



Technical Ammonium Nitrate Plant

Yara Pilbara Nitrates Pty Ltd

Ambient Air Quality Monitoring Report 2024-2025

JBS&G 70753 | 170,746 (Rev 0)

2 October 2025





We acknowledge the Traditional Custodians of Country throughout Australia and their connections to land, sea and community.

We pay respect to Elders past and present and in the spirit of reconciliation, we commit to working together for our shared future.

Caring for Country The Journey of JBS&G
Artist: Patrick Caruso, Eastern Arrernte



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Appendices

Appendix A	Results from Monitoring of Gases
Appendix B	Results from Monitoring of TSP

Abbreviations and Definitions

Term	Definition	Description and context for this report
µm	Micrometre	One millionth (0.000001) of a metre
CSIRO	The Commonwealth Scientific and Industrial Research Organisation	The Commonwealth Scientific and Industrial Research Organisation is an independent Australian federal government agency responsible for scientific research.
EPBC	Environment Protection and Biodiversity Conservation	Refers to the Australian Government EPBC Act of 1999
Insoluble fraction	Component of deposited dust that is not soluble in water	Deposited dust can comprise of aqueous soluble and insoluble materials depending on mechanisms and sources of dust emissions. The insoluble fraction is typically derived from crustal materials.
MicroVol	MicroVol 1100 low volume sampler	Low volume air sampling instrument for sampling of TSP, manufactured by Ecotech
NH ₃	Ammonia	Gaseous air pollutant from natural sources and industrial sources (including YPN TAN Plant)
NO ₂	Nitrogen dioxide	Gaseous air pollutant from combustion sources
OEMP	Operational Environmental Management Plan	Management plan prepared by YPN in accordance with Condition 7 of the EPBC Approval (as varied 24 March 2020)
Passive sampling	Ambient air sampling for gaseous substances involving passive samplers	Sampling technique whereby airborne gaseous pollutants are extracted from the air column onto an adsorbent material via a diffusive mechanism
PM ₁₀	Particulate matter (10 micrometre)	Dust particles which are present in ambient air with an equivalent aerodynamic diameter of 10 micrometres (µm)
Radiello® passive sampler	Sampler for gaseous substances in ambient air	Sampling devices manufactured by Sigma Aldrich under licence from Fondazione Salvatore Maugeri IRCCS for passively monitoring airborne concentrations of gases
SO ₂	Sulfur dioxide	Gaseous air pollutant from oxidation (combustion) of sulfur containing substances
Soluble fraction	Component of deposited dust that is soluble in water	Deposited dust can comprise of aqueous soluble and insoluble materials depending on mechanisms and sources of dust emissions. The soluble fraction is typically derived from marine aerosols
TAN Plant	Technical Ammonium Nitrate Plant	YPN plant on Murujuga for production of ammonium nitrate
TSP	Total suspended particulates	Dust particles which are present in ambient air with equivalent aerodynamic diameter of 50 micrometres (µm)
YPN	Yara Pilbara Nitrates	The operator of the TAN Plant

1. Introduction

Conditions 9 and 9A of Yara Pilbara Nitrates Pty Ltd.'s (YPN) approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for the Technical Ammonium Nitrate (TAN) Plant (reference 2008/4546 as varied 24 March 2020) requires monitoring of various air quality parameters.

Condition 3 of the approval outlines reporting requirements, including an analysis of monitoring data from the monitoring program carried out under condition 9A. This report is provided in response to Condition 3(a) of the approval for the monitoring period 1 July 2024 to 30 June 2025.

2. Scope of Monitoring Program

To protect the values of the Dampier Archipelago (including Murujuga/Burrup Peninsula) National Heritage Place, particularly rock art sites, the EPBC Act approval (Condition 9) required Baseline Air Quality Monitoring to be carried out for a period of not less than 24 months from the commencement of construction of the TAN Plant. YPN issued a report to the then Department of the Environment and Energy on 16 June 2017 on completion of the Baseline Air Quality Monitoring (YPN 2017).

Condition 9A of the approval informs the scope of the Ongoing Air Quality Monitoring and is reproduced below (Figure 1).

9A. To protect the values of the Dampier Archipelago (including Burrup Peninsula) National Heritage Place, particularly the rock art sites, the person taking the action must ensure:

- a. Ongoing air quality monitoring is undertaken within 30 days after this condition comes into effect (the date the relevant variation to conditions notice is signed) and until expiry of the approval.
- b. Air quality monitoring parameters are monitored at the rock art sites: Site 5 (Burrup Road), Site 6 (Water tanks site) and Site 7 (Hearson Cove Road site) as shown in Attachment 2.
- c. Monitoring of air quality at rock art sites is undertaken by a suitably qualified person (Air Quality).

The air quality monitoring parameters in the table below must be monitored at the frequencies indicated in the table below:

Element of air quality to be monitored	Specific air quality parameter to be sampled	Minimum frequency of monitoring
Ambient air concentration of gases	NH ₃ (ammonia)	Continuous monitoring for at least 14 consecutive days, every month
	NO ₂ (nitrogen oxide)	
	SO ₂ (sulfur oxide)	
Airborne particulate concentration	Total suspended particulates up to 50 μm (TSP)	Every 6 days
Deposited dust	Total dust deposition per month (Insoluble Fraction)	Quarterly
	Total dust deposition per month (Soluble Fraction)	

Figure 1: Condition 9A of EPBC Approval 2008/4546 (as varied 24 March 2020)

Condition 3(a)i of the EPBC Act approval requires (in part) publication of a report that includes “...an analysis of monitoring data required under Condition 9A...”.

On 24 March 2020, approval was granted to relocate Site 7 (Deep Gorge) to accommodate the development of a boardwalk at the Nganjarli heritage site (formerly known as Deep Gorge) by Murujuga Aboriginal Corporation (MAC). Consequently, Site 7 was relocated to Hearson Cove on 8 April 2020. This site was referenced as ‘Deep Gorge’ in the report for 2020-2021. However, as the site is now closer to Hearson Cove, it is referred as ‘Hearson Cove’ herein (including in graphs where data prior to April 2020 is from monitoring at the Deep Gorge site).

Note that earlier studies carried out by CSIRO included monitoring of gaseous nitric acid (HNO_3). The EPBC Act approval does not require monitoring of this substance. However, as described in the Operational Environmental Management Plan (OEMP) prepared by YPN under the EPBC Act approval, YPN has continued monitoring HNO_3 after the CSIRO studies concluded. This allows for direct comparisons of current deposition rates with the rates determined since 2003.

The following reports have been issued as required by the EPBC Act approval:

- October 2018 for the period 2017-2018 (Strategen 2018);
- October 2019 for the period 2018-2019 (Strategen-JBS&G 2019);
- October 2020 for the period 2019-2020 (Strategen-JBS&G 2020);
- October 2021 for the period 2020-2021 (Strategen-JBS&G 2021);
- October 2022 for the period 2021-2022 (Strategen-JBS&G 2022);
- October 2023 for the period 2022-2023 (JBS&G 2023); and
- October 2024 for the period 2023-2024 (JBS&G 2024).

This report presents an analysis of monitoring data obtained for the monitoring period 1 July 2024 to 30 June 2025 (referred to herein as the 2024-2025 monitoring period).

3. TAN Plant Operation

The TAN Plant (including the Nitric Acid Plant, Ammonium Nitrate Solution Plant and Prill Plant) was in operation for the following dates during the 2024-2025 monitoring period:

- 1 July 2024 (start of reporting period) to 26 September 2024;
- 27 September 2024 to 14 December 2024;
- 26 January 2025 to 30 January 2025;
- 1 February 2025 to 12 February 2025;
- 21 February 2025 to 29 April 2025; and
- 1 May 2025 to 30 June 2025 (end of reporting period).

4. Air Quality Monitoring Program

4.1 Gases

4.1.1 Results of Monitoring

Monitoring of ammonia (NH_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2) and nitric acid (HNO_3) gases was carried out continuously using Radiello passive sampling throughout the 2024-2025 monitoring period at the three specified monitoring sites – Site 5 Burrup Road, Site 6 Water Tanks and Site 7 Hearson Cove.

A total of 24 fortnightly measurements were made of NH_3 , NO_2 , SO_2 and HNO_3 concentrations at each monitoring site during the 2024-2025 monitoring period. Sampling commenced on 1 July 2024, when samplers deployed for the previous fortnightly sampling period were replaced, and sampling concluded on 1 July 2025.

Tabulated results of the monitoring are shown in Appendix A. The concentrations for each parameter, with data points plotted at the end of the exposure period at the respective sites, are illustrated in Figure 2 for NH_3 , Figure 3 for NO_2 , Figure 4 for SO_2 and Figure 5 for HNO_3 .

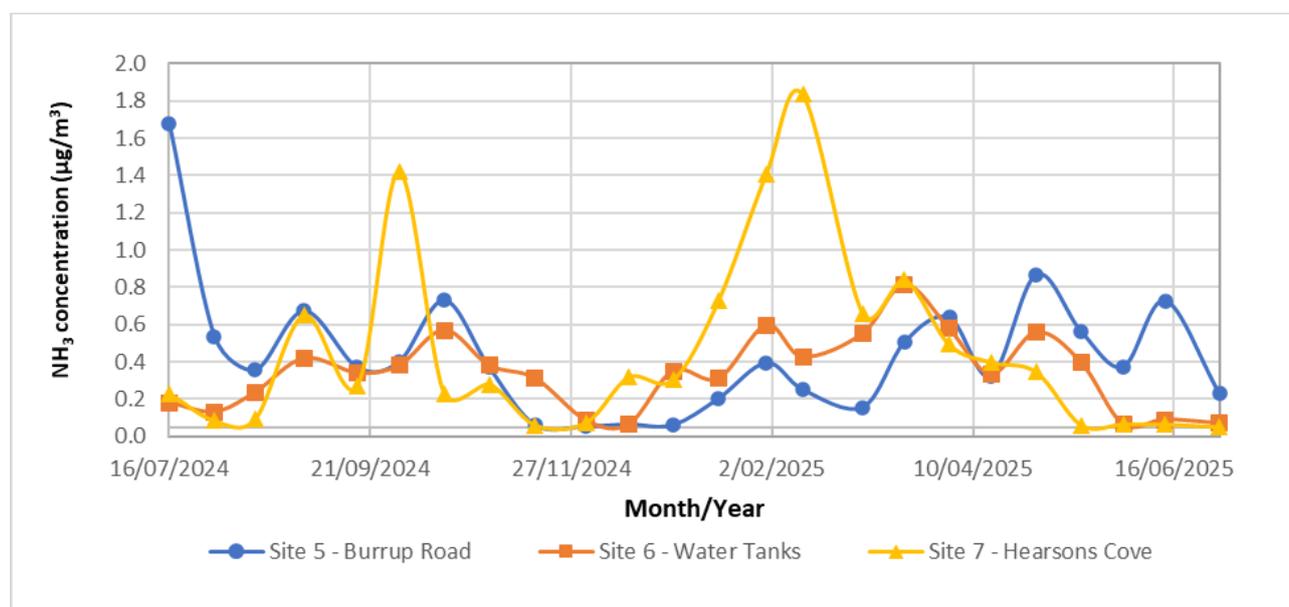


Figure 2: Measured NH_3 concentrations for 1 July 2024 to 30 June 2025

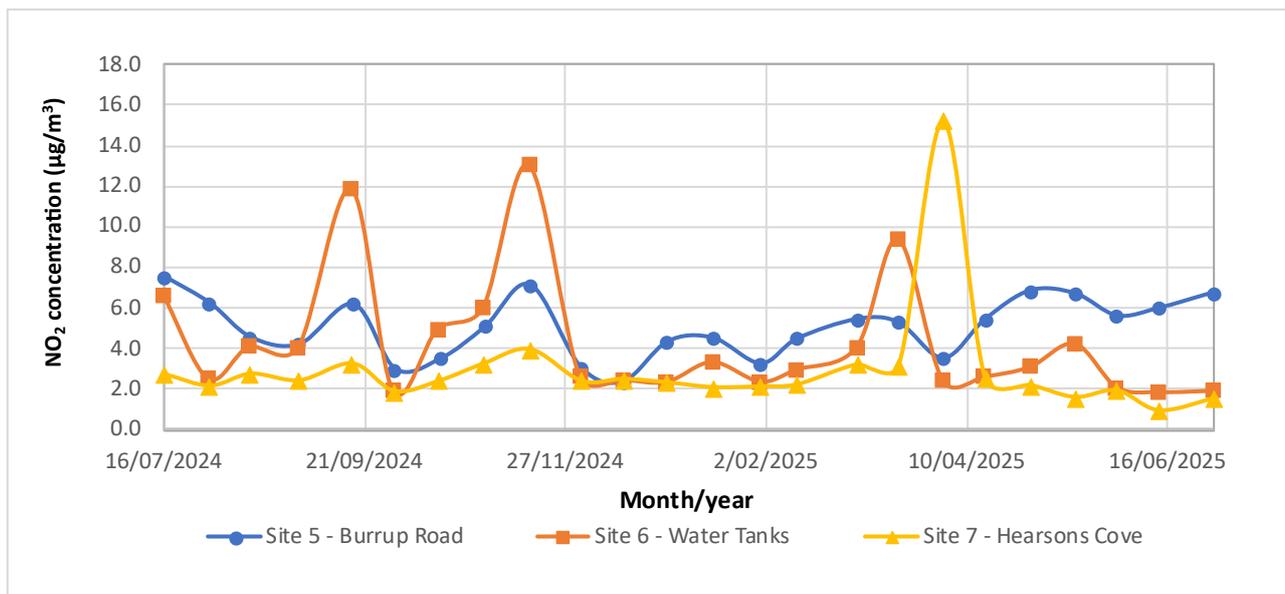


Figure 3: Measured NO₂ concentrations for 1 July 2024 to 30 June 2025

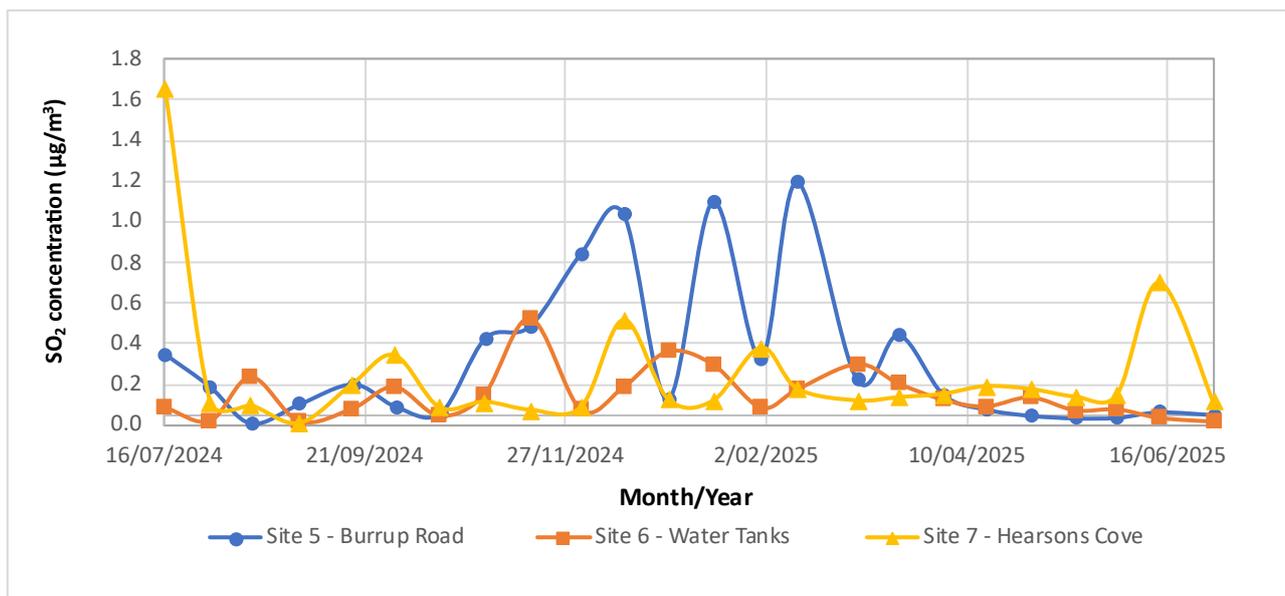


Figure 4: Measured SO₂ concentrations for 1 July 2024 to 30 June 2025

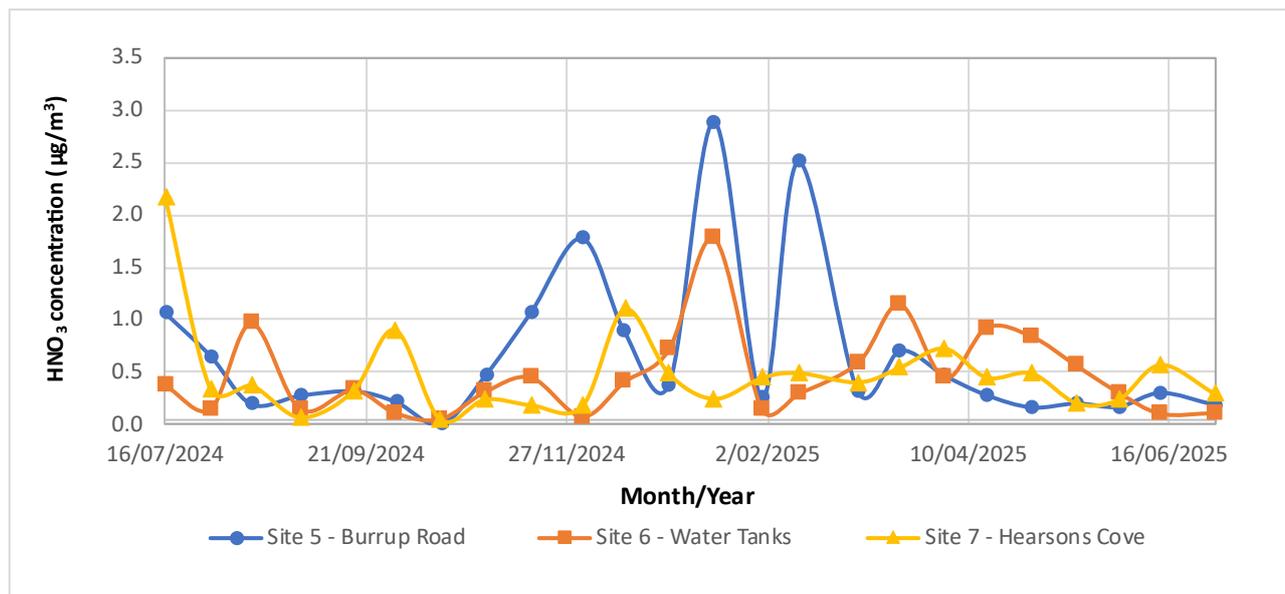


Figure 5: Measured HNO₃ concentrations for 1 July 2024 to 30 June 2025

4.1.2 Analysis of Data

Analysis of measured concentrations involves a comparison of descriptive statistics for the 2024-2025 monitoring period with those from monitoring carried out in the Baseline Air Quality Monitoring (YPN 2017). These statistics are shown in Table 1 for concentrations of NH₃, Table 2 for NO₂, Table 3 for SO₂ and Table 4 for HNO₃. Concentrations are calculated for the actual duration of exposure of the samplers, which were nominally 15-days but can vary a day on either side of that duration for logistical reasons.

Table 1: Descriptive statistics for NH₃ concentrations (2024-2025 and baseline)

Ammonia concentration µg/m ³						
Statistic	Site 5 Burrup Road		Site 6 Water Tanks		Site 7 Hearson Cove	
	2024-2025	Baseline	2024-2025	Baseline	2024-2025	Baseline
Minimum	0.05	0	0.06	0	0.05	0
Average	0.44	0.44	0.34	0.93	0.46	0.75
Maximum	1.68	1.2	0.81	3.97	1.83	4.35
Standard deviation	0.35	0.34	0.20	0.76	0.49	0.82

Table 2: Descriptive statistics for NO₂ monitoring (2024-2025 and baseline)

Nitrogen dioxide concentration µg/m ³						
Statistic	Site 5 Burrup Road		Site 6 Water Tanks		Site 7 Hearson Cove	
	2024-2025	Baseline	2024-2025	Baseline	2024-2025	Baseline
Minimum	2.38	0.38	1.84	0.31	0.92	0.4
Average	5.04	3.6	4.28	2.56	2.94	2.31
Maximum	7.53	6.53	13.02	5.27	15.24	4.12
Standard deviation	1.46	1.46	3.08	1.04	2.70	0.69

Table 3: Descriptive statistics for SO₂ monitoring (2024-2025 and baseline)

Sulfur dioxide concentration µg/m ³						
Statistic	Site 5 Burrup Road		Site 6 Water Tanks		Site 7 Hearson Cove	
	2024-2025	Baseline	2024-2025	Baseline	2024-2025	Baseline
Minimum	0.01	0.07	0.02	0	0.01	0.13
Average	0.32	1.38	0.15	0.95	0.25	0.82
Maximum	1.19	3.09	0.52	3.5	1.66	2.01
Standard deviation	0.36	0.83	0.12	0.84	0.34	0.53

Table 4: Descriptive statistics for HNO₃ monitoring (2024-2025 and baseline)

Nitric acid concentration µg/m ³						
Statistic	Site 5 Burrup Road		Site 6 Water Tanks		Site 7 Hearson Cove	
	2024-2025	Baseline	2024-2025	Baseline	2024-2025	Baseline
Minimum	0.00	0.00	0.05	0.00	0.05	0.00
Average	0.66	0.58	0.47	0.54	0.48	0.48
Maximum	2.89	1.55	1.77	1.81	2.16	1.42
Standard deviation	0.75	0.45	0.42	0.48	0.44	0.37

The concentrations for each monitoring site from the 2024-2025 monitoring period have been compared with the baseline data via statistical analysis (t-test) to determine if differences in the average concentrations are statistically significant (determined by t-test P values <0.05). The results are summarised in Table 5 and key findings from these data are summarised in Table 6.

Table 5: T-test results for comparison of 2024-2025 and baseline NH₃, NO₂, SO₂ and HNO₃ concentrations

Parameter	Monitoring period	Statistic	Site 5 Burrup Road	Site 6 Water Tanks	Site 7 Hearson Cove
NH ₃	2024-2025	Average	0.44	0.34	0.46
	baseline	Average	0.44	0.93	0.75
		P value	0.98	3.14E-06	0.08
NO ₂	2024-2025	Average	5.04	4.28	2.94
	baseline	Average	3.60	2.56	2.31
		P value	4.72E-04	0.013	0.27
SO ₂	2024-2025	Average	0.32	0.15	0.25
	baseline	Average	1.38	0.95	0.82
		P value	2.19E-08	1.46E-08	1.40E-06
HNO ₃	2024-2025	Average	0.66	0.47	0.48
	baseline	Average	0.58	0.54	0.48
		P value	0.67	0.53	0.98

(1) Red value indicate statistically significant different concentrations from the baseline.

Table 6: Analysis of NH₃, NO₂, SO₂ and HNO₃ concentration data

Parameter	Site	Finding
NH ₃	Burrup Road	The average NH ₃ concentration from 2024-2025 monitoring period is the same as from the baseline monitoring at this site
	Water Tanks	The (lower) average NH ₃ concentration from 2024-2025 monitoring period compared with baseline monitoring is statistically significant
	Hearson Cove	The (lower) average NH ₃ concentration from 2024-2025 monitoring period compared with baseline monitoring is not statistically significant
NO ₂	Burrup Road	The (higher) average NO ₂ concentration from 2024-2025 monitoring period compared with baseline monitoring at this site is statistically significant
	Water Tanks	The (higher) average NO ₂ concentration from 2024-2025 monitoring period compared with baseline monitoring at this site is statistically significant
	Hearson Cove	The (higher) average NO ₂ concentration from 2024-2025 monitoring period compared with baseline monitoring at this site is not statistically significant
SO ₂	Burrup Road Water Tanks Hearson Cove	The (lower) average SO ₂ concentrations from 2024-2025 monitoring period compared with baseline monitoring are statistically significant at all three monitoring sites
HNO ₃	Burrup Road	The (higher) average HNO ₃ concentrations from 2024-2025 monitoring period compared with baseline monitoring is not statistically significant
	Water Tanks	The (lower) average HNO ₃ concentrations from 2024-2025 monitoring period compared with baseline monitoring is not statistically significant
	Hearson Cove	The average HNO ₃ concentration from 2024-2025 monitoring period is the same as from the baseline monitoring at this site

The average concentrations of NH₃ detected at the Burrup Road and Hearson Cove sites during the 2024-2025 monitoring period were determined to be statistically insignificant from the baseline dataset. The average NH₃ concentration measured at Water Tanks, however, was determined to be statistically significantly lower than the baseline.

The average concentrations of NO₂ at the Burrup Road and Water tanks sites were determined to be statistically significantly higher than the baseline. The slightly higher average NO₂ concentrations measured at the Burrup Road site, however, was determined not to be significantly different to the baseline.

Continuing from previous monitoring periods, statistically significant decreases in the SO₂ concentrations recorded during the 2024-2025 monitoring period compared with the baseline study were determined for all three monitoring sites.

The differences in the HNO₃ concentrations recorded at all monitoring sites during the 2024-2025 monitoring period relative to the baseline study are statistically insignificant.

4.1.3 Dry Deposition Rates – Gases

Annual (total) dry deposition rates were calculated from the gas sampling at the three monitoring sites for the duration of the baseline and ongoing monitoring program. Total annual deposition rates were calculated from the combined rates for NH₃, NO₂, SO₂ and HNO₃. The results for total annual dry deposition are illustrated in Figure 6.

The monitoring periods shown are from the start of July to the end of June in the following year, except for the 2013-2014 monitoring period, which is reported from September 2013 to August 2014 and, therefore, overlaps with the 2014-2015 period to represent an entire 12-month period.

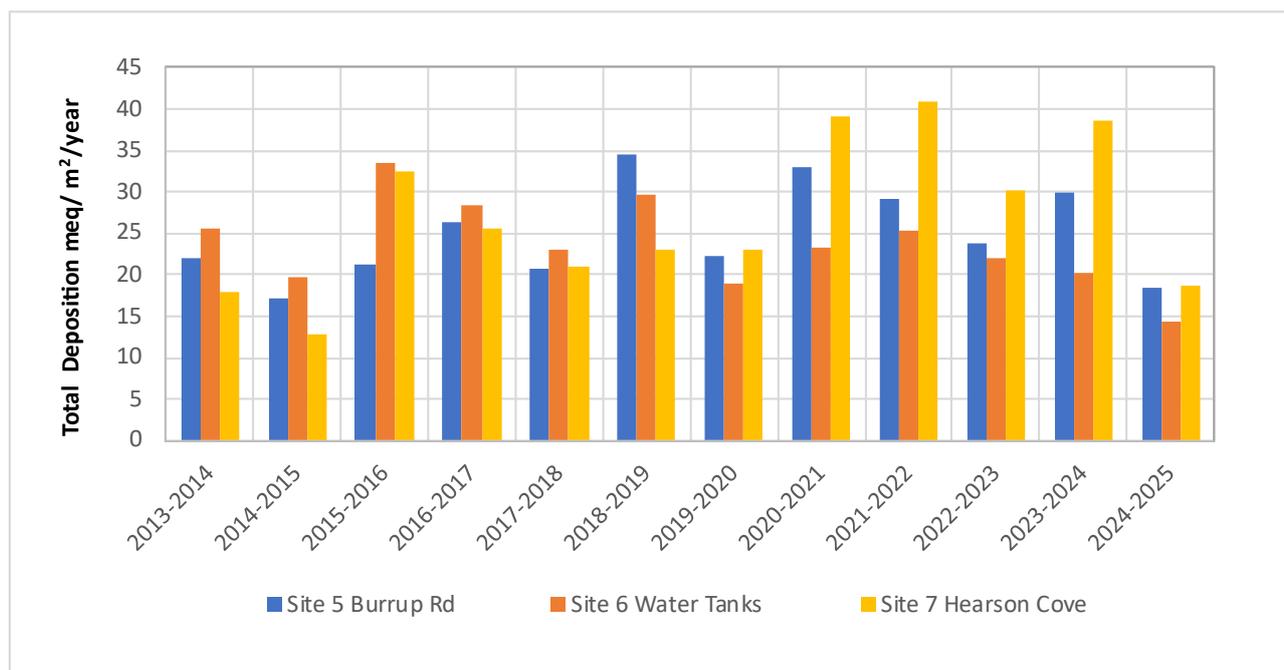


Figure 6: Annual deposition rates from measured gases (2013-2025)

The results of the annual dry deposition monitoring are summarised in Table 7. Investigation levels were derived from the average of rolling monthly annual deposition rates from the baseline period plus three standard deviations (as described in the OEMP).

Table 7: Annual dry deposition rates

Monitoring period	Annual deposition rates (meq/m ² /year)		
	Site 5 Burrup Road	Site 6 Water Tanks	Site 7 Hearson Cove
2013-2014	22.1	25.6	17.9
2014-2015	17.3	19.8	12.9
2015-2016	21.3	33.6	32.4
2016-2017	26.3	28.5	25.6
2017-2018	20.7	23.0	21.0
2018-2019	34.5	29.7	23.0
2019-2020	22.4	19.0	23.2
2020-2021	32.9	23.3	39.1
2021-2022	29.1	25.4	40.9
2022-2023	23.8	22.0	30.1
2023-2024	30.0	20.3	38.7
2024-2025	18.5	14.5	18.8
Investigation level	25.5	42.2	51.8

During the 2024-2025 monitoring period, dry deposition rates of gas species remained within the levels observed in previous monitoring periods.

The annual dry deposition rate determined for the Burrup Road site was above the investigation level at the beginning of the year, whereas the rates at the Water Tanks and Hearson Cove sites were below the respective investigation levels.

The composition of the total deposition at each monitoring site is illustrated in Figure 7 to Figure 9.

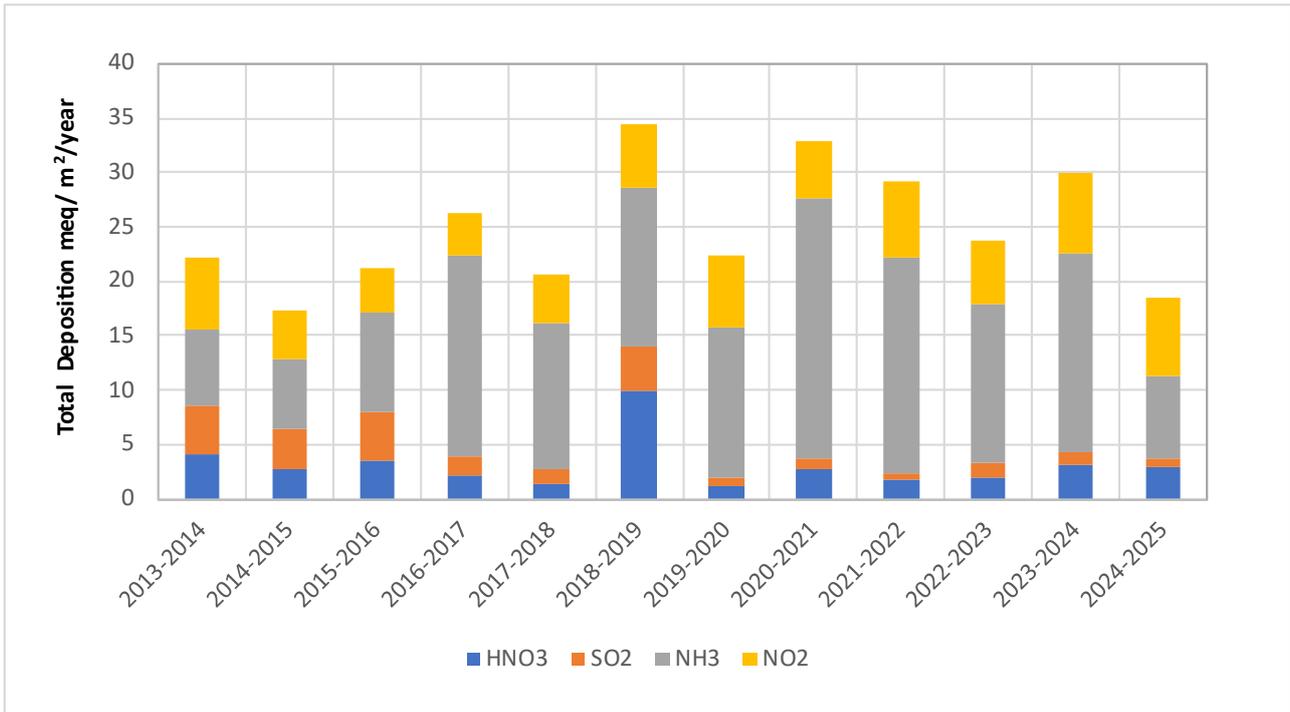


Figure 7: Burrup Road dry deposition composition

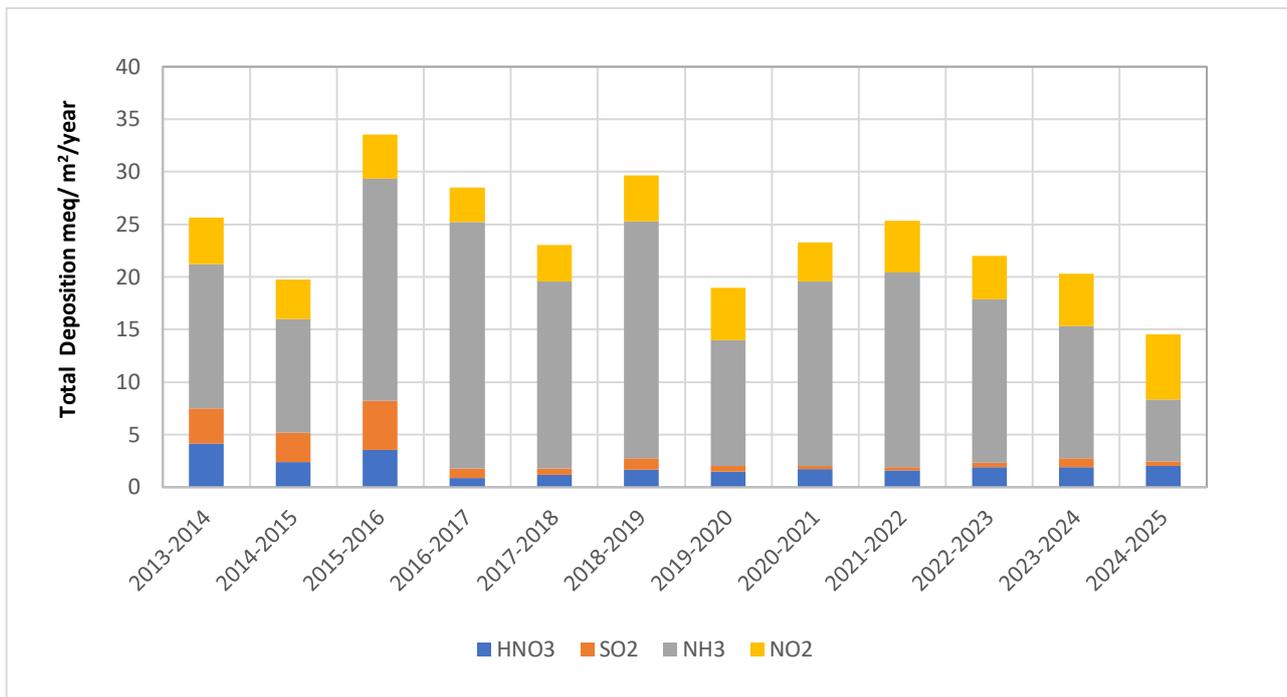


Figure 8: Water Tanks dry deposition rates

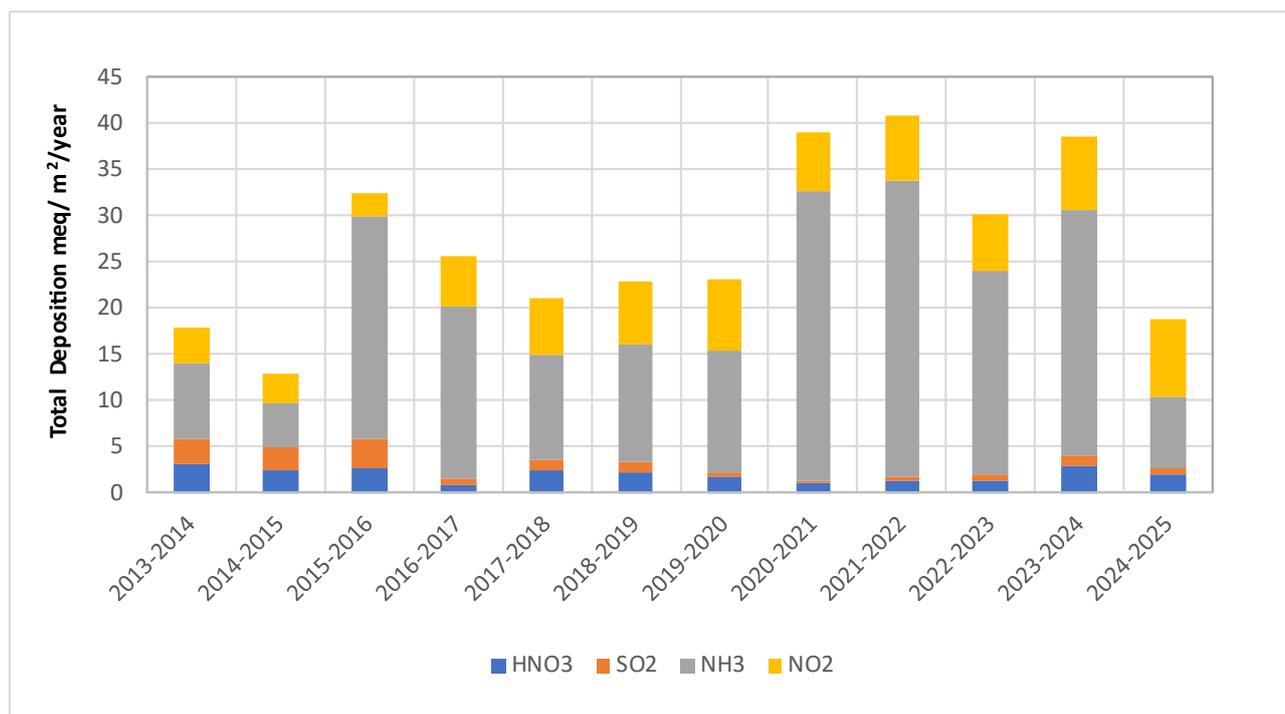


Figure 9: Hearson Cove dry deposition rates

4.2 Total Suspended Particulates

4.2.1 Results of TSP Monitoring

Monitoring for total suspended particulates (TSP) using MicroVol samplers was carried out at the three monitoring sites. Monitoring occurred for 24 hours every six days from the period 5 July 2024 to 30 June 2025. Valid data was collected at all monitoring sites throughout the 2024-2025 monitoring period with the following exceptions:

- Spoilage (suspected rain ingress) occurred for the sample collected on 1 January 2025 at Burrup Road and Water Tanks and 13 January 2025 at Hearson Cove;
- No TSP samples were collected 19 January 2025 and 12 February 2025 due to cyclone activity; and
- Valid TSP samples were not collected at Burrup Road on 2 November 2024, 6 June 2025 and 12 June 2025, and at Water Tanks for 18 February, 24 June 2025 and 30 June 2025 due to the run time and/or flow being outside of tolerance.

Tabulated results of the TSP monitoring are shown in Appendix B.

Similar trends in the TSP concentrations from the three monitoring sites are typically observable across the monitoring period (Figure 10). This suggests the monitoring data reflects TSP trends in the local airshed rather than direct impacts from individual local sources.

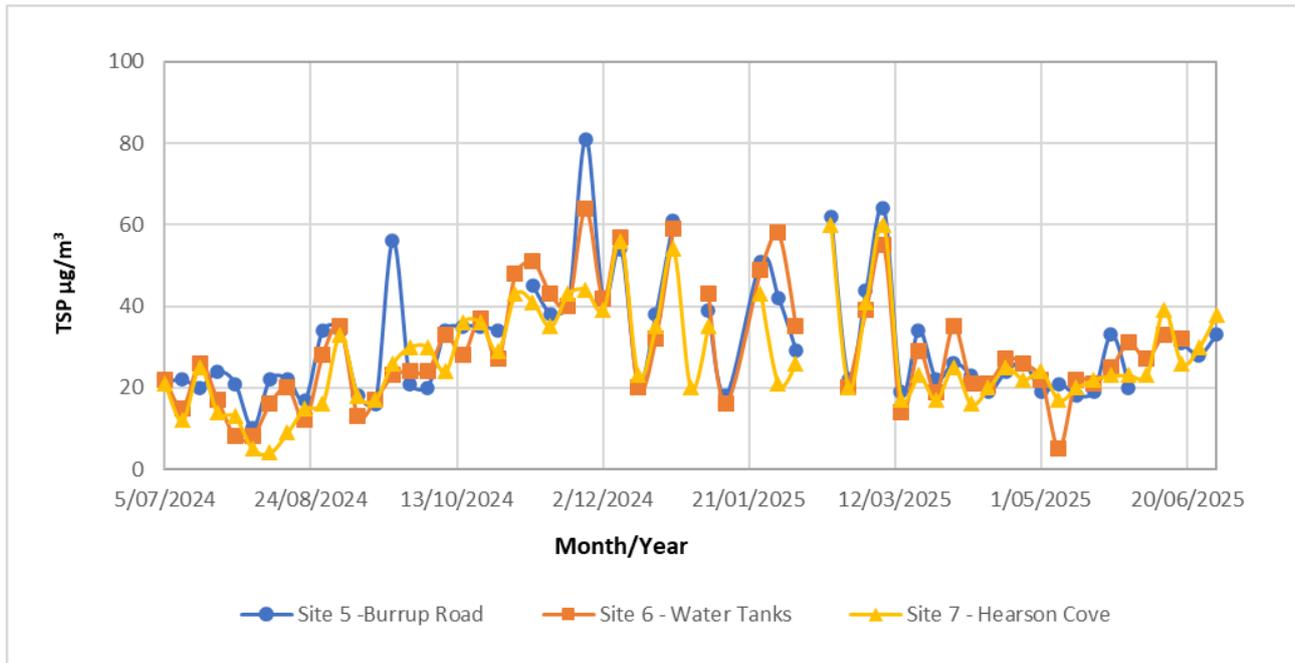


Figure 10: Measured TSP concentrations for 2024-2025

The baseline dataset was derived from direct TSP measurements as well as from estimates calculated from measured PM₁₀ concentrations as described in the Baseline Air Quality Monitoring (YPN 2017). The measured baseline dataset for the Water Tanks site was impacted by local activities associated with the construction of the TAN Plant, resulting in an over-representation of background levels at that site. The ongoing measured average concentration data are consequently compared to both the measured and calculated datasets for the baseline (Figure 11).

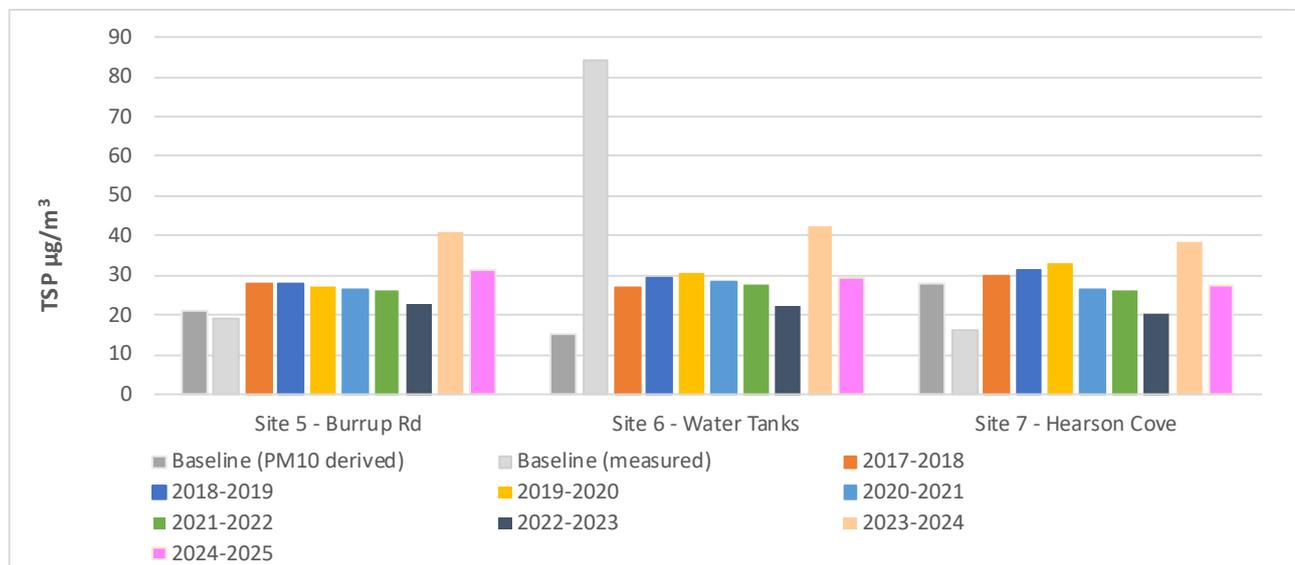


Figure 11: Comparison of average TSP concentrations for 2024-2025 with previous monitoring periods and baseline data

Descriptive statistics for TSP during the 2024-2025 monitoring period at all three monitoring sites are shown in Table 8 to Table 10 alongside the data for previous monitoring periods.

Table 8: Descriptive statistics for TSP monitoring 2018 to 2025 – Burrup Road

Statistic	TSP concentration $\mu\text{g}/\text{m}^3$							
Site	Site 5 Burrup Road							
Monitoring period	2024-2025	2023-2024	2022-2023	2021-2022	2020-2021	2019-2020	2018-2019	2017-2018
Minimum	10	6	5	8	5	8	2	6
Average	31	41	23	26	27	27	28	28
Maximum	81	168	50	76	78	77	66	76
Standard deviation	15	32	10	13	14	15	14	13

Table 9: Descriptive statistics for TSP monitoring 2018 to 2025 – Water Tanks

Statistic	TSP concentration $\mu\text{g}/\text{m}^3$							
Site	Site 6 Water Tanks							
Monitoring period	2024-2025	2023-2024	2022-2023	2021-2022	2020-2021	2019-2020	2018-2019	2017-2018
Minimum	5	9	6	8	5	9	8	6
Average	29	42	22	28	28	31	29	27
Maximum	64	176	50	89	79	141	63	76
Standard deviation	14	34	10	14	15	22	13	12

Table 10: Descriptive statistics for TSP monitoring 2018 to 2025 – Hearson Cove

Statistic	TSP concentration $\mu\text{g}/\text{m}^3$							
Site	Site 7 Hearson Cove							
Monitoring period	2024-2025	2023-2024	2022-2023	2021-2022	2020-2021	2019-2020	2018-2019	2017-2018
Minimum	4	9	6	7	7	8	8	11
Average	28	38	20	26	27	33	32	30
Maximum	60	143	50	89	67	148	67	79
Standard deviation	13	30	9	15	14	23	15	15

A comparison of the mean TSP concentrations measured during the seven monitoring periods after the baseline study shows that the average TSP concentration for the 2024-2025 monitoring period is below the previous monitoring period (Figure 11 and Table 8 to Table 10). The 2023-2024 monitoring period concentrations were above previous monitoring periods for all monitoring sites predominantly due to extensive earthworks associated with construction of the Perdaman Urea Project to the west of the TAN plant.

The levels monitored at the Water Tanks site since the baseline study have persisted lower than the baseline measured data and are comparable to the levels recorded at other sites. This continues to support the hypothesis that the baseline measurements at the Water Tanks site were affected by construction activities.

The 2024-2025 data were compared to the previously measured dataset to determine if there was any significant change in the recorded ambient TSP levels. The 2024-2025 dataset was determined to be statistically significantly different to 2023-2024 (current period is lower), and 2022-2023 and baseline monitoring periods during which lower TSP was recorded. The TSP data from the 2024-2025 monitoring

period was not statistically different from other monitoring periods except for Burrup Road for the 2021-2022 monitoring period.

4.3 Dust Deposition

4.3.1 Results from Monitoring Deposited Dust

Results of dust deposition monitoring at the three monitoring sites are shown in Table 11. Values with a less than (<) prefix indicate the measured deposition rates were below the method detection limits, with the value indicating the limit. The Burrup Road sample for the January 2025 monitoring period was compromised (leaked in transit); thus the result is shown as not available (NA).

Table 11: Results of dust deposition monitoring 2024-2025

Date deployed	Date collected	Site 5 – Burrup Road		Site 6 – Water Tanks		Site 7 – Hearson Cove	
		Soluble solids	Insoluble solids	Soluble solids	Insoluble solids	Soluble solids	Insoluble solids
		g/m ² /month					
01/07/2024	02/08/2024	1.2	1.2	0.7	<0.8	1	<0.8
02/08/2024	30/08/2024	<0.7	<0.8	1	<0.8	0.8	<0.8
30/08/2024	01/10/2024	1.3	1.5	1.9	1.3	1.4	1.2
01/10/2024	31/10/2024	0.8	1.8	1.2	1.9	0.8	2
31/10/2024	02/12/2024	0.8	2	1.2	1.2	<0.7	1.8
2/12/2024	31/12/2024	1.5	2.3	1.5	1.8	1.4	2
31/12/2024	31/01/2025	NA	NA	3	2.1	3.2	1.2
31/01/2025	04/03/2025	0.9	1.9	0.8	1.9	0.9	1.9
06/03/2025	02/04/2025	<0.7	1.4	4.7	4.6	1.3	1.7
02/04/2025	01/05/2025	<0.7	<0.8	0.7	<0.8	0.8	<0.8
01/05/2025	30/05/2025	<0.7	<0.8	<0.7	<0.8	<0.7	<0.8
30/05/2025	01/07/2025	1.2	<0.8	1.7	<0.8	1.2	<0.8

4.3.2 Analysis of Dust Deposition Data

A comparison of the dust deposition data from the 2024-2025 monitoring period with the baseline data (insoluble fraction only) is shown in Table 12.

Table 12: Descriptive statistics for dust deposition monitoring 2024-2025 and baseline study

Statistic ⁽¹⁾	Burrup Road (g/m ² /month)			Water Tanks (g/m ² /month)			Hearson Cove (g/m ² /month)		
	2024-2025		Baseline	2024-2025		Baseline	2024-2025		Baseline
	Soluble	Insoluble	Insoluble	Soluble	Insoluble	Insoluble	Soluble	Insoluble	Insoluble
Minimum	0.4	0.4	0.0	0.4	0.4	0.0	0.4	0.4	0.0
Average	0.8	1.2	0.9	1.6	1.4	0.8	1.1	1.2	1.1
95 th percentile	1.4	2.2	1.8	3.8	3.2	1.9	2.2	2.0	2.3
Maximum	1.5	2.3	2.0	4.7	4.6	2.1	3.2	2.0	5.0

(1) Half method detection limit deposition rates for non-detect results were used for calculations of statistics.

Average dust deposition rates for the insoluble fraction are higher than baseline across all three monitoring sites (Figure 12). The differences between the baseline and 2024-2025 datasets were not statistically significant at any of the three monitoring sites (determined by t-test P values >0.05). The average measured

insoluble fraction at the Burrup Road and Hearson Cove sites are within the range seen in other monitoring periods, while the average at the Water Tanks site was above that previously recorded.

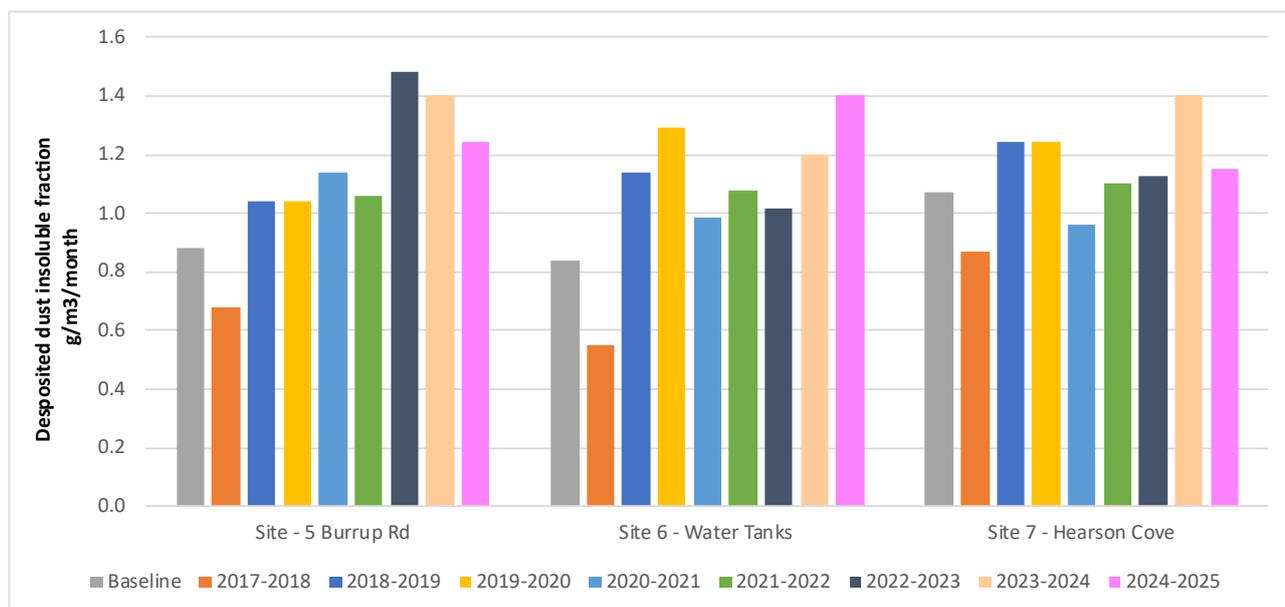


Figure 12: Deposited dust average insoluble fraction baseline to 2024-2025

The soluble fraction was not determined in samples collected for the Baseline Air Quality Monitoring as the EPBC Act approval at the time (dated 14 September 2011) only required measurements of TSP and “dust”. The latter requirement was interpreted to mean the insoluble fraction of deposited dust. The amended approval of 12 September 2017 required both insoluble and soluble fractions of deposited dust to be monitored. In the absence of baseline data, the soluble fraction data for the 2024-2025 monitoring period is compared to the data collected for the 2018 to 2023 monitoring periods.

The average soluble fraction measured from the deposited dust collected in the 2024-2025 monitoring period is within the range seen from monitoring carried out across previous monitoring periods at all sites (Figure 13).

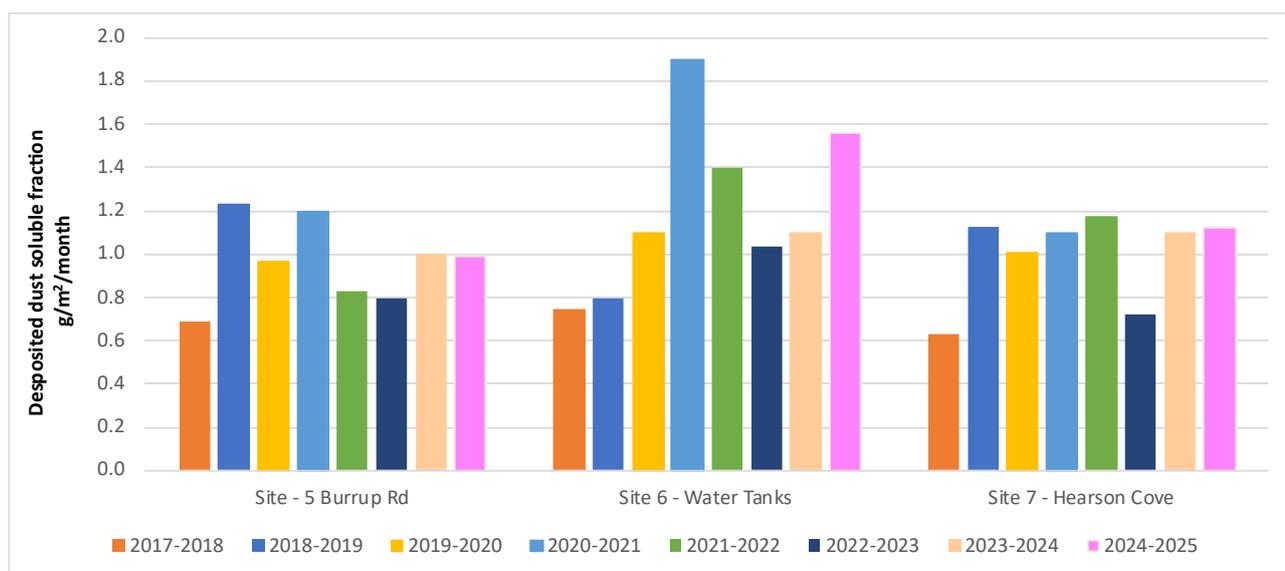


Figure 13: Deposited dust average soluble fraction baseline to 2024-2025

The trends in the soluble and insoluble deposition rates observed at the three monitoring sites across the 2024-2025 monitoring period are presented in Figure 14 and Figure 15. Note that these comparisons reflect the use of non-detect deposition rates of half the detection limits. The actual deposition rates below detection limits may be lower or higher than the half detection rates.

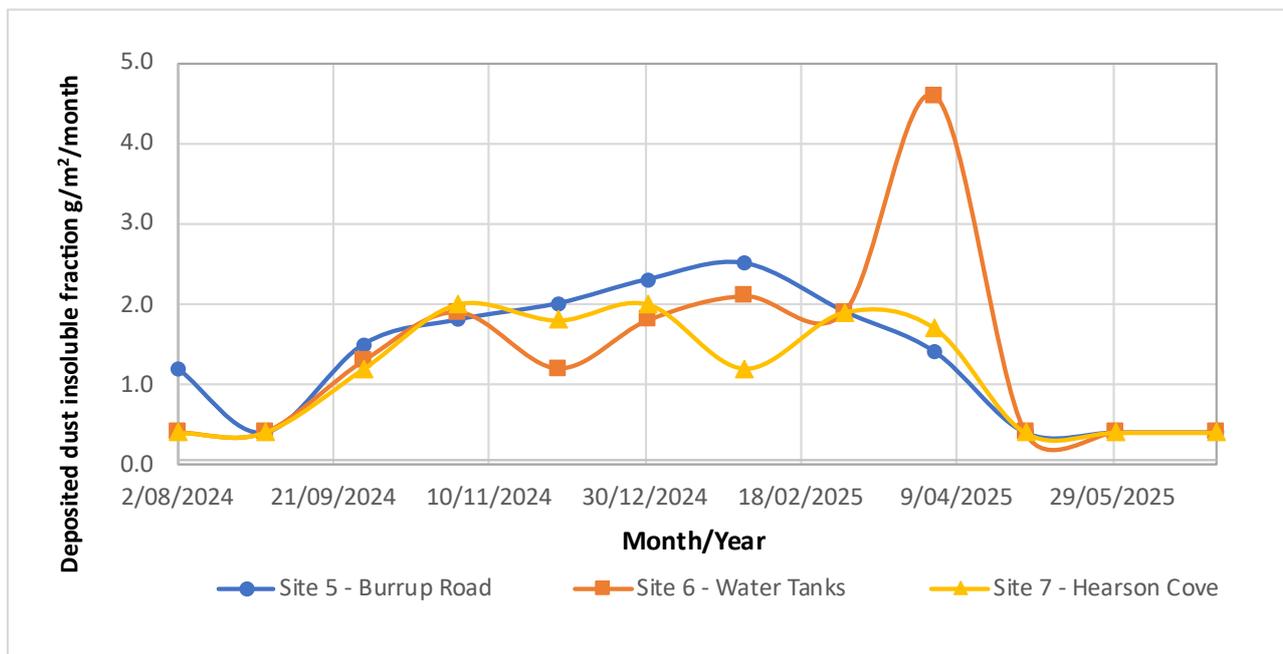


Figure 14: Deposited dust insoluble fraction 2024-2025

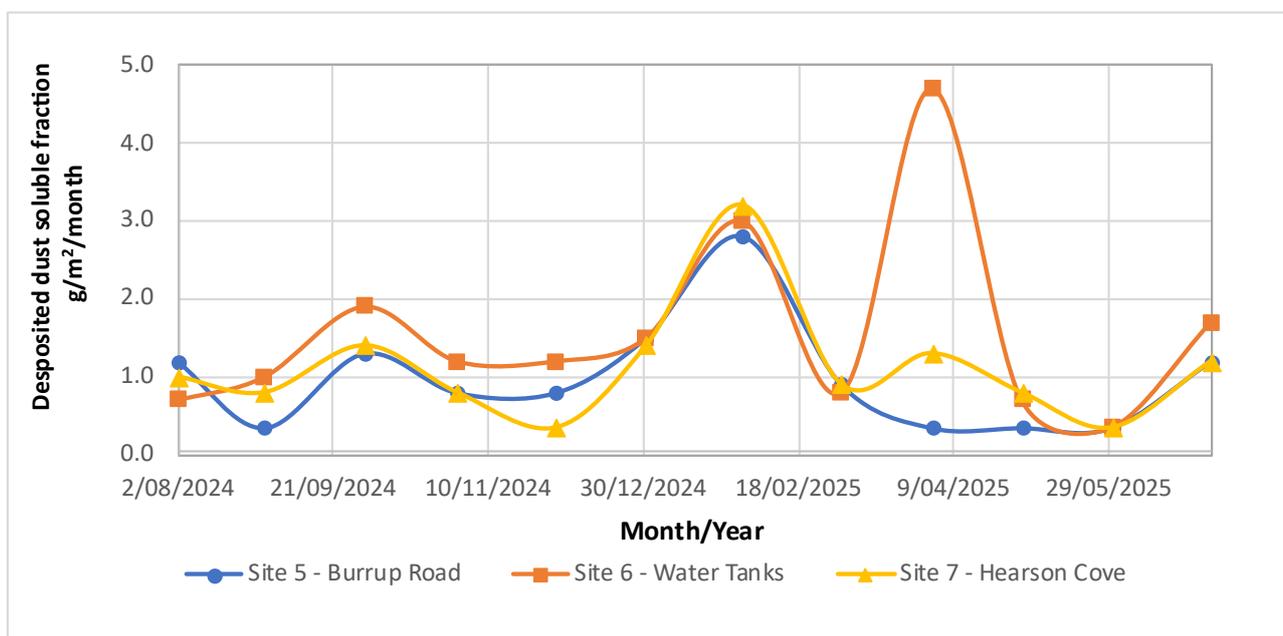


Figure 15: Deposited dust soluble fraction 2024-2025

Similar trends in the insoluble and insoluble deposition rates were observed at the three monitoring sites across most of the 2024-2025 monitoring period. The exception was the deposition of both insoluble and soluble material at the Water Tanks site, which recorded levels above the other monitoring sites during March 2025. Furthermore, results were the highest recorded at any site throughout the monitoring program. The monitoring duration was 27 days, which is outside the Australian Standard specification of

30 days \pm 2 days and may have contributed to an anomalous result; however, since high results were not evident at other sites, the slightly reduced sampling period is unlikely to be the cause of the elevated result. It is more likely a contaminated sample or local event influenced the Water Tanks site during this monitoring period, although it is not possible to discern further what influenced this result with the information available.

Overall, the levels of dust deposited at the three monitoring sites remain largely consistent with those observed from the Baseline Air Quality Monitoring study and Ongoing Air Quality Monitoring carried out since 2017.

5. Dry Deposition Rate Investigation and Actions

As described in Section 4.1.3, the monitoring carried out in the 2024-2025 monitoring period showed that the annual dry deposition rate at the beginning of the reporting period exceeded the investigation levels established from the Baseline Air Quality Monitoring at the Burrup Road site.

Subsequently the Burrup Road site rolling annual deposition had a falling trend across the 2024-2025 monitoring period with the monthly rolling annual deposition rate below the investigation level (25.5 meq/m²/year) from the start of the third quarter 2024 onwards (Figure 16). Peak concentrations were within the range of previous monitoring periods (Figure 17).

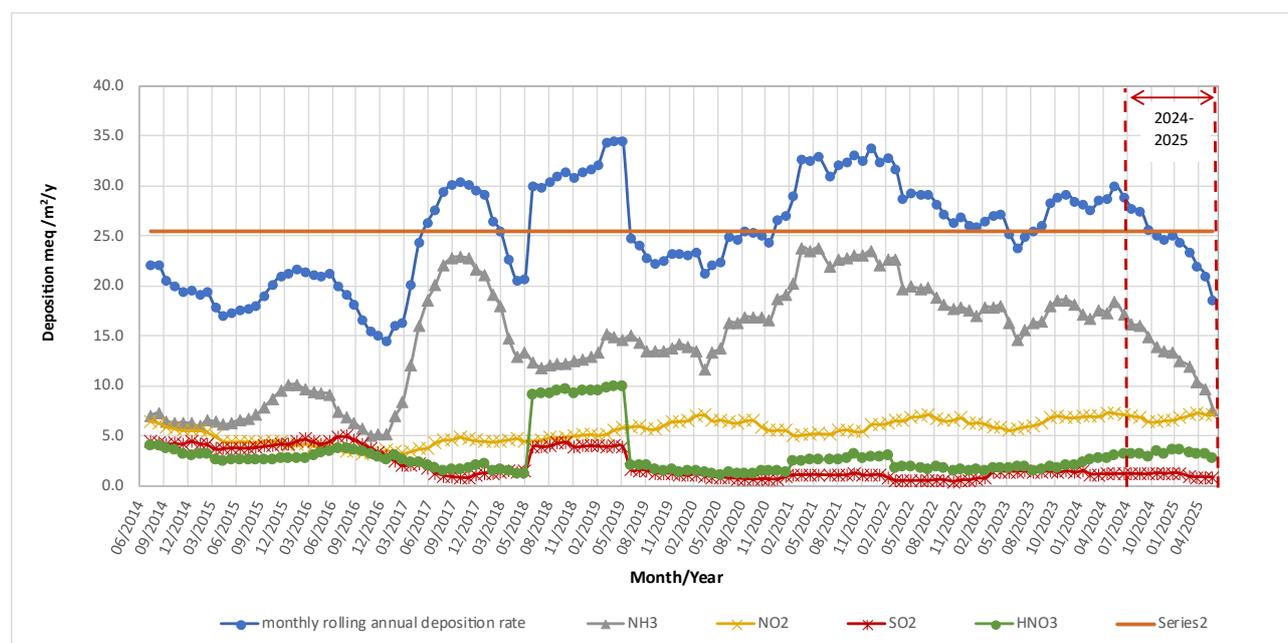


Figure 16: Monthly rolling annual total and individual gas dry deposition rates – Burrup Road

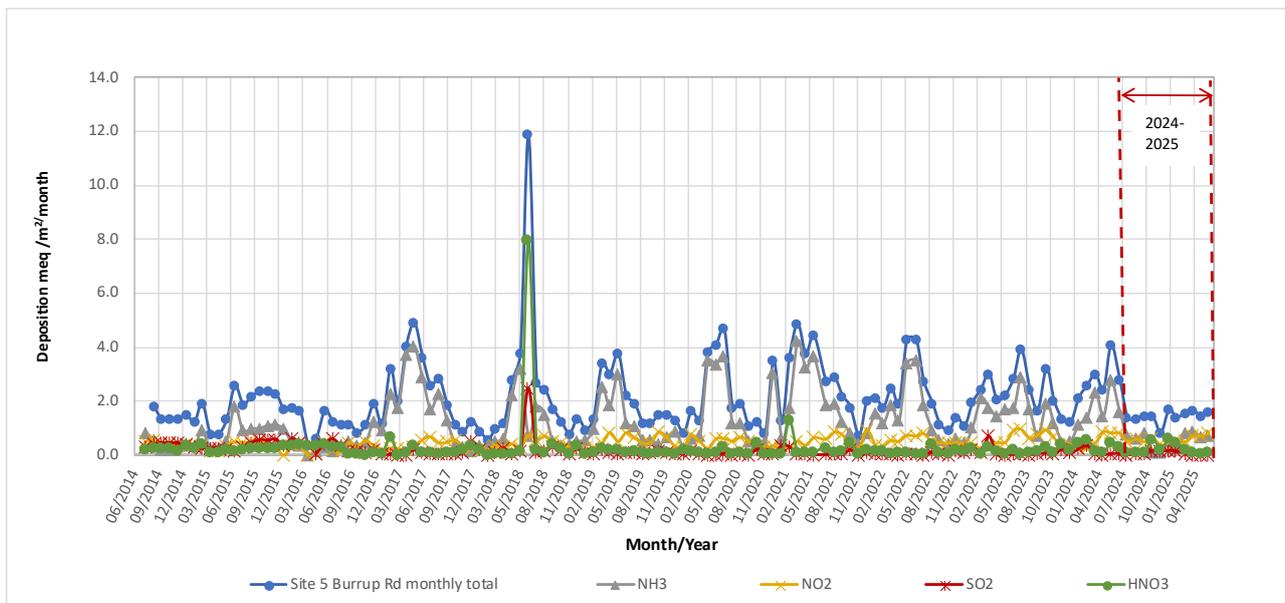


Figure 17: Monthly total and individual gas dry deposition rates – Burrup Road

The monthly rolling annual deposition at the Water Tanks and Hearson Cove sites continued to remain below the investigation level throughout the monitoring period (Figure 18 and Figure 19).

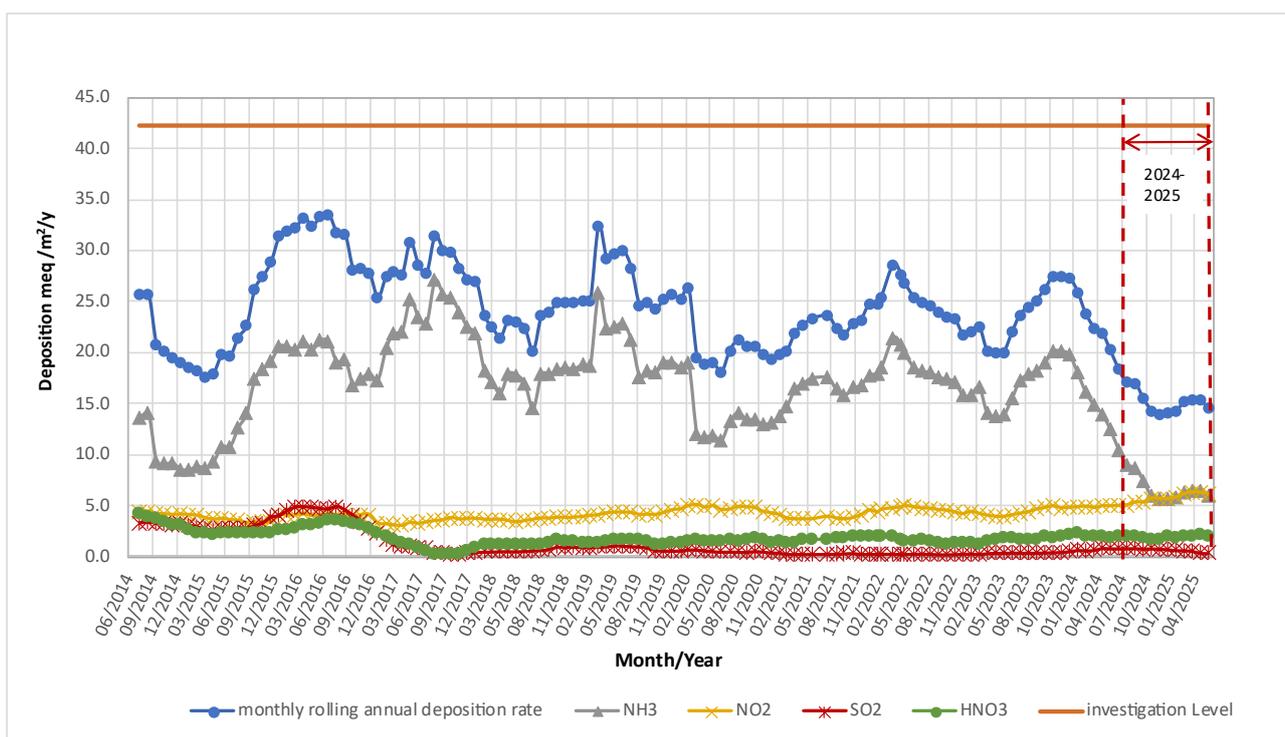


Figure 18: Monthly rolling annual total and individual gas dry deposition rates – Water Tanks

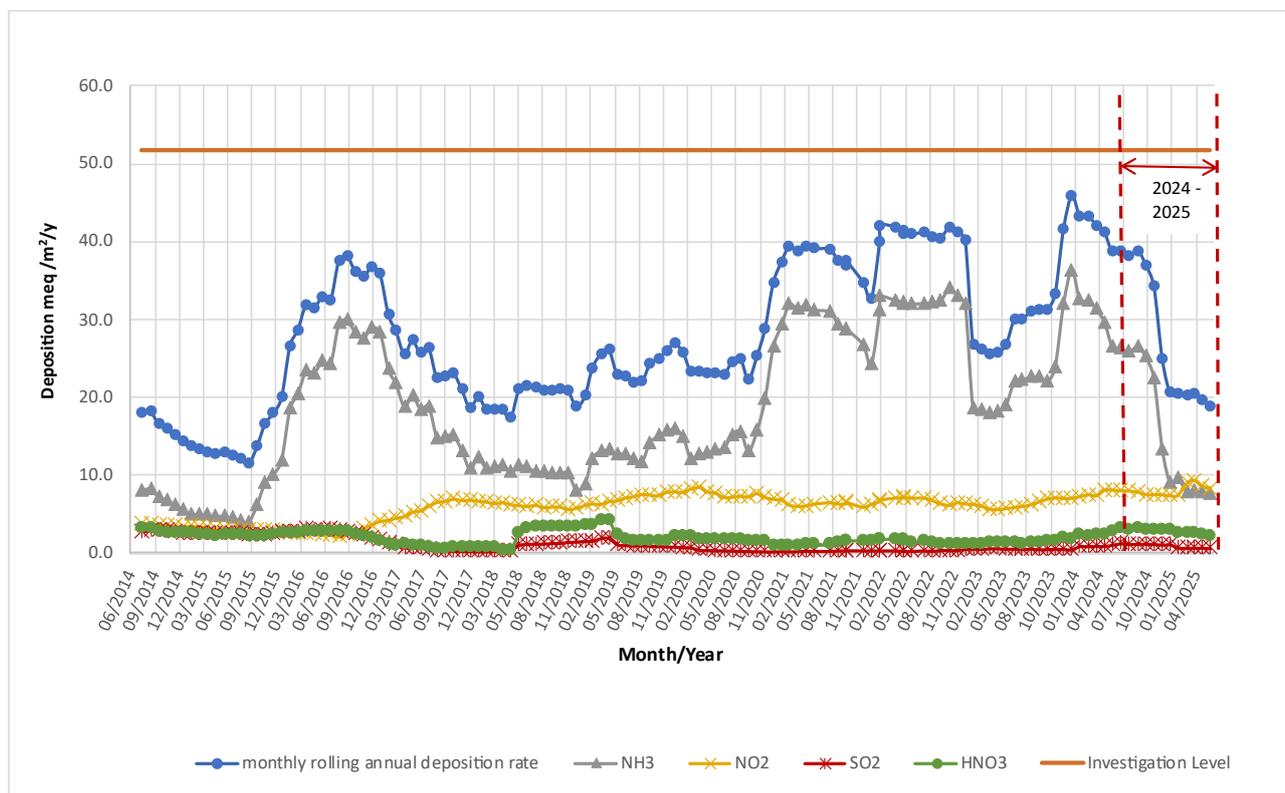


Figure 19: Monthly rolling annual total and individual gas dry deposition rates – Hearson Cove

Key findings from the investigation into the deposition rates exceeding the investigation level at Burrup Road are summarised in Table 13.

Table 13: Findings from investigation into elevated deposition rates

Factor	Investigation	Finding	Comment
Contributions from individual gases	Individual contributions examined to identify the gases responsible for increase in deposition rate compared to baseline	Deposition dominated by NH ₃ at all sites. Burrup Road: Actual deposition rates recorded during the 2024-2025 monitoring period were well within the range detected in previous monitoring periods. However, the rolling average in the first half of the year includes elevated NH ₃ levels from the previous monitoring period (see Figure 17).	It was determined for the preceding monitoring period that it was not possible to determine any correlation of NH ₃ emissions from that TAN Plant sources with the ambient concentrations and deposition rates. Variation in NH ₃ deposition, resulting in an increase in rolling annual deposition above the investigation level during the previous monitoring period and during the start of the current monitoring period, may have been due to sources other than TAN Plant emissions. The Ammonia Plant operated at continuous steady state for the duration of the current reporting period.

Factor	Investigation	Finding	Comment
TAN Plant operations	TAN Plant availability and emissions monitoring reviewed to determine any plant operating conditions that could have led to elevated emissions from the Nitric Acid Plant stack emissions or other sources associated with the facility.	<p>The TAN Plant was operating under steady state for most (84%) of the monitoring period.</p> <p>Elevated NH₃ emissions exceeding regulatory limits (Licence L9223/2019/1)¹ were recorded by continuous monitoring at the Nitric Acid Plant on 2 February 2025 at 11AM (2.19 mg/m³) and 12PM (2.4 mg/m³). This fortnightly monitoring period reported the highest 15-day ammonia concentration of the 2024-2025 monitoring period.</p> <p>However, the concentration was within historical levels and did not contribute to the exceedance of the investigation levels.</p>	Preliminary review of available data determined ammonia deposition above the annual investigation level was attributable to contribution of elevated ammonia levels in the previous monitoring period.

6. Concluding Remarks

Monitoring data are reported for all parameters specified in EPBC Act approval (2008/4546 as varied 24 March 2020).

Analysis of data for gases shows that:

- The average NH₃ concentrations at the Water Tanks site were found to be statistically significantly different (lower) to the baseline;
- The average NH₃ concentrations at the Burrup Road and Hearson Cove sites were equivalent and lower than baseline, respectively, but the difference was not statistically significant;
- The average NO₂ concentrations were not found to be statistically significant at the Hearson Cove site but were significantly higher at the Burrup Road and Water Tanks sites;
- The average SO₂ concentrations at all three monitoring sites were lower than the baseline concentrations, with differences in the averages being statistically significant; and

The TAN Plant was operating at steady state for 84% of the 2024-2025 monitoring period. Five plant startups occurred in the monitoring period during which potentially higher NH₃ emissions may occur; however, these did not correlate with elevated ambient concentrations.

Overall, there is no evidence from the monitoring conducted during 2024-2025 that operation of the TAN Plant has resulted in significant increases in NO₂ NH₃ or SO₂ levels over the monitoring period.

Analysis of annual dry deposition rates of gas species shows that:

- Dry deposition rates were within the range determined for previous monitoring periods;

¹ [12534_L9223-2019-1_L.pdf](#)

- The annual dry deposition rate for the 2024-2025 monitoring period was below the investigation level derived from baseline measurements for the Water Tanks and Hearson Cove sites;
- The Burrup Road site rolling annual dry deposition rate was above the investigation level derived from baseline measurements for the first half of the year due to contribution from the preceding period; and
- NH₃ is the dominant contributor to dry deposition at all monitoring sites.

Analysis of the TSP data shows that:

- Concentrations of TSP measured in the 2024-2025 monitoring period continue to be comparable across the three monitoring sites suggesting they are reflective of airshed background concentrations as seen in previous reporting periods;
- Average TSP concentrations at all three monitoring sites were reduced when compared to the results from the previous monitoring period, which were elevated compared to monitoring carried out since 2017; and
- There is no evidence to show that the operation of the TAN Plant resulted in a significant increase in ambient TSP concentrations in the 2024-2025 monitoring period.

Analysis of dust deposition data shows that:

- Average insoluble deposition rates within previous levels were observed at the Hearson Cove and Burrup Road sites;
- Average insoluble deposition rates at the Water Tanks site were elevated compared to historical monitoring results; however, this was influenced by one very high sample that did not align with results from other sites;
- Average insoluble deposition was not statistically significantly different to those concentrations measured in the Baseline Air Quality Monitoring at any of the three monitoring sites;
- The soluble fraction of the deposited dust from the 2024-2025 monitoring period was within the range of previous monitoring periods for all sites; and
- There is no evidence to suggest that the operation of the TAN Plant has resulted in materially significant increases in insoluble dust deposition rates.

7. References

- Strategen (2018). *Yara Pilbara Nitrates, EPBC Approval 2008/4546*. Ambient air quality report 2017-2018. Document 650-200-rep-sec-0004, issued October 2018.
- Strategen-JBS&G (2019). *Yara Pilbara Nitrates, EPBC Approval 2008/4546*. Ambient air quality report 2018-2019. Document 650-200-rep-sec-0006, issued October 2019.
- Strategen-JBS&G (2020). *Yara Pilbara Nitrates, EPBC Approval 2008/4546*. Ambient air quality report 2019-2020. 650-200-rep-sec-0007, issued October 2020.
- Strategen-JBS&G (2021). *Yara Pilbara Nitrates, EPBC Approval 2008/4546*. Ambient air quality report 2020-2021. 650-200-rep-sec-0007, issued October 2021.
- Strategen-JBS&G (2022). *Yara Pilbara Nitrates, EPBC Approval 2008/4546*. Ambient air quality report 2021-2022. 650-200-rep-sec-0007, issued October 2022.
- JBS&G (2023). *Yara Pilbara Nitrates, EPBC Approval 2008/4546*. Ambient air quality report 2022-2023. 650-200-rep-sec-0007, issued October 2023.
- JBS&G (2024). *Yara Pilbara Nitrates, EPBC Approval 2008/4546*. Ambient air quality report 2023-2024. 650-200-rep-sec-0007, issued October 2024.
- YPN (2017). *Yara Pilbara Nitrates, EPBC Approval 2008/4546. Baseline Air Quality Monitoring Report*. Document 250-200-rep-ypf-0002, issued 16 June 2017, updated 24 March 2020.

8. Limitations

Scope of services

This report (“the report”) has been prepared by JBS&G in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and JBS&G. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

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Environmental conclusions

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Appendix A Results from Monitoring of Gases

Site	Date on	Date off	NH ₃ µg/m ³	NO ₂ µg/m ³	SO ₂ µg/m ³	HNO ₃ µg/m ³
Site 5 - Burrup Road	1/07/2024	16/07/2024	1.68	7.53	0.35	1.06
Site 5 - Burrup Road	16/07/2024	31/07/2024	0.54	6.23	0.19	0.65
Site 5 - Burrup Road	31/07/2024	14/08/2024	0.36	4.55	0.01	0.19
Site 5 - Burrup Road	14/08/2024	30/08/2024	0.67	4.21	0.10	0.27
Site 5 - Burrup Road	30/08/2024	17/09/2024	0.37	6.18	0.20	0.32
Site 5 - Burrup Road	17/09/2024	1/10/2024	0.40	2.98	0.09	0.21
Site 5 - Burrup Road	1/10/2024	16/10/2024	0.73	3.50	0.06	0.00
Site 5 - Burrup Road	16/10/2024	31/10/2024	0.37	5.08	0.43	0.47
Site 5 - Burrup Road	31/10/2024	15/11/2024	0.06	7.14	0.49	1.07
Site 5 - Burrup Road	15/11/2024	2/12/2024	0.05	3.07	0.84	1.78
Site 5 - Burrup Road	2/12/2024	16/12/2024	0.06	2.38	1.04	0.89
Site 5 - Burrup Road	16/12/2024	31/12/2024	0.06	4.35	0.12	0.38
Site 5 - Burrup Road	31/12/2024	15/01/2025	0.20	4.52	1.10	2.89
Site 5 - Burrup Road	15/01/2025	31/01/2025	0.39	3.26	0.33	0.26
Site 5 - Burrup Road	31/01/2025	12/02/2025	0.25	4.48	1.19	2.51
Site 5 - Burrup Road	17/02/2025	4/03/2025	0.16	5.44	0.22	0.31
Site 5 - Burrup Road	4/03/2025	18/03/2025	0.50	5.28	0.44	0.70
Site 5 - Burrup Road	18/03/2025	2/04/2025	0.64	3.52	0.15	0.47
Site 5 - Burrup Road	2/04/2025	16/04/2025	0.32	5.44	0.08	0.28
Site 5 - Burrup Road	16/04/2025	1/05/2025	0.87	6.86	0.05	0.16
Site 5 - Burrup Road	1/05/2025	16/05/2025	0.56	6.71	0.03	0.20
Site 5 - Burrup Road	16/05/2025	30/05/2025	0.37	5.62	0.03	0.17
Site 5 - Burrup Road	30/05/2025	13/06/2025	0.73	5.99	0.06	0.30
Site 5 - Burrup Road	13/06/2025	1/07/2025	0.23	6.75	0.05	0.19
Site 6 - Water Tanks	1/07/2024	16/07/2024	0.18	6.65	0.09	0.37
Site 6 - Water Tanks	16/07/2024	31/07/2024	0.13	2.51	0.02	0.15
Site 6 - Water Tanks	31/07/2024	14/08/2024	0.24	4.08	0.24	0.96
Site 6 - Water Tanks	14/08/2024	30/08/2024	0.42	4.03	0.02	0.14
Site 6 - Water Tanks	30/08/2024	17/09/2024	0.34	11.86	0.08	0.32
Site 6 - Water Tanks	17/09/2024	1/10/2024	0.38	1.93	0.19	0.11
Site 6 - Water Tanks	1/10/2024	16/10/2024	0.57	4.97	0.05	0.05
Site 6 - Water Tanks	16/10/2024	31/10/2024	0.38	6.00	0.15	0.31
Site 6 - Water Tanks	31/10/2024	15/11/2024	0.31	13.02	0.52	0.44
Site 6 - Water Tanks	15/11/2024	2/12/2024	0.08	2.61	0.07	0.07
Site 6 - Water Tanks	2/12/2024	16/12/2024	0.06	2.46	0.19	0.40
Site 6 - Water Tanks	16/12/2024	31/12/2024	0.35	2.35	0.36	0.71
Site 6 - Water Tanks	31/12/2024	15/01/2025	0.31	3.32	0.30	1.77
Site 6 - Water Tanks	15/01/2025	31/01/2025	0.60	2.36	0.09	0.14

Site	Date on	Date off	NH ₃ µg/m ³	NO ₂ µg/m ³	SO ₂ µg/m ³	HNO ₃ µg/m ³
Site 6 - Water Tanks	31/01/2025	12/02/2025	0.43	2.95	0.17	0.29
Site 6 - Water Tanks	17/02/2025	4/03/2025	0.55	4.06	0.30	0.59
Site 6 - Water Tanks	4/03/2025	18/03/2025	0.81	9.36	0.20	1.14
Site 6 - Water Tanks	18/03/2025	2/04/2025	0.58	2.42	0.12	0.44
Site 6 - Water Tanks	2/04/2025	16/04/2025	0.33	2.61	0.09	0.92
Site 6 - Water Tanks	16/04/2025	1/05/2025	0.56	3.08	0.14	0.84
Site 6 - Water Tanks	1/05/2025	16/05/2025	0.40	4.23	0.07	0.56
Site 6 - Water Tanks	16/05/2025	30/05/2025	0.06	2.08	0.08	0.30
Site 6 - Water Tanks	30/05/2025	13/06/2025	0.09	1.84	0.03	0.10
Site 6 - Water Tanks	13/06/2025	1/07/2025	0.07	1.91	0.02	0.11
Site 7 - Hearson Cove	1/07/2024	16/07/2024	0.23	2.71	1.66	2.16
Site 7 - Hearson Cove	16/07/2024	31/07/2024	0.08	2.15	0.11	0.33
Site 7 - Hearson Cove	31/07/2024	14/08/2024	0.09	2.74	0.09	0.37
Site 7 - Hearson Cove	14/08/2024	30/08/2024	0.65	2.41	0.01	0.07
Site 7 - Hearson Cove	30/08/2024	17/09/2024	0.27	3.25	0.20	0.32
Site 7 - Hearson Cove	17/09/2024	1/10/2024	1.42	1.88	0.34	0.90
Site 7 - Hearson Cove	1/10/2024	16/10/2024	0.23	2.39	0.08	0.05
Site 7 - Hearson Cove	16/10/2024	31/10/2024	0.28	3.26	0.11	0.24
Site 7 - Hearson Cove	31/10/2024	15/11/2024	0.06	3.95	0.07	0.18
Site 7 - Hearson Cove	15/11/2024	2/12/2024	0.07	2.39	0.09	0.17
Site 7 - Hearson Cove	2/12/2024	16/12/2024	0.32	2.48	0.51	1.10
Site 7 - Hearson Cove	16/12/2024	31/12/2024	0.30	2.30	0.12	0.48
Site 7 - Hearson Cove	31/12/2024	15/01/2025	0.73	2.07	0.12	0.24
Site 7 - Hearson Cove	15/01/2025	31/01/2025	1.41	2.11	0.38	0.44
Site 7 - Hearson Cove	31/01/2025	12/02/2025	1.83	2.21	0.17	0.49
Site 7 - Hearson Cove	17/02/2025	4/03/2025	0.66	3.20	0.12	0.40
Site 7 - Hearson Cove	4/03/2025	18/03/2025	0.84	3.15	0.13	0.54
Site 7 - Hearson Cove	18/03/2025	2/04/2025	0.49	15.24	0.15	0.73
Site 7 - Hearson Cove	2/04/2025	16/04/2025	0.40	2.53	0.19	0.45
Site 7 - Hearson Cove	16/04/2025	1/05/2025	0.34	2.18	0.17	0.49
Site 7 - Hearson Cove	1/05/2025	16/05/2025	0.06	1.58	0.14	0.20
Site 7 - Hearson Cove	16/05/2025	30/05/2025	0.06	1.91	0.15	0.23
Site 7 - Hearson Cove	30/05/2025	13/06/2025	0.06	0.92	0.70	0.57
Site 7 - Hearson Cove	13/06/2025	1/07/2025	0.05	1.52	0.11	0.29

Appendix B Results from Monitoring of TSP

Period start date	Site 5 - Burrup Road TSP $\mu\text{g}/\text{m}^3$	Site 6 - Water Tanks TSP $\mu\text{g}/\text{m}^3$	Site 7 – Hearson Cove TSP $\mu\text{g}/\text{m}^3$
5/07/2024	21	22	21
11/07/2024	22	15	12
17/07/2024	20	26	25
23/07/2024	24	17	14
29/07/2024	21	8	13
4/08/2024	10	8	5
10/08/2024	22	16	4
16/08/2024	22	20	9
22/08/2024	17	12	15
28/08/2024	34	28	16
3/09/2024	34	35	33
9/09/2024	18	13	18
15/09/2024	16	17	17
21/09/2024	56	23	26
27/09/2024	21	24	30
3/10/2024	20	24	30
9/10/2024	34	33	24
15/10/2024	35	28	36
21/10/2024	35	37	36
27/10/2024	34	27	29
2/11/2024	-	48	43
8/11/2024	45	51	41
14/11/2024	38	43	35
20/11/2024	40	40	43
26/11/2024	81	64	44
2/12/2024	42	42	39
8/12/2024	54	57	56
14/12/2024	21	20	23
20/12/2024	38	32	35
26/12/2024	61	59	54
1/01/2025	-	-	20
7/01/2025	39	43	35
13/01/2025	18	16	-
19/01/2025	-	-	-
25/01/2025	51	49	43
31/01/2025	42	58	21
6/02/2025	29	35	26
12/02/2025	-	-	-
18/02/2025	62	-	60

Period start date	Site 5 - Burrup Road TSP $\mu\text{g}/\text{m}^3$	Site 6 - Water Tanks TSP $\mu\text{g}/\text{m}^3$	Site 7 – Hearson Cove TSP $\mu\text{g}/\text{m}^3$
24/02/2025	22	20	20
2/03/2025	44	39	41
8/03/2025	64	55	60
14/03/2025	19	14	17
20/03/2025	34	29	23
26/03/2025	22	19	17
1/04/2025	26	35	25
7/04/2025	23	21	16
13/04/2025	19	21	20
19/04/2025	24	27	25
25/04/2025	26	26	22
1/05/2025	19	22	24
7/05/2025	21	5	17
13/05/2025	18	22	20
19/05/2025	19	21	22
25/05/2025	33	25	23
31/05/2025	20	31	23
6/06/2025	-	27	23
12/06/2025	-	33	39
18/06/2025	31	32	26
24/06/2025	28	-	30
30/06/2025	33	-	38

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