 2017, bore EC has generally declined and stabilized to pre-2015 levels.

Simcoa will continue to monitor bore chemistry each month, in excess of DWER licencing requirements, and report on trends in this bore in future AERs.

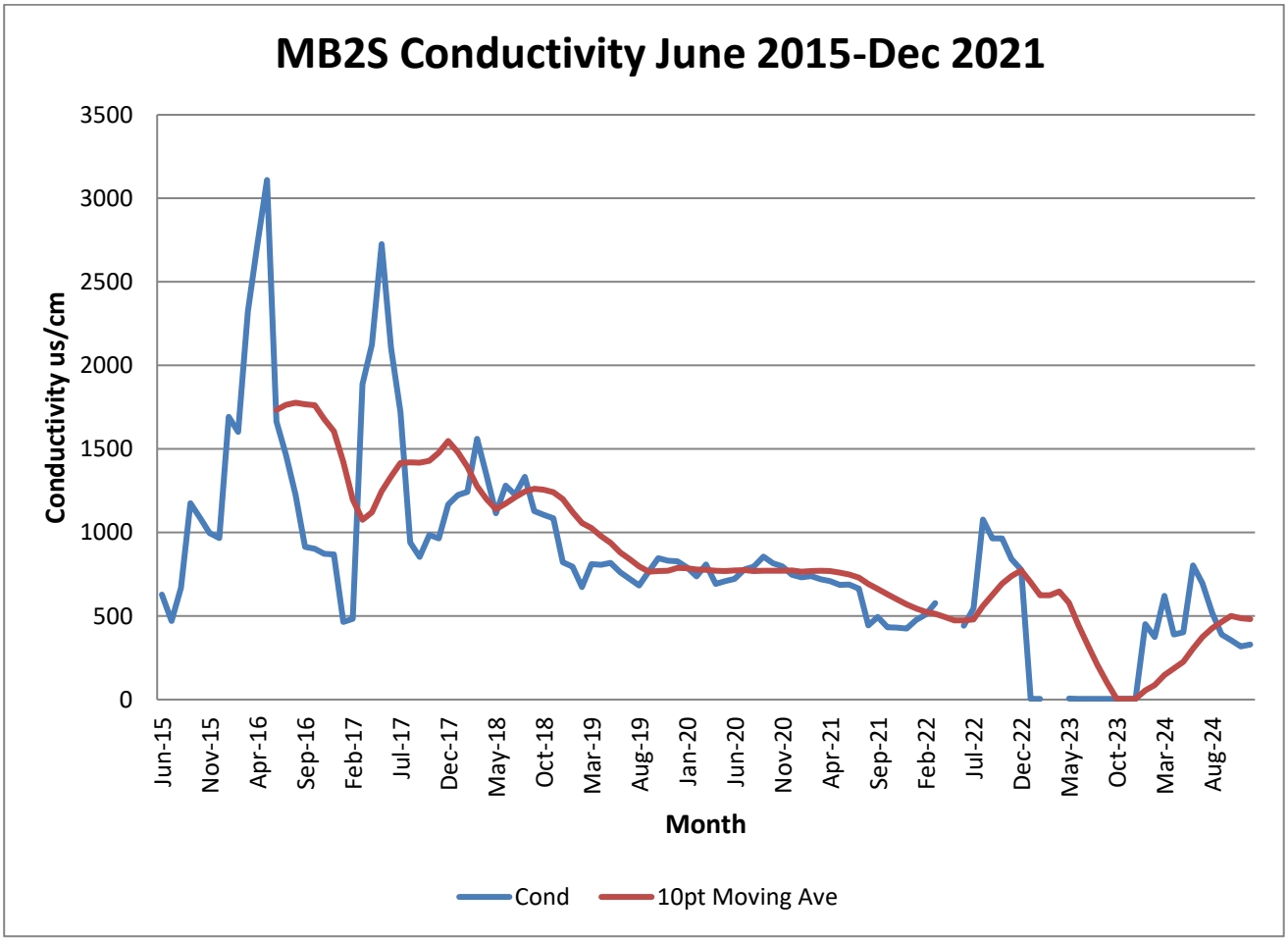


Figure 16: Monthly conductivity in borehole MB2S. June 2015 - Dec 2024

4.5 Contaminated Sites

Two locations on the Simcoa premise are currently classified as “possibly contaminated – investigation required”. Simcoa has previously reported these areas as suspected contaminated sites consistent with its obligations under to the *Contaminated Sites Act 2003* (WA).

The first location was a ‘no longer used’ solid waste landfill site used for a short time following the commissioning of the plant to dispose of silica fume, and the second was an area adjacent to the settling pond showing signs of elevated groundwater salinity. Both locations are unlikely to present any significant long term environmental health risk and are consistent with the current and future land use of the premises.

4.6 Greenhouse Gas Emissions

The production of silicon is both energy and carbon intensive, requiring large amounts of electricity and carbon-based reductants to reduce quartzite to silicon. This means that the GHG emissions intensity for silicon production is understandably high, in the order of approximately 12 tonnes of CO_2-e per tonne of silicon.

GHG emissions at Simcoa are dominated by Scope 2 emissions (from the generation of electricity used in the smelter). This accounts for approximately 80% of the total emissions from the plant. Scope 1 emissions, primarily from the use of coal and carbon electrodes in smelting, account for the remainder of emissions. More than 95% of Simcoa’s total emissions are generated by the Kemerton Smelter.

Simcoa is one of the world’s most energy efficient silicon smelters. Its low emission intensity is the result of its excellent energy efficiency and its extensive use of charcoal reductant. Biomass-based reductants are considered “zero rated” in terms of GHG emissions.

In 2024 the Simcoa Smelter reported energy use and GHG emissions under the National Greenhouse and Energy Reporting Scheme. In the 2023/24 reporting period, the smelter generated Scope 1 and Scope 2 emissions totalling approximately 402,490 tonnes of CO_2-e. This was below the 2022/23 reporting year performance of 415,901 tonnes of CO_2-e.

GHG emission intensity in 2023/24 was 8.5 tonnes CO_2-e per tonne of saleable silicon, a decrease from the 2022/23 figure of 8.6 tonnes CO_2-e per tonne of saleable silicon.

4.7 Waste Disposal

Simcoa has established markets for most of its byproducts and therefore generates minimal waste from its processes. The relatively small volumes of waste materials generated at the site which are disposed through waste disposal and recycling companies. Details of these wastes and their disposal can be found in Table13.

Mixed solid waste slightly increased in 2021. As previously highlighted in Section 3.3, a rebound in the silica fume market due to an upturn in the construction industry resulted in reduced fume dumping in 2021 and this continued into 2022.

Table13: Waste Disposal (2020 - 2024)

Waste	UOM	2020	2021	2022	2023	2024	Disposal Company
Mixed solid waste	Tonnes	3,576	4,286	4,361	1,752	5,897	Cleanaway; Bunbury Ezy Bins; J and P Group
Waste Fume	Tonnes	4,691	1,537	718	34.16	709	Prestige
Oil waste	Tonnes	5.9	4.0	9.3	9.3	4.6	Wren Oil

4.8 Wood Supply

Simcoa produces charcoal from wood residue and plantation timber. Historically a large proportion of the wood used to make charcoal was supplied as char grade logs from the timber harvesting operations in Southwest forests. This has ceased from December 2023 with a change in government policy. Current sources of timber include ecological thinning for forest health, plantation species, as well as sawmill wastes, recycled timber and wood residue generated during the clearing of land for bauxite mining which was previously burnt as waste.

Table15: Wood Consumed (2021 – 2024)

Figure 17: Waste Reducer processing waste wood from bauxite mining

4.9 Dangerous Goods Storage

There was no significant change to Dangerous Goods storage practices or volumes stored at the premises in 2024.

Storage of environmental hazardous liquids at Kemerton complies with AS1940 and AS3780. Generally, the volume stored in any location meets the criteria for minor storage under the relevant Standards. The Kemerton site is fenced and is manned on a continuous basis.

4.10 Environmental Incidents

There were no incidents reported to DWER in 2024.

5. NATIONAL POLLUTANT INVENTORY

Industrial facilities are required to report emissions to the National Pollution Inventory (NPI) if they use more than a threshold quantity of one or more substances on the NPI reporting list or consume more than a specified amount of fuel or electrical power. Simcoa's substantial power and fuel use means that it is required to report emissions from its Kemerton operations. A summary of selected NPI substances and their annual emissions can be found in Table 14.

Emissions are estimated using techniques outlined in industry handbooks and related manuals.

Table 14: Selected NPI Emissions (2020/21-2023/24)

Substance	Annual Emissions (Tonnes)			
	2020/21	2021/22	2022/23	2023/24
Carbon monoxide	730	688	604	806
Oxides of Nitrogen	894	939	1130	1759
Particulate Matter 10.0 µm	22.8	60.1	52.9	54.4
Sulphur dioxide	309	306	400	400
Total Volatile Organic Compounds	5.0	9.2	6.3	7.3

Changes in raw material composition and quantities, sampling and process stability generally account for variations in emission levels.

Further information on Simcoa's NPI emissions can be found on the NPI website: www.npi.gov.au.

6. COMMUNITY INVOLVEMENT

The company directly employees approximately 200 full time staff and is a major contributor to the local and State economy. The company maintained contact with the community, local government authority and neighbouring industry by participating in meetings of the Kemerton Industrial Park Consultative Committee.

In 2024 Simcoa continued to be active in support of community projects and groups. Some of the organisations and projects that benefited from Simcoa sponsorship included:

- CMAS Moora Show
- COB SW Festival of Japan
- Dardanup Bull and Barrel Festival
- Parkrun Australia
- Newton Moore Senior High School
- Parkfield Primary School
- Leschenault Volunteer Bush Fire Brigade
- Bunbury Multicultural Group
- Dardanup Art Spectacular
- Bunbury Fringe Festival 2025
- Rotary Club of Bunbury Leschenault
- Binningup Surf Life Saving
- Saint Patricks Catherdral Pansh of Bunbury
- Movember Australia
- Harvey Shire – Youthella Event

7. EMERGENCY RESPONSE

To ensure that it is capable of responding to an emergency situation Simcoa maintains two emergency response teams. The teams are manned with volunteers from staff and are trained in:

- Urban fire fighting
- Vertical rescue
- Occupational first aid
- Confined space rescue
- The use of self-contained breathing apparatus
- Hazardous materials spill response
- Emergency scenarios

8. RISK MANAGEMENT

In 2024, Simcoa continued the development of its formal risk management system. The aim of the system is to identify, evaluate and address significant enterprise risks. These include risks associated with the operational, safety, environmental and financial aspects of the company's operations.

Simcoa's Risk Management process is based on ISO 31000. This document details the process for Project and Task Risk Management and excludes Corporate Risk which is covered in M-MAN-02.

Simcoa applies a risk management approach to its operations, to control risks to people working on site to as low as reasonably practicable. A hierarchical approach to risk management is adopted, starting at area-based risk register level to identify hazards that are present due to the nature of the operation, the tasks executed, and the interactions that occur in each area. Further assessment of risks is then conducted at task and activity levels. This approach is detailed in the section below.

Eliminating hazards and reducing WHS risks.

Risk Management activities will be conducted as outlined in the Risk Management Manual (S-MAN-008). This is consistent with AS/NZS ISO31000 Risk Management Standard. The manual refers to five levels of risk management utilised to assess risks and identify controls summarized in the table below. Risk is assessed using a Risk Matrix (see Appendix 4).

The risk management process involves the following steps:

- identifying hazards – find out what could cause harm to health and safety.
- assessing risks – understand the nature of the harm that could be caused by the hazard, how serious the harm could be and the likelihood of it happening.
- managing risks – so far as is reasonably practicable, eliminate the hazard and associated risk or, minimise the risk through the implementation of effective risk control measures based upon the hierarchy of control; and
- reviewing – control measures to ensure they are working as planned.

Simcoa aims to eliminate risks so far as reasonably practicable. Where this cannot be achieved, risks must be minimised by the implementation of effective control measures. For each of the critical risks that are identified, risk assessments are undertaken as per S-MAN-008.

A critical aspect of Simcoa's risk management is control of work framework. Control of work is the systematic way in which handover of operational equipment takes place, maintenance on operational equipment is performed, and risk controls are established for high-risk work types. The procedures under the control of work framework establish minimum requirements for work to be performed for consistent application across work types.

APPENDICES

APPENDIX A ANNUAL AUDIT COMPLIANCE REPORT

APPENDIX B ENVIRONMENTAL LICENCE COMPLIANCE TABLE

APPENDIX C 2023 STACK MONITORING

APPENDIX D TRANSFERRED WASTEWATER VOLUME AND QUALITY

APPENDIX D TRANSFERRED WASTEWATER VOLUME AND QUALITY

APPENDIX A ANNUAL AUDIT COMPLIANCE REPORT

Government of **Western Australia**
Department of **Water and Environmental Regulation**

Annual Audit Compliance Report Form

Environmental Protection Act 1986, Part V Division 3

Once completed, please submit this form either via email to info@dwer.wa.gov.au, or to the below postal address:

Department of Water and Environmental Regulation
Locked Bag 10
Joondalup DC WA 6919

Section A – Licence details			
Licence number:	L6341/1988/10	Licence file number:	DER2014/001534-1
Licence holder name:	Simcoa Operations Pty Ltd		
Trading as:	As Above		
ACN:	009 064 653		
Registered business address:	973 Marriott Rd WELLESLEY WA 6233		
Reporting period:	1/01/2024 **to** 31/12/2024		

Section B – Statement of compliance with licence conditions

Did you comply with all of your licence conditions during the reporting period? (please tick the appropriate box)

☒ Yes – please complete:
- section C;
- section D (if required); and
- sign the declaration in Section F.

☐ No – please complete:
- section C;
- section D (if required);
- section E; and
- sign the declaration in Section F.

Section C – Statement of actual production

Provide the actual production quantity for this reporting period. Supporting documentation is to be attached.

Prescribed premises category	Actual production quantity
Metal Smelting or Refining (Category 44) (Silicon)	43,770 Tonnes
Char manufacturing (Category 37)	20,412 Tonnes

Section D – Statement of actual Part 2 waste discharge quantity

Provide the actual Part 2 waste discharge quantity for this reporting period. Supporting documentation is to be attached.

Prescribed premises category	Actual Part 2 waste discharge quantity
Wastewater discharged to Kemerton Titanium	39,633 m3

IR-F14 v4.0 (February 2019)

Department of Water and Environmental Regulation

Section D – Statement of actual Part 2 waste discharge quantity	
Provide the actual Part 2 waste discharge quantity for this reporting period. Supporting documentation is to be attached.	
Prescribed premises category	**Actual Part 2 waste discharge quantity**
dioxide processing plant	
Wastewater discharged to land	39,363 m3

Section F – Declaration

I declare that the information in this Annual Audit Compliance Report is true and correct and is not false or misleading in a material particular[1].

I consent to the Annual Audit Compliance Report being published on the Department of Water and Environmental Regulation's (DWER) website.

Signature[2]:		Signature:	
Name: (printed)	David Miles	Name: (printed)	
Position:	Vice President. Site Services and Marketing	Position:	
Date:	26.3.25	Date:	
Seal (if signing under seal):			

[1] It is an offence under section 112 of the *Environmental Protection Act 1986* for a person to give information on this form that to their knowledge is false or misleading in a material particular.
[2] AACRs can only be signed by the licence holder or an authorised person with the legal authority to sign on behalf of the licence holder.

APPENDIX B ENVIRONMENTAL LICENCE COMPLIANCE TABLE

SIMCOA ENVIRONMENTAL LICENCE AUDIT TABLE

The following table details:

- Simcoa Operations Pty Ltd conditions of operation as specified in its Part V Environmental Licence (click link to view)
- How these conditions are complied with.
- Evidence required and method of reporting
- Timing of condition
- Current status

This table is to be completed and attached to Annual Environmental Reports as an appendix

Premises: Kemerton Silicon Smelter
Licence Number: L6341/1988/10
Date of Issue: 9 October, 2014
Date of Expiry: 12 October, 2026

Date Compiled: 15/03/2024

Con-dition	Subject	Action	How	Evidence	Responsibility	When	Status/ Remarks
1.2.1	**General**	Licensee shall ensure that waste material is only stored and/or treated within areas or compounds provided with the infrastructure detailed in Table 1.2.1 (Settling pond)	No storage or treatment of waste outside of the settling pond	Visual inspection	• Environmental Specialist • Area Managers	At all times	AER Section 4.3
2.1.1	**Emissions: Point source emission to air**	Licensee shall ensure that where waste is emitted to air from the emission points in Table 2.2.1 and identified on map of emission points in Schedule 1 it is done so in accordance with the conditions of this Licence.	Ensure emissions to air are done so in accordance with licence conditions. Record and investigate non compliance via the incident reporting system and report to DWER	Incident reporting system	• Environmental Specialist • Area Managers	At all times	AER Section 4.2
2.1.2	**Emissions: Point source emission to air**	Licensee shall not allow the direct venting of furnace off gases to the atmosphere (bypassing the baghouse), unless necessary for the safe operation of the Premises.	Direct venting of the furnaces while furnaces are online is only to be performed in unexpected instances, eg power failures, high temp alarms in baghouses or failure of baghouse fans. On such occasions venting from smelter building is necessary to protect workers who could be engulfed by dust. Instances of direct venting are recorded and investigated using the incident reporting system	Incident reporting system	• Environmental Specialist • Furnace Management	At all times	AER Section 4.2.5 No instance of venting in 2023

Con-dition	Subject	Action	How	Evidence	Responsibility	When	Status/ Remarks
2.2.1	**Emissions: Emissions to land**	The Licensee shall ensure that where waste is emitted to land from the emission points in Table 2.5.1 and identified on the map of emission points in Schedule 1 it is done so in accordance with the conditions of this Licence.	Ensure emissions to land are done so in accordance with licence conditions. Record and investigate non compliance via the incident reporting system and report to DWER	Incident reporting system	• Environmental Specialist • Area Managers	At all times	AER Section 4.3
3.1.1	**Monitoring: General monitoring**	The licensee shall ensure that: a) all water samples are collected and preserved in accordance with AS/NZS 5667.1; b) all wastewater sampling is conducted in accordance with AS/NZS 5667.10; c) all groundwater sampling is conducted in accordance with AS/NZS 5667.11; and d) all lab samples are submitted to and tested by a laboratory with current NATA accreditation for the parameters being measured unless indicated otherwise in the relevant table.	• Collect and dispatch all groundwater samples as per SOP R10 [Groundwater Monitoring] to a NATA approved laboratory (currently MPL) • Collect all wastewater samples from designated sampling points	• Monitoring records • SOPs	• Environmental Specialist • Technical Officers	At all times	AER Section 4.3, 4.4
3.1.2	**Monitoring: General monitoring**	3.1.2 The Licensee shall ensure that: a) weekly monitoring undertaken at least 5 days apart; b) 6 mthly monitoring undertaken at least 5 months apart; c) annual monitoring undertaken at least 9 months apart.	Complete monitoring as per monitoring schedule	• Monitoring records • Monitoring schedule	• Technical Officers • Environmental Specialist	At all times	AER Section 4.2, 4.3, 4.4
3.1.3	**Monitoring: General monitoring**	The Licensee shall record production or throughput data and any other process parameters relevant to any non-continuous or CEMS monitoring undertaken.	Record production and raw material use	CPR	All	At all times	AER Section 3
3.1.4	**Monitoring: General monitoring**	The Licensee shall, where the require-ments for calibration cannot be practi-cably met or a discrepancy exists in the interpretation of the requirements, bring these issues to the attention of the CEO accompanied with a report	Inform CEO if condition triggered (unlikely with current conditions)	Letter to CEO	Environmental Specialist	At all times	Condition not triggered

Con-dition	Subject	Action	How	Evidence	Responsibility	When	Status/ Remarks
		comprising details of any method modifications					
3.2.1	**Monitoring: Monitoring of point source emissions to air**	The Licensee shall undertake the monitoring in Table 3.2.1 according to the specifications in that table	Complete annual air point source emission monitoring of Retort and Furnace 3 baghouse stacks as detailed in Table 3.2.1	Annual compliance monitoring report from consultant	Environmental Specialist	Annually. Conducted Feb to May to avoid wet weather	AER Section 4.2.1
3.2.2	**Monitoring: Monitoring of point source emissions to air**	Licensee shall ensure sampling required under Condition 3.2.1 of the Licence is undertaken at sampling locations in accordance with the AS 4323.1 or relevant part of the CEMS Code.	Ensure Retort and Furnace 3 baghouse sampling locations remain compliant with AS4323.1	Visual Inspection	Environmental Specialist	At all times	AER Section 4.2.1
3.2.3	**Monitoring: Monitoring of point source emissions to air**	Licensee shall ensure all non-continuous sampling and analysis undertaken pursuant to condition 3.2.1 is undertaken by a holder of NATA accreditation for the relevant methods of sampling and analysis.	All annual air point source emission monitoring must be completed by a consultancy that is NATA approved for all methods detailed in Table 3.2.1	• Consultancy proposals • Annual compliance monitoring report from consultant	Environmental Specialist	When approaching emission monitoring consultancies	AER Section 4.2.1
3.3.1	**Monitoring: Monitoring of emissions to land**	The Licensee shall undertake the monitoring in Table 3.3.1 according to the specifications in that table.	Monitor wastewater from settling pond and block pond as detailed in Table 3.2.1	• Monitoring data to be recorded using Form LF057 [Environmental Water Analysis Worksheet] and filed • Monitoring results to be saved on Simcoa network	• Technical officers • Environmental Specialist	L1 L2 L3 sampled Weekly when flowing L3 continuous flow rate monitoring	AER Section 4.3 Non conformance for monitoring of L1 and L2
3.4.1	**Monitoring: Monitoring of inputs and outputs**	The Licensee shall undertake the monitoring in Table 3.4.1 according to the specifications in that table.	• Dispatch samples of all coal types currently in use to a NATA approved laboratory for sulfur testing as per Table 3.4.1 • Continuously monitor flow rate at wastewater station	• Analysis report from NATA approved laboratory. • Continuous monitoring data from Simcoa process control system	• Technical officers • Environmental Specialist	Quarterly At all times	AER Section 4.2.4 and 4.3.2
3.5.1	**Monitoring: Ambient environmental quality monitoring**	The Licensee shall undertake the monitoring in Tables 3.5.1 and 3.5.2 according to the specifications in those tables.	• Conduct HVAS for TSP at the Leschenault Parklands and at the Simcoa boundary for a 24 hour period. • Conduct Ambient sulfur dioxide testing in Leschenault and Simcoa parklands over a period of 1 month	• HVAS records & filter papers to be filed in the QHSE Supervisors office • Monitoring report from ambient SO2 monitoring consultant • Groundwater monitoring records	• Environmental SpecialistTechnical officers	• Annually. Min of 2 samples between 1 Oct and 31 May • Triennially • 6 Monthly	AER Section 4.2.3 AER Section 4.2.4 AER Section 4.4

Con-dition	Subject	Action	How	Evidence	Responsibility	When	Status/ Remarks
			• Complete quarterly sampling of groundwater bores as per SOP R10 [Groundwater Monitoring]	• Analysis records from NATA approved lab			
3.5.2	**Monitoring: Ambient environmental quality monitoring**	The Licensee shall ensure that the siting of ambient air monitoring equipment is in accordance with AS 3580.1.1.	Site ambient air monitoring equipment in accordance with AS 3580.1.1	Visual inspection	• Environmental Specialist	At all times	AER Section 4.2.3
4.1.1	**Information: Records**	All information and records required by the Licence shall: a) be legible; b) if amended, be amended in such a way that the original and subsequent amendments remain legible or are capable of retrieval; c) except for records listed in 5.1.1(d), be retained for at least 6 years from the date the records were made or until the expiry of the Licence or any subsequent licence; and d) for those following records, be retained until the expiry of the Licence and any subsequent licence: -offsite environmental effects; or -matters affecting the condition of the land or waters	• Maintain legible records, either through electronic or hard copy • Ensure any amendments to monitoring still retains records of pre amendment results • Maintain all monitoring data for at least 6 years • Maintain records for items under condition 5.1.1 (d) indefinitely	• Maintain legible records; electronic of hard copy. Ensure electronic records are maintained on Simcoa network • Note any amendments to records, ensure original record is maintained. • Maintain records for items under condition 5.1.1 (d) indefinitely retained for 6 years	• Technical officers • Environmental Specialist	At all times	Compliant in 2023
4.1.2	**Information: Records**	The Licensee shall complete an Annual Audit Compliance Report indicating the extent to which the Licensee has complied with the conditions of the Licence, and any previous licence issued under Part V of the Act for the Premises for the previous annual period	Complete Annual Audit compliance report and attach to AER	AER	Environmental Specialist	Annually (AER)	AER Appendix A

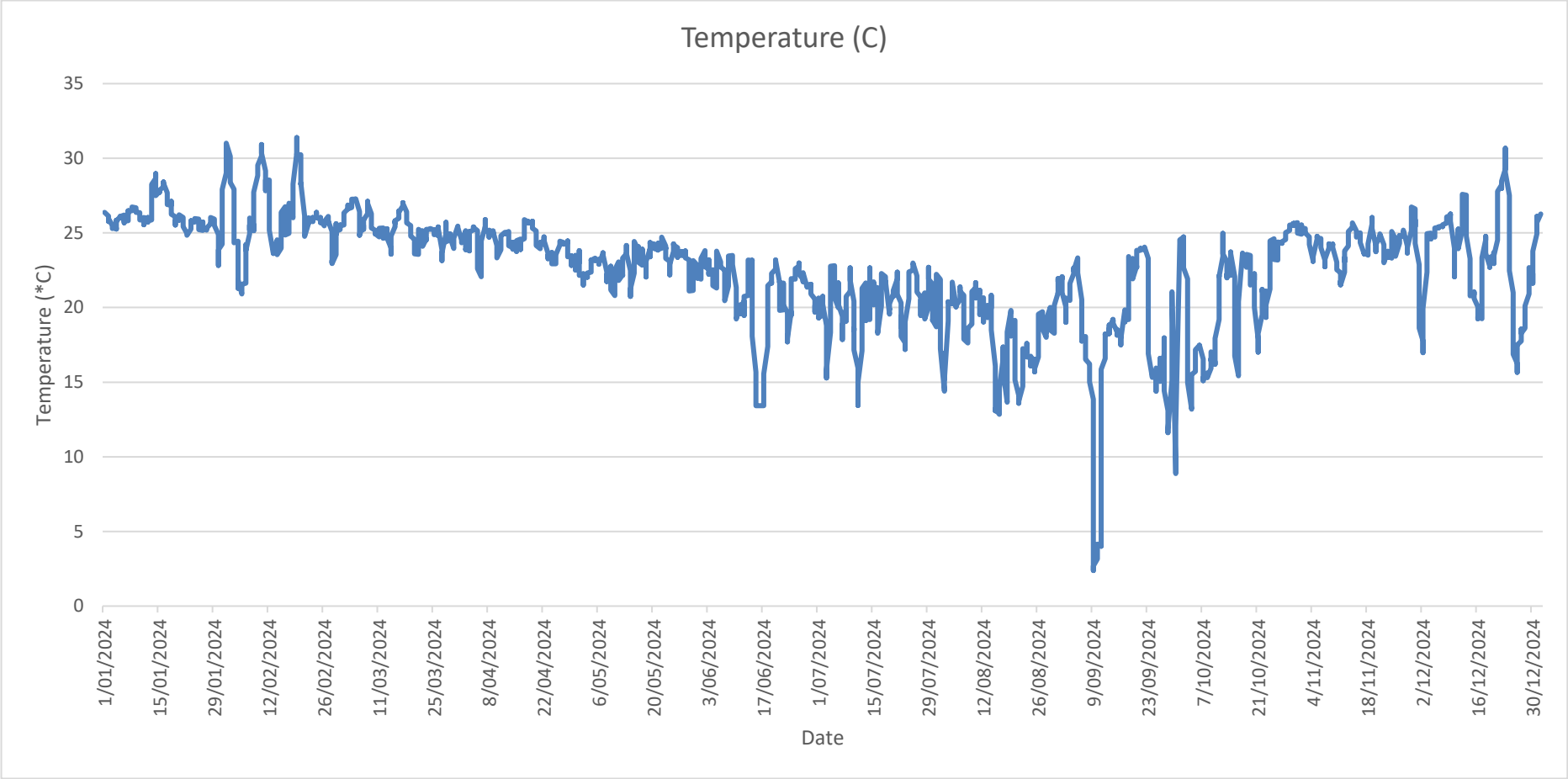
Con-dition	Subject	Action	How	Evidence	Responsibility	When	Status/ Remarks
4.1.3	**Information: Records**	The Licensee shall implement a comp-laints management system that as a minimum records number and details of complaints received concerning the environ-mental impact of the activities under-taken at the Premises and any action taken in response to the complaint	Record and investigate all environmental complaints via the Simcoa incident reporting system	Incident reporting system	Environmental Specialist	At all times	AER Section 4.1.2, 4.10
4.2.1	**Information: Reporting**	The Licensee shall submit to the CEO an Annual Environmental Report by 31 March in each year. The report shall contain the information listed in Table 4.2.1 in the format or form specified in that table	Include the following information in the Annual Environmental Report: • Summary of any failure or malfunction of any pollution control equipment and any environmental incident that occurred in the report period and actions taken • Monitoring of point source emissions to air • Monitoring of emissions to land • Monitoring of inputs and outputs • Monitoring of ambient air quality • Monitoring of groundwater quality • Compliance report • Complaints summary	Annual AER	Environmental Specialist	Submit to CEO by 31st March	2023 AER
4.2.2	**Information: Reporting**	The Licensee shall ensure that the Ann-ual Environmental Report also contains: (a) any relevant process, production or operational data recorded under Condition 3.1.3; and (b) an assessment of the information contained within the report against previous monitoring results and Licence limits and/or targets.	Include the following information in the annual environmental report: • Silicon production and raw material use • Provide comparisons with previous years data for all reported parameters	Annual AER	Environmental Specialist	Submit to CEO by 31st March	AER Section 3

Con-dition	Subject	Action	How	Evidence	Responsibility	When	Status/ Remarks
4.2.3	**Information: Reporting**	The Licensee shall submit the information in Table 4.2.2 to the CEO according to the specifications in that table.	Supply to the CEO • Copies of original monitoring reports submitted to the Licensee by third parties • Date, time, duration and explanation for periods of direct venting of furnace off gases	• Monitoring reports as received by the Licensee from third parties • Email to DER officer	Environmental Specialist	• Within 14 days of the CEOs request • Within 28 calendar days of venting incident	Reports submitted to department on request. No venting incidents reported to DWER in 2023.
4.3.1	**Information: Notification**	The Licensee shall ensure that the parameters listed in Table 4.3.1 are notified to the CEO in accordance with the notification requirements of the table.	Notify CEO of any of the following occurrences: • Breach of any limit specified in Licence • Calibration report	• Form N1 • None Specified	Environmental Specialist	As soon as practi-cable but no later than 5pm of next usual working day.	Condition not triggered

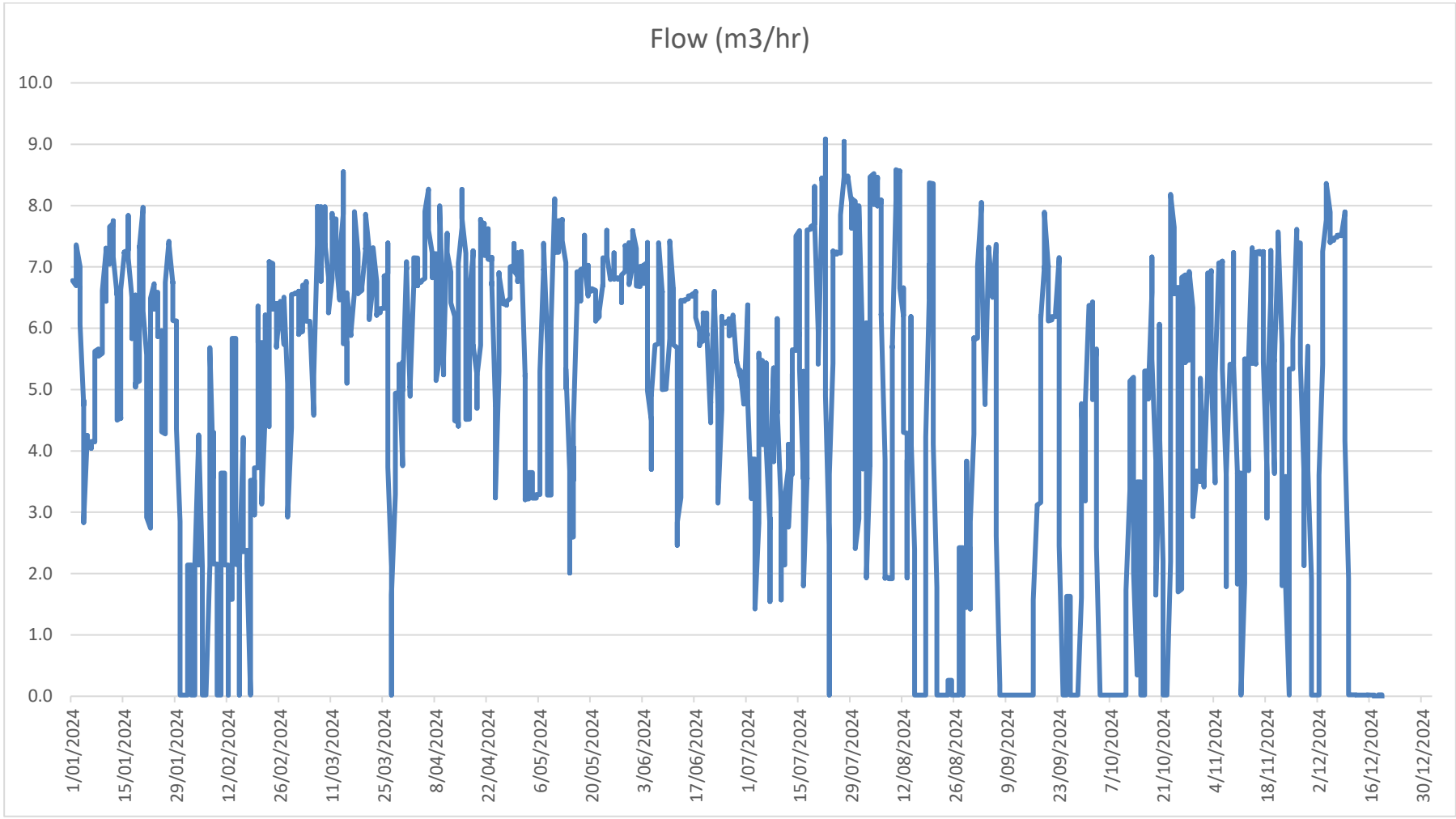
APPENDIX C 2023 STACK MONITORING

APPENDIX D TRANSFERRED WASTEWATER VOLUME AND QUALITY

Temperature (4pt moving average)



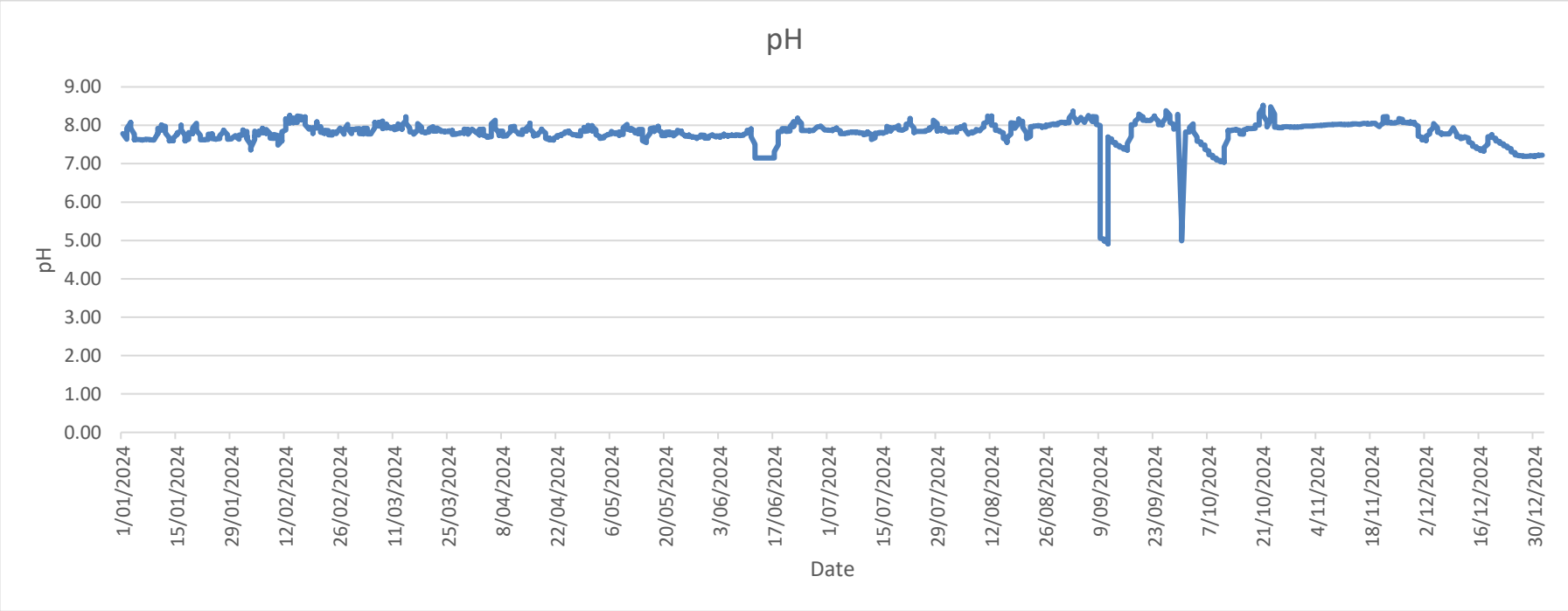
Flow (Tronox outlet) (10pt moving average)



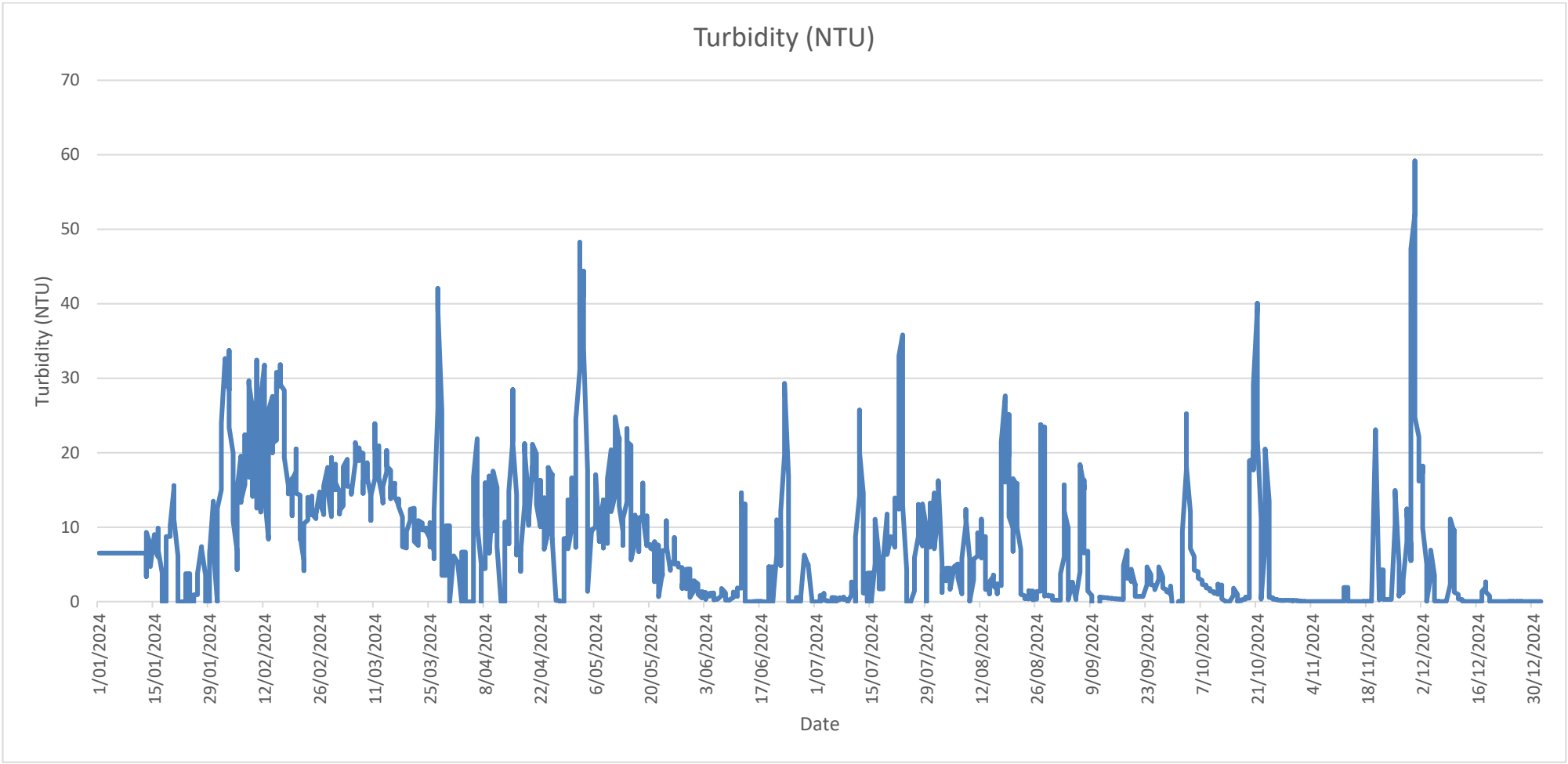
Volume

Total Transferred in period: 39,632 kL

pH (4pt moving average)



Turbidity (4pt moving average)



APPENDIX E GROUNDWATER MONITORING

Groundwater Monitoring

DWER Bore ID	Simcoa Bore ID	Date	Conductivity (µS/cm)	TDS (mg/)	pH	TOC (mg/L)	SWL (mAHD)
GQ1	1Shallow	Jun-24	330	270	5.4	42	8.88
	1Shallow	Dec-24	410	320	6.2	39	9.87
	1Deep	Jun-24	480	320	5.8	16	8.73
	1Deep	Dec-24	520	310	6.6	12	9.63
GQ2	2Shallow	Jun-24	790	510	6.6	23	8.76
	2Shallow	Dec-24	340	210	6.9	13	9.48
	2Deep	Jun-24	460	310	5.8	21	8.53
	2Deep	Dec-24	390	250	6.3	18	9.33
GQ3	3Shallow	Jun-24	370	270	6	13	8.62
	3Shallow	Dec-24	370	230	6.1	16	9.08
	3Deep	Jun-24	440	310	5.8	26	8.34
	3Deep	Dec-24	460	290	6.2	25	9.06

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